

WP2

Portugal

Short Country Report

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CONTENTS

1.	Historical context (narrative).....	5
1.1.	Introduction to the historical context.....	5
1.2.	Contextual narrative.....	6
1.3.	Presentation of main actors.....	15
2.	Showcase.....	18
3.	Events.....	22
4.	Facts and figures.....	22
4.1.	Key dates and abbreviations.....	22
5.	References.....	23

Executive summary

This report belongs to a collection of 20 short country reports on the History of Nuclear Energy and Society (HoNESt, project Ref.662268). The reports tackle the complex sociotechnical system around nuclear energy. Nuclear developments, notably nuclear energy, are closely intertwined with social, economic, environmental, political and cultural spheres. Nuclear energy is also a globalized system involving transnational transfers of knowledge, materials, technologies, people and products including electrical power, medical elements, toxic wastes and other environmental hazards, materials, capacities and knowledge that must be carefully safeguarded. Nuclear energy is a complex social and technological phenomenon that influences societies but is also shaped by societies.

The short country reports are designed to assemble information and research results on the history of the relations between nuclear energy and society about all the different country cases in an accessible manner, and to document the findings with references.

The purpose of the country reports is threefold, addressing three different audiences:

1. to provide basic elements of narrative and analysis for further historical research by HoNESt researchers,
2. to provide information, context and background for further analysis for HoNESt's social science researchers,
3. to provide accessible information on nuclear-societal relations in the various countries for the purposes of outreach and communication with stakeholders (civil society, industry, associations, policy makers, journalists).

This report focuses on the history of the relations between nuclear energy and society in *Portugal*. The main findings are:

Possessing uranium deposits was decisive for Portugal to enter the nuclear age. In 1949 and 1956, major agreements involved Portugal and the Combined Development Agency (a UK/US

alliance) for the sale of uranium oxide. The outcome was the export of 1,250 tons to the US until 1962.

Portugal participated in the US Atoms for Peace programme (see USA Short Country Report) by signing the American-Portuguese Bilateral Agreement to acquire a nuclear experimental reactor, in 1955. To house the reactor, a Laboratory for Nuclear Physics and Engineering was inaugurated in 1961. This Laboratory was crucial for the training of technical and scientific experts. Recently it was attached to the University of Lisbon.

CPIN, Companhia Portuguesa de Indústrias Nucleares, was created in 1958 to launch a project to implement nuclear power but, failing this goal, proclaimed its bankruptcy in 1964. Despite this early start promoted by the private sector, all subsequent projects to build a nuclear power plant failed, including the latest attempt in 2006.

Relationships between the nuclear industry and society were only possible after the April 1974 Democratic Revolution which ended a forty-eight year dictatorship.

In March 1976, an attempt at installing a nuclear power plant at the village of Ferrel, in the coastal centre of Portugal, was received with fierce opposition by the local population. This was the first and last case of an uprising against nuclear power.

This incident became a milestone for the Portuguese anti-nuclear movement. This and the difficulty to find an adequate site to install the nuclear power plant led the utility to abandon the decision to build the nuclear power plant.

After the incident at Chernobyl on 26 April 1986, the nuclear power programme was shelved by the government.

Evocation of the Ferrel incident in the media is still evoked as a shorthand for Portugal's anti-nuclear stance.

Mostly hydro and wind but also solar PV, biomass and geothermal energies are gaining ground, presently. However, the instability of wind and hydro power supply still require, in dry years, imports of electricity from (and through) Spain, a country equipped with nuclear power capacity (see Spain Short Country Report).

1. Historical context (narrative)

1.1. Introduction to the historical context

Until April 1974, Portugal was a dictatorship known as Estado Novo (New State), in power from 1933, ruled by António de Oliveira Salazar (1889-1970) and succeeded by Marcelo Alves Caetano (1906-1980), on 27 September 1968. Freedom of speech and association was denied and placed under the control of a political police, censorship was applied to the press and all published material. This means that interactions within society only became visible after the Democratic Revolution of 25 April 1974, after which Portugal entered slowly into the tempo of regular democratic procedures.

Viriato Soromenho-Marques (n. 1957) argues that, in those times “the expansion of the environmental association movement bears a complex relationship with the construction of a representative democratic regime.” The reason for this is that, on the one hand, by the April 1974 Revolution the new constitutional and institutional conditions of liberty of press and association created a climate that favoured the establishment of environmental organizations, opening the way for the participation of citizens in decisions affecting their lives. On the other hand, the need to launch an urgent process to construct the basic foundations of the democratic state relegated the environmental causes to second plan in this scale of priorities, particularly in the first decade of democracy (Soromenho-Marques 2005: 3-4).

