Ayuntamiento de Pamplona

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ORDINANCE ON THE COLLECTION AND USE OF THERMAL SOLAR ENERGY IN BUILDINGS

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Ayuntamiento de Pamplona

AGENCIA ENERGÉTICA MUNICIPAL DE PAMPLONA

ENERGY AGENCY – PAMPLONA CITY COUNCIL
Area of Health and Environment

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STATEMENT OF OBJECTIVES

Energy consumption in industrialised countries displays common features, among them bi-annual peaks, and excessive dependency on fossil fuels. This situation creates common problems such as resource depletion, and external dependence, in addition to the resulting political and economic implications, and negative environmental impacts like acid rain and the greenhouse affect.

Within this context, the Pamplona Town Council, acting as local Administrator in charge of overseeing the interests of its citizens and responding to the issues that concern them, (respect for the environment occupies a priority spot in their concerns, as is periodically confirmed by opinion polls), aims to encourage the use of renewable energy in the city, and as a result decrease the use of fossil fuels to provide energy, within the limits of its competencies.

The use of solar energy for thermal use in the context of the present Ordinance fully satisfies the previously cited objective, given its indigenous, inexhaustible, and non-polluting nature. This fact can be observed by the development and execution of this clean energy resource, which leads to reduced CO_2 emissions reduced emissions of other gases produced by boilers, which will undoubtedly have a positive impact on the quality of life of the citizens of Pamplona.

Section 1. Aim

The aim of this Ordinance report is to regulate the incorporation of active low to medium temperature solar energy systems used to produce clean hot water for buildings and structures, as well as to heat swimming pools, in the Pamplona municipal area.

Section 2. Area of application

1. The obligation to plan and install thermal solar systems, in the context of the present Ordinance, will be on buildings that come under the following categories:

a) Construction of new buildings and structures, reforms and fundamental restoration work, or changes to how an entire building is used, be they public or privately owned buildings, including those that form part of a complex.
Under the scope of this Ordinance, fundamental restoration work is assumed to mean the complete gutting of a building, leaving facades as the only remaining sections.

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b) Buildings and structures, (buildings used as homes are exempt), that are used in ways that feature in the following section; that consume a minimum volume of clean hot water estimated at 1,750 litres or more per day, on a bi-annual basis, (equivalent to annual energy consumption of 292 mega joules), calculated on the basis of unit consumption, as defined in part 3.3 of Annex 1- Technical Characteristics.
The Ordinance will apply to buildings and structures housing multiple homes, where the number of homes is equal to, or above 15.

2. The Ordinance is also applicable to water-heated installations- newly built indoor heated swimming pools with a volume of 100 m^3 or more. In these situations the energy provided by the solar energy system will be at least 60% of the energy required to heat the pool water each year. Solar energy systems will always be used to heat heated outdoor swimming pools.

Section 3. Included usage

1. The solar energy systems proposed under the scope of this Ordinance will apply in the following areas:
- Homes.
- Hotels.
- Jails.
- Health facilities.
- Education facilities.
- Sports facilities.
- Residential facilities.
- Commercial facilities.
- Industrial installations.
- Collective canteens, kitchens and laundries.
- Generally wherever there is a need to produce hot water for human use.
- The obligation in relation to commercial facilities will affect buildings where energy is used primarily for business purposes. It does not applied to commercial premises located in buildings that are primarily used as dwellings, given the impossibility of knowing *a priori* the nature of the final energy usage in these situations. Nevertheless, coverage should be available in areas of these premises so that they may employ a thermal energy system in the future.

2. These uses should comply with the urban legislation in force in Pamplona.

Section 4. Degree of coverage, exceptions and relevant legislation

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1. Thermal solar systems should supply at least 60% of the energy required to meet the demand for clean hot water, as well as the heated swimming pool demand.

