



ALMARAZ  
TRILLO

# 20 21

CNAT  
ANNUAL  
REPORT



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# ALMARAZ (UI-UII)

## TECHNICAL CHARACTERISTICS:

### Reactor Type:

Pressurised Water Reactor (PWR)

### Supplier:

Westinghouse

### Thermal Power:

2.947 MWt (U-I) - 2.947 MWt (U-II)

### Fuel:

Enriched Uranium Dioxide (UO<sub>2</sub>)

No. of fuel elements: 157

### Gross Electrical Power:

1,049.43 MWe (U-I) - 1,044.45 MWe (U-II)

### Net Electrical Power:

1,011.30 MWe (U-I) - 1,005.83 MWe (U-II)

### Cooling:

Open Circuit. Arrocampo Reservoir

## OWNERS:

Iberdrola Generación Nuclear, S.A.U.

**(52,687%)**

Endesa Generación, S.A.U.

**(36,021%)**

Naturgy Generación S.L.U.

**(11,292%)**

## LOCATION:

Almaraz (Cáceres)

## START OF COMMERCIAL OPERATION:

1 September 1983 (U-I)

1 July 1984 (U-II)

## OPERATING AUTHORISATION IN FORCE:

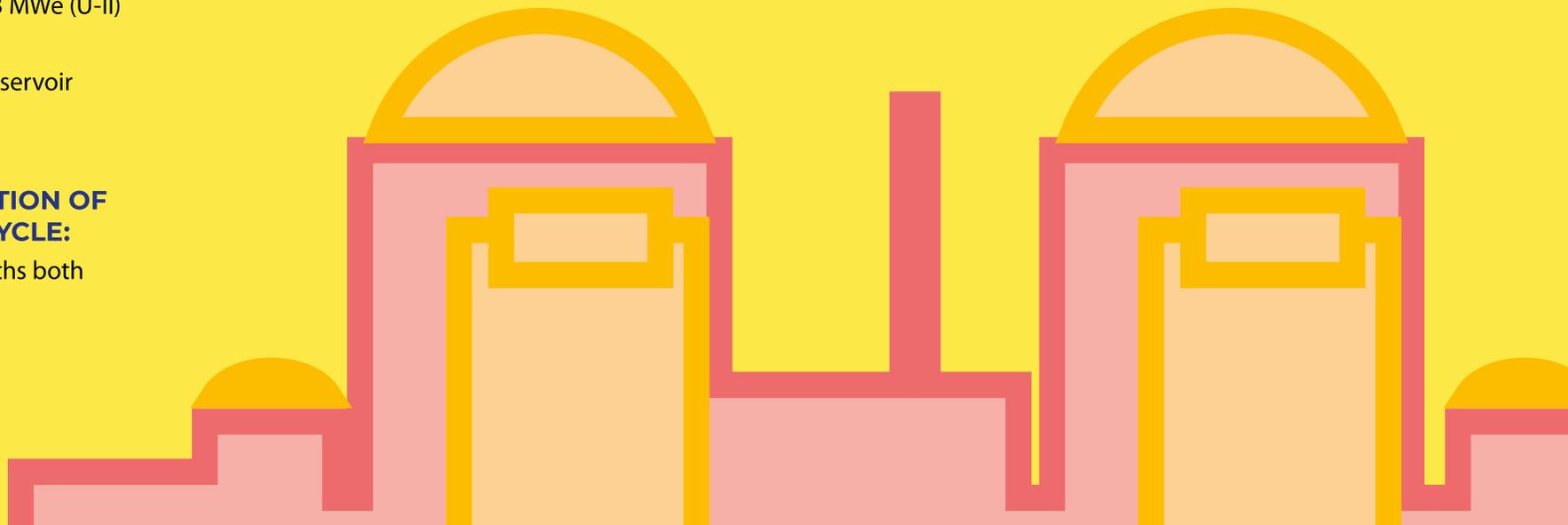
UI - 24/07/2020 for a period of 7 years

UII - 24/07/2020 for a period of 8 years



## DURATION OF THE CYCLE:

18 months both units



# TRILLO

## TECHNICAL CHARACTERISTICS:

**Reactor Type:**

Pressurised Water Reactor (PWR)

**Supplier:**

KWU

**Thermal Power:**

3.010 MWt

**Fuel:**

Enriched Uranium Dioxide (UO<sub>2</sub>)

No. of fuel elements: 177

**Gross Electrical Power:**

1,066 MWe

**Net Electrical Power:**

1,003 MWe

**Cooling:**

Natural Draft Towers (Tagus River)

## OWNERS:

Iberdrola Generación Nuclear, S.A.U.

**(49%)**

Naturgy Generación S.L.U.

**(34,5%)**

Iberenergía, S.A.U.

**(15,5%)**

Endesa Generación, S.A.U.

**(1%)**

## LOCATION:

Trillo (Guadalajara)

## START OF COMMERCIAL OPERATION:

6 August 1988

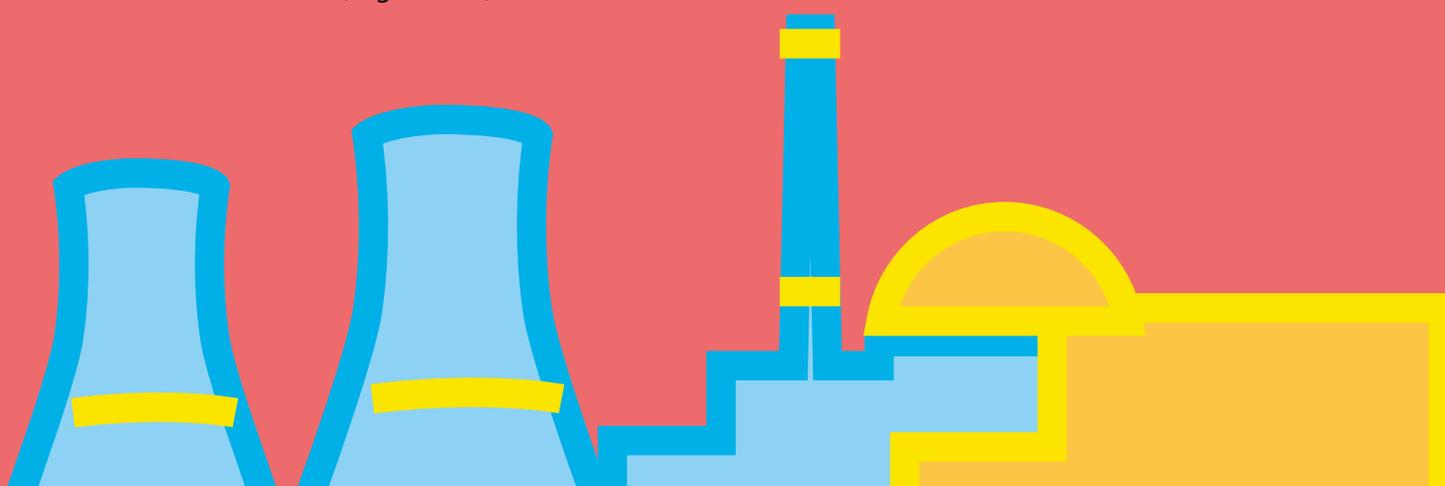
## OPERATING AUTHORISATION IN FORCE:

117/11/2014 for a period of 10 years



## DURATION OF THE CYCLE:

12 months



# SUMMARY OF THE YEAR

Our Power Plants have been operating stably during 2021, a year once again marked by the pandemic caused by COVID 19 which, once again, highlighted our essential role in ensuring the generation of electricity to the country along the state of alert, which has maintained life and activity in homes, healthcare centres and companies. We have adapted our COVID 19 Plan to the health circumstances to protect the health of workers while ensuring the safe and reliable operation of our plants. Proof of this commitment is, for example, the more than 25,000 antigen tests carried out on CNAT personnel as well as personnel who have visited our plants.

