

ALMARAZ
TRILLO

ENVIRONMENTAL Report

**Edition**

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Coordination

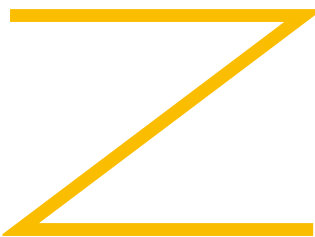
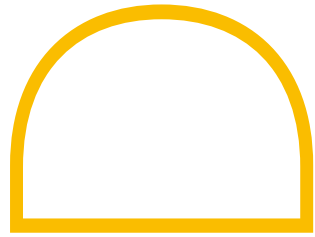
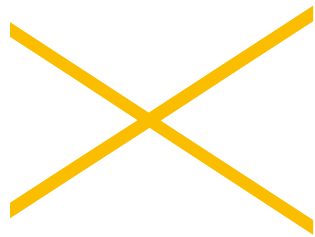
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1. ALMARAZ AND TRILLO NUCLEAR POWER PLANTS

Owner companies

The owner companies of the Almaraz and Trillo Nuclear Power Plants formed the Economic Interest Grouping in November 1999, called Centrales Nucleares Almaraz-Trillo, A.I.E., for the integrated operation, management and administration of both plants, and their shares in the assets of each have remained unchanged. Currently, pursuant to Royal Decree Law 13/2014, Almaraz-Trillo Nuclear Power Plant IA.I.E. also holds the Operating Permits for the installations.

Accordingly, the shares of the owner companies in the installed capacity, at both plants, is as follows:



Iberdrola Generación Nuclear, S.A.U.



Endesa Generación, S.A.U.



Gas Natural Fenosa Generación, S.L.U.



Iberenergía, S.A.U.



Nucenor S.A.

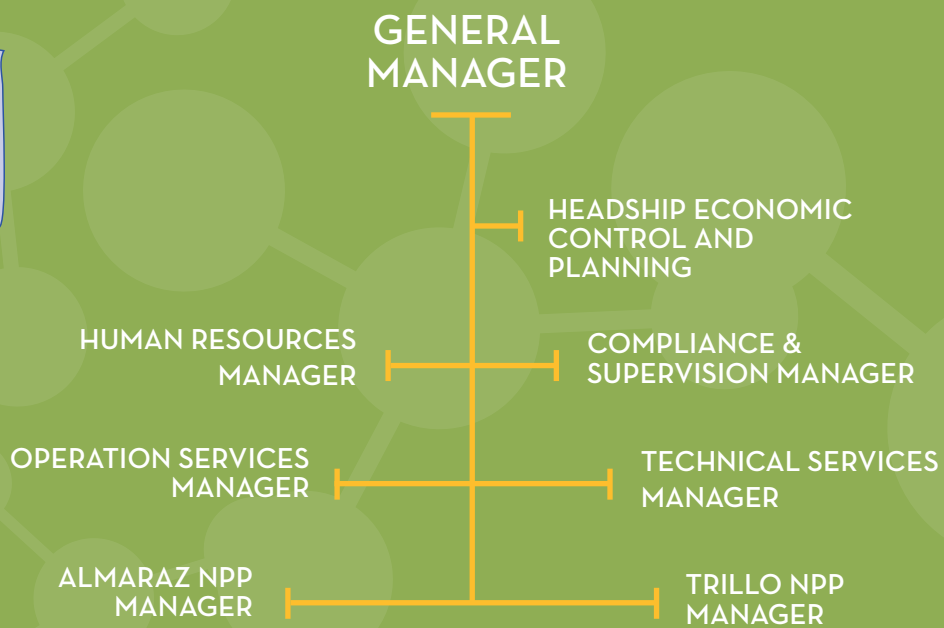
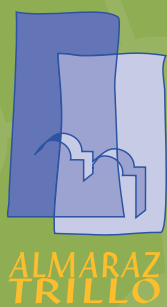


Organisational Structure

The structure of A.I.E Centrales Nucleares Almaraz-Trillo is based on the development of a single organisation, with clearly defined unitary control, and the unambiguous assignment of functions and responsibilities.

The organisation's governing body is the General Meeting of Members, which brings together the owner companies, and the Management Board, and contains representatives of both.

The basic organisational chart for A.I.E. Centrales Nucleares Almaraz-Trillo, with effect from 1 January 2017, is detailed below:



Key features of the Almaraz NPP

ALMARAZ NPP (UI-UII)

Almaraz Nuclear Power Plant is in the Extremadura community, in the region of Campo Arañuelo (Caceres) on a site defined by the Tajo and Tiétar rivers.

The climate in the area is continental, with low and erratic rainfall, resulting in an environment with more pastures than crops, and pasturelands and irrigated land are the two most common forms of land use. The proximity to large numbers of environmental protection areas is notable, including the Monfragüe National Park LIC (Site of Community Importance) and its ZEPA (Special Protection Area) and Environment Pastures alongside the Arrocampo.

The main technical features of the Plant are listed in the following table:

ALMARAZ NPP (UI-UII)

OWNERS:

Iberdrola Generación, S.A. (52.687%)
Endesa Generación, S.A. (36.021%)
Gas Natural Fenosa Generación, SLU 11.292%

LOCATION:

Almaraz (Cáceres)

TECHNICAL SPECIFICATION:

Reactor Type: Pressurized Water Reactor (PWR)
Supplier: Westinghouse
Thermal Power: 2,947 MWt (U-I), 2,947 MWt (U-II)
Fuel Enriched Uranium Dioxide (UO₂)
No. of fuel elements 157
Gross Electrical Output: 1,049.43 MWt (U-I), 1,044.45 MWt (U-II)
Net Electrical Output 1,011.30 MWt (U-I), 1,005.83 MWt (U-II)
Cooling: Open Circuit. Arrocampo Lake

COMMENCEMENT OF COMMERCIAL OPERATIONS:

1 September, 1983 (UI) - 1 July, 1984 (U-II)

CURRENT OPERATIONAL AUTHORISATION:

08/06/2010 for a period of 10 years

CYCLE DURATION:

18 months both units



During 2016, gross electricity generated by the Almaraz nuclear power plant was 15,780.19 million kWh, and net production was 15,174.27 million kWh.

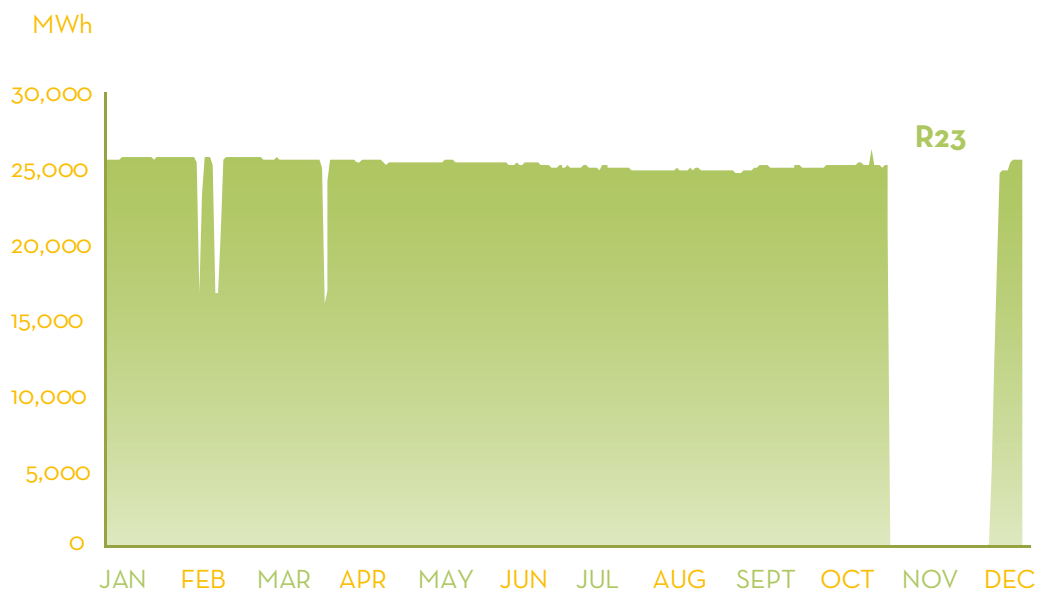
The following graphs reflect the daily gross production of both units during 2016.

Gross electricity production for Unit I was 7,782.60 MWh, and 7,997.60 million kWh for Unit II.

GROSS PRODUCTION DAILY 2016 ALMARAZ NPP UNIT I



GROSS PRODUCTION DAILY 2016 ALMARAZ NPP UNIT II



TRILLO NPP

Trillo Nuclear Power Plant is in Castilla - La Mancha, in the Alcarria region (Guadalajara), alongside the course of the Tagus River.

The Alcarria has a continental Mediterranean climate, typical of inland areas of the Iberian Peninsula, with strong thermal oscillations, very hot summers and very cold winters, and little rain or frost presence. The plant site is near the LIC and ZEPA in the Alto Tajo Natural Park.

The main technical features of the Plant are listed in the following table:

TRILLO NPP

OWNERS:

Iberdrola Generación, S.A. (48%)
 Gas Natural Fenosa Generación, SLU 34.5%
 Iberenergía, SAU (15.5%)
 Nuclenor, S.A. (2%)

LOCATION:

Trillo (Guadalajara)

TECHNICAL SPECIFICATION:

Reactor Type: Pressurized Water Reactor (PWR)
 Supplier: KWU
 Thermal Power: 3,010 MWt
 Fuel Enriched Uranium Dioxide (UO₂)
 No. of fuel elements 177
 Gross Electrical Output: 1,066 MWe
 Net Electrical Output 1,003 MWe
 Cooling: Natural Draft Towers (River Tajo)

COMMENCEMENT OF COMMERCIAL OPERATIONS:

6 August, 1988

CURRENT OPERATIONAL AUTHORISATION:

17/11/2014 for a period of 10 years

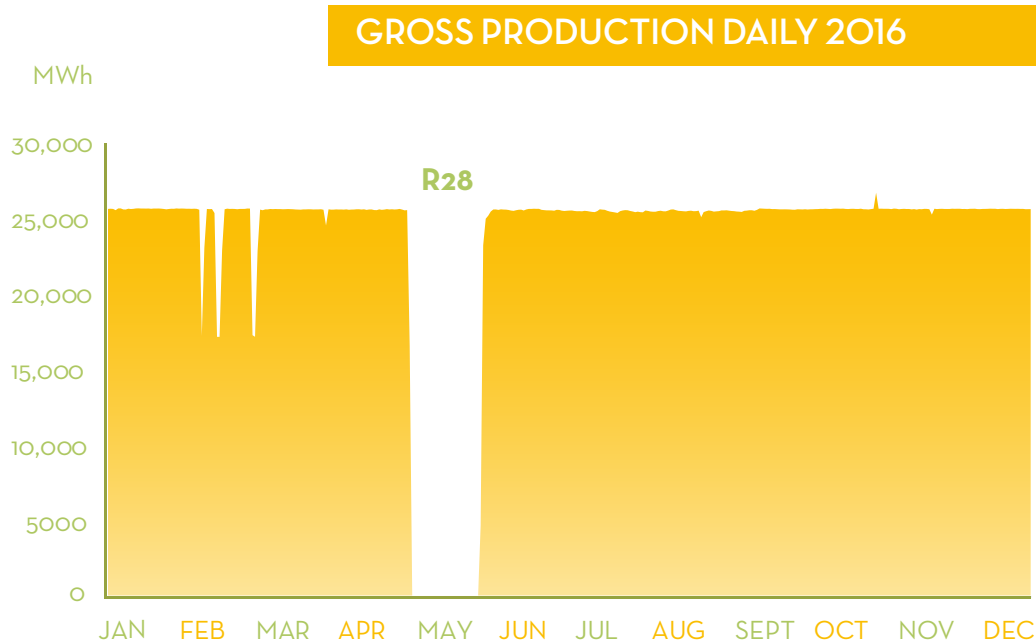
CYCLE DURATION:

12 months



Gross production by the Trillo NPP from 1 January to 31 December 2016 totalled 8,552.97 million kWh, and net production in that period was 8,004.55 million kWh.

