

**An Information Building on Radioactivity and Nuclear Energy for the French CEA
Cadarache Research Center - 13492**

Guy Brunel, Dominique Denis, Alain Boulet
Commissariat à l'Énergie Atomique et aux Energies Alternatives (CEA-Cadarache)
DEN/CEACAD/UCAP,
13108 Saint Paul lez Durance Cedex
France

ABSTRACT

The CEA Cadarache research center is one of the 10 research centers of the French Alternative Energies and Atomic Energy Commission (CEA). Distributed throughout various research platforms, it focuses on nuclear fission, nuclear fusion, new energy technologies (hydrogen, solar, biomass) and fundamental research in the field of vegetal biology. It is the most important technological research and development centers for energy in Europe.

Considering the sensitive nature of nuclear activities, the questions surrounding the issue of radioactive waste, the nuclear energy and the social, economic and environmental concerns for present and future generations, the French Government asked nuclear actors to open communication and to give all the information asked by the Local Information Commission (CLI) and the public [1]. In this context, the CEA Cadarache has decided to better show and explain its expertise and experience in the area of nuclear energy and nuclear power plant design, and to make it available to stakeholders and to the public.

CEA Cadarache receives each year more than 9000 visitors. To complete technical visits of the research facilities and laboratories, a scientific cultural center has been built in 2011 to inform the public on CEA Cadarache research activities and to facilitate the acceptance of nuclear energy in a way suited to the level of knowledge of the visitors. A modern interactive exhibition of 150 m² allows visitors to find out more about energy, CEA Cadarache research programs, radioactive waste management and radiological impact on the research center activities. It also offers an auditorium for group discussions and for school groups to discover science through enjoyment.

This communication center has received several thousand visitors since its opening on October 2011; the initial results of this experience are now available. It's possible to explain the design of this exhibition, to give some statistics on the number of the visitors, their characteristics and their perception after their center visits.

INTRODUCTION

The CEA continues to conduct scientific and technical research in the energy, healthcare and national defence sectors, working in close collaboration with other French nuclear operators, such as EDF and AREVA.

Mainly focused on the nuclear industry, EDF is the main electricity production and distribution company in France, while the AREVA group is involved in the entire range of industrial activities relating to nuclear energy (nuclear propulsion, processing and recycling, etc.).

The CEA Cadarache research is one of the ten research centres of the French Alternative Energies and Atomic Energy Commission (CEA). It is one of the most important centres for energy-related research and technological development in Europe.

The CEA/Cadarache centre, created on October 14, 1959, is located in Saint-Paul-Lez-Durance (Bouches-du-Rhône, France), some forty kilometres to the north of Aix-en-Provence, on the borders of three other *départements* (Alpes-de-Haute-Provence, Var and Vaucluse).

The activities of the CEA/Cadarache centre are divided between several technological research and development (R&D) platforms, mainly focusing on nuclear energy (fission, with 20 Basic Nuclear Installations; and fusion, with Tore-supra and ITER), but also including research into new energy technologies and studies of the effects of radiation on plants (plant ecophysiology and microbiology).

To support these R&D activities, the Cadarache centre has a services platform, bringing together the resources required to:

- manage nuclear materials, waste and discharges from nuclear facilities, and the general resources required to monitor facilities and the environment, and ensure facilities are safe and secure;
- ensure research facilities function correctly (wastewater treatment networks, water, electricity, etc.).

Nearly 6,000 people work daily in Cadarache.

The Cadarache centre is made up of twenty Basic Nuclear facilities (INB) and forty non-INB Classified Environmental Protection facilities (ICPE), including thirty of a nuclear nature.

In total, more than 400 buildings are spread out over a closed-off area of nearly 900 hectares.

NUCLEAR ENERGY, THE FUEL CYCLE, AND WASTE MANAGEMENT

Today a little less than 400 nuclear reactors produce 15% of the world's electricity. Eighty percent of these are "light-water" reactors, in which the core is cooled by ordinary water: This is the case for the 58 pressurized water reactors (PWRs) currently operating in France to meet nearly 80% of the country's electricity requirements.