Nevertheless, the confrontation between the democratic state’s option for nuclear power and the environmental organizations started early in November 1974, when a member of the Provisional Government announced the nuclear option as a strategic goal to reach energy autonomy. This stance was the spark that set off a process of civilian engagement from which sprang an environmental movement which was profoundly anti-nuclear (Soromenho-Marques 2005: 4).

In March 1976, the Ferrel incident was the first and last case of uprising against the installation of a nuclear power plant. The historical context was peculiar. A new wave of understanding that people could speak for themselves, and that their problems mattered swept the country. Activists of the emergent environmental movement were on the spot to underline this

understanding, gaining political influence in their turn. The result was that the successive governments' nuclear power programme faced several difficulties in its implementation and it was abandoned after Chernobyl, in 1986.

However, the nuclear option still divides the country, as shown after June 2005, when an entrepreneur, Patrick Monteiro de Barros, announced at a Lisbon press conference his proposal to install a nuclear power plant. The nuclear debate on a new energy model for Portugal ensued with the participation of stakeholders for and against nuclear power. However, the government put an end to the debate by announcing that during the parliamentary term ending in 2009, the nuclear option was not contemplated (Rodrigues 2006: 26). No further initiative followed since then.

1.2. Contextual narrative

The uranium drive

As shown in *Table 1, section 4. Facts and Figures*, there has been a remarkable persistence of attempts to implement nuclear power in Portugal. Firstly, the country possessed and still possesses a great number of small uranium deposits scattered over a vast region, although of poor quality. Secondly, scientists and engineers, mostly, were aroused by this background to nurture hopes of a brighter future for their country and for their careers. Yet, are these conditions sufficient to explain the persistence? What were the social, economic, and political contexts and the role played by uranium? How did the interplay of different actors result in the failure to implement nuclear power? This narrative aims at enlightening the circumstances that brought about the nuclear power impossibility.

After 1939, the British government, alarmed by the prospect that Germany might get hold of Portuguese uranium ore, delineated a pre-emptive policy (Perrin 1942) which involved the United States after 1943. This policy was expanded by the Anglo-American Declaration of Trust, of June 1944, which institutionalised the Combined Development Trust (CDT) ("Anglo-American Declaration of Trust" 1984). The consequence of this co-operation was the CDT's request for negotiations with the Portuguese Government, in 1947, ending in the first major agreement of 1949 to acquire 700 tons of uranium oxide until 31 December 1957 (Gaspar 2014: Section 2.3)

Both parties, the Combined Development Trust (named Combined Development Agency, CDA, in 1948) and the Portuguese Government were disappointed with this agreement. The first considered too short both the quantity and the period of the contract; the latter were vexed by the extraordinary low price paid by the CDT/CDA. The result was a revision of the first agreement, signed in 1956, for the uranium oxide export of 1,325 tons to the United States, till the end of 1962, paying an export tax of £3.03 per kg instead of 4.5 shillings (Gaspar 2014: Section 3.3).

The expectations of the scientific and technological community saw light at the end of the tunnel after two institutions, the Comissão de Estudos de Energia Nuclear (Commission for Nuclear Energy Studies, henceforth Commission), introduced tentatively in 1952, and the Junta de Energia Nuclear (Nuclear Energy Board, henceforth Board), were established in March 1954. This technical-scientific framework developed a nuclear programme, electing as their starting points the training of nuclear specialists and a wide geological survey of uranium deposits. In 1955, Portugal participated in the American Atoms for Peace plan which offered Bilateral Agreements to acquire nuclear experimental reactors. Building LFEN, Laboratório de Física e Energia Nucleares (Laboratory for Nuclear Physics and Engineering, henceforth Laboratory) was the consequence of acquiring a nuclear experimental reactor. In sum, the nuclear programme began its implementation because the funds were available from the uranium oxide exported to the United States. Simultaneously, on 29 July 1957, Portugal became founding member of the International Atomic Energy Agency, qualifying as uranium oxide producer (Gaspar 2014: Section 3.4.2). Thus, the Portuguese nuclear programme had two components, one external and one internal, both propelled by uranium, a Latourian non-human agent. The government's internal policy was to implement the conditions that would favour the training of nuclear experts, both abroad and at home by the Commission and by the Laboratory after inauguration in 1961, opening the way for the involvement of nuclear experts in projects at home.

The private sector's intervention

CPIN, Companhia Portuguesa de Indústrias Nucleares, was created in April 1958 to advance proposals to favour the nuclear alternative over thermal energy based on national coal, both intending to complement the announced exhaustion of the hydro-power option and the hydro-power shortages in years of dry weather. CPIN's programme aimed to study the uses of nuclear energy, the implementation of projects resulting from those studies and, as a whole, to promote, create, develop and coordinate activities regarding the production or application of nuclear energy. The leader of this initiative was the nuclear physicist, Armando Gibert (1914-1985), well connected with the industrialists and with the technological and scientific community. CPIN's people were also in contact with the leadership of the Board. CPIN's shareholders were private companies and individuals. Ten electrical utilities, representing more than 40% of the capital, were responsible for 99% of electricity production and distribution, in 1959. Thirteen came from the industrial sector producing a high percentage of chemicals, electrical cables and conductors, high and low tension electrical equipment, electrical motors and transformers, ferrous and non-ferrous metallurgic products, among others. Three shipping companies and one bank (Banco Burnay, SARL) completed the shareholders' private association (*A Companhia Portuguesa* 1961). However, the statutes were clear in preventing CPIN, or their representatives, to engage in electricity production by means of nuclear reactors. This task was reserved for the utilities.