The following graph shows the gross production trend during 2016.



Mission, Vision, Key Strategies

The mission of Almaraz-Trillo Nuclear Power Plants is to produce electricity in a manner which is safe, economic, respectful to the environment and guaranteeing long-term production by optimum operation of the Almaraz and Trillo plants.

Our Vision aims to position the Almaraz and Trillo Plants between the benchmark Plants for safety, quality and costs, by employing a management model in which the development and participation of people enable higher levels of safety, productivity and efficiency to be achieved.

To achieve this mission and move towards the goals established in the Vision, Almaraz-Trillo Nuclear Power Plants develop strategy around the following key elements:



2. ENVIRONMENTAL QUALITY MANAGEMENT

To fulfil the mission within a socially responsible framework, Almaraz-Trillo Nuclear Power Plants have different corporate policies that establish work patterns throughout the whole organisation.

A.I.E.'s commitment to respect the Environment Almaraz-Trillo NPPs is expressed in the organisation's Environmental Policy.

The Environmental Policy drives the application of the Environmental Management System and its continuous improvement, reflecting the Board's commitment and constituting the starting principles on which the programme of annual objectives is based, and in more general terms, the activities of the company in relation to the Environment.



Environmental Policy

The policy established by the organisation, with the associated Code of Conduct is detailed below:

ENVIRONMENTAL POLICY

A.I.E. The mission of A.I.E. CENTRALES NUCLEARES ALMARAZ-TRILLO is to produce electricity in a manner which is safe, reliable, economic, respectful of the environment and which guarantees production over the long term, by optimum operation of the Almaraz and Trillo nuclear power plants, and an Environmental Policy has been defined appropriate to its nature, magnitude and environmental impact, which serves as a reference for the establishment and review of objectives and environmental aims, and based on this, it commits to:

- Guarantee compliance with the environmental legislation in force and other voluntarily accepted requirements, maintaining an attitude of ongoing adherence.
- Operate the installations with respect for the environment, identifying, preventing, controlling and minimizing, as far as possible, the environmental impact of its activities.
- Continually making improvements to all processes which could have environmental repercussions.
- Controlling and reducing, as far as reasonably possible, leakages, and conventional and nuclear waste.
- Motivating and training staff in respect to the environment, stimulating development of an environmental culture and communicating the Environmental Policy within and outside the Organisation.
- Introducing and maintaining updated a Standard Environmental Management System.

AENOR has certified the Environmental Management System at Centrales Nucleares Almaraz-Trillo A.I.E. in accordance with UNE-EN-ISO 14001: 2004 since 2005. This triennial certificate was last renewed in 2014, and remains effective until 2017.

ENVIRONMENTAL CODE OF CONDUCT

- TO INTEGRATE environmental management in all design, supply, operation and maintenance activities at the installations, and at all organisational levels.
- TO EMPLOY raw materials and energy rationally, and minimise the generation of waste and effluents.
- TO AVOID inadequate waste collection and disposal of effluents, and the use of unauthorised sites
- TO TRANSLATE and require contractors and employees to comply with this Code of Conduct.
- TO COLLABORATE on the development of new technologies to improve the efficiency of the nuclear generation of electrical power, and in researching environmental issues and the development of energy savings.
- TO MAINTAIN external communication channels, facilitating access to environmental information.

3. ACTION PLANS

Almaraz-Trillo Nuclear Plants have continued to perform important activities in relation to environmental issues during 2016, which are incorporated in the Environmental Management Programme, the most significant of which are detailed below:

Independent Spent Fuel Storage Installation (ISFSI)

Regarding the HLW constituted by the spent fuel extracted from the reactor, Almaraz NPP has obtained favourable decision regarding the Environmental Impact Statement issued by M-GRAMA and the corresponding administrative authorisation from MINETAD to construct an Independent Spent Fuel Storage Installation (ISFSI), which will be implemented in 2017.

Replacement of gasses affecting the ozone layer

Both Plants they have continued design modifications to eliminate the use of fluorinated gases which can potentially affect the ozone layer. Since this programme began, approximately 130 items of equipment have been replaced at both Plants. The aim is to eliminate the risk from emissions of such gases to the atmosphere.

Improvements in the treatment of Legionella

Improvements have been made to the treatment of Legionella in cooling towers. At Almaraz NPP, the fillers in the cooling towers of the Turbine Building Cooling Water System have been replaced, an improvement directed against Le-

gionella. At Trillo NPP, testing of the treatment with chlorine dioxide against Legionella has continued in the main cooling towers.

Reducing paper consumption in the organisation

Starting in 2013 and until the present day, various activities have been carried out with the aim of reducing paper consumption throughout the organisation. In 2016 actions to replace controlled paper distribution by electronic distribution have been completed.

Minimising the impact of the Tagus river clean-ups

Trillo NPP has begun a design modification to install a floating barrier at the dam, to minimise the impact of intake clean-ups on the Tagus river. Installation is scheduled for 2017.

Other actions

A major improvement in the management of waste toner has been undertaken by Almaraz NPP, by prior segregation, which has resulted in a reduction by almost a factor of 5 in the quantities generated.



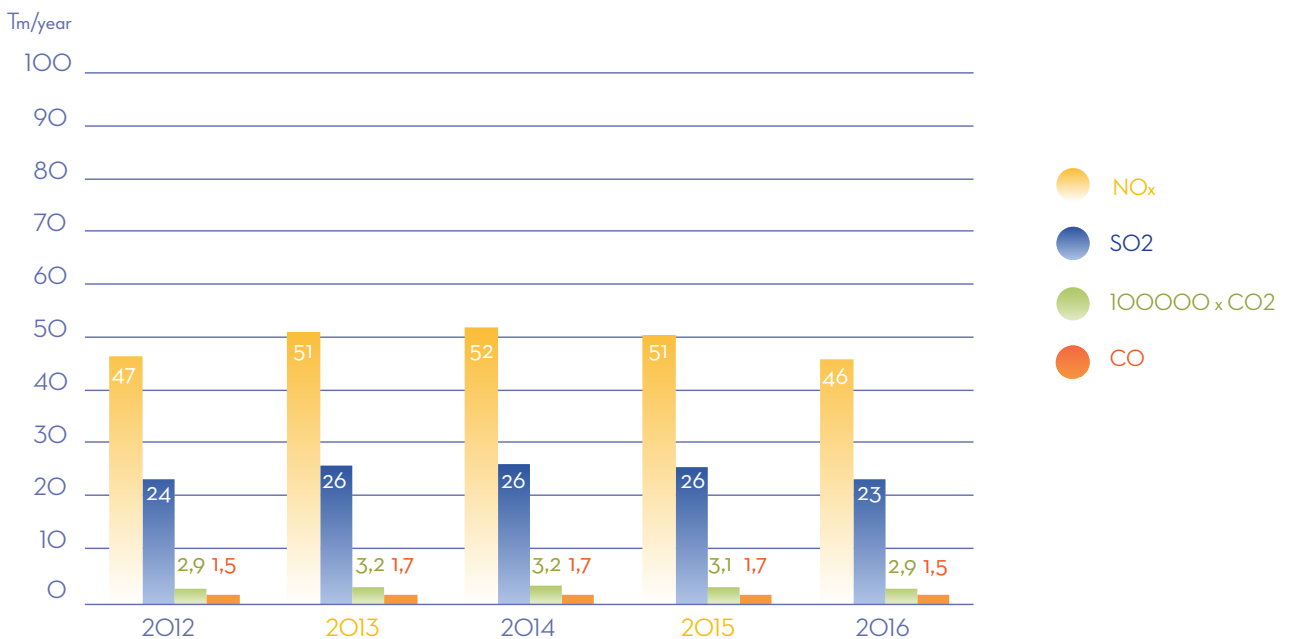
4. ENVIRONMENTAL MANAGEMENT RESULTS

Environmental Issues are defined by the applicable international regulations as “types of activity, products or services which interact or could interact with the environment”. Those identified at the Almaraz and Trillo plants can be grouped under the following categories:

Atmospheric emissions

Given the little relevance this category has in terms of environmental impact by our installations, this section groups together everything resulting from the emission of gases by auxiliary combustion and emergency equipment, together with any emitted by the vehicle fleet, and any associated with fire-fighting training.

ATMOSPHERIC EMISSIONS (ALMARAZ - TRILLO)



Generation of Radioactive Waste Material

For the purpose of management and subsequent storage, and considering the clearly differentiated characteristics, radioactive waste products generated in the nuclear power plants can be categorised as “Very Low, and Medium and Low Level Activity” waste and “High Level” waste, which corresponds essentially to spent fuel.

High Level Waste

In 2016 a total of 164 spent fuel elements were removed from the reactors, 64 from Unit I, and 60 from Unit II of Almaraz NPP, and 40 from Trillo NPP, which were then replaced with new elements. The volume occupied by the elements recovered from both plants was 31.8 m³.

The fuel removed from Unit I (64 elements) and Unit II (60 elements) at Almaraz NPP has generated approximately 12,400 GWh and 11,400 GWh respectively gross electricity throughout its lifetime in the reactor (three and a half years), and fuel recovered from Trillo NPP (40 elements), about 9,000 GWh (over approximately four years).