Typically, after producing energy for three or four years in the core of a PWR, spent uranium oxide (UOX) fuel contains 94% uranium and 1% plutonium—both of which are recyclable energy-producing materials—and 5% waste fission products together with 0.1% minor actinides. Because of its very high

and persistent radioactivity, spent fuel management is a core issue not only for public acceptance of nuclear energy but also as a technical problem. The radiotoxicity of spent UOX fuel is much higher than that of the natural uranium ore used to fabricate the initial fuel. The additional radiotoxicity is due mainly to the fission products for about three hundred years, to the minor actinides for about twenty thousand years, and to plutonium for about three hundred thousand years.

The waste is managed with the objective of durably protecting the human population and the environment from the resulting hazard. From this perspective, two main management routes (or fuel cycle options) can be considered for these materials:

- A closed fuel cycle, in which spent fuel is processed to separate the remaining reusable materials from the ultimate waste. In this option, the radioactive waste elements are incorporated into a glass matrix protected by a metal canister. The resulting waste packages are first placed in interim storage (industrial facilities designed for safe waste management for periods of fifty to a hundred years). Following this period, one option is to dispose of the packages in deep geological formations to ensure long-term immobilization, i.e. to isolate them durably from the human population and the environment so that they cannot migrate into the biosphere before their residual health-related and environmental impact is negligible—just as the impact of nuclear electric power plants and fuel cycle facilities is negligible today.
- An open fuel cycle, in which spent fuel is considered as waste and is packaged directly in canisters. Following an interim storage period, they could be placed as waste in deep geological formations with same objective as in the closed fuel cycle.

France has opted for the first step in closing the cycle by reprocessing spent UOX fuel and recycling the extracted plutonium in PWRs in the form of MOX fuel.

No country to date has yet commissioned a deep geological repository for spent fuel or vitrified waste packages. Like the waste radiotoxicity, the residual thermal power in the waste arises mainly from the fission products during the first century, and from plutonium and americium for the next few centuries. The feasibility of geological disposal with a degree of initial heat depending on the nature of the waste and on the duration of the prior interim storage, requires a conclusive demonstration and guarantee that any release of significant quantities of radioelements into the biosphere is impossible.

Even after the technical feasibility demonstration [2], however, the actual construction of a repository—assuming the decision is made—requires a strong public commitment from the beginning of the project, and must address public concerns related not only to waste management but also to the socioeconomic and environmental implications for present and future generations. Informing and educating the public about radioactive waste management options thus acquires significant or even crucial importance.

COMMUNICATION WITH THE PUBLIC

Scientific progress, industrial risks, and ethical issues raise questions among citizens and strengthen their resolve to better control progress. If the advances of science and technology are to meet the needs and gain the acceptance of the citizens, quality information must be available along with unhindered access to this culture.

In the last half-century, science and technology have lost much of the aura that had made them the principal values of human progress [3]. After the trauma of the nuclear bombardment of Japan at the end of the Second World War, the major accidents at Three Mile Island in the United States, Chernobyl in Ukraine and Fukushima Daïchi nuclear accident altered the popular perception of commercial nuclear energy and made the general population aware of the danger it entails.

With hindsight it is now clear that the problem was largely compounded—at least in France—by a tradition of communication in which the public is given only partial information destined above all to

reassure the population and convince it of the soundness of scientific and technical orientations that are presented as unavoidable. The fears raised by nuclear energy—the risks for workers in the industry, or for those who live near production sites—have thus been supplemented by denunciations of the hazards involved in the transportation and disposal of radioactive waste, even though these activities have been subject to no major accident to date.

Environmental issues are true priorities. These highly complex issues call for major efforts to provide information and scientific education in the face of the legitimate concerns of the population and elected officials.

In a knowledge-based society, democratic governance must provide citizens with the means to participate knowingly in defining the orientations made possible by responsible scientific and technological progress.

These are the concerns addressed by “Communication Building 1220” at Cadarache. In a context where the future of nuclear energy—and in particular radioactive waste—is a subject of nationwide public debate and where the prospect of decommissioning aging power plants is now taking shape, our ambition is to objectively inform the public about nuclear energy and the disposition taken to save uranium resources around the world and to reduce the radio toxicity of industrial nuclear waste.

Communication about the nuclear industry and radioactivity is a difficult undertaking, both conceptually and politically.

CEA Cadarache center attracts two types of visitors:

- Groups of adults: mainly professionals, but also groups of retired persons or local associations.
- Schoolchildren: from primary school to high school, accompanied by their teachers, who sometimes participate in learning activities.