2. It is possible to justifiably reduce this 60% contribution, in the following circumstances:

a) When $5m^2$ (or equivalent) minimum floor space per typical home is not available. The equivalence effect will be calculated based on part 3 of Annex 1- Technical Characteristics, by applying the correcting coefficient P/4 to the $5m^2$ figure, per home. The maximum available floor space should be used for these calculations.

b) When more than 40% of the clean hot water demand, and heated swimming pool demand is supplied by generating heat and electricity together (co-generation); via gas heat pumps, the use of residual heat, heat recovery, or via the thermal potential of subsoil water aquifers via heat pumps, so that the sum of this supply added to the solar supply covers 100% of the energy needs.

c) When compliance with this level of production is assumed to exceed the calculation criteria indicated in the Regulations on Thermal Systems in Buildings (RITE).

d) When the location does not offer sufficient solar access due to external barriers to the sun.

e) When there are serious architectural limitations in restored buildings, as a result of the original architectural configuration.

f) Generally buildings that are exempt from the obligatory 60% energy coverage requirement, in the context of thermal solar energy system use, are those that present technical obstacles to compliance with the conditions established in part 3 of Annex 1- Technical Characteristics. Such a position should be duly justified by means of a relevant technical study.

g) Exception will be total where it is impossible to cover 25% of demand.

3. The thermal solar energy systems should comply with the legislation in force at any particular moment. Law 21/1992 of Industry is particularly relevant in relation to infractions and sanctions, and the Regulations on Thermal Systems in Buildings (RITE) approved by Royal Decree 1751/1998, of 31st July.

Section 5. Planning regulations, Municipal by-laws and integration in the urban landscape

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1. When applying the Ordinance, the relevant planning regulations and by-laws in force in Pamplona should be respected, in order to maintain environmental harmony in the local landscape and architecture, among other things. Buildings, structures, the environment and landscapes, should be preserved and protected, and the specific protection regulations governing historical-artistic heritage should be respected.

2. The relevant municipal body will confirm that systems comply with urban regulations and will evaluate the degree of integration with the surroundings.

Section 6. Administrative authorisation

1. The request for the work license for the thermal solar system project must be accompanied by the analytical calculations that justify compliance with the Ordinance.

This document will act as a substitute for the documentation presented by the installer in the event that a design plan is considered unnecessary according to the RITE. It includes the conditions that determine technical instruction ITE 07, which relates to the aforementioned Regulation, and to other instructions that may apply in the future, to which the rest of the systems in the Ordinance will similarly apply. The calculations for fulfilling the aforementioned technical instructions should also be recorded in the relevant data storage location.

2. Before granting the operations or entry license, a certificate will be requested that verifies that the system conforms to the design plan, and that it was carried out in line with the model in Appendix 06.1 of the RITE. A qualified technician should issue the certificate.

Section 7. Parties responsible for the Ordinance

1. Conformance with the conditions established under the Ordinance, will be the responsibility of the construction or reforms contractor, the party to whom the affected buildings belong, and the professional organising or managing the work, in the scope of their relative capacities.

2. The party performing work on buildings or constructions affected by said activities is also expected to conform to the Ordinance.
Any party carrying out development work on a building with a solar energy system is obliged to maintain it in perfect working order, so that the system is fully operative and works efficiently in terms of solar energy collection.
To facilitate checks on the system to confirm it is working properly, operations that the maintenance company performed should be duly recorded in the thermal solar system “maintenance book”.

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Section 8. Inspections, requirements and orders

1. The Municipal authorities technical services section have the right to perform inspections on the thermal solar systems in buildings included in the application range of the Ordinance.

2. If anomalies in the system- or maintenance of the same- are observed, the corresponding municipal technical service personnel will carry out the necessary requirements, and where appropriate, will dictate the course of action considered necessary to ensure compliance with the Ordinance.

Section 9. Precautionary measures

1. The mayor's office is the relevant competent body that will issue orders to revise licenses, and suspend work on buildings or use of the same, in the event of non-compliance with the Ordinance.