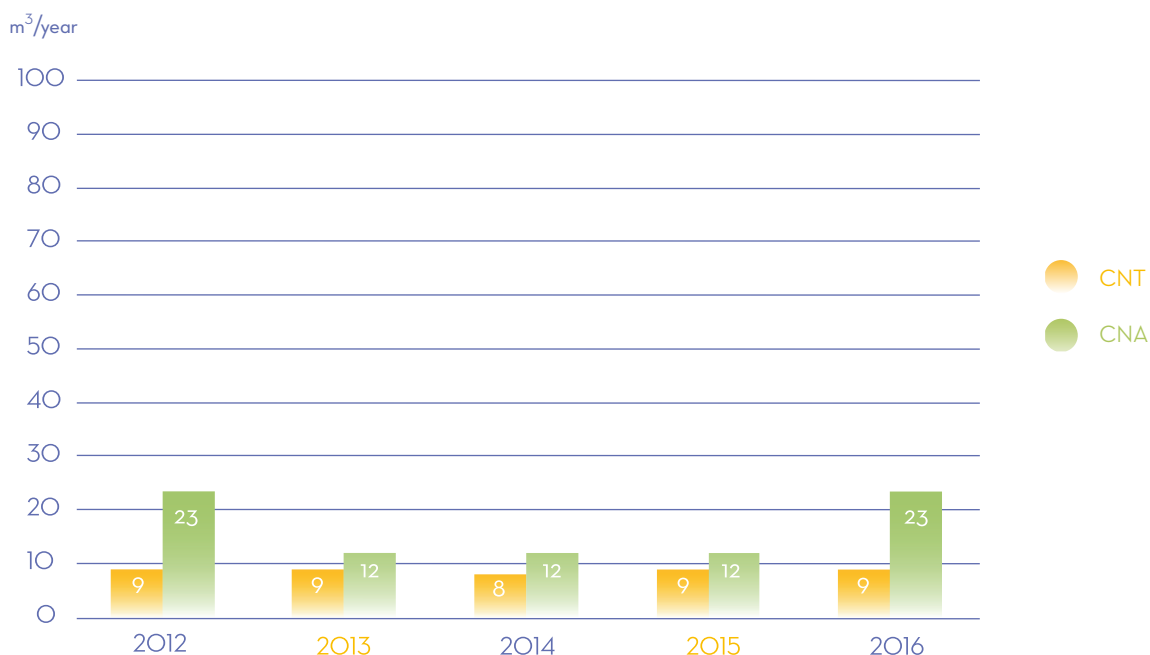
The spent fuel is stored inside the installations, in the corresponding pools located in the controlled area. At 31 December, they were 1,456 spent fuel elements stored corresponding to Unit I at Almaraz NPP, 1,440 at Unit II, and 504 at Trillo NPP. In addition, the Trillo Plant has an

Independent Spent Fuel Storage Installation (ISFSI), which enables dry storage inside dual usage storage-transportation containers. At the end of 2016, a total of 672 elements were stored in 32 containers.

As detailed in the action plans section, Almaraz NPP is planning to construct an ITS on its own land, and aims to commence usage from 2018. Currently it has Administrative Authorisation for execution and assembly, obtained following the favourable Environmental Impact Statement. Other Spanish nuclear power plants, including Trillo as already indicated, already have high-level waste ITS units in operation.

The graph shows the generation of spent fuel over time at both Plants. The highest values for Almaraz NPP correspond to the period - every three years - when the refuelling of the two units coincides in the same year.

HIGH LEVEL ACTIVITY WASTE (SPENT FUEL)





Very Low Level and Low and Intermediate Level Waste

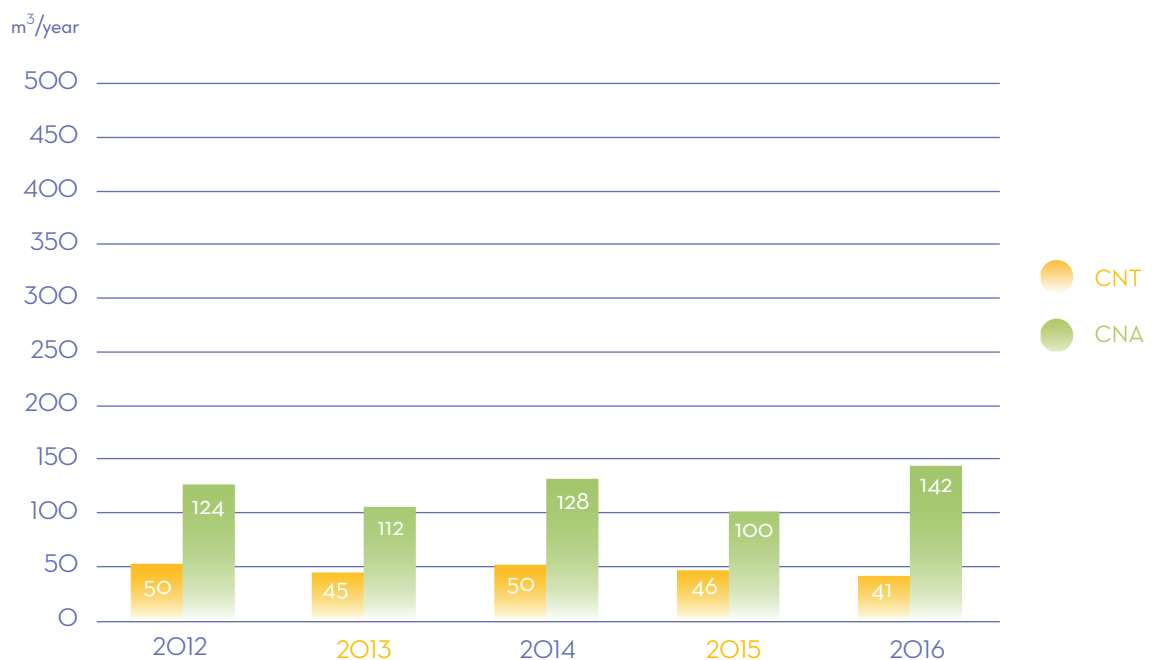
This type of waste originates because of plant operations and maintenance, due to activities carried out in the controlled zone. This also applies regarding the spent filtration elements and purification outputs from cooling and other systems, materials resulting from installation maintenance work, overalls and protective clothing.

Intermediate and Low Activity Waste is processed within the Plants themselves, with the objective of preparing it for final storage. There is a specific treatment process for each type of waste material, depending on its origin:

- Heterogeneous solids
- Drainage, from evaporator concentrate
- Pressed solids
- Spent ionic exchange resins
- Used filters
- Evaporator concentrates

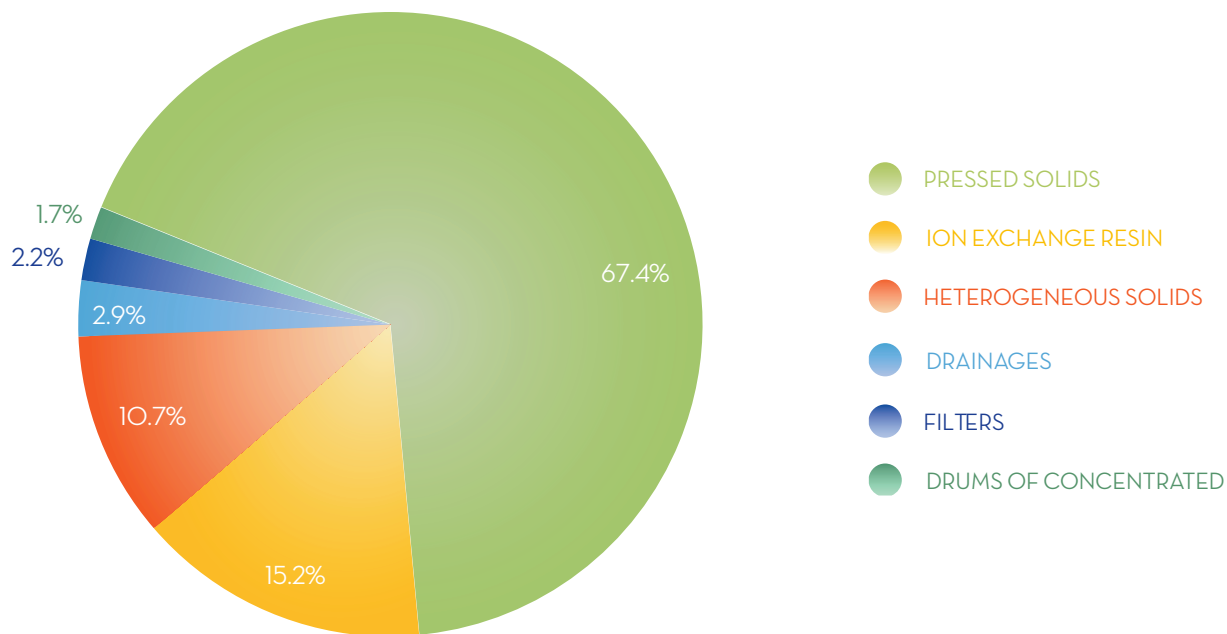
During 2016, the Almaraz Plant generated a total of 52.6 m³ of Low and Intermediate Level Waste (LILW), and 89.1 m³ of Very Low Level Waste (VLLW). In the case of the Trillo Plant, it was 31.3 m³ and 9.9 m³ respectively. The graph shows the joint production trends for these waste materials.

INTERMEDIATE & LOW, AND VERY LOW ACTIVITY LEVEL WASTE



The diagram shows the proportional distribution of the different categories.

**INTERMEDIATE & LOW, AND VERY LOW ACTIVITY WASTE CATEGORIES 2.016
(ALMARAZ - TRILLO)**



Low and Intermediate Level Waste material, after it has been conditioned to prepare it for final storage, is stored temporarily inside the Plants, and is routinely removed by the National Radioactive Waste Company (Empresa Nacional de Residuos Radiactivos - ENRESA) to sites within installations provided for storage in El Cabril (Córdoba).