In a word, the goal is not to convince the public or have it adopt one particular viewpoint rather than another, but to inform visitors objectively by showing the advantages and drawbacks of the possible solutions and the research programs associated. In sum, our purpose is never to separate the scientific and technical issues from their social and human consequences, never to hide the dangers or the medium- or long-term consequences of the proposed solutions.

COMMUNICATION CENTRE 1220 : AN INFORMATION CENTER ON RESEARCH ACTIVITIES OF CEA CADARACHE

The CEA, a public-funded research organization in the fields of energy, defense, information technologies and health services, has been present at Cadarache since October 1959, where today it employs about 2,100 people.

Cadarache is the CEA’s center of reference concerning the design of nuclear reactors i.e. the new generations of nuclear reactors that will be able to “burn” minor actinides in order to reduce the radio toxicity of high level radioactive waste resulting from the fuel reprocessing cycle and the development of alternative energies (solar, biofuels..).



Figure 1. **Communication Building 1220**

Main missions of the CEA Cadarache Communication Building 1220 (Fig.1)

The CCB1220 (Fig.2) was created to fulfill two essential missions:

- House a permanent exhibition on the current research programs and strategies carried out at the CEA Cadarache Research Center
- Organize a meeting place for official presentations of the center and debates destined for VIPs and visitors among scientists and nuclear stakeholders.

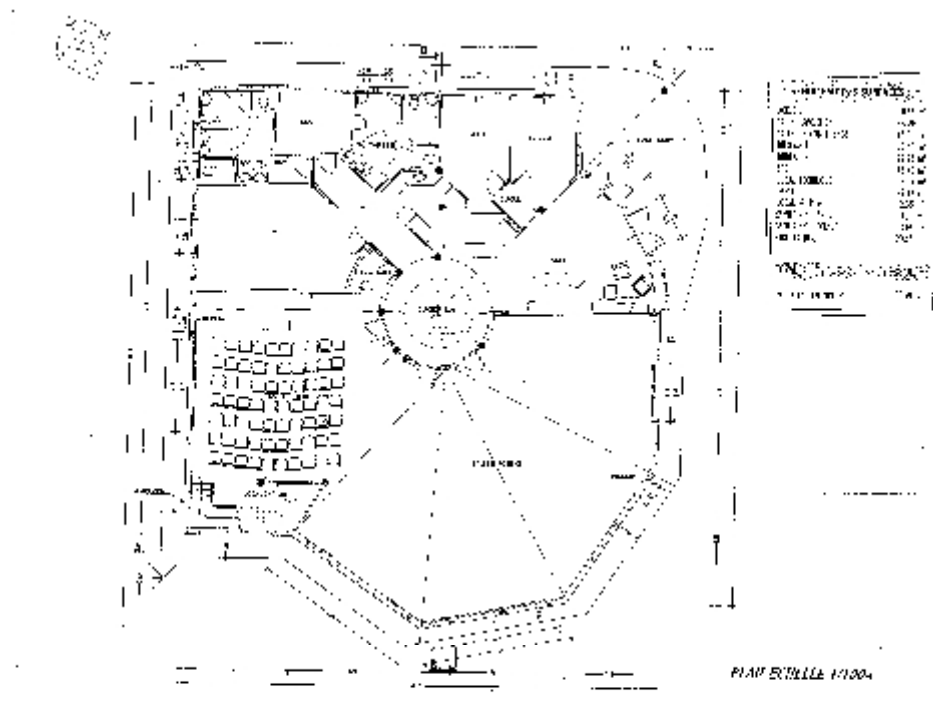


Figure 2. **Communication Building 1220: floor plan**

The CEA center at Cadarache is one of the most important centers of technological research and energy development in Europe and has played a major role since its creation in 1959. With 6,000 people working on its site, it is one of the largest scientific and technological platforms in the Provence-Alps-Côte d'Azur Region (PACA). Located in the commune of Saint Paul-lez-Durance (French department of les Bouches du Rhône) it is about forty kilometers north of Aix-en-Provence and stands at the crossroads of three other departments, namely the Alps of Haute Provence, the Var and the Vaucluse. Every year, the Cadarache center welcomes about 6500 visitors.