During six years CPIN deployed intense activity, particularly investigating: the promotion of nuclear power production, electricity production and the market, as well as, supporting the training of technicians for the nuclear power plants' operation. In 1962, this activity terminated in a project for a 460 MW experimental nuclear power plant (Gibert 1962; Gibert 1961), but the whole project came to an end in 1964, with CPIN declaring bankruptcy after the government's decision to build a 750 MW thermal power plant at Carregado (north of Lisbon), to burn fuel oil and giving the concession to ETP, Empresa Termoeléctrica Portuguesa (Cabral 2001). Thus, the government showed no interest in the nuclear option in the 1960s. This is understandable considering that the electrification of the country was based on hydroelectric dam construction complemented with thermal energy to run on national coal even though this would soon be exhausted. As far as nuclear technology was concerned it involved great risk because of its

novelty and, in addition, it required a huge investment at a time when Portugal was engaged in a colonial war which consumed the nation's resources. Notwithstanding the close contact of CPIN with the Board and the support of its engineers, the dictatorial government ignored all pressure to face the change to nuclear technology.

On 30 June 2005, little more than forty years after CPIN's insolvency, an entrepreneur, Patrick Monteiro de Barros, announced at a Lisbon press conference his proposition to install a nuclear power plant. Barros's main supporter was Pedro Sampaio Nunes, secretary of State for Science and Innovation in the previous government. A nuclear debate on a new energy model for Portugal was launched but without consequence, because José Sócrates Pinto de Sousa (b. 1957), the Prime Minister from 12 March 2005 to 26 October 2009, declared that the nuclear option was not anticipated during the parliamentary term ending in 2009 (Rodrigues 2006: 26). Recently, in March 2016, Sampaio Nunes seemed that the nuclear debate was over, stating that for Portugal the nuclear was "dead and buried, above all because of its costs" (Cipriano 2016).

The dictatorial state's intervention

In 1973, the trend was for Direcção-Geral de Combustíveis e Reactores Nucleares Industriais (General-Directorate for Fuel and Industrial Nuclear Reactors), a department of the Board, to have limited intervention in nuclear power, engaging in their licensing and inspection. Industrial promotion of the plants was to be left to the respective department in the Ministry of Economy. In March, CPE, Companhia Portuguesa de Electricidade, the successor of Empresa Termoeléctrica Portuguesa, was already involved in planning the construction of a nuclear power plant, requesting the Board to study possible locations which included Ferrel, close to the fishing town of Peniche on the coastal centre of Portugal (Oliveira 2002: 48).

Finally, the dictatorial government decided to launch a nuclear power plant programme which was included in the Developmental Plan for the period of 1974 to 1979, anticipating the construction of the first Portuguese nuclear power plant (*IV Plano de Fomento* 1974: 509–12).

The democratic state's intervention

The Democratic Revolution of April 1974, resulting from a peaceful military intervention, represented a deep change from dictatorship to the new democratic rule. However, this did not apply to nuclear power because the supporters of the nuclear endeavour soon found their way into the government. This was the case of José de Melo Torres de Campos, appointed Secretary of State for Industry and Energy in the first three Provisional Governments from 17 May 1974 to 26 March 1975 (Oliveira 2002: 52, 57, 60). In November 1974, he borrowed the nuclear option from the dictatorship government's Developmental Plan, announcing that it was one of the aims of the government in the struggle for energy self-sufficiency (Soromenho-Marques 2005: 4).

After March 1975, a wave of nationalizations, including banks, insurance companies, and the energy sector, swept the country and is evidence for leftist drift of the government. Another peaceful military intervention, on 25 November, set the stage for a return to normalization during the sixth Provisional Government (19 September 1975 to 23 July 1976) (Telo 2007: 122–6, 169–72). Walter Ruivo Gomes Rosa (b.1919), another key supporter of the nuclear option, was appointed minister for Industry and Technology, on 6 January 1976 (Oliveira 2002: 87). An ex-senior officer of CPE, he had been responsible for conventional thermal plants since the 1960s (Domingos 1978: 120).