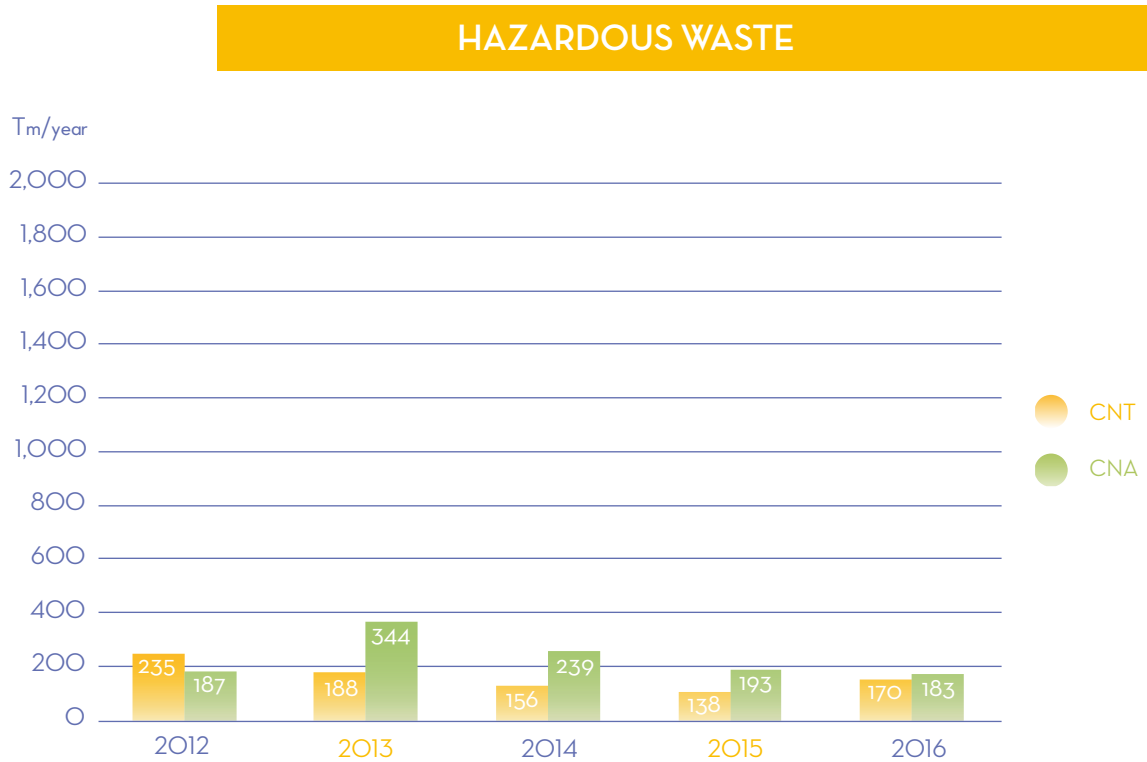
During 2016, several dispatches were made to these installations, totalling 33.22 m³ from Almaraz and 31.24 m³ from Trillo.

Production of Hazardous and Non-Hazardous Waste Materials

Nuclear power plants also routinely generate non-radioactive industrial-type waste, due largely as a result of preventive maintenance of machines and conventional equipment: replacement of oils, equipment sludge cleaning, filters, containers, etc. All these activities result in the generation of different categories of Hazardous and Non-Hazardous wastes.

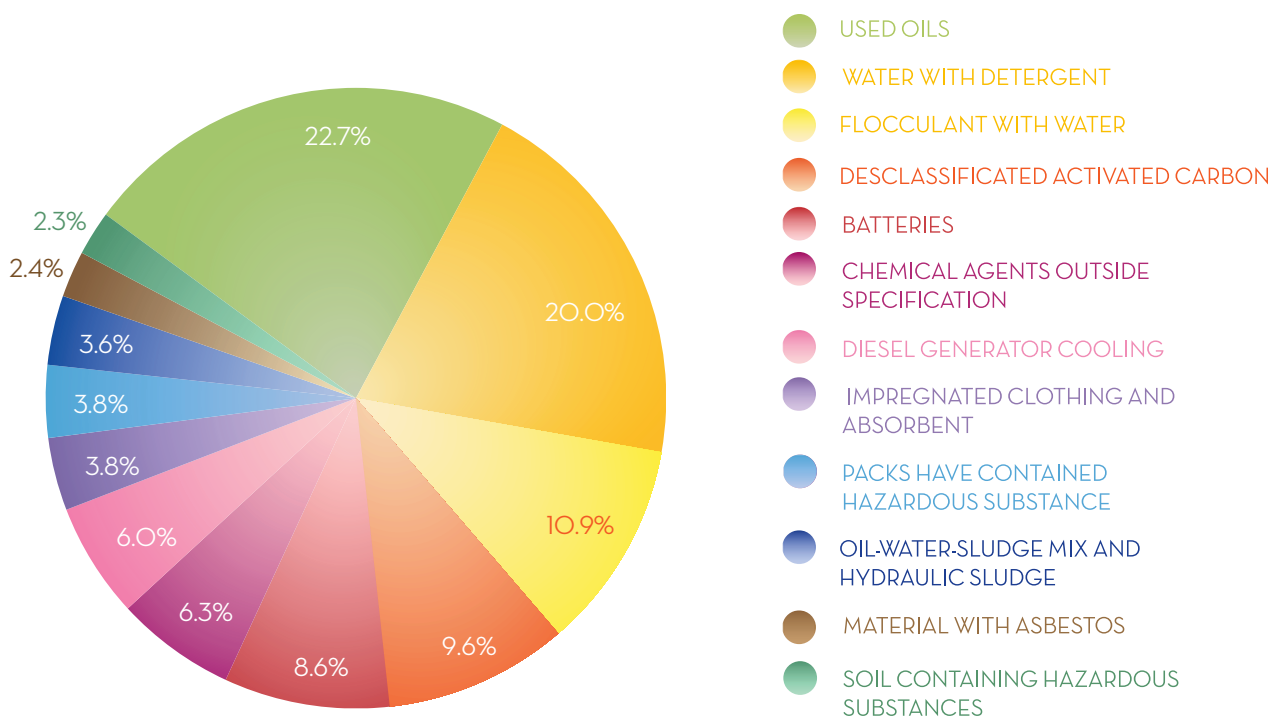
Exceptionally, waste may also be generated as the result of work and design modifications, and unusual corrective maintenance activities, which cause fluctuations in the time series.

The **Hazardous Waste** trend is shown below:



The following graph shows the relative proportions of different types of hazardous waste in 2016.

HAZARDOUS WASTE MAIN CATEGORIES 2.016 (ALMARAZ - TRILLO)

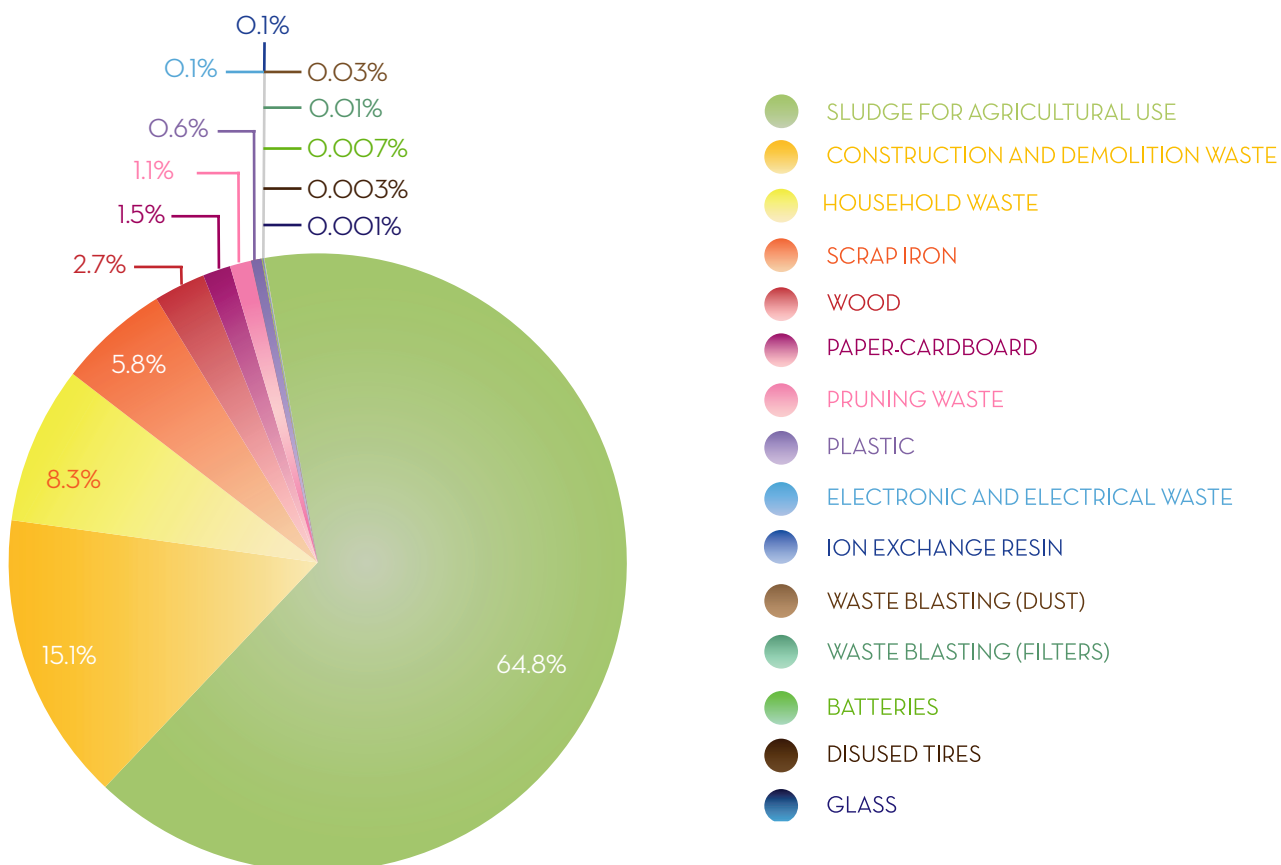




Regarding **Non-Hazardous Waste**, it should be noted that the most sensitive category in relation to extraordinary activities carried out at the Plant, is the generation of debris and construction and demolition waste (CDW), because of the design modification work which occurred during the year.

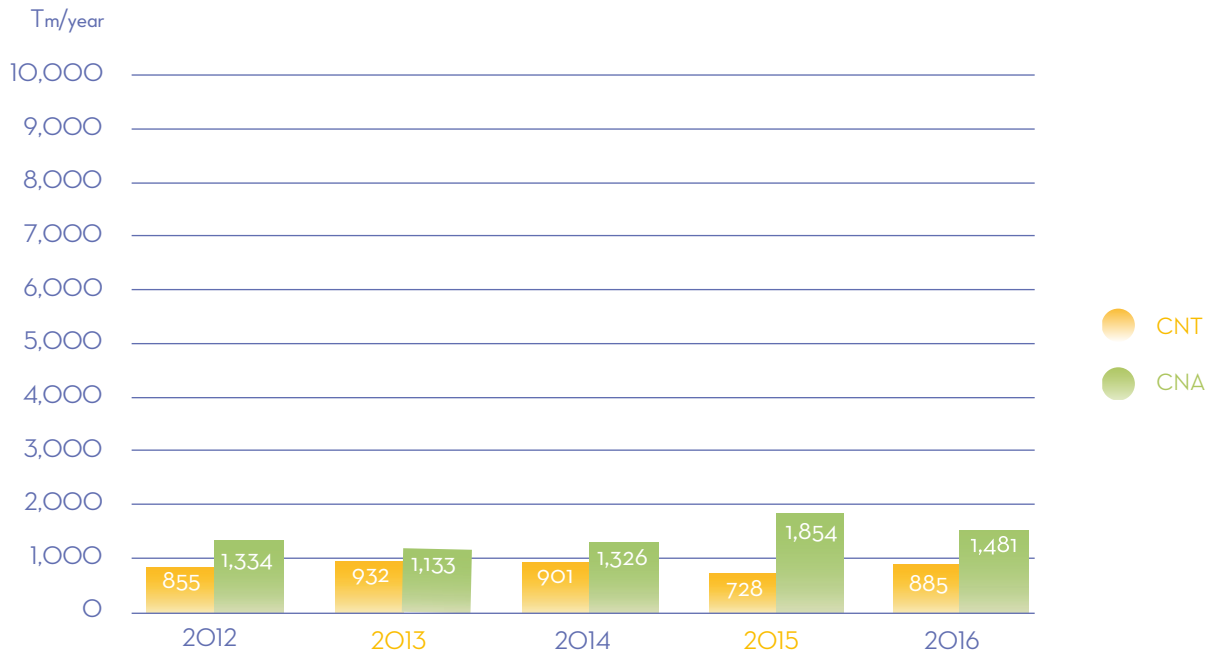
Another important contribution is the generation of sludge from water pre-treatment at both plants, which has become a routine source of non-hazardous waste generation, following the commissioning of new pre-treatment plants at the Almaraz and Trillo NPPs in 2012, as the following graph shows proportionally compared to other categories.