In 2021, the gross electricity production of the Almaraz and Trillo nuclear power plants totalled 23,766 GWh (15,837.67 GWh from Almaraz and 7,929.1 GWh from Trillo), representing 42% of the energy generated by the Spanish nuclear fleet and 10% of the national total. Nuclear energy was the second most important energy source contributing 21% of the total to the Spanish generation system.

The year began by putting our protocols to the test in the face of extremely adverse weather conditions, such as the Filomena squall that blocked a large part of the country in the first days of January. Thanks to the operation strategy put in place, our plants, especially the Trillo plant, operated normally without any incidents of material or personal damage.

It is also worth highlighting CNAT's firm commitment to Occupational Risk Prevention, materialised in the A-ZERO Plan with the aim of achieving ZERO occupational accidents. The organisation's efforts have been very important and a cultural change has been perceived in terms of personal safety. During 2021, an improvement in the overall accident rate has been achieved, having reached, for example at Almaraz NPP, the best accumulated historical record of 865 days and more than 5.7 million hours worked without accidents with sick leave.

The Ministry for Ecological Transition and Demographic Challenge (MITERD) published the Ministerial Order that allows Trillo NPP to postpone two years the request for renewal of its Operation License. According to this, the application for renewal of the Trillo plant's authorisation can be submitted together with the submission of the Periodic Safety Review (PSR) of the facility, i.e. one year before the expiry of the current licence instead of the three years initially considered.

May 1st marked the 40th anniversary of the first coupling to the national electricity grid of Almaraz NPP, Unit 1, placing it among the best nuclear power plants in the world after 4 decades of operation.

This year we faced the challenge of carrying out three refuelling outages: the XXXIII of Trillo NPP, XXVIII of Unit I of CNA and XXVI of Unit II of CNA . During these periods, the safety and prevention measures put in place since the beginning of the pandemic were reinforced to minimise the risk of contagion and ensure the execution of the work, guaranteeing the health of all workers.

WANO's Corporate Peer Review concluded on 2 December. A mission in which an external and independent team of 11 international experts from the nuclear industry evaluated the areas of Corporate Leadership, Corporate Governance, Corporate Oversight and Control, Corporate Independent Oversight, Organisational Effectiveness, Human Resources and Corporate Leadership and Communication. The evaluation team identified both, the A-ZERO Plan Leadership and the TALENT programme.



# MILESTONES 2021



## JANUARY

Filomena puts our protocols for severe weather to the test



## MARCH

XXVI refuelling outage of Almaraz NPP Unit II  
Almaraz NPP **585** days without accidents implying sick leave



## APRIL

CNAT commemorates the World Day for Safety and Health at Work  
Trillo NPP reaches **1 million** hours without accidents implying sick leave



## MAY

XXXIII refuelling outage of Trillo NPP  
**40** years since the first connection of Almaraz NPP Unit I to the national grid



## JUNE

Trillo NPP Future Plan is launched



## NOVEMBER

XXVIII refuelling outage of Unit I of the Almaraz NPP  
MITERD publishes the Ministerial Order allowing Trillo NPP to delay two years the application for the renewal of its Operational Licence.

Annual In-site Emergency Drill at Trillo NPP.

Almaraz and Trillo's Information Committees.

## OCTOBER

Annual In-site Emergency Drill at Almaraz NPP



## SEPTEMBER

The Almaraz power plant carries out an emergency response exercise with the Military Emergency Unit (UME).



## DECEMBER

Ending WANOS's *Corporate Peer Review*

CNA records 865 days and more than **5.7 million** hours worked without seek-leaf accidents.



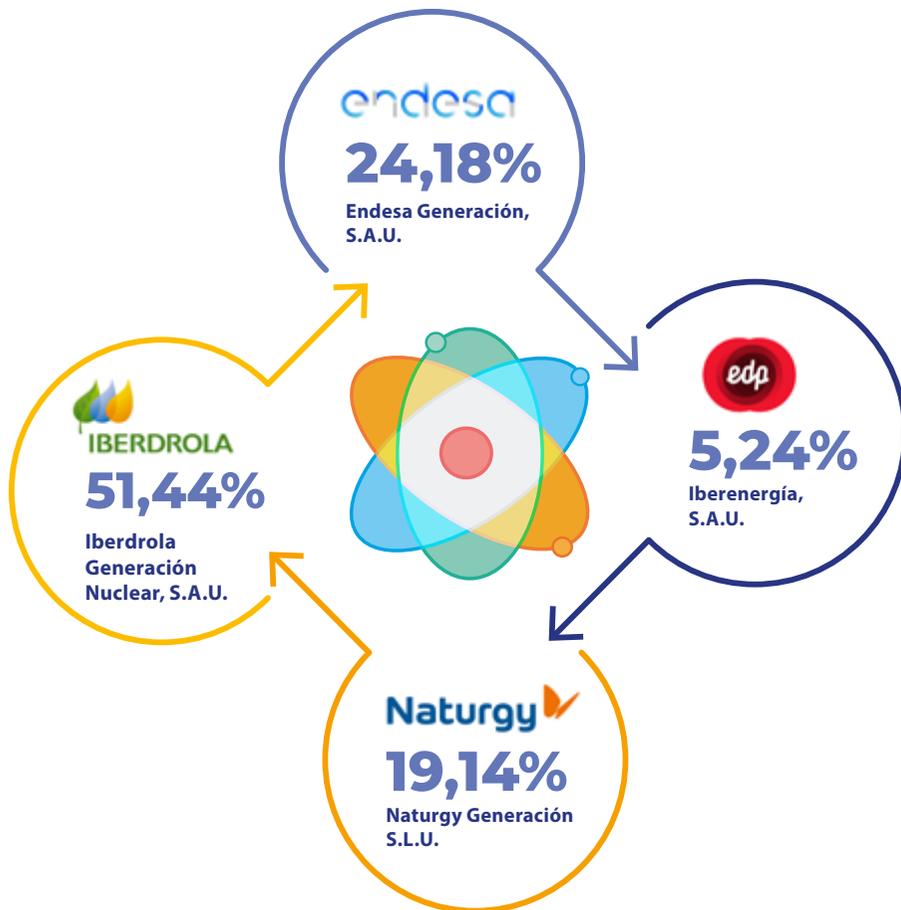
## AUGUST

Almaraz NPP **2** years without accidents implying sick leave

# CNAT PROFILE

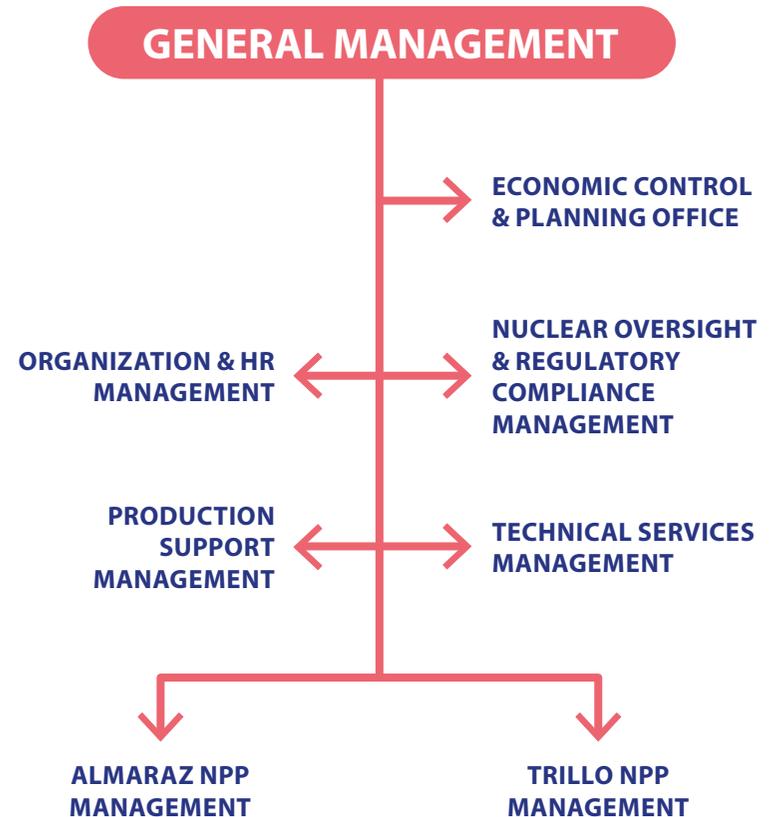
## Owner Companies

The participation of the companies owning the Almaraz and Trillo Nuclear Power Plants and of the installed capacity of both plants is as follows:



## Organisational Structure

The organisational chart reflects the organisational structure of the Economic Interest Group A.I.E. Centrales Nucleares Almaraz-Trillo:



# MISSION, VISION, STRATEGIC PILLARS

The mission of Centrales Nucleares Almaraz-Trillo is to produce electricity in a safe, reliable, economic and environmentally friendly manner, guaranteeing long-term production through the optimal operation of the Almaraz and Trillo power plants.

Our Vision aims to place the Almaraz and Trillo plants among the benchmark plants in terms of safety, quality and costs, by means of a management model in which the development and participation of involved persons makes it possible to achieve higher levels of safety, productivity and efficiency.

In order to achieve its Mission and advance towards the horizon established by its Vision, Almaraz-Trillo Nuclear Power Plants develops its strategy around the following strategic pillars:



# ACTIVITY REPORT

## Operation

### Almaraz power plant

The gross production generated between the two units of the Almaraz NPP at the end of 2021 was 15,837.67 GWh and the joint net production was 15,222.75 GWh. The gross electricity production corresponding to Unit I was 8,008.86 GWh and that corresponding to Unit II was 7,828.81 GWh. The Almaraz plant has an accumulated gross electricity production at origin of 577,364.97 GWh (290,416.67 GWh from UI and 286,948.79 GWh from UII).

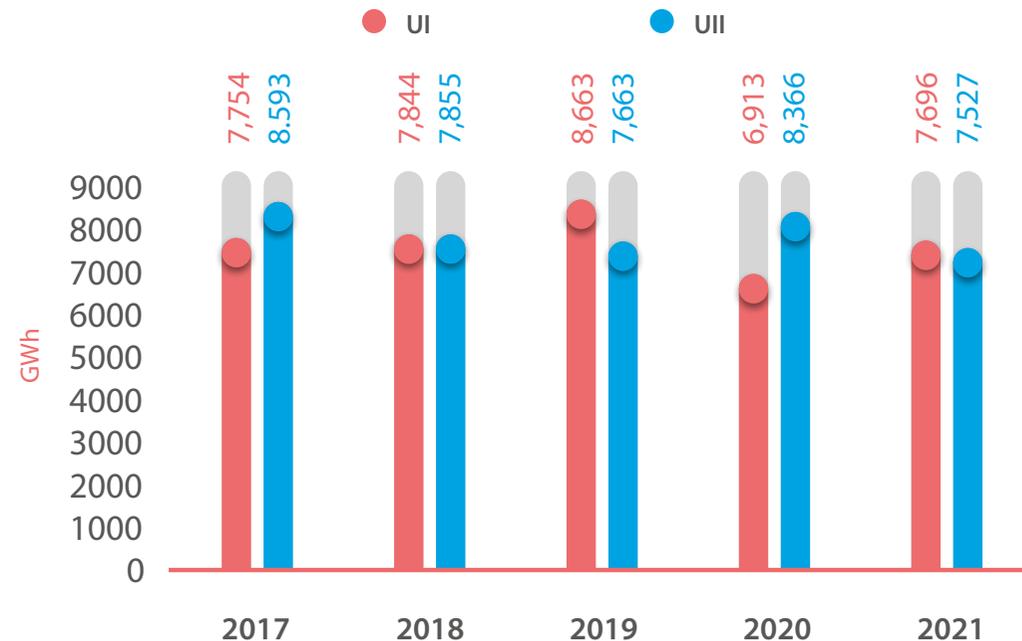
Unit I has been operating stably with the exception of the beginning of February, when the load was lowered to 65% at the request of the Central Generation Dispatch (grid operator) for flexible operation. The 28th refuelling cycle began on 22 November and ended on 9 January 2022. In this last cycle, the U-I achieved its second best record with 513 days of uninterrupted coupling to the national grid. Furthermore, May 1st marked the 40th anniversary of the first coupling to the national grid, placing CNA, after 4 decades of operation, among the best nuclear power plants in the world.

Unit II has been operating stably until the beginning of February, when the load was reduced to 75% at the request of the Central Generation Dispatch for Flexible Operation. On 13th March the 26th refuelling was started until 24th April (42 days), reaching 100% power on 6th May. In addition, there was an automatic shutdown of the reactor on July 8th as a result of a ground signal that caused a circuit breaker to open, and the reactor was re-coupled to the electrical grid the following day.

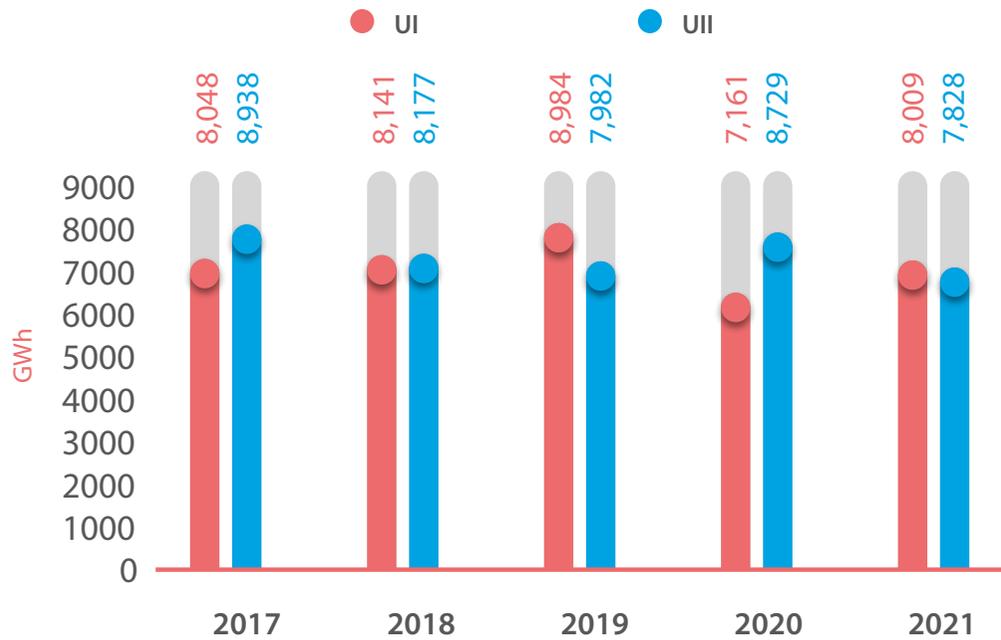
In 2021 the Almaraz nuclear power plant reported 4 within reportable events (2 in each Unit) to the Spanish Regulator (CSN). The annual drill of the Site Emergency

Plan (SEP) was carried out on 21st October, an exercise that was carried out taking into account the measures established as a result of the pandemic caused by Covid-19.