In 1975, all companies involved in production, transport and distribution of electric energy were nationalized (“Decree-Law nº 205–G/75” 1975) and, during the sixth Provisional Government, CPE had the means to launch their nuclear programme. In January 1976, they applied to Direcção-Geral dos Serviços Eléctricos (Directorate General of Electrical Services) to install the first nuclear power plant at Ferrel, attaching a “Preliminary Study and of the Site for the First Portuguese Nuclear Power Plant” (Oliveira 2002: 261, n. 156). Prospective work for its installation started, but, on 15 March, a local uprising became a serious threat to the project, though this was not the main obstacle.

The First Constitutional Government (23 July 1976 to 7 December 1977) led by the socialist Mário Soares, included Rosa, a key supporter of the nuclear option, who remained in office as Minister of Industry and Technology until 7 January 1977, and Joaquim Rocha Cabral as

Secretary of State for Energy and Mines another ex-officer of CPE and previous head of their nuclear project (Oliveira 2002: 93, 105). A new policy was adopted for the energy sector intended to stimulate national resources, hydropower and national uranium, for electricity production and to reduce the dependency on thermal electricity, namely imported fuel oil (“Programa do Governo” 1976: 58–60; Oliveira 2002: 93). Meanwhile, in June 1976, CPE was succeeded by Electricidade de Portugal (EDP) to exclusively manage the public service of production, transport and distribution of electricity (“Decree-Law n° 502/76” 1976).

On 31 December 1977, after the fall of the government, the Ministry for Industry and Technology was reorganized and a Gabinete de Protecção e Segurança Nuclear, GPSN, (Bureau for Nuclear Protection and Safety) was set up to supervise nuclear power plants and reactors in all instances (“Decree-Law n° 548/77” 1977; Oliveira 2002: 187–8). Mário Soares was again Prime Minister of the short lived Second Constitutional Government (23 January 1978 to 27 July 1978) with Cabral as Secretary of State for Energy and Base Industries (Oliveira 2002: 141). The governmental programme included the construction of the first nuclear power plant and another thermal plant to burn fuel oil or coal (Oliveira 2002: 254, n.115). The installation of the nuclear power plant project at Ferrel by EDP, Electricidade de Portugal, was then submitted to GPSN. They concluded that the study on which EDP based their plan was unacceptable due to deficiency of fundamental details. GPSN summoned local experts who included those from Geological Services, National Laboratory of Civil Engineering, and National Institute of Meteorology and Geophysics. They argued that EDP’s studies were generally “more descriptive than corroborated, their conclusions were partly omitted and were not substantiated.” Therefore, it would be impossible to license Ferrel without “complementary geological and seismological studies.” (Oliveira 2002: 188). In early 1979, experts of the International Atomic Energy Agency, confirmed GPSN’s conclusions. In March, the Three Mile Island accident did not help the Ferrel case, with movements engaging in the promotion of a better environment (Oliveira 2002: 172).

By 1985, EDP had been unable to present a coherent study to enable the selection of sites to install the nuclear power plant (Oliveira 2002: 177). The Portuguese nuclear power plant programme headed by EDP was not credible and it was for a long time in a blind alley. Its end was anticipated earlier, in 1978, by Alfeu Fernandes Forte, an engineer of EDP, and former

technical employee of the company CPIN. He considered that dispersion of technicians, both of this company and of the Board, into other institutions would thwart the gathering of specialists to participate in the project, the construction, the assembling, and the supervision of a nuclear power plant (Forte 1978: 125–6).

At the end of the ninth Constitutional Government (9 June 1983 to 6 November 1985), headed by Mário Soares, it was perceived that the nuclear programme was unsustainable, “particularly because it lacked the motivation to face the pressure of environmentalists.” The next government headed by Aníbal Cavaco Silva (n. 1945) chose coal for thermoelectric plants and encouraged the development of hydroelectric sources still available (Oliveira 2002: 177). The incident at Chernobyl on 26 April 1986 dealt the final blow to the nuclear programme’s chances of recovery (Oliveira 2002: 180).

Nuclear cooperation between Portugal and Spain

CPIN’s drawback did not discourage nuclear power supporters, particularly some of the engineers who kept the pressure inside and outside the Nuclear Energy Board. In 1967, a joint proposal of the Spanish *Compañía Sevillana de Electricidad* and *Empresa Termoeléctrica Portuguesa* (which had assumed the responsibility to lead the nuclear power plants issue in 1963) was conveyed to both governments to construct a 600 MW nuclear Spanish-Portuguese power plant at the southern border, close to river Guadiana, around 1975. The Board’s experts were summoned to participate in the respective studies but, apparently, the proposal was disregarded, at least, by the Portuguese government (Videira 1969: 3; Simão 2005: 398). In 1969, members of the two Boards (Portuguese and Spanish) engaged in conversations for the Portuguese participation in the Spanish Almaraz nuclear power plant and, again, no consequence ensued (Videira 1969: 3–4).