Its activities, divided into research platforms, focus on:

- Nuclear fission energy
- Nuclear fusion energy
- The new energy technologies (hydrogen, solar and biomass energies)
- Fundamental research in the field of vegetal biology

In addition to this, there are the "services" platforms, specifically created to ensure the security and safety of the site, the management of nuclear materials and waste and the surveillance of all health and environmental issues.

Cadarache is one of the ten research centers of the French Commission of Atomic and Alternative Energies. Half of the basic nuclear facilities operated by the CEA are set up on its site.

In order to develop the activities presented above, the Cadarache Center relies on a whole series of nuclear facilities that include:

- Experimental reactors (CABRI, EOLE, MINERVE, PHEBUS).
- Research laboratories (LEFCA, LECA, Labo UO₂).
- Facilities providing "nuclear services" for the reprocessing and storage of radioactive waste (CEDRA, Rotonde).

The Cadarache Center is now constructing state-of-the-art tools necessary for the research involved in the Generation 3 nuclear reactors, the future Generation 4 reactors and the improvement of the existing French nuclear infrastructure. On this particular point, several projects dealing with all nuclear fission activities are undergoing further development within the Cadarache Center. Among the most notable are:

- In the field of research:
 - ✓ A new laboratory devoted to the study of nuclear fuels (VERDON)
 - ✓ A new reactor that will enable researchers to test the behavior of nuclear fuels and materials (JHR: the Jules Horowitz Reactor)
- In the field of "backup" or support of these research activities (the renewal of the support facilities)
 - ✓ A storage facility for fissile matter (MAGENTA)
 - ✓ A facility specifically designed for the treatment of radioactive effluents (AGATE)

The new brochure, presenting the activities of Cadarache, is included in the current specifications

Cadarache regularly discusses its missions and activities with the general public, with scientific organizations and with its supervisory authorities. It is also accountable to the Local Commission of Information (LCI)

The Public Affairs and Communication Unit (the "UCAP") at the Cadarache Center is in charge of organizing a communication and information service dealing with all the activities and research projects

involved in the development of nuclear fission. The purpose of this building, located right within the center, is to welcome all types of people coming from different horizons, be they specialists or just people from the general public.

Communication building objectives

The CEA Cadarache Center regularly organizes visits focused on specific themes, dealing with all the fields of activity presented in the introduction of this document. These visits are designed for different types of people, ranging from groups of high school students to scientific specialists or elected officials. Upon their arrival, the visitors are usually given a tour of the center which gives them the opportunity to view the different facilities located on the Cadarache site.

The CEA Cadarache Center must have a special facility designed to welcome these people visiting the Center--a building that provides a general information point describing all the activities of Cadarache in a clear and simple manner. This is, of course, our conference room which also doubles as a presentation hall. But information centers are actually spread out all over the Cadarache site and can be found in many other facilities besides the CCB1220. We might mention the welcome and information center located in the entrance hall of the Fusion facility that deals exclusively with this subject.

The new project involves the creation of a Communication complex designed for people from all walks of life and varying backgrounds. Our goal is to inform them about the following subjects:

- The international energy context and the role played by nuclear activities in the energy mix.
- Nuclear fission: the phenomena, the environmental and human implications, activities and projects developed in this particular field.
- The activities carried out at the CEA Cadarache Center in the field of fission and in its associated facilities with a particular focus given to the Jules Horowitz Reactor.
- Cadarache and the development of new energies

This communication complex will also be used to hold conferences for small groups (a maximum of 60 people)

Speaking in terms of the Center, the purpose of this communication complex is to centralize and organize--in one single area--all our communication tools based on the themes presented above. This can be accomplished through a whole range of information aids and materials such as

- Interactive terminals
- Video screens (instruments of the multimedia)
- Mockups, either mechanical or otherwise, representing the facilities and processes of nuclear activities.
- Panels
- Posters

Since the final objective is to produce a dynamic and effective interactive exhibition, multi-media tools will be our privileged means of communication instead of static supports such as posters and such.

The guides in charge of our visits will therefore have a place to welcome visitors, a special space enabling them to present the activities and fields of research developed on the Center. They can easily plunge the visitors into the heart of the CEA's activities before they actually experience them "physically" during their visits to the facilities.