NON - HAZARDOUS WASTE CATEGORIES 2.016 (ALMARAZ - TRILLO)



The year on year evolution of non-hazardous waste (excluding CDW due to its sensitivity to extraordinary variations as previously discussed) is shown below.

NON - HAZARDOUS WASTE

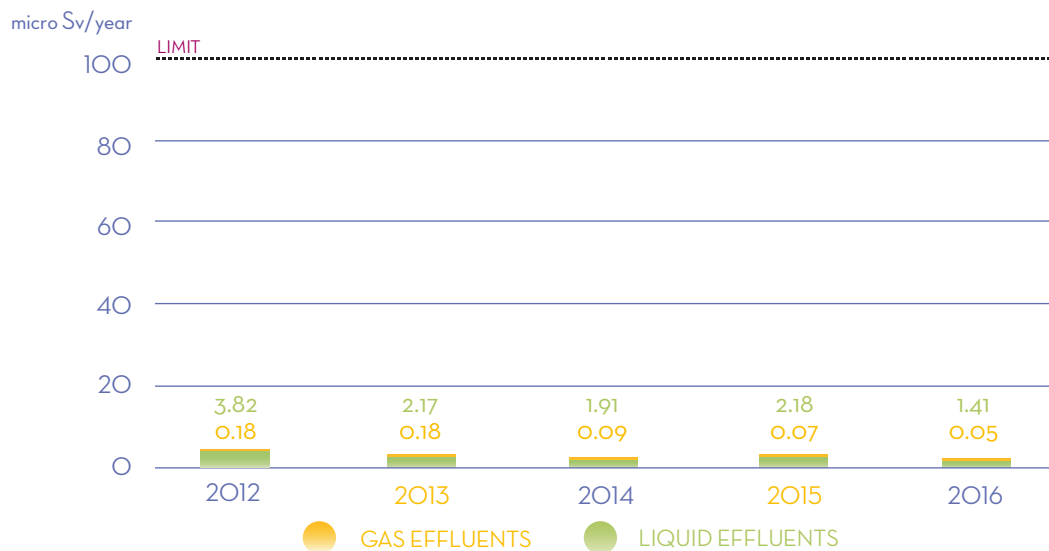


Calculated effluent doses

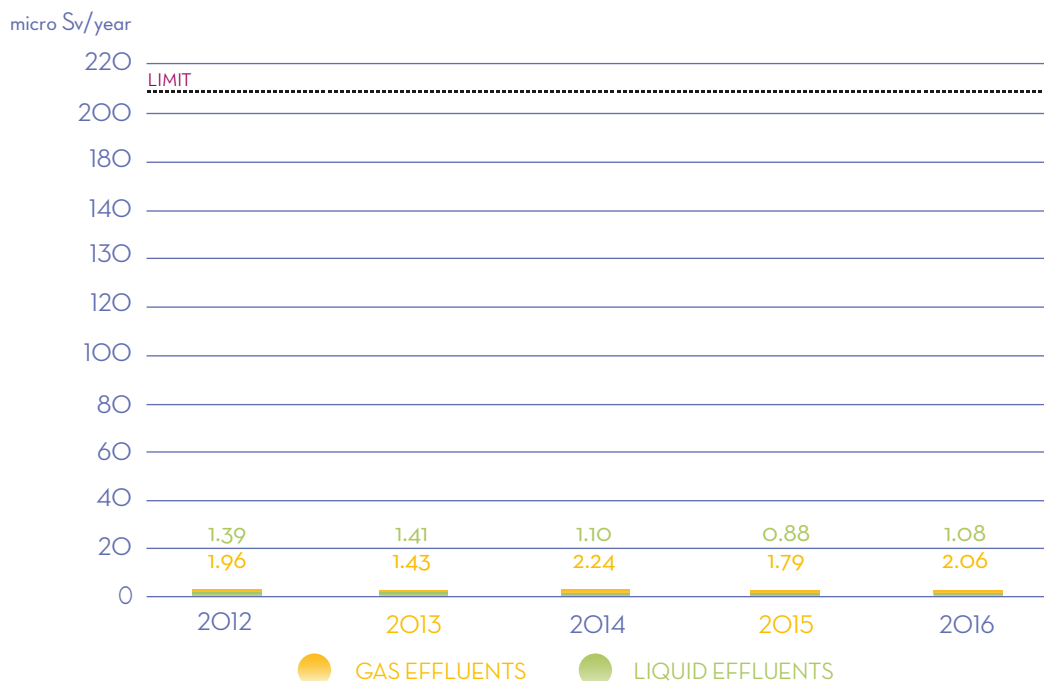
External doses resulting from effluents from both plants, either as liquids or to emissions to the atmosphere, remain at very low levels, demonstrably less than the limits established by the Nuclear Safety Council, and they reflect the corresponding External Doses Calculation Manuals - EDCMs. These doses are insignificant compared to those originated by natural background radiation, and the associated graphs show the year-on-year changes.

Natural background radiation is of the order of 700 to 1200 $\mu\text{Sv}/\text{year}$ in areas surrounding the sites, while radiation from doses resulting from operation of the Plants lies in the range 50 - 100 times lower, in the most unfavourable situation. The true calculation of doses, taking into consideration human geography and the actual activities taking place close by, results in values even less than those referred to, which means the contribution to environmental radiation from operation of the Power Plants is insignificant.

EXTERNAL DOSE FROM EFFLUENTS TRILLO NPP



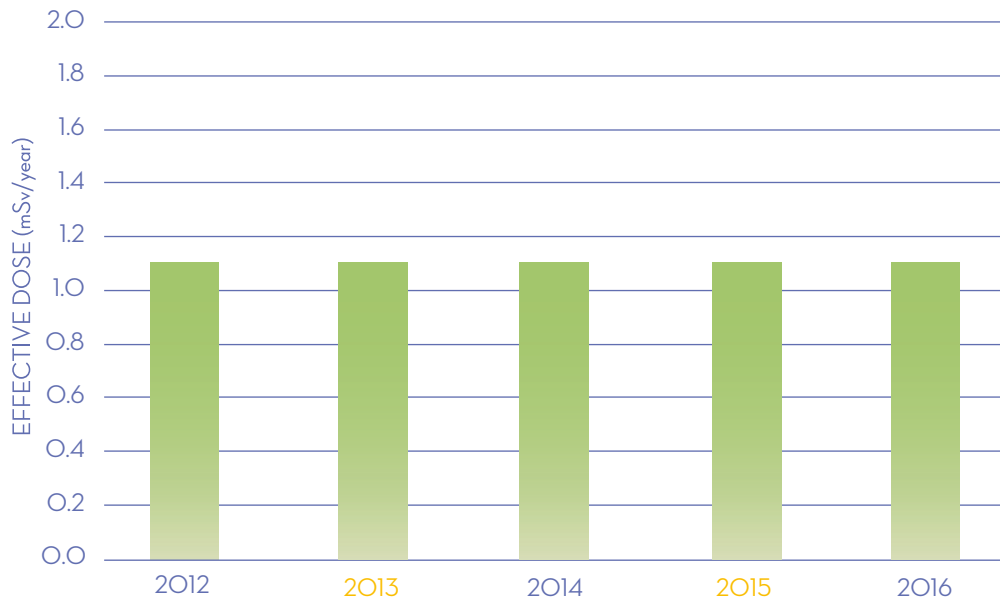
EXTERNAL DOSE FROM EFFLUENTS ALMARAZ NPP



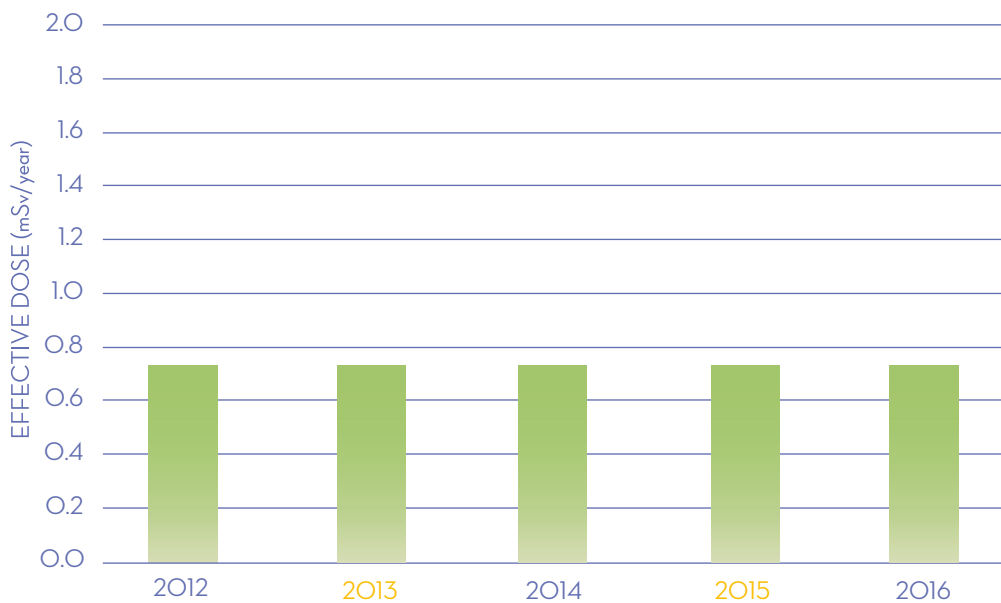
Doses measured during environmental radiological surveillance

The evolution of dose values, measured near both Plants as part of the relevant of environmental monitoring programmes, and comparison of the 2016 values for the Almaraz and Trillo NPPs with the Nuclear Safety Council REVIRA programme values, specified for our site, give results even lower than the natural surroundings in several areas.