These conversations were followed by the “General Convention of Scientific and Technological Cooperation between Portugal and Spain” held in Madrid, on 22 May 1970. A document signed by both parties, titled “Agreement between the Government of Portugal and the Government of Spain for the Cooperation on the Uses of Nuclear Energy for Pacific Purposes” waited until 15 March 1971 to be “approved for endorsement” (“Decree-Law nº 118/71” 1971). This agreement had no consequence. It was followed, nine years later, by the “Portuguese-Spanish Agreement

about Co-Operation on Safety Matters of Border Nuclear Installations,” of 31 March 1980. The circumstance of its application was a project to build a nuclear power plant at Sayago, located in the northern province of Zamora on the river Douro hydrographic basin, near the Portuguese border. For this undertaking the Portuguese member of the Technical Permanent Commission, received two reports, “Preliminary Security Report” and the “Analytical and Radiological Study” which assessment was concluded in 1982 (Oliveira 2002: 189, 261–2 n.157). No information was found if these documents had any impact on the fact that this nuclear plant advanced no further than the planned stage.

At the time GPSN, was also called to intervene when several accidents occurred during the installation of the Spanish Almaraz nuclear power plant (Oliveira 2002: 189-90), cooled by the international river Tagus, 100 km from the Portuguese border in the Cáceres province of western Spain. The plant has two reactors of 930 MW: Almaraz I began construction in 1973 and became operational in 1982; Almaraz II began construction in 1974 and became operational in 1984. In March 2016, Almaraz nuclear power plants involved environmentalists and political parties in Parliament claiming that it should be closed-down because its useful period had expired (“Ambientalistas e partidos” 2016). The Parliamentary Commission for Environment of Assembleia da República (Portuguese Parliament) questioned the Portuguese government about the nuclear risk and were reassured by the minister for Environment that the matter was being followed and that Madrid guaranteed the plant to be “operating under absolute safety conditions” (Tomás 2016). Finding their claims had not been fulfilled, on 11 June 2016, more than twenty Portuguese associations participated in a joint Portuguese and Spanish demonstration at Cáceres calling for the closure of Almaraz nuclear power plant (“Manifestação Ibérica” 2016). Presently, as reported by the media, the Almaraz nuclear power plants’ incident is still a matter for concern in Portugal without a satisfactory response from Spain (see Spain Short Country Report).

Investing in the renewables' alternative

At the end of World War II, the electrification programme of Portugal based on hydro-power with the necessary complement of national coal, was a late decision of the dictatorial government of Salazar, expecting to promote energy independence (Rollo 1996: 349–50). However, by the end of the 1970s, hydro-power totalled 2,268 MW (58%) against 1,632 MW (42%) of thermal-power, which was gaining ground to reach 3,555 MW (54%) against 3,069 MW (46%) of hydro-power, end of the 1980s. Thermal electricity production was gaining momentum and to beat it new renewable energies (wind, low hydro-power, photovoltaic, and biomass) entered the market with high hopes on wind energy. In 2015, the renewable energies' share was 48.1% against thermal's 47.3% however Portugal still imports electric energy in times of drought which is of nuclear origin.

Conclusion

The nuclear power quest started in Portugal in 1958 and was pursued in the following decades (*Table 1, section 4. Facts and Figures*). It was a sequential failure, and joint ventures with Spain were not successful either, even after an agreement of cooperation was signed in 1971. The Ferrel event has a twofold meaning. On the one hand, it stands for the tentative effort of EDP to install a nuclear power plant in Portugal and on the other hand, it was strongly connected with the emerging environmentalist movement in Portugal, which made the anti-nuclear option their banner. Finally, after 1985, the government of Cavaco Silva decided to abandon the nuclear power plants programme. The successive persistence and failure in implementing a nuclear power programme in Portugal withered away with time.

In the long run, the nuclear energy alternative does not seem to be an option for Portugal, even in a scenery of electric mobility to substitute oil derivatives in transports, because the growing consumption of electricity may be covered by gas thermo-plants and by developing the renewables. From last 7 May to 11 May, during 107 hours, electricity consumption was totally covered by renewables, as reported widely in the press. Besides, an estimate of net consumption of 100% renewable electric energy has been advanced for 2040, by António Sá Costa, leader of APREN-Association for Renewable Energies (Azevedo 2016). Nuclear fusion is the greatest hope for clean and abundant energy but is still a distant possibility because the first tests have only been anticipated for 2025 ("Reactor de fusão nuclear" 2016).

The Democratic Revolution of 1974 set off a stage of difficult times for the Laboratory of Nuclear Physics and Engineering but a low-profile operation has been safeguarded to the present. On December 22, 2011, the government decided to integrate it in Instituto Superior Técnico (Higher Technical Institute) of the University of Lisbon, as IST/Instituto Tecnológico e Nuclear (“Notas Históricas” 2016).