### ALMARAZ NPP UI+UII NET PRODUCTION



### ALMARAZ NPP UI+UII GROSS PRODUCTION



## Trillo NPP

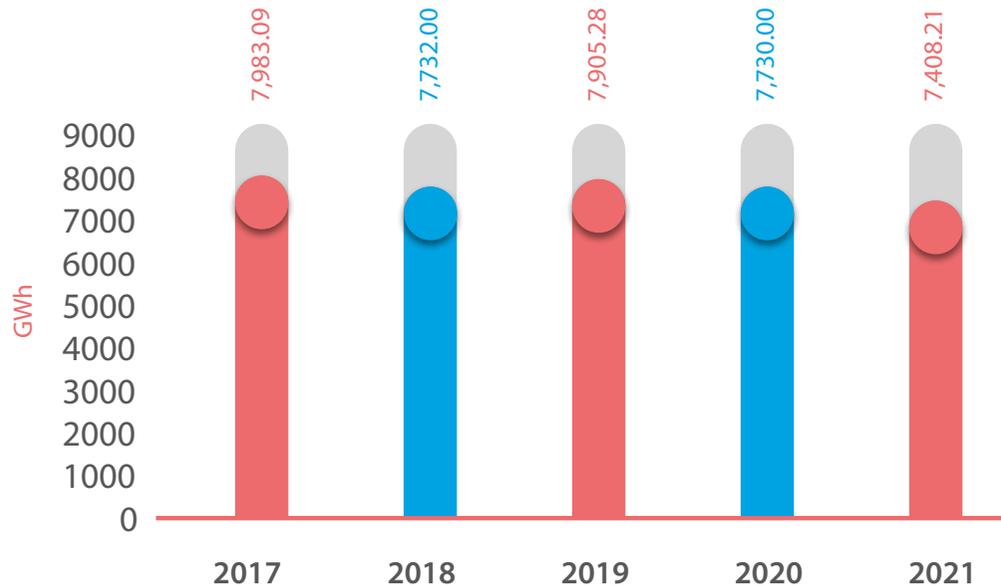
During 2021, the Trillo nuclear power plant generated 7,929.1 GWh of gross electricity and 7,408.2 GWh of net electricity. It has an accumulated gross electricity production since the start of commercial operation of 271,953.9 GWh, with a total of 260,589.6 hours coupled to the grid.

The Trillo Nuclear Power Plant has operated in a stable manner throughout the year, except on 30th January and 1st February, when, at the request of the Grid Operator, the load was lowered due to flexible operation purposes; from 16th to 27th February the plant was shut down for the repair of a valve (TF30S014), and on 16th May the reactor was shut down for the repair of the AT02 transformer.

Refuelling outage R433 fuel began on 18 May at 07:00 hours. During the month of June, the plant continued the shut down for its refuelling outage until the 23rd day, and has been operating at 100% power since June 26th.

In 2021 the Trillo Nuclear Power Plant reported 7 reportable events to the CSN. The annual In-site Emergency Plan (ISP) drill was carried out on 18th November, which began with simulation of a major earthquake that led to the loss of off-site electricity supply, following which a fire was declared that required off-site support and the deployment of Fukushima equipment.

**TRILLO NPP**  
**NET PRODUCTION**



**TRILLO NPP**  
**GROSS PRODUCTION**



## Refuelling Outages

### Almaraz NPP

On 13 March, the 26th refuelling outage began on U-II, with a duration of 42 days, proceeding to the synchronisation to the electricity grid on 24 April at 21:47 hours. More than 13,500 maintenance activities were carried out during this refuelling outage, among the most important of which, in addition to the renewal of the fuel assemblies, are the following: Eddy current inspection of the three steam generators, ultrasonic inspection of the bottom of the vessel, overhaul of the seals of the three cooling pumps and inspection of the RCP2 bearing, replacement of three safety valves on the pressuriser, overhaul of the high pressure turbine stop valve, general overhaul of the main feedwater turbine-pump B, maintenance of turbine valves and replacement of the motor of the charging pump number 2, with the implementation of 23 design modifications linked to requirements and commitments to the Nuclear Safety Council (CSN).

On 22 November, the 28th refuelling outage of the U-I began with a duration of 48 days, extending until 9 January 2022. During this refuelling outage, more than 13,500 preventive maintenance activities were performed and 23 design modifications were implemented, most of them linked to requirements and commitments to the Nuclear Safety Council.

During these peak periods for the plant, more than 1,100 workers joined the plant in addition to the normal workforce, most of them from the municipalities in the immediate vicinity of the facility, and a large part of the protection measures against COVID-19 that had already been implemented during previous refuelling outages to protect people against the risk of contagion by coronavirus were maintained and reinforced.

### Trillo NPP

The thirty-third refuelling and general maintenance of Trillo NPP took place between 18 May and 23 June. It lasted 36.4 days. Some of the protocols of the previous year were maintained with respect to COVID19 , maintaining the staggered entry of personnel to the plant, the use of the established protections, the organisation of different shifts and work schedules, as well as the defined sanitation measures. In addition, the number of personnel in the plant was minimised so that no more than 800 people coincided, including staff, collaborating companies and additional workers.

To support the regular staff in the execution of the work, the services of more than forty specialised companies were used, employing more than a thousand workers, most of whom come from the area surrounding the plant.

The 4,105 activities carried out included the replacement of 40 fuel assemblies, eddy current tests inspection of the control rods, replacement of the main pump motor 10 for preventive maintenance, capacity test on redundancy batteries 1-5, electrical and mechanical revision of redundancy 4-8, replacement of the high pressure cooler TA11B001, inspections of valves for preventive maintenance on the turbine-group and of the integrity test of the containment enclosure.

## Radiation Safety and Protection

The operation of the facilities during the year 2021 has been carried out in a completely normal manner, without any significant incident affecting nuclear safety and radiation protection, either of the employees or of the environment of the plants.

In the case of Almaraz NPP, the collective dose of the personnel was 856.15 mSv per person for the two units overall, and at Trillo NPP the dose was 213.79 mSv per person. The results obtained from the measurements performed show that the dose of professionally exposed personnel is once again far below the legally established limits.



New permanent sealing ring for the cavity of Almaraz 1 NPP

## Technological Updating

During 2021, CNAT has continued with the planned investment plan framed within the process it has been carrying out in recent years to improve safety, as well as to maintain the availability of the plants by renewing their equipment suffering obsolescence.

### At the Almaraz Nuclear Power Plant

- Work has been carried out on the modernisation of structures and equipment:
  - » A new heliport has been built to allow the installation of the metering substation corresponding to the new Francisco Pizarro high-voltage line.
  - » Studies have been initiated on alternatives for a new single temporary storage facility with a capacity for the complete emptying of the two spent fuel pools (ATI-100).
  - » The permanent cavity seal ring (ASPC) has been installed in Unit 1.
  - » The RH and CS exchangers in Unit 1 have been replaced.
  - » The filtration units for the extraction of the dryers in the controlled area access building (CAF) have been replaced.
  - » Upgrading of lifting equipment has been carried out.
- In the electrical and I&C area, work has continued on upgrading:
  - » Phase 1 of the Medium Voltage Safety Electric Motor Renewal Plan (REMSE) has been completed.

- » The replacement of low voltage circuit breakers continues (the HFB model is replaced by HFD) and the medium voltage circuit breakers are replaced from the OTOMAX and NOVOMAX models to the new EMAX model.
- » The installation of the partial discharge measurement system for the 6.3 kV motors has been completed.
- » The modernisation of the Crossflow ultrasonic flow measurement system has been completed, improving its configuration for noise filtering.

## At the Trillo Nuclear Power Plant

- Work has been carried out on the modernisation of structures and equipment:
  - » The refurbishment of the Bitzer compressors in the ZX building has been completed.
  - » Work continues on the strategic plan for the renewal of diesel generators (engines and backup and emergency alternators), with a view to operating the plant until the end of its life.
  - » The TA11B001 changer has been replaced to improve reliability.
  - » Renewal of RS/UT Pumps (purchase of spare parts)
  - » The first of the new UF Pumps have been installed, due to obsolescence.
- In the electrical and I&C area, work has continued on upgrading:
  - » The voltage regulation and power stabilisation systems of the plant's main generator were modernised during the last R433 refuelling outage (2021).