ALMARAZ NPP ENVIRONMENTAL RADIOLOGICAL MONITORING ENVIRONMENTAL DOSE



TRILLO NPP ENVIRONMENTAL RADIOLOGICAL MONITORING ENVIRONMENTAL DOSE



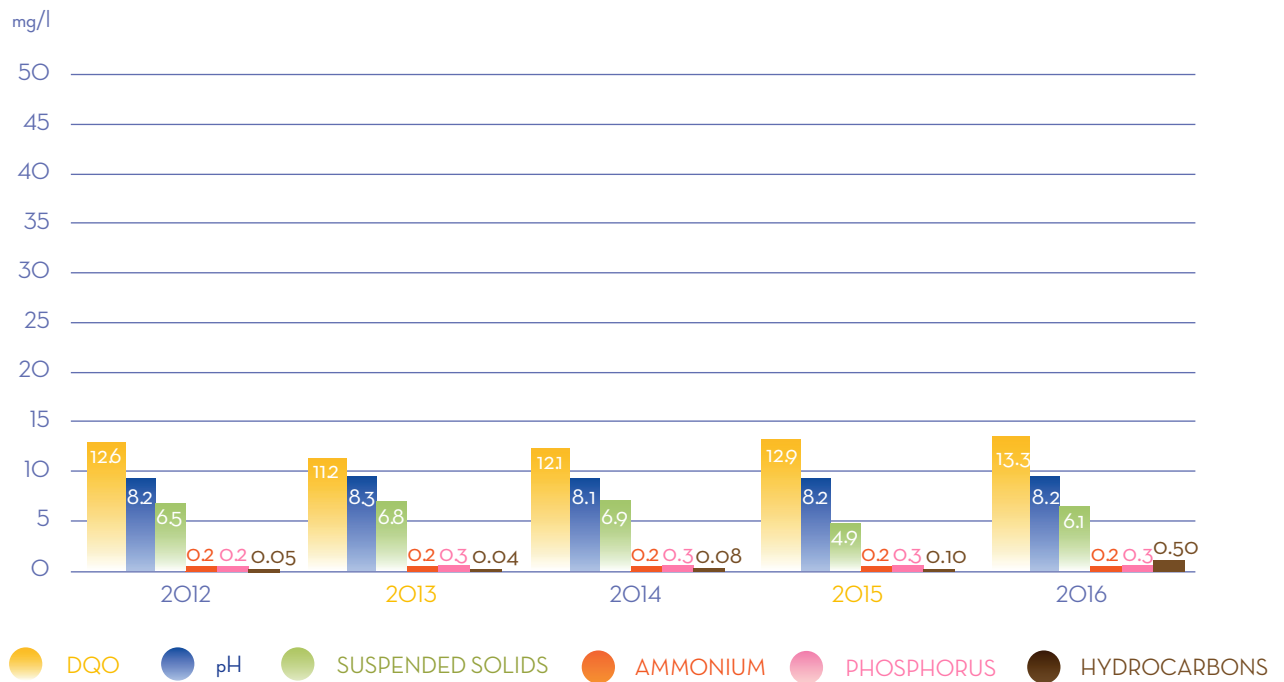
ENVIRONMENTAL DOSIMETRY: ALMARAZ - TRILLO
COMPARISON WITH REVIRA-CSN STATION



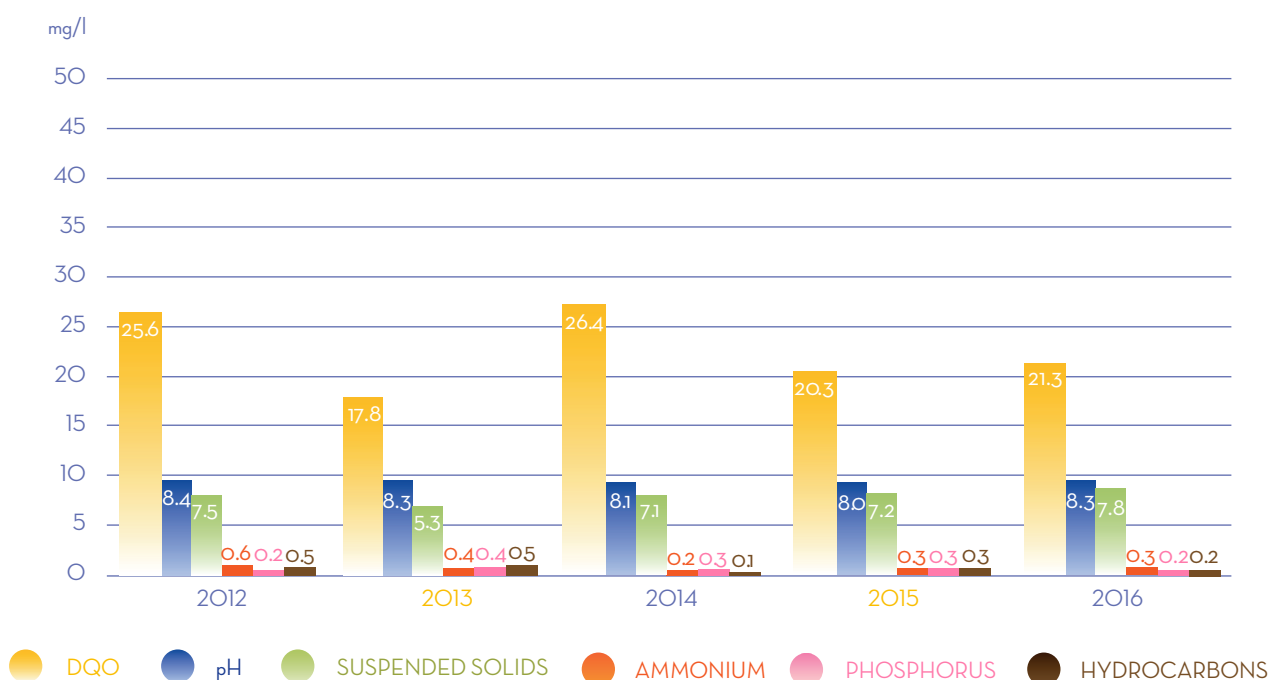
Physico-chemical discharges

Effluents from plants are treated prior to discharge to the receiving environment, and the physico-chemical parameters are exhaustively monitored. The following graphs show the evolution of the main parameters limited by discharge authorisations, which are sent monthly to the Tagus River Basin Confederation.

PHYSICO - CHEMICAL DISCHARGES TRILLO NPP



PHYSICO - CHEMICAL DISCHARGES ALMARAZ NPP



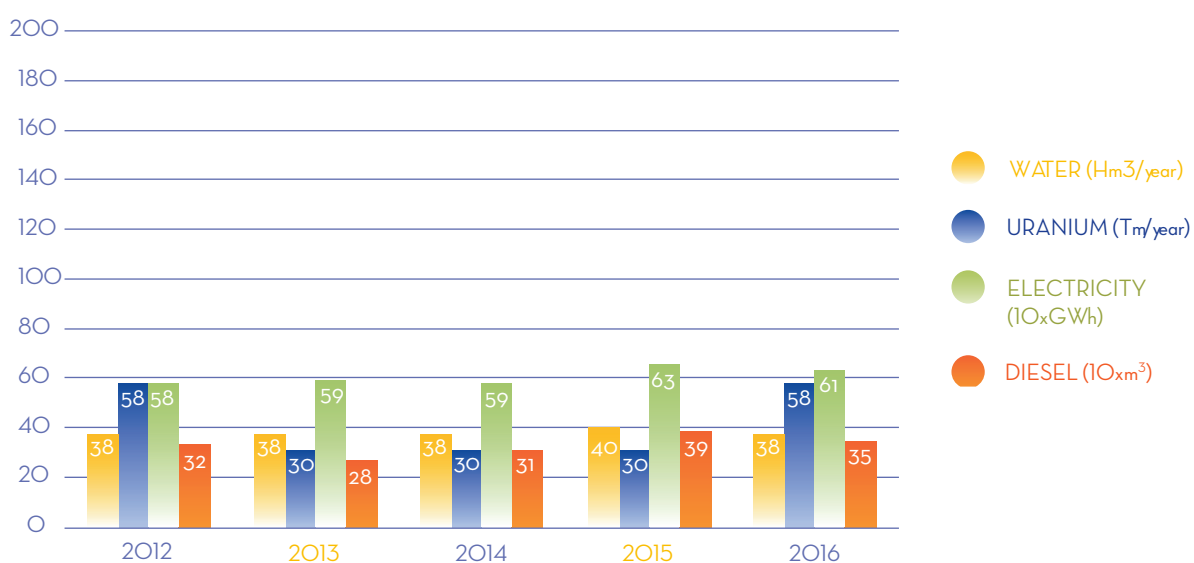
Resource consumption

This Environmental Issue category refers to the use of abiotic resources, whether by the main power generation production process, or by auxiliary services.

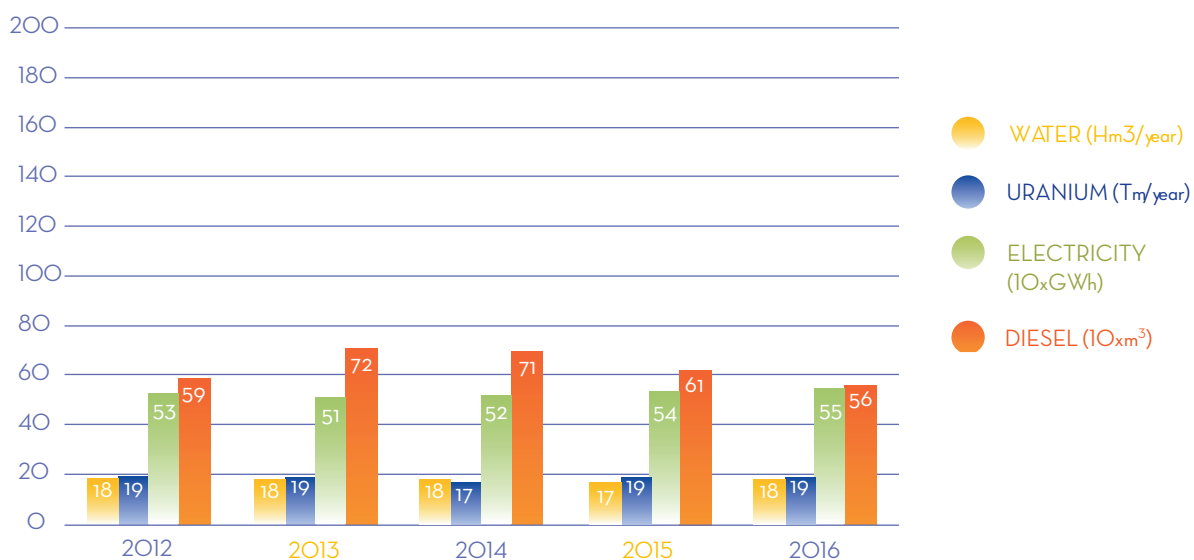
The main consumption consists of:

- Enriched uranium
- Water
- Electricity (own consumption)
- Diesel (Emergency Electricity Generation Systems, auxiliary steam on shut-downs, FP and vehicles).