Targeted audiences

As we mentioned earlier, this new communication complex is designed to benefit people visiting the Cadarache site and even our personnel to a lesser degree. The targeted audiences belong mainly to the following categories:

- The general public
- School groups (secondary schools and high schools)
- VIPs
- Scientists specialized in the field of nuclear energy
- National and international partners of the CEA (universities, research institutes...)
- Elected officials
- Professionals from the world of the media
- Control and evaluation organizations

The knowledge level is considered to be varied; the objective is to satisfy the expectations and preoccupations of all types of audiences.

Organization of the information

Recent current events have stimulated a renewed interest in the international community about nuclear energy production and all of this for the purpose of dealing with the challenges of future energy needs. But further concern also focuses on the need to find a source of energy that will stop the production of greenhouse gases by using reactors that benefit from constantly upgraded safety. Many projects have been launched, particularly in the field of nuclear fission, whether they involve the construction of new reactors called the Generation 3 or EPR reactors or research on fuel behavior and the treatment of these fuels as well as research on the 4th Generations reactors.

Other themes focusing on nuclear energy have also been dealt with in a thorough and decisive manner in recent current events and they primarily concern:

- Nuclear fusion research (the ITER project)
- The new energy technologies (hydrogen, biomass, photovoltaics...)
- The impact of nuclear production on the environment (waste management, treatment and recycling...)
- Safety and security within nuclear facilities.

CEA Cadarache is involved in each and every one of these subjects that are a source of concern to the public and **it is vital to emphasize the commitment of the Center in working to improve research in these fields** and in certain cases to point out the progress made in the situation in relation to the ongoing research aimed at benefitting the rest of the world

Indeed, since its creation, Cadarache has been involved in programs that will enable it to make current reactors safer and more efficient. In the context of the energy crisis at the beginning of the 21st century, the programs carried out at Cadarache are deeply committed to making the nuclear option an enduring and sustainable one: Achieving this can be done by the following:

- Economizing resources: studies on more effective nuclear fuels, on reactors that consume fewer raw materials.
- Reducing the amount of radioactive waste production: the Generation 4 reactors.
- Safer reactors: safety studies, studies on materials
- Preparing for the future by developing non-proliferative reactors: Tore Supra, Iter, Demo.

In the eyes of the general public, the whole image of nuclear energy is often incomplete or spoiled by prejudice. Nuclear energy has always retained a negative image, most notably with regard to aspects of pollution or radioactive danger. The lack of objective information on this subject has contributed to the fact that this negative image endures in the minds of the population. Therefore the goal of this communication complex is to "de-construct" the preconceived ideas that the public has on this subject in order to present, in an objective and positive manner the state of nuclear research in France and the numerous possibilities that this type of energy offers for the future. Acting on this basis, the visitors benefit from all useful input data that will eventually enable them to make their own judgments.

The objective is to start with an overall view of the subject (the worldwide energy context and the role played by nuclear energy) and afterwards to "zoom in" specifically on the field of nuclear fission and the associated research currently carried out on it in Cadarache.

It will also be indispensable to present the other fields of competence present on the Cadarache site but they will be dealt with in a more succinct manner.

The subjects will be presented having a logical link with each other. Even though this place is intended for guided visits and consequently subject to a presentation organized in stages that are linked together, it is possible from time to time for certain visitors to be present in a free manner. As a result it will also be necessary for each exhibit to "stand on its own" and to be consulted in an independent and logical manner by the visitors.

Naturally the presentation and the arrangement of the exhibits will have to be adapted to all types of visitors who arrive there. Handicapped visitors have not been forgotten and will receive all the necessary attention and arrangements they require.

Subjects discussed

Energy

Objective: to place nuclear energy and the studies carried out at Cadarache on fission on fusion and the new alternative energies in the present day energy context.

Presentation of nuclear energy as an essential component in the world of sustainable development.

✓ **The worldwide energy context**

The increase in world population and the economic development of emerging nations within the next twenty or so years will lead to a doubling in worldwide energy needs. The crucial question at the dawn of the 21st century is to know how to meet this demand while managing to limit the use of fossile fuels (oil, gas, coal) which are responsible for global warming and which will rapidly be exhausted.

- The different sources of energy: production techniques, industrial processes, the environmental impact.
- Ever increasing energy needs: population increase, economic growth, the consequences of sustainable development (loss of fossil fuels due to their exhaustion, greenhouse effect...)

✓ **Tomorrow's energy: "the energy mix"**

The policy for tomorrow consists in conjugating our mastery of consummation, the development of renewable energies and nuclear energy.