- » The first phase of the 10 kV and 15 kV ring renewal project has been completed.
- » The designs have been finalised and the new generation switchgear has been stockpiled for replacement in the R434 refuelling outage (2022) due to the obsolescence of the current one.
- » The manufacture of a new single-phase armoured transformer has been initiated for the replacement of one of the main transformers currently in operation during the R435 refuelling outage (2023), thus restoring the availability of a spare equipment.
- » The H&B actuators modernisation project continues.



**New generation switchgear (Trillo NPP)**



Manufacture of a new single-phase armoured transformer (Trillo NPP)

- » Work continues on the packaging of electronic modules and of the purchase of additional stock.
- » The design of the new alternator monitoring system (GÜR) that will be replaced in the R434 refuelling outage (2022) has been finalised.
- » Modernisation work on the reactor limitation and protection system test computer (ERBUS) has been completed.
- » The control of the pressuriser sprinkler valves has been renewed.

The activities associated with security improvements include the following:

### At the Almaraz Nuclear Power Plant

- In 2021 the implementation of the improvement proposals included in the RPS related to the Renewal of the Operating Permit for Almaraz NPP was completed. Among these, following items stand out:
  - » Improvements to increase the available margin in the DC nuclear component cooling system (new exchanger cleaning system, replacement of HR and CS pump coolers) at Unit 1. Planned to be implemented at Unit 2 in 2022.
  - » The new passive seals for the primary pumps in both units. New automatic tripping logic has also been installed for these pumps to enable the operation of the passive seals.
- In 2021 and as part of the actions for the transition to the fire protection standard (NFPA 805), the installation of the design modifications has been completed, among which the following stand out:
  - » The installation of a dual supply pipe line for the containment fire-protection system and improvements to the hose stations in both units.

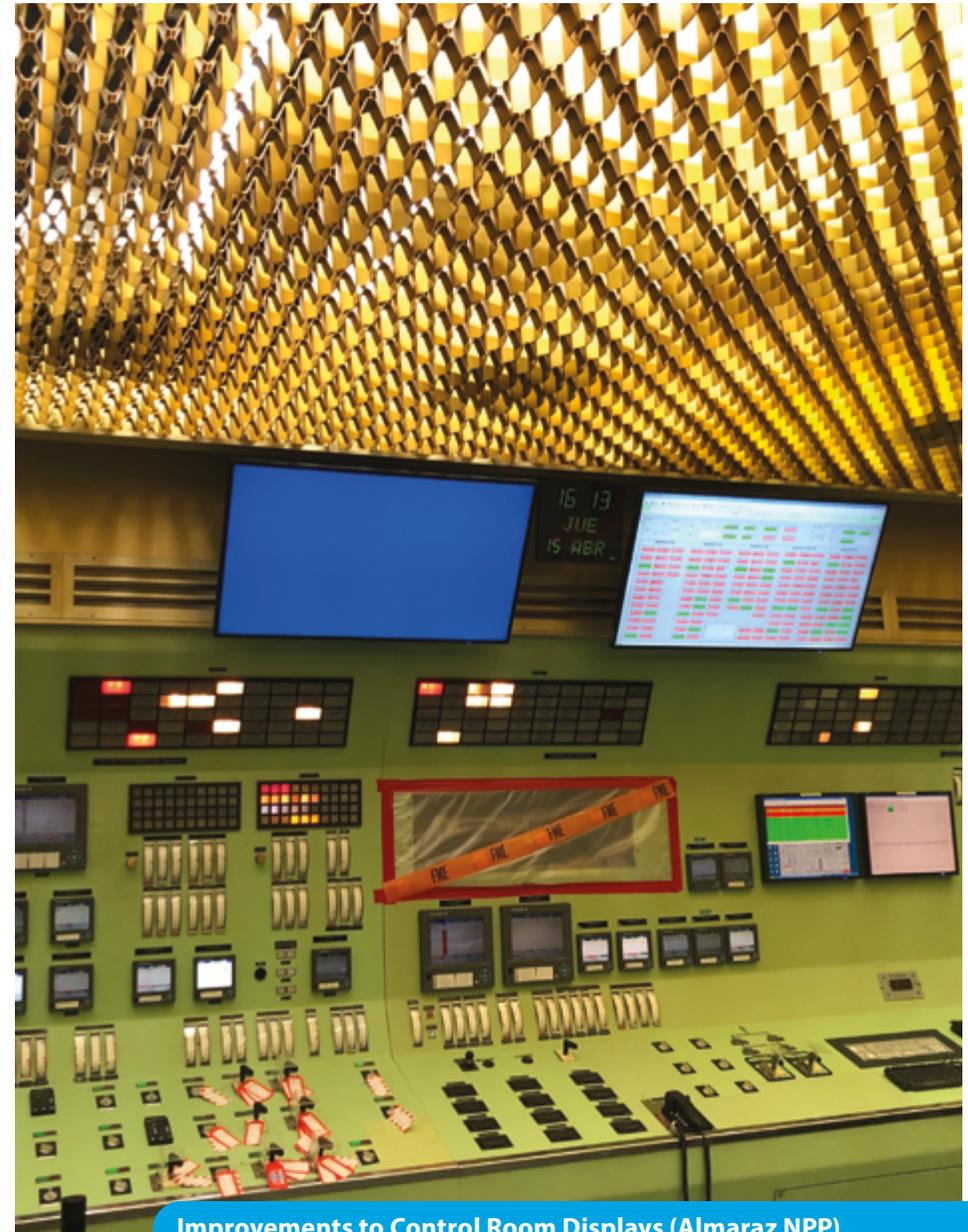
- » Design of improvements in Control Room screens for Fire Monitoring in both units.

## At the Trillo Nuclear Power Plant

- Work has continued on activities relating to the nuclear authority (CSN) Technical Instruction (derived from the requirements of GL2008-01), in relation to the prevention and elimination of the accumulation of gases in piping lines.
- The activities for compliance with ITC-14 of the Operating Permit (Adaptation of systems and equipment for testing to RG-1.140) have been completed.
- Work continued on adaptation to ATEX fire protection regulations.

## Common to both Power Plants

- Work has continued on the Seismic Characterisation of the plants (seismic CTI) project, with a view to obtaining the hazard curves required by the nuclear authority (CSN) in 2022.
- Within the framework of Long-Term Operation, worked on by the Nuclear Forum, progress continues on the actions deriving from lifetime management (LMO), and the Integrated Plan for the Assessment and Management of Ageing (PIEGE) has been already submitted to the CSN.
- Work has been carried out on the Environmental Qualification of Mechanical Equipment (CAEM).



Improvements to Control Room Displays (Almaraz NPP)

# Quality

At CNAT, quality is intrinsic to all its activities and is the main source of confidence for our owners, social environment, workers and collaborating companies. Since 1995, CNAT's commitment to quality has been recognised by the Spanish Association for Standardisation (AENOR) through the award of the official certificate, which accredits compliance of our Quality Management System with the UNE EN ISO 9001:2015 standard for the production of electricity from nuclear energy. In 2021, AENOR carried out a follow-up audit of the certification with a satisfactory result. We also comply with the quality standard of reference in the nuclear sector, the UNE 73401 on Quality Assurance in nuclear facilities, which is the basis of our Quality Assurance Manual, the requirements of which are permanently audited both internally by the Plant and Corporate Quality Assurance units, and externally by the Nuclear Safety Council (CSN).

We also voluntarily apply for international evaluations to assess the organisation's level of excellence. These include the WANO (World Association of Nuclear Operators) Peer Review. In November 2021, a WANO team of 11 international nuclear industry experts conducted an independent assessment of CNAT in which they evaluated the areas of Corporate Leadership, Governance, Corporate Oversight and Control, Corporate Independent Oversight, Organisational Effectiveness, Human Resources, and Corporate Leadership and Communication. They have identified strengths in the leadership of the A-ZERO plan (relating to industrial safety) and the TALENT programme (relating to professional development), as well as an area for improvement in relation to measuring the effectiveness of our improvement processes.