At present, a reflection of the earlier policy of supporting nuclear expertise is the participation in the EURATOM Fusion Programme through Instituto de Plasmas e Fusão Nuclear, an institution attached to the Higher Technical Institute (“About Instituto de Plasmas” 2016).

1.3. Presentation of main actors

Companhia Portuguesa de Indústrias Nucleares (CPIN)

CPIN was created in April 1958 to advance proposals to favour the nuclear alternative over thermal energy based on national coal, both intending to complement the announced exhaustion of the hydro-power option and the hydro-power shortages in years of dry weather. The leader of this initiative was the nuclear physicist, Armando Gibert (1914-1985), well connected with the industrialists and with the technological and scientific community. CPIN’s people were also in contact with the leadership of the Board. CPIN’s shareholders were private companies and individuals.

During six years CPIN deployed intense activity, particularly investigating: the promotion of nuclear power production, electricity production and the consuming market, as well as, supporting the training of technicians in the operation of nuclear power plants. In 1962, this activity terminated in a project for a 460 MW experimental nuclear power plant (Gibert 1962; Gibert 1961), but the whole project came to an end in 1964, with CPIN declaring bankruptcy after the government’s decision to build a 750 MW power thermal plant at Carregado (north of Lisbon), to burn fuel oil and giving the concession to ETP, Empresa Termoeléctrica Portuguesa (Cabral 2001). Thus, the government showed no interest in the nuclear option in the 1960s. This is understandable considering that the electrification of the country was based on hydroelectric

dam construction complemented with thermal energy to run on national coal even though this would soon be exhausted. As far as nuclear technology was concerned it was seen to involve great risk because of its novelty in addition to the huge capital investment required at a time when Portugal was engaged in a colonial war which consumed the nation's resources.

Laboratory for Nuclear Physics and Engineering

The expectations of the scientific and technological community saw light at the end of the tunnel after two institutions, the Comissão de Estudos de Energia Nuclear (Commission for Nuclear Energy Studies, henceforth Commission), introduced tentatively in 1952, and the Junta de Energia Nuclear (Nuclear Energy Board, henceforth Board), were established in March 1954. This technical-scientific framework developed a nuclear programme, electing as their starting points the training of nuclear specialists and a wide geological survey of uranium deposits. In 1955, Portugal participated in the American Atoms for Peace plan which offered Bilateral Agreements to acquire nuclear experimental reactors. Building LFEN, Laboratório de Física e Energia Nucleares (Laboratory for Nuclear Physics and Engineering, henceforth Laboratory) was the consequence of acquiring a nuclear experimental reactor. The government's internal policy was to implement the conditions that would favour the training of nuclear experts, both abroad and at home by the Commission and by the Laboratory after inauguration in 1961, opening the way for the involvement of nuclear experts in projects at home.

The Democratic Revolution of 1974 set off a stage of difficult times for the Laboratory but a low-profile operation has been safeguarded to the present. On December 22, 2011, the government decided to integrate it in Instituto Superior Técnico (Higher Technical Institute) of the University of Lisbon, as IST/Instituto Tecnológico e Nuclear ("Notas Históricas" 2016).

The democratic state's nuclear intervention

After the Democratic Revolution of 1974, the First Constitutional Government (23 July 1976 to 7 December 1977), led by the socialist Mário Soares, adopted a new policy for the energy sector intended to stimulate national resources, hydropower and national uranium for electricity

production, and to reduce the dependency on thermal electricity, namely imported fuel oil (“Programa do Governo” 1976: 58–60; Oliveira 2002: 93). Meanwhile, in June 1976, Electricidade de Portugal (EDP) had been appointed to superintend, exclusively, the public service of production, transport and distribution of electrical energy (“Decree-Law nº 502/76” 1976).

Mário Soares was again prime minister of the short lived Second Constitutional Government (23 January 1978 to 27 July 1978). The governmental programme included the construction of the first nuclear power plant and another thermal plant to burn fuel oil or carbon (Oliveira 2002: 254, n.115). A project for the installation of a nuclear power plant at Ferrel was then submitted by EDP to the government but it was rejected on technical grounds. In March 1979, the Three Mile Island accident did not help the Ferrel case, with movements campaigning for a better environment (Oliveira 2002: 172).

By 1985, EDP had been unable to present a coherent study to enable the selection of sites to install the nuclear power plant (Oliveira 2002: 177). The nuclear incident at Chernobyl on 26 April 1986 dealt the final blow to the nuclear programme’s chances of recovery (Oliveira 2002: 180).

2. Showcase

In the Portuguese case, the nuclear industry had practically no existence because it did not develop beyond the phase of the search for a site to install the nuclear power plant. The interaction between nuclear industry and civil society advanced during the narrow lapse of time during which preliminary devices were installed, such as a 100 meter high tower with a meteorological aerial to measure winds, temperature and moisture. On the morning of 15 March 1976, on their way to work, people gathered at the churchyard decided to stop these preliminary works and to damage the premises (Cipriano 2016).