- Nuclear energy: fission, fusion
- Other types of energy: the renewable energies (solar, biomass, wind and hydrogen energies)

Nuclear fission

Objective: to establish the bases that will enable the visitor to better understand the studies carried out in Cadarache in the field of fission.

✓ **Radioactivity**

What is radioactivity?

Natural radioactivity

Artificial radioactivity

The atom, the nucleus, radioactive radiation

The impact on man and the environment: natural exposure and artificial exposure.

Measuring radioactivity: the units

Irradiation, contamination: How does one protect oneself?

Applications of radioactivity

✓ **Nuclear fission**

Explanation of the fission phenomenon (chain reaction, energy release)

How this phenomenon is used in nuclear reactors.

✓ **The nuclear reactor:**

How a nuclear reactor works, electricity production

The nuclear fuel cycle, radioactive waste

The different reactor types: PWR, FR, EPR and the reactors of the future (GEN IV)

Cadarache acting as a support to nuclear energy

Objective: to demonstrate that through its activities and its facilities Cadarache has participated since its creation in the improvement of safety and in the production of nuclear energy for the current French nuclear infrastructure and will continue to participate in developing the reactors of the future generations (III and IV generations)

✓ **The research reactors**

Cadarache, since its creation, is home to research reactors

- Fast reactors: Rapsodie, Harmonie, Masurca, GEN IV

- Pressurized Water Reactors: Eole, Minerve

- Reactors designed for safety studies: Cabri, Phébus

- Naval propulsion reactors: PAT, CAP, RGN, RES

- Jules Horowitz Reactor (**zoom on the JHR**)

The JHR is an irradiation reactor designed for the study of both nuclear materials and fuels

It is an infrastructure of major research in Europe, acting as a support for safety studies and in the development of the successive generations of nuclear reactors (GEN III and GEN IV)

Partners in the project

It will also enable researchers to produce radio elements for medical purposes.

✓ **The nuclear fuels**

- The fabrication of nuclear fuel: from the gram to the ton

Fuel for Rapsodie, Phenix, Superphénix and the MOX.

- Studies on nuclear fuels:
Improvement of the fission yield, the flexibility, safety and economic competitiveness.
Studies on fuels for future systems (GEN IV)
Laboratories involved in these studies: LECA-STAR, LEFCA, Labo UO2

✓ **Waste and effluent management**

The effluents and the waste from Cadarache are (or will be) processed, conditioned and stored in new facilities, namely CASCAD, Rotonde, Cedra, Agate, Magenta

Cadarache and the new energies

Objective: to show that Cadarache has a commitment to developing new, competitive energies that do not emit greenhouse gases and that respect and preserve the environment.

✓ **Area of solar research**

The present solar platform: thermal behavior of the habitat, electricity production by photovoltaic modules
Mégasolar: Experimental platform of the INES

✓ **The City of Energy**

Experimental platform on 3rd generation biofuels
PROHYTEC: Experimental platform dealing with massive hydrogen production
The area devoted to competitiveness: CAPENERGIES

✓ **Area of fusion research (Zoom on the Fusion department and the ITER site)**

- Fusion: an explanation of the fusion phenomenon
The advantage of producing energy by fusion: an abundant fuel, no need to transport radioactive matter, increased safety, no greenhouse gas emissions, very little waste production.
- Tore Supra: the largest tokamak in the world with magnetic supra conductors
- ITER: The greatest international research project of all time.
Industrial prototype
The provisional planning
The costs, presented in a few figures
The financing
- DEMO: demonstrator
The next stage

✓ **The environmental impact of Cadarache**

(The documents are associated: Map on the table, The Transparency and Safety Report)

The key messages

The key messages that the CEA is trying to put across to its visitors are directly co-related to the type of visitor concerned. Concerning the "General Public" visits, which are the most common, our objective is to

answer the visitors' questions that concern the nuclear energy fields and more specifically questions concerning the activities carried out in Cadarache.

- What are the current energy needs and those of the future and how do we intend to meet them?
- Nuclear energy provides a solution to modern energy needs.
- The activities in Cadarache, acting as a solid backup to safety and the development of future reactor generations.
- The "fission" facilities of the center: their interest and value, their place in the world of research, their objectives.
- The role of Cadarache and its participation in the development of "non-emitting greenhouse gases"
- Cadarache "a concentration of energies"
- What are the differences between the generation reactors 1, 2, 3, 4?
- An understanding of fission and fusion reactions and knowing how to differentiate them.