WANO Member Support Missions (MSM) are also requested, in which specific aspects are assessed with reference to industry best practices. In 2021, a MSM on Line Supervision took place at Trillo NPP, where recommendations for improvement in different areas were identified.

Continuous Improvement is part of CNAT's organisational culture, which is why we manage around 5,000 corrective and improvement actions every year, the

origin of which is both external evaluation and independent internal evaluation (Quality Assurance audits and inspections and specific evaluations and other Nuclear Supervision activities), as well as self-evaluation by the units themselves of their activities and processes. On the other hand, trend analysis of low-level incidents is performed, allowing for the identification of preventive actions to avoid incidents of greater relevance. In addition, we have a powerful system of indicators that allows us to monitor all our processes and activities.



Participants in Corporate Peer Review 2021

# ENVIRONMENT

## Quality Environmental Management

The commitment to respect for the environment of Centrales Nucleares Almaraz-Trillo is embodied in the organisation's Environmental Policy. The Environmental Policy drives the application of the Environmental Management System and the continuous improvement of its performance, reflecting the commitment of the Management and constituting the guiding principle from which the annual programmes of objectives and, in general, all the company's activities in relation to the Environment are derived.

## Environmental Policy

Centrales Nucleares Almaraz-Trillo's environmental policy has been defined in accordance with the purpose and context of the organisation, including the nature, magnitude and environmental impacts of its activities, products and services, constituting the guiding framework of the Environmental Management System and in which the environmental objectives are established and reviewed. It guarantees the following commitments:

- Fully integrate the environmental dimension into the organisation's strategy, to ensure the protection of the environment, the natural surroundings and the prevention of pollution.
- Continuous improvement in all processes that may have an environmental impact.
- Knowing and assessing the environmental opportunities and risks of the activities carried out, to ensure the achievement of the expected results.
- Comply with applicable environmental legislation and other requirements voluntarily subscribed to, maintaining an attitude of permanent compliance with them.
- Integrate environmental management into all activities and levels of the organisation, including design, supply, operation and maintenance; identifying, preventing, controlling and minimising, as far as possible, environmental impacts in the development of these activities:
  - » **USING** raw materials and energy rationally, and minimising the generation of conventional and nuclear waste and effluents.
  - » **AVOIDING** improper waste collection and effluent disposal in unauthorised ways and places.
  - » **CONSIDERING** the development or application of new technologies to improve efficiency in electricity generation, environmental research and the promotion of energy saving.
- Motivate, inform and train staff to respect the environment, stimulating the development of an environmental culture and disseminating the Environmental Policy inside and outside of the Organisation, including collaborating companies.
- To report transparently on environmental results and actions, maintaining the appropriate channels to encourage communication with stakeholders.
- Implement and maintain a standardised Environmental Management System.

## Lines of Action

As regards the environment, throughout 2021, Centrales Nucleares Almaraz-Trillo has continued to carry out important actions included in the Environmental Management Programme, the most significant of which are listed below:

- Actions aimed at minimising the production of radioactive waste:
  - » **Low and intermediate level waste:** optimisation of the design to avoid the undesired generation of radioactive waste in certain operations, strengthening of processes for the declassification of materials (used oil, activated carbon, earth, metals and others), installation of equipment for the destruction of compactable waste, and improvements in the management of used oil and grease waste in the controlled area by means of centrifugation.
  - » **High level waste:** actions were carried out to reduce high level radioactive waste by means of new cycle management at the Trillo NPP.
- Definition of lines of action to minimise the generation of hazardous and non-hazardous waste at both plants.
- Improvements in the pollution prevention systems: conditioning of the storage area for reserve transformers at Almaraz NPP and improvement of the diesel oil containment system, in the event of a possible spill in the diesel generator of the Center for Alternative Emergency Control (CAGE) building at Trillo NPP.
- Improvement of the thermo-ecological conditions of the Arrocampo reservoir, through the progressive repair of sections of the thermal separation screen at Almaraz NPP and optimisation of the discharge temperature control.
- Improvements in the data acquisition of the EM-02 meteorological tower.

- Actions aimed at reducing the risk of legionella by replacing the filling in cooling towers (TEVA) and carrying out a study to analyse the dispersion of legionella in this system.

## Environmental Audits

Centrales Nucleares Almaraz-Trillo has had its Environmental Management System certified by AENOR since 2005, in accordance with the international standard UNE-EN-ISO-14001:2015. From October 4th to 8th, the Environmental Management System Certification Monitoring Audit was carried out by AENOR INTERNACIONAL S.A.U. The auditors reviewed the Almaraz and Trillo plants and the activities carried out at the Central Offices, with a final result of "compliant assessment".

The Environmental Management Certificate, after sixteen years of validity, was renewed in 2020 with validity until 28/11/2023, thus recognising the involvement of the Management and the collective effort of the entire Organisation, carried out throughout these years. Each milestone of this nature should be understood, however, as a new starting point towards a better environmental performance of the company.

Prior to the AENOR audit, the internal audit of the system is carried out, which forms part of the verification process required by the system itself. The audit corresponding to 2021 took place in June, with none Non-conformities detected.

The Nuclear Safety Council carried out a number of inspections at both plants on various environmental matters.

## Environmental Monitoring Programmes

The Almaraz and Trillo plants have historically carried out various environmental surveillance programmes aimed at verifying the absence of significant environmental impacts as a result of their activities, in both the radiological and conventional fields.

### Study of aquatic ecosystems

In the area surrounding the Almaraz power plant, two main environmental studies are being carried out, the scope of which includes the Arrocampo and Torrejón reservoirs: Ecological Study of the Aquatic Ecosystem and the Thermal Study of the Reservoirs.

These monitoring studies are far-reaching due to the fact that the Arrocampo reservoir should also be considered as another system of the plant, since it was built exclusively for industrial use for cooling the Almaraz NPP and is therefore used for final heat dissipation. It is hence necessary to have the most precise knowledge possible of its characteristics in terms of its capacity to perform its cooling function, both in the short and long term. This requires intensive control and monitoring of both physic-chemical parameters, especially temperature, and biological parameters.

The environmental study being carried out in the area surrounding the Trillo power station currently consists of monitoring the Tagus river, into which the plant discharges, and the Entrepeñas reservoir, located downstream in the vicinity of the plant.

The scope of the study includes the assessment of water quality from the physic-chemical point of view and its content of metals and other undesirable substances, as well as the characteristics of other elements of the aquatic ecosystem such as sediments, benthic algae, phytoplankton and zooplankton, as well as ichthyofauna.

## Environmental Radiation Monitoring

The Almaraz and Trillo plants carry out continuous and strict control and surveillance of their own radioactive effluent releases. Nevertheless, in order to experimentally verify the impact that radioactive effluents might have on the environment, the plants carry out an Environmental Radiological Monitoring Programme (ERSP) through the direct measurement of radiation levels in the vicinity of the facilities and of the radioactive substance content of a series of environmental samples collected at a set of sampling points.



All abiotic elements and living beings representative of the ecosystems linked to all natural environments around the plants (aerial, terrestrial and aquatic) are fully monitored.

A large number of samples are collected annually at each of the two plants for different types of analysis (gamma spectrometry, beta activity, environmental dose, strontium, tritium and radioiodine).

The goodness of the analytical results is ensured by the parallel performance of a quality control programme by another laboratory independent from the main laboratory and by the performance of an independent surveillance programme (PVRAIN) carried out directly by the Nuclear Safety Council.