RESOURCE CONSUMPTION ALMARAZ NPP



RESOURCE CONSUMPTION TRILLO NPP



5. LEGISLATION

The Environmental Management System defines a procedure to ensure identification and compliance with environmental legislative requirements applicable to the installations. It uses a software program and legislative database, updated monthly, which incorporates all conventional legal or voluntary provisions typified within the scope of applicability to the Almaraz-Trillo Nuclear Plants, with the corresponding detailed requirements extracted.

The legislative compliance verification process is performed every six months, and this is discussed by the A.I.E. Board in the Environmental Committees, and during the Annual Review of the Environmental Management System by the Board.

With regard to legislation, the emergence of the following legislation had particular relevance for our activities in 2016:

- **Instruction (Extremadura) 1/2014**, issued by the Directorate General for the Environment, on the procedure for Authorising and Notifying Potential Atmospheric Polluting Activities.
- **Royal Decree 56/2016** of 12 February, amending Directive 2012/27/EU of the European Parliament and of the Council, of 25 October 2012 on energy efficiency, regarding energy audits, accreditation of service providers and energy auditors, and promoting energy supply efficiency.
- **Order of 1 April 2016** general fishing restrictions in the Autonomous Community of Extremadura.
- **Order 18 May 2016** establishing the period of high danger of forest fires for the INFOEX Plan and regulating the use of fire and activities that could cause fires during that period in 2016.
- **Regulation (EU) 2016/918** of 19 May 2016 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) no. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures.
- **Order (Castilla - La Mancha) of 19 January 2016**, on the 2016 Fisheries Restrictions, and **Order of 23 June 2016** amending the Order of 19/1/2016.
- **Order 11 October 2016** establishing the period of high danger of forest fires for the INFOEX Plan and regulating the use of fire and the PREIFEX Plan prevention measures for application during the period.
- **Order 24 October 2016**, Technical Part of the Forrest Fire Prevention Plan in the Autonomous Community of Extremadura.
- **Decree 76/2016**, of 13/12/2016, by which the Bonelli's Eagle Recovery Plan (Aquila Fasciata) is approved and critical areas are declared sensitive areas for survival of this species in Castilla-La Mancha.
- Resolution of the Tagus Hydrographic Confederation, of the Ministry of Agriculture, Food and Environment of 27 September 2016, modifying the corporate change in the composition of the holder of the concession to use waters destined for the Almaraz Nuclear Power Plant.
- Authorisation of the Tajo Hydrographic Confederation for the installation of a floating barrier next to the intake to Trillo Nuclear Plant.
- Trillo Nuclear Plant (Steam Boilers) authorisation for potentially atmospheric polluting activity.

6. ENVIRONMENTAL AUDITS

From 26 September to 30 September 2016, the third-cycle of the Environmental Management System Audit (ISO 14001) was carried out by the Spanish Association for Standardisation and Certification (*Asociación Española de Normalización y Certificación - AENOR*), after the Certificate had been in force for eleven years, and was found to be compliant.

The auditors inspected the Almaraz and Trillo plants and the activities at the Power Plant Offices. Previously, in April, an internal audit of the System was performed, an obligatory part of the verification process.

There were several inspections by the Nuclear Safety Council on subjects related to the environment at both plants.



7. ENVIRONMENTAL MONITORING PROGRAMMES

Almaraz and Trillo Plants have historically performed several environmental monitoring programmes, with the aim of verifying the absence of significant environmental impacts as a consequence of their activities, whether of a radiological or conventional type.

The content of these programmes is detailed below:

Studies of Almaraz Nuclear Power Plant surroundings

Two environmental studies of the areas surrounding the Almaraz plant were carried out incorporating the Arrocampo and Torrejón reservoirs.

- Ecological Study of the aquatic ecosystem.
- Thermal study of the reservoirs.

These surveys are far reaching because the Arrocampo also must be considered as another Plant system, as it was constructed exclusively for industrial use in cooling Almaraz NPP, as it is used for the final heat dissipation and therefore it is necessary to understand as accurate as possible its characteristics with regard to its ability to fulfil its cooling function, in both the short and long-terms. This requires intensive monitoring and surveillance of both physical

and chemical parameters, especially temperature, as well as biological factors.

The main characteristics of the Arrocampo reservoir are as follows:

- Capacity 35.5 hm³.
- Very elongated form, with a length greater than 10 Km and a surface area of 7.73 Km², with a predominance of shallow water.
- Divided into two parts with a thermal separation screen which requires the cooling water to execute a path approximately 25 km along the reservoir facilitating cooling prior to returning to the cooling intake.
- The natural hydric supply to the Arrocampo reservoir is much reduced, and is fed mainly by water from the river Tajo, through pumping.
- The water added to the Arrocampo reservoir from the Torrejón reservoir has a high nutrient level, particularly phosphorous and nitrogen.
- The contribution of these nutrients, combined with the effect of the water temperature causes the development of a significant biomass of planktonic organisms in Arrocampo, whose metabolic processes influence the quality of the water, and which must therefore be controlled and monitored.



Ecological Study of the Arrocampo and Torrejón reservoirs

Two studies carried out in an independent and coordinated manner are used to monitor the aquatic ecosystems of both reservoirs:

- Limnological study
- Ichthyological study

The limnological study sampling and analysis programme consists of sampling and measurement points and is carried out with the frequency detailed in the following table:

RESERVOIR	NUMBER OF SAMPLING POINTS	
	LIMNOLOGICAL STUDY	ICHTHYOLOGICAL STUDY
ARROCAMPO	7	7
TORREJÓN	8	10
VALDECAÑAS	1	-
ESSENTIALS	3	-
MEASUREMENT/ SAMPLING FREQUENCY	MONTHLY/SEASONAL	QUARTERLY

These studies are used to determine the state of the ichthyofauna, and the diversity and abundance of species, paying attention to their evolution over time. From a limnological viewpoint, the plankton state is monitored in detail, as well as the wide variety of physico-chemical variables.

The results obtained from both studies, which are sent to the Administration, indicate the existence of a dynamic equilibrium in the ecosystem consisting of the Arrocampo reservoir, which is observed to be affected fundamentally by the plant's power level, the physico-chemical characteristics and the volume of water provided from Torrejón, and the meteorological conditions in the area. This state of equilibrium has not experienced any significant modification during recent years. The Torrejón reservoir shows conditional zoning, in the initial stretch because of the channelled flow from the deep water of the Valdecañas reservoir, in the middle stretch a result of the recirculated flow from the Arrocampo reservoir, and in the final stretch because of the pumped flow from the Tiétar.



Thermal Study of the Arrocampo and Torrejón reservoirs

Exhaustive monitoring of the temperature trends in the water in the Arrocampo and Torrejón reservoirs has been carried out, and an evaluation of the values measured with the objective of understanding the thermal impact which plant operations have on the water mass.

Continual measurement and recording systems are also provided to measure temperature, the pH value, dissolved oxygen and water flow in the Arrocampo overflow, with the objective of verifying the basic characteristics of the discharge from Arrocampo.

In order to comply with the conditions of the water exploitation concession, the most relevant information about the thermal state of the reservoirs is sent monthly to the Tajo Hydrographic Confederation as the responsible management body, to keep it constantly updated about this condition.

Study of the Trillo Nuclear Power Plant surrounding areas

The environmental study of the aquatic ecosystems carried out near the Trillo plant consist currently of monitoring the river Tajo, where the thermal surplus discharge is made after cooling in the towers, and the general physico-chemical condition of the Plant, and the Entrepeñas reservoir, located downstream in the proximity of the Plant.

This study includes evaluating the water quality from the physico-chemical viewpoint, 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, phyto and zoo plankton and ichthyofauna.

The capture of water from the river Tajo is taken from the water held by the Ermita dam, cons-



tructed to guarantee a constant level to enable the functioning of the pumps supplying the Plant, which is subsequently discharged to the river again after fulfilling its cooling function, immediately into the water downstream of the dam through a diffuser system which facilitates complete mixing with the flow in the river

The Plant is situated at the extreme end of the zone of upper Tajo, where the river experiences significant flow variations due to the non-existence of water regulation from the higher reaches causing flooding, although minor, with a frequency coinciding with episodes of intense rainfall, which have a bearing on water quality due to the debris picked up at such times.

Generally, the waters of the Tajo around the Plant are of good quality, and can be characterized as oligotrophic.

The Entrepeñas reservoir is located downstream, close to the Plant, and its principal characteristic is the low level experienced in recent years, and the significant variations in levels experienced throughout the year. The basic use made of the water stored in the Entrepeñas reservoir is for hydroelectric production and irrigation, as, together with the Buendía reservoir, they constitute the reserve for the Tajo-Segura transfer.

The sampling and analysis programme consists of 4 sampling points situated upstream and downstream of the Ermita weir, including a point located in the Entrepeñas reservoir, capturing samples of water with a monthly frequency, and sediments, benthic algae, phyto and zoo plankton and ichthyofauna, with a quarterly frequency.



Environmental Radiological Monitoring

The Almaraz and Trillo Plants exercise continuous strict control and monitoring of their own radioactive effluent emissions. Nonetheless, with the objective of verifying experimentally the impact radioactive elements might have on the environment, the plants have implemented an Environmental Radiological Monitoring Programme (ERMP) through direct measurement of radiation levels in the surroundings near to the installations, and of the content of radioactive substances from a series of types of environmental samples which are collected from a set of sampling points.

Comprehensive monitoring is carried out on all abiotic elements and living organisms represented in the ecosystems associated with all the natural resources of the surroundings of the plants (air, land and water).

The usefulness of the analytical results are assured through parallel implementation of a quality control programme by another, independent laboratory, and by the implementa-

tion of a programme of independent monitoring (PVRAIN) directly by the Nuclear Safety Council.

Also, in the case of the Almaraz Plant, a collaboration agreement is maintained with CEDEX to enable this official body, which reports to the Ministry of Development, to carry out independent surveillance of the aquatic resources in the proximity of the Plant. Extremadura Council also carries out independent radiological monitoring, with the help of the University of Extremadura.

The results obtained during 2016 at both plants indicate that the radiological state of the ecosystems of their surroundings have experienced no significant variations during the year, with natural background values remaining unchanged, confirming the absence of environmental effects due to the leakage of radioactive elements, rendering radiologically insignificant any leakages from both plants.