STRUCTURAL ORGANIZATION OF THE COMMUNICATION CENTER

The building

This communication center was built using a timber frame. Its surface totals about 390 square meters. The major spaces that make up its surface have been divided into the following areas:

- An 85 m² (square meter) conference room
- A 150 m² exhibition hall
- A 30 m² storage room for documentation and information materials
- A 25 m² area divided into two offices
- A 30 m² reception hall

The conference room and exhibition hall (Fig.3 and 4) are separated in order to clearly define the functionality of each. However, given the possibilities offered by the surface, the architect wanted these two areas to be regrouped into one volume, the physical separation being created through the use of furniture or through the use of a mobile partition that can be defined within the framework of the interior arrangements of the rooms for museum purposes.

90 minutes, with groups split between the workshop and the exhibition visit.



Figure 3 : Exhibition hall



Conference room

Figure 4. Communication building exhibition and conference room

The lighting will be designed to optimize the different objects on display.

The planned functioning of this communication center

- The size of groups that the center can accommodate: 10 to 60 people maximum
- The projection space is designed to accommodate 60 people.
- All groups are accompanied and the visit is a guided one.
- The building will not be open to the public on a free entry basis.

Special features expected for this communication center

- It will be the welcoming place of the CEA for general public visits and others as well.

- The presentation will be done in an entertaining and yet practical manner, specifying the subjects discussed earlier.
- CEA know how and talents at the Cadarache center will be emphasized.
- All of the visitors' questions will be answered.
- It will be the reference point for information about the CEA Cadarache Research Center.

PUBLIC IMPACT

The purpose of this evaluation is to assess CEA Cadarache research center visitor statistics for 2012 for example to analyze the visitors to date by categories and the statistical variations in the number of visitors at different periods of the year (Fig 5).

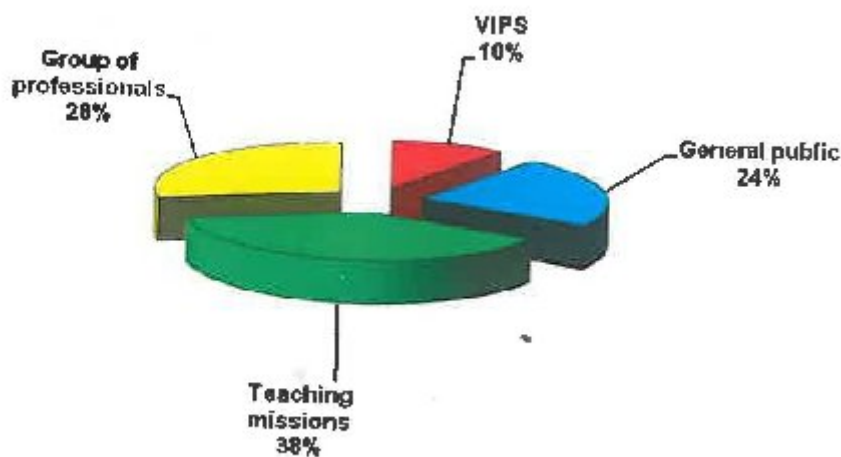


Figure 5. Distribution of visitors by category for 2012

Groups of adults accounted for more than 30% of the total number of visitors. Most of these were “professionals” who came specifically to see facilities at Cadarache.

Schoolchildren and teachers represented more than 38% of the total number of visitors. One of the prime objectives of CEA Cadarache is to attract school-age children, who accounted more in 2013

We collect visitors' remarks in two ways: through an evaluation questionnaire and in the visitor's book. Both are freely available to all visitors.

The visitor messages contain many congratulatory remarks by VIPs, professionals, but also from the general public.

References

1. 2006-686 French Act on transparency and safety for nuclear activities. June 13, 2006. JORF n° 136. June 14, 2006. page 8946, text n°2.
2. 2006-739 French Act on the radioactive materials and waste program. June 28, 2006. JORF n°149, June29, 2003. page 9721, text n°1
3. 2012 French Institute for Radiological Protection and Reactor Safety (IRSN) risk perception and safety by the French population. General Results. January 2012