Furthermore, in the case of the Almaraz plant, a collaboration agreement has been entered into with CEDEX for this official organisation, which reports to the Ministry of Public Works, to carry out independent monitoring of the aquatic environment around the plant. The Regional Government of Extremadura also carries out independent radiological monitoring through the Environmental Radioactivity Laboratory of the University of Extremadura (LAUREX).

The results obtained during the year 2021 at both plants indicate that the radiological status of the surrounding ecosystems has not undergone significant variations during the year, with the natural background values remaining unchanged, confirming the absence of environmental effects due to the release of radioactive effluents, a fact to be expected given the practically insignificant radiological relevance of the releases carried out by both plants.

## Meteorological studies

The Almaraz and Trillo plants have weather stations that continuously measure and record the most significant parameters such as temperature, precipitation, wind direction and speed, humidity and solar radiation.

Meteorological information is of special relevance for various applications related to the environment, and a very good characterisation of the climate at the sites is available after more than thirty years of monitoring.

The stations have the necessary redundancies to ensure the continuous availability of meteorological information.



# SOCIAL

## People Management

The human team is the main asset of Centrales Nucleares Almaraz-Trillo (CNAT). Their collaboration, commitment and identification with the Organisation are the best guarantee for the safe operation of the plants and compliance with the corporate objectives. For this reason, the human resources policy seeks to foster a working environment that allows for professional and personal development, with special attention to the health and safety of its employees.

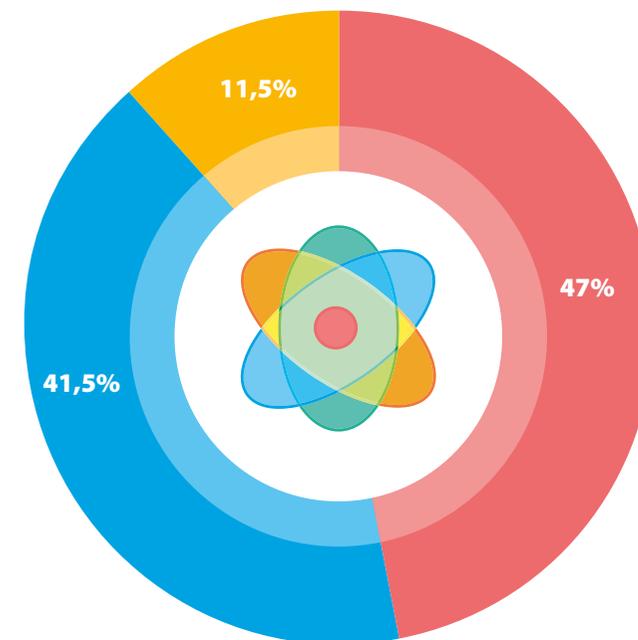
As of 31 December 2021, CNAT has a team of 786 professionals characterised by their experience and high qualifications: 53% have university degrees. CNAT's workforce is mainly concentrated in Extremadura with 370 workers at the Almaraz plant (47%), in Castilla-La Mancha with 326 workers at the Trillo plant (41.5%) and in Madrid with 90 workers at the Central Offices (11.5%).

During 2021 there were 34 new hires and in all cases an initial training programme was carried out prior to the start of their job responsibilities. It is important to note that the CNAT workforce is assisted by around 750 workers from specialised service companies during normal operations, and between 1,000 and 1,200 additional workers join the plants during refuelling outage periods.

Since 2017 CNAT has been certified by AENOR INTERNACIONAL S.A.U. in accordance with the ISO-10.667-2:2011 standard on the provision of assessment services: Procedures and methods for the assessment of people in work and organisational environments.

CNAT maintains the Efr-Certificate (Family-Responsible Company) from the Másfamilia Foundation, accrediting the improvement of the company's rating to the A level of Excellence. This certificate, which is awarded after an external

### DISTRIBUTION OF STAFF 2021



- Almaraz NPP
- Trillo NPP
- Central Offices

audit, recognises good practices in organisations that integrate models for the reconciliation of work and family life. CNAT has held the Efr-Certificate since 2010 and has implemented different measures focused on reconciling work and family life, promoting flexibility, supporting equal opportunities and promoting diversity.

CNAT has also renewed its ISO 10.667 certification for procedures and methods for the assessment of people in work and organisational environments, which verifies a rigorous and exhaustive work methodology that is perfectly aligned with the requirements established in the reference standard.



## A-ZERO PLAN

Building on the basic principle that all occupational accidents can and should be avoided, the health and safety of people and the integration of prevention at all levels of the organisation are a priority for CNAT. The commitment to the Health and Safety of people is a hallmark of the identity of Almaraz-Trillo Nuclear Power Plants and its ultimate objective is the achievement and maintenance of ZERO accidents. For this reason, since 2018 the CNAT Management has promoted a multi-annual project to improve the preventive culture of the organisation, which we have called the A-ZERO Plan, this being one of the priority Plans of the Organisation. The actions of the A-ZERO Plan involve all CNAT workers, with a very important focus on the collaborating companies that carry out their activity in the plants.

With this objective, three priority lines of work defined in the Strategic Management Committee and three transversal areas of work are established for the year 2021, relating to other actions foreseen within the Plan.

### Priority areas of work:

- Improvement in the discharge process (integrated in CNT's Operational Performance Improvement Plan).
- Leadership and motivation: Leadership and motivation continue to be promoted in personal security, supported by the line of command and integrated into the organisation, with specific actions such as:
  - » Consolidation of the process of investigation, analysis and reporting of accidents and incidents in order to identify root causes, enhance organisational learning and, based on the resulting actions, prevent recurrence.
  - » Consolidation of a programme of Preventive Safety Observations (OPS) in which both CNAT and collaborating companies participate,

which acts at the base of the accident pyramid, favours the detection of failures and helps to set the safety expectations that we want for the organisation.

- » The programme of individual and collective recognition and achievements in prevention has been continued.
- Reduction and elimination of risks (DERI): with lines of action focused on minimising or eliminating the risks present in our facilities (chemical risk, electric arc, elimination of gaps, improvements in lighting, etc.).



## Transversal Areas:

- Education and training. An ambitious programme has been developed to ensure the highest level of training in prevention for all workers in the plants.
- Communication and dissemination: With the aim of making the A-ZERO Plan visible and making clear the absolute priority of people's safety at CNAT, we have continued with impactful and effective communication campaigns capable of reaching the entire organisation.
- Management and Monitoring of the Plan: Through the maintenance of a structure (Project Group) that allows the Plan's achievements to be monitored, as well as establishing new lines or priorities in the Plan, strengthening existing or newly created management, discussion, analysis and dissemination bodies, such as Health and Safety and Business Activity Coordination Committees, Prevention Committees and specific Working Groups.

## Health Surveillance

CNAT's own Prevention Service has a basic health unit (UBS) which carries out Health Surveillance at the three work centres and looks after the health of its workers. In its medical check-ups, it applies the specific **health surveillance** protocols required for each job, according to the risk assessment carried out by Technical Prevention. This unit also performs health care, emergency and occupational accident care functions and maintains Level I accreditation for the care of irradiated and contaminated workers.

Due to the pandemic situation declared in March 2020 in which we are still immersed, during the year 2021 Health Surveillance has had to reschedule the activities that are usually carried out in personal presence within the scope of Health Promotion in CNAT, even so, it has been possible to carry out the campaigns of Colon Cancer Screening (hidden blood in faeces), Planning

of annual gynaecological examinations, Nutritional Assessment Video-consultation and the following workshops "on line": Prevention of Skin Cancer, Keys to physical exercise for effective weight loss, Emotional intelligence in day-to-day management, Healthy eating, Tips for preventing cardiovascular diseases, Tips for preventing prostate cancer, Tips for preventing breast cancer, Cardiovascular Prevention and an informative action on "Fatty liver disease associated with metabolic dysfunction". A First Aid personal card was also produced and distributed to workers.