The question is how were the local citizens, mostly small farmers, informed about the purpose of the tower and about nuclear power. A description of this event is found in *Arado, Jornal Popular do Concelho de Peniche (The Plough, Popular Newspaper of the County of Peniche)*. A leaflet, titled “To the population – Communiqué” had been distributed to the people informing about the dangers “environmental pollution with severe health dangers (increasing cancer incidence, etc.), death of marine species (algae and fish)”, affecting the agricultural and fishing activities of the county (“O povo de Ferrel” 1976). This was indeed alarming information which touched the local people’s most cherished interests. Their main concern, and that of the villages around Peniche, was losing their farms and fishing craft, as well as the means of their activity and subsistence. Therefore, they marched against the tower erected by CPE carrying their work tools – hoes, pitchforks, rakes, and sickles – menacing to destroy the tower if CPE continued their work to install the nuclear power plant (Cipriano 2016). They could see no alternative.

The leaflet contained other type of information. The construction of a nuclear power plant at Ferrel had been programmed seven years before, in 1969 (the year was in fact 1973, see above section 1.2, under subtitle “The dictatorial state’s intervention”, p.9). On 5 March 1976, a “Committee of Ferrel’s residents” had sent telegrams to CPE, Companhia Portuguesa de Electricidade, and the Prime Minister; Radio and TV were also contacted. The telegrams announced the protest “against the installation of the nuclear power plant” and that “all legal means” would be used to prevent it from being constructed. The media were criticised for not

disseminating the information contained in this telegram (A população de Ferrel 1976). No reply was received.

Therefore, the nuclear industry was perceived by the local citizens through information spread through the local press which involved environmental activists, not from experience. The first attempt to install a nuclear power plant, in 1976, engaged the local citizens in contact with an embryonic environmental movement producing a resonance that favoured the image of this movement in detriment to the promotion of nuclear power. This was the first and last participation of Ferrel's people in the struggle against CPE's (and their successor EDP) nuclear power plant, particularly, because no solution was found by the latter for the local seismological problems and other technical difficulties. EDP's problem was aggravated by the fact that they could not find another site to substitute Ferrel and this was in fact the end of their nuclear power ambition (above section 1.2, pp.12-13).

The newspaper *O Século* (*The Century*) a Lisbon newspaper printed the *Arado* report to illustrate their article "A guerra do átomo 'pacífico'" (The war of the 'pacific' atom), on 30 March 1976 ("A guerra do átomo" 1976). The environmentalists were fascinated by the Ferrel event and aimed at creating a large movement against the nuclear option, mainly through their journals, of which the following are an example. An instance of spreading the protest occurred on 8 June 1976, by *Cadernos de Ecologia e Sociedade* (*Notebooks on Ecology and Society*) supervised by José Carlos Costa Marques (b. 1945). Its Editorial Note titled "Somos todos moradores de Ferrel" ("We are all Ferrel's residents") evoked John F. Kennedy's speech "I am a Berliner" of 26 June 1963. It claimed that "Ferrel is already the trenches which will divide the Portuguese people in two new 'parties': on one side the party of the dead and, on the other side supporting Ferrel's residents the party of life" ("Somos todos moradores" 1976). Another important contribution to the anti-nuclear debate was given by *Raiz e Utopia*, a quarterly journal, edited by António José Saraiva and Carlos L. Medeiros. In 1977, it published a round-table about nuclear issues (Silva 1977) and a Manifesto on Energy Policy – For a National Debate on Nuclear Energy, signed by over 100 scientists and engineers ("Manifesto" 1977).

Scientists, engineers, and economists, obviously, participated in the nuclear debate. In 1977, the "Manifesto on Energy Policy" was signed by a group of 110 persons, of which 74 were

technicians of EDP, and among them some belonged to its Project Team of the Nuclear Power Plant and to the Central Planning Board. Carlos Matos Ferreira (1948–2014), physics professor of IST, headed this group calling for a national debate about the nuclear option (Ferreira 1977: 151-2). A year later, the group had grown to 200 individuals and a “Commission for Promoting the National Debate on the Nuclear Option” was led by two Higher Technical Institute professors, Matos Ferreira and Tito Mendonça. In a press conference, the group demanded that a White Paper be made public and announced their interest in participating in study groups on nuclear energy issues, “safety, the fuel cycle, economics, the participation of national industries, alternative energies and the biological effects of radiations” (Delicado 2013: 200).

In 1978, a collective authored book on nuclear technical issues was published with the participation of mostly researchers of LFEN, Laboratório de Física e Engenharia Nucleares, as well as other engineers and economists (*O que é a Energia Nuclear* 1978).