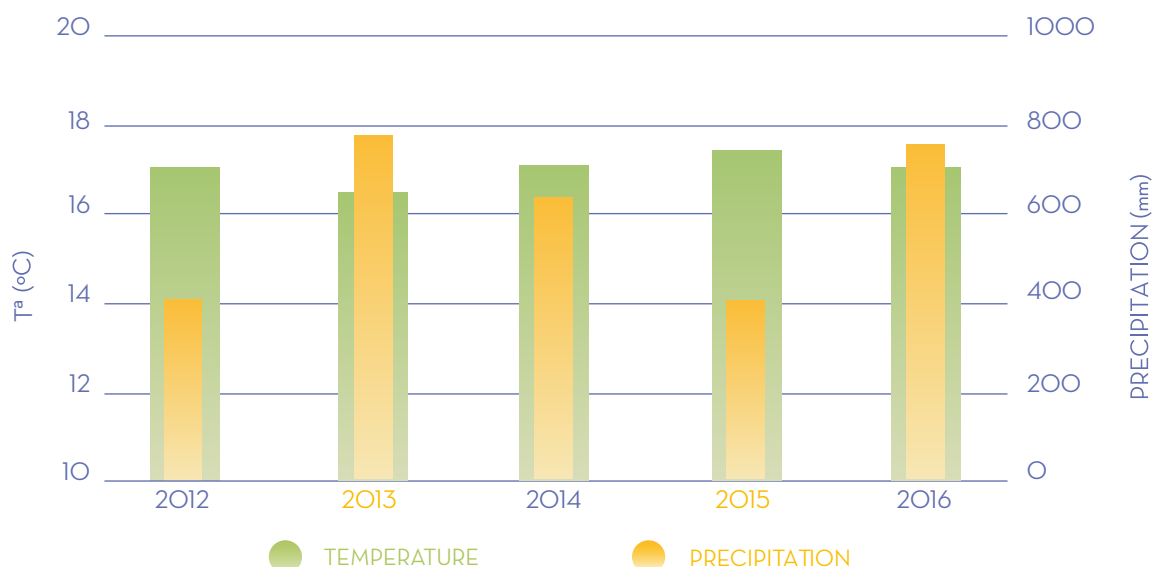
Meteorological Studies

The Almaraz and Trillo plants have meteorological stations which are used continuously to measure and record the most significant parameters such as temperature, precipitation, wind direction and speed, humidity and solar radiation. The meteorological information is of particular relevance for various applications related to the environment, providing an excellent description of the climate at the site, after thirty years of monitoring.

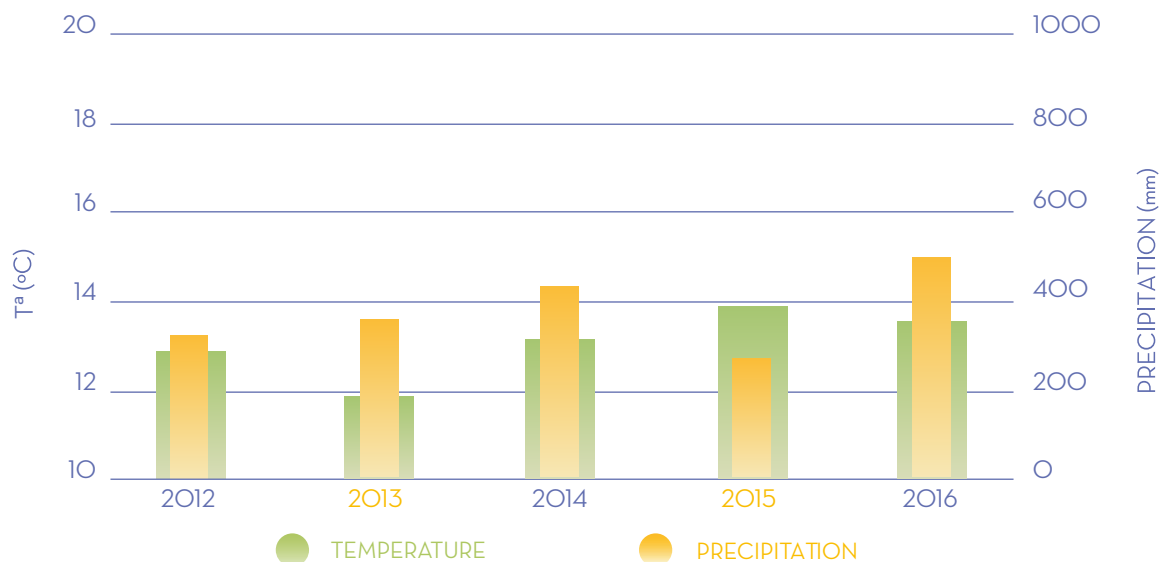
The stations provide the required redundancy to ensure continuous availability of meteorological information.

The average temperature readings and total precipitation registered during recent years at each plant are shown below, as well as the corresponding wind frequency rose diagrams for each direction.

ALMARAZ NPP METEOROLOGY AT THE SITE AVERAGE TEMPERATURE AND TOTAL PRECIPITATION

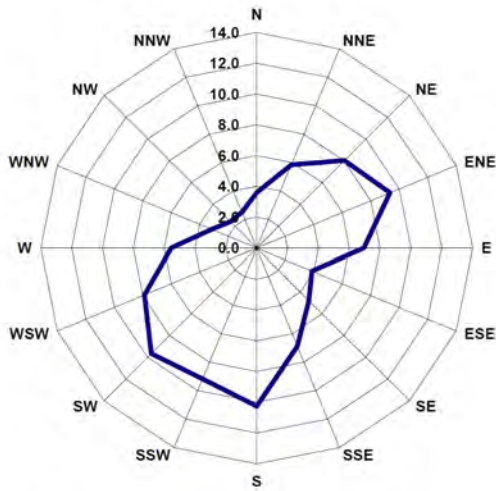


TRILLO NPP METEOROLOGY AT THE SITE AVERAGE TEMPERATURE AND TOTAL PRECIPITATION

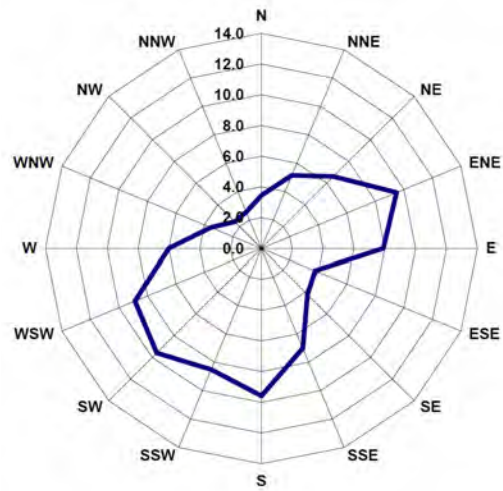


NPP ALMARAZ

Compass Rose of the year 2016

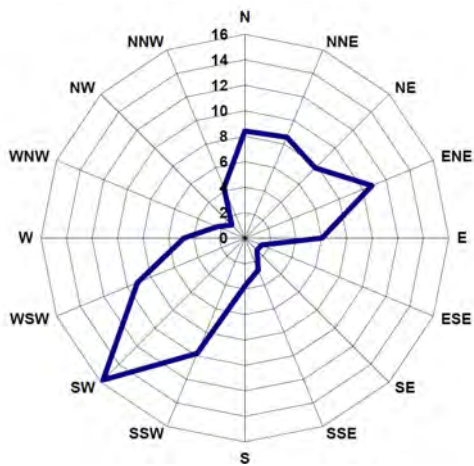


Compass Rose. Period 1987 - 2016

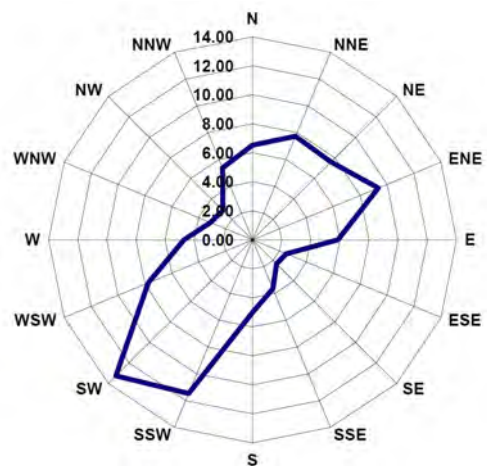


NPP TRILLO

Compass Rose 100 meters 2016



Compass Rose. Period 1976 - 2016





8. RELATIONSHIP WITH STAKEHOLDERS

Local authorities

CNAT continues to maintain fluid and dynamic relationships with institutions with responsibilities in the field of power plant performance, and four biannual meetings were held on this matter in 2016, two at each plant, with the mayors of the municipalities in the areas of influence, and details of the operating results and future plans and projects were provided.

145 personalised meetings were also held with mayors of surrounding municipalities to study on a bilateral basis the relationships of the Plants with each municipality and potential collaboration channels. Local Information Commissions organised by the Ministry of Industry, Energy and Tourism (MINETUR) are being held annually.

Media

A strong relationship with the media is maintained based on truth, transparency and our constant availability to meet their information demands. During 2016, 19 news updates were distributed, providing information about the most significant events at the installations related to various operational and maintenance issues at the plants (refuellings, drills etc., environmental issues and other information of general interest).

Additionally, and specifically, managers responsible for both plants have held biannual meetings with the media in their surrounding area, and they have provided them with relevant information about the installations regarding operating results, and future plans and projects.

Public

Over the years, the Information Centres at the Almaraz and Trillo NPPs have emerged as effective channels of communication with the public. Thanks to the diversity of audio-visual and exhibition resources that they are equipped with, nuclear energy and in particular the characteristics of the nuclear installations and their relevant environmental aspects are much more well known to the general public.

CNAT continues to develop publications, both periodic and specialised. During 2016, several general interest publications have been made available, most of which can be found on the CNAT website (www.cnat.es).

In addition, the organisation has a corporate blog www.energiaymas.es to make the public aware of the activity that takes place in our installations and in the municipalities in their areas.



Immediate vicinity

Almaraz and Trillo NPPs represent an important socio-economic benchmark, as they are an unquestionable source of employment and wealth in their areas of influence. The commitment of the Almaraz-Trillo Plants to their neighbouring communities is apparent in the form of support for initiatives that impact on improving the quality of life and economic and social development of their regions. In 2016, there were several initiatives, and the most significant undertaken in the environmental field were:

- Collaboration Agreement Framework with the University of Extremadura, to implement technical and scientific projects. In addition, the company also collaborates with the Department of Chemical and Energetics Engineering at UEX, for work relating to scientific and technical analysis of the retention of radioactive isotopes by activated carbons prepared from native residues, and the reuse of activated carbons present in Almaraz NPP filters for processing cooling circuit water.
- Agreement with the Department of Ecology, Faculty of Sciences at UEX, to carry out scientific and technical work relating to monitoring spatio-temporal structures and sequences of plant populations in the surrounding areas of Almaraz NPP, and the bird populations that use the Arrocampo reservoir.
- Collaboration agreement between the University of Extremadura and the Almaraz Nuclear Power Plant, through the Chair on Energy and Environment, to encourage the introduction of college students to the professional world, and their integration, after completion of studies by means of scholarships that facilitate contact with the business world.
- Collaboration Agreement with the Association for the Defence of Water Quality (ADECA-GUA) to promote the introduction of school and secondary school teachers to water bodies in general.
- Invitation to the XIX edition of the photographic contest "Nature in Extremadura", with a travelling exhibition of the best photographs of the localities in the area.
- Partnership agreement with the Irrigation Community for the Valdecañas Irrigation Plan.
- Agreement with the Riberas del Tajo Commonwealth.



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