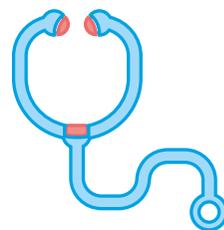
Special mention should be made of all the work carried out by CNAT Health Surveillance throughout 2021 in relation to the pandemic from an informative and preventive point of view, including posters, videos, notes, informative

mailings, protocols, guides, procedures, plans, reports, articles, mass campaigns for antigens, antibodies, PCR, etc., as well as tracking, monitoring and exhaustive control of cases affected by COVID-19 and active participation in the working groups created for the management of the pandemic, which have been responsible for the prevention and protection of the health of CNAT workers and its collaborating companies throughout the evolution of the pandemic.

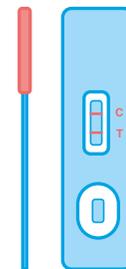
There has also been active collaboration with the relevant regional ministries in each work centre and with the health centres in the areas of influence of the facilities throughout the pandemic, applying at all times the guidelines, documents and recommendations issued by the Ministry of Health, Consumer Affairs and Social Welfare.



Promotion of teleworking



Surveillance and follow-up by Medical Service



Administration of quick antigen/antibody tests



Storage of covid prevention materials

# Training

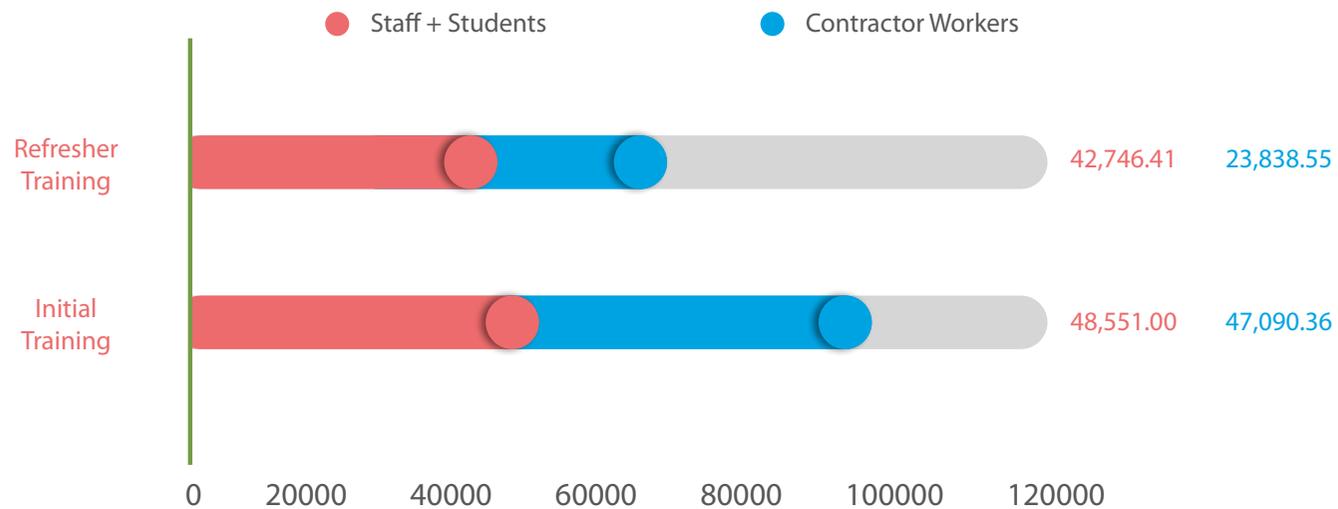
The qualification of the people working for Almaraz-Trillo Nuclear Power Plants is one of the priority areas of interest, for which reason CNAT has permanent resources dedicated to the planning and development of annual training plans at each work centre, both for initial training and for refreshment training and training in management skills.

In 2021, 572 initial training and retraining courses were held, involving 162,226 hours of training for 5,778 workers, including future plant operators (16 young students undergoing training). Within the training programmes, the part

dedicated to retraining workers accounted for 44% and that corresponding to initial training was 56%.

During the year, 777 CNAT employees (99.8% of the total) took part in training actions, totalling 65,025 hours of training, with an average of 83.7 hours of training per employee. The training programmes for future plant operators, prior to their incorporation into the workforce, involved 26,272 hours of training during the year.

## GENERAL DISTRIBUTION 2021 TRAINING PROGRAM



With regard to the process of controlling the qualification of contractor company personnel, CNAT has continued to promote the improvement of their training, facilitating their attendance at the training actions planned for staff personnel, and carrying out specific training actions for these workers. In 2021, 70,928 hours of training were given to 4,985 workers from contractor companies.



## Internal Communication

Covid-19 has also had a high impact on CNAT's internal communication, where it has continued to adapt in a sudden process to the new circumstances and the consequences of the pandemic in order to meet the demands for information and avoid the isolation caused by the generalisation of remote working.

For this reason, an internal communication programme was maintained with the dual objective of conveying a message of closeness, promoting integration and reinforcing the channels for disseminating information about Covid-19. The goal was for all CNAT employees to feel part of the organisation at this time, through contact with their managers and colleagues.

Technological supports such as Teams, which facilitates online communications, video chats or virtual cafés, have served to keep the conversation between teams alive and have allowed us to work remotely and be more connected than ever. One of the most widely used tools has been video screening, which has gone from being an infrequent format to being practically essential, because it has maintained the link between employees and because it has made visible and reinforced the close and natural leadership of the management team.

In addition, this year saw the launch of the internal campaign "Pride in being Trillo". This is an innovative programme with different actions based on the participation of the plant's personnel to promote pride in belonging to the Trillo NPP. It also aims to highlight the importance and prestige of being able to work at a benchmark nuclear power plant and the professional values and qualities associated with this important professional task.

At the same time, the different actions included in the internal campaign of the A-ZERO Plan have been continued.

## Relations with Society

CNAT continues to maintain fluid and dynamic relations with the institutions that have competences in the area in which the plants operate, organising meetings with the mayors of the surrounding areas to bilaterally study the relations between the plants and each municipality and the possible channels of collaboration, participating in the Information Committees convened by THE Ministry for Ecological Transition and Demographic Challenge (MITERD), as well as in institutional meetings with provincial and autonomous community organisations.

In this year 2021, marked by the pandemic, the six-monthly information with the mayors of nearby municipalities and the media has been provided either by telematic means or in person, depending on the health conditions. In this information, all the data concerning the results of the operation are detailed and news on future plans and projects is provided. Also, and always in compliance with the measures established by the health authorities to avoid contagion by COVID 19, meetings have been held with the mayors of the areas surrounding both plants. Likewise, this year the company has participated in the Almaraz Information Committee organised in virtual format by the official bodies responsible for nuclear energy, providing the information required at all times.

The commitment of the Almaraz and Trillo nuclear power plants to their neighbouring communities is reflected in the collaboration agreements that have been renewed in the areas of economic and social development, the environment and educational projects. Likewise, CNAT has renewed the collaboration agreements with the most representative news agencies and press associations in the area surrounding the plants, by means of which the training and specialisation of students in the last year of Information Sciences in the field of nuclear electricity is promoted.

Visits to the Information Centres have been reduced during 2021 due to the health crisis caused by COVID-19 and only corporate meetings and events have been held there. Since their origin, between the two Centres, more than one million people have visited the Almaraz and Trillo facilities.

In addition, both the website ([www.cnat.es](http://www.cnat.es)) and the blog [www.energiaymas.es](http://www.energiaymas.es) offer information of interest on the activity of the plants and their surroundings, contributing to the dissemination of the nuclear world.

To ensure continuous improvement in the quality of products and associated services, CNAT ensures that its suppliers are familiar with and participate in the company's work processes and protocols. The contracting volume in 2021 was 357.7 M€. Of the total number of suppliers identified with contract awards, 91.78% (693 out of 755) are Spanish suppliers.



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