However, the peak of mass mobilization was the Festival “Pela Vida e Contra o Nuclear” (For Life and Against Nuclear) staged at nearby Caldas da Rainha on 21 and 22 January 1978. The newspaper *Gazeta das Caldas* and its supplement *Pela Vida (For Life)*, first published in November 1977, organized the festival which was transmitted abroad and was popularly attended, including a few foreign activists (Eloy 2015, 32). The festivities included a march to the site at Ferrel where the nuclear power plant was to be installed and Portuguese ecologists and anti-nuclear activists were involved in debates (Nascimento 1978). Despite the enthusiasm, the Festival was an urban event, mainly attended by people from Lisbon (Barca 2016: 512-13).

The site of Ferrel was abandoned by EDP – Electricidade de Portugal, the successor of CPE, and no substitute was found. The Ferrel incident became a milestone for the Portuguese anti-nuclear movement and its evocation by the media has invigorated its memory.

Thirty years after the event, March 2006, the nuclear debate was energised because of Barros’s proposition to install a nuclear power plant in Portugal (above, section 1.2, under subtitle “The private sector’s intervention”, p.9). The date was a pretext for the SIC TV news programme to recall Ferrel (“Ferrel e o protesto” 2006). On March 15, 2011, thirty-five years later, a speech was recorded to commemorate Ferrel by Domingos (Domingos 2011). On 21 March 2012,

Jornal das Caldas celebrated the 36 years of Ferrel (Gomes 2012). The most recent commemoration was the 40th anniversary, in March 2016 (Cipriano 2016). TSF, radio FM also participated with the chronicle, “40 anos da Marcha do Povo de Ferrel contra a Central Nuclear” (“40 years of Ferrel’s people march against the Nuclear Power Plant”) (“40 anos da Marcha do Povo” 2016).

The media, generally, contributed to keep the Ferrel incident alive to the present day, its attraction owes much to the people’s spontaneous and vivid action.

3. Events

Note: Ferrel was the only event demonstrating the interaction between nuclear industry and civil society and therefore it was selected for the Showcase (section 2).

4. Facts and figures

Note: Portugal did not implement any nuclear power programme. Electricity production in Portugal is based on fossil and renewable energy sources. Therefore, the Facts and Figures section does not apply to the Portugal Short Country Report.

4.1. Key dates and abbreviations

Key dates:

Table 1 – Persistent attempts at installing nuclear power plants

Year/period	Description
1958–1964	Creation of CPIN, a business association involving electricity utilities, industrial and shipping companies, a bank, and several individuals. After six years of intense activity, the company declared bankruptcy for lack of governmental support.
1960s	The dictatorial government appointed ETP, Empresa Termoelectrica Portuguesa [Portuguese Thermoelectric Company], to lead the nuclear power plants issue.
1967	Spanish Compañía Sevillana de Electricidad and ETP proposed to respective governments the construction of a 600 MW nuclear Spanish-Portuguese power plant at the southern border close to river Guadiana, around 1975. Portuguese government disregarded it.
1969	Conversations held between the two JENs (Portuguese and Spanish) for the Portuguese participation in the Spanish Almaraz nuclear power plant. They had no consequence.
December 1969	Fusion of five companies of hydro-energy, thermal-energy (ETP) and energy transport led to a new company named CPE, Companhia Portuguesa de Electricidade). It succeeded ETP in all matters connected with nuclear issues.
1974–1979	Developmental Plan anticipated the construction of first Portuguese nuclear power plant. April 1974 democratic revolution prevented the Plan from seeing day light.
1976	CPE promoted prospective work for installing a nuclear power plant at Ferrel,

near the fishing port of Peniche, north of Lisbon. March 15, a local uprising was reported in the press, leading to hot debates against nuclear power.

June 30, 1976	EDP, Electricidade de Portugal, was assigned the management of the totally nationalised electricity sector, succeeding CPE's nuclear commitment.
Late 1970s and 1980s	Constitutional governments tried to adopt a nuclear power plants program but the social climate was discouraging.
2005–2006	Supporters of nuclear option launched a debate on a new energetic model for Portugal with no consequence.

Abbreviations:

CDA	Combined Development Agency
CDT	Combined Development Trust
CPE	Companhia Portuguesa de Electricidade [Portuguese Company of Electricity]
CPIN	Companhia Portuguesa de Indústrias Nucleares [Portuguese Company for Nuclear Industries]
EDP	Eletricidade de Portugal
ETP	Empresa Termoeléctrica Portuguesa [Portuguese Thermolectric Company]
GPSN	Gabinete de Protecção e Segurança Nuclear, [Bureau for Nuclear Protection and Safety]
IST	- Instituto Superior Técnico [(Higher Technical Institute)]
JEN	Junta de Energia Nuclear [Nuclear Energy Board] is the common name of the respective Spanish and Portuguese institution.
LFEN	Laboratório de Física e Energia Nucleares [Nuclear Physics and Energy Laboratory]

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