2. The suspension order will be preceded in all circumstances by a request sent to the person in charge of the work. A suitable time period will be established within which the obligations applicable under the Ordinance, must be fulfilled.

Section 10. Help

Each year the Pamplona Town Council may approve an amount of aid, to facilitate the application of items included under the Ordinance.

Final sole provision

The Ordinance will become effective six months after its publication in the Navarre Government Gazette, and will apply to projects authorised after the effective date. Not withstanding the previous point, the Ordinance will not apply to systems or to work performed on a project that was authorised prior to the Ordinance entering into force.

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ANNEX 1- TECHNICAL CHARACTERISTICS

1. Best technology available

Compliance with the Ordinance will imply the application of the best technology available at any given time. The Town Council will control the relevant conditions required to adapt the Ordinance's technical previsions to technological changes that may arise.

2. The adopted system

1. The thermal solar system will be composed of: a collection system via solar collectors, an exchange system between the consumption and the collection circuits, an accumulation system, and a solar control system. The thermal solar system will be integrated with the support systems used by other conventional energy systems, and with the distribution and consumption system.
An open collection system without exchange or control devices may be employed in swimming pools, where possible.

2. Only collectors that are certified by a properly qualified body should be used in the thermal solar systems. The design plan should include output data and the characteristic performance curve.
The Regulations on Thermal Systems in Buildings (RITE), approved by Royal Decree 1751/1998 of 31st July, should be respected at all times, in particular chapter ITE 10.1, " Clean Hot Water Production via active solar systems ", and chapter ITE 10.2, "Swimming pool conditioning".

3. Calculating demand

3.1 Basic parameters

1. The parameters used to calculate demand are the following:

a) Minimum temperature of clean hot water: *50ºC*. The system will allow the water to reach a temperature of 70ºC

b) Planned temperature for water in heated swimming pools: those fixed under the Regulations on Thermal Systems in Buildings, RITE, ITE 10.2 1.2. "Water temperature".

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c) Percentage fraction (DA) of the total annual energy demand for clean hot water covered by the thermal solar system: *60%*, based on the following equation: DA = [A/(A+C)]x100.
In this equation A is the thermal solar energy supplied to the consumption points, and C is the additional thermal energy issuing from traditional energy sources, used as a support supply to cover energy needs.

d) Percentage fraction (DA) of the total annual energy demand for heating the water in heated swimming pools, covered by the thermal solar system: *60%.* The calculation will be performed in the same way as in part c) immediately above.

2. In response to prevailing circumstances, the Town Council may increase the parameters relating to the thermal solar system's level of coverage, to a maximum coverage figure of *80%*

3.2 Specific consumption parameters per home

1. The design plan will cover minimum consumption of clean hot water at 50ºC or higher, of *140 litres per typical home per day* (annual average based on consumption of 35 litres per day per person) equivalent to 21MJ per day per typical home.

A typical home refers to a home whose functional design comprises four persons, in accordance with the criteria established by the Planning Regulations and Municipal By-laws on Buildings. For homes with alternative functional designs, consumption will be calculated by applying measurement criteria based on the number of people legally corresponding to the functional design, in accordance with the following equation: Ci = 140xP/4
In this equation, Ci is the consumption of clean hot water used to design the relevant system for a home, expressed in litres / day, and P is the number of people making up the functional design of the home in question.

2. To measure the size of a collective solar system to be employed by a block of homes, the consumption of clean hot water will be calculated according to the following equation: C = f* S Ci.
In this expression, C is the consumption of clean hot water used to design the appropriate system for the whole building, S Ci is the sum of Ci consumption for all the homes in the block, calculated according to the previously stated formula, f is a reducing factor that is determined on the basis of the number of homes in the building (n), according to the following equation:

f = 1	if n < = 10 homes
f = 1,2 - (0,02 n)	if 10 < n < 25 homes.
f = 0,7	if n > = 25 homes

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3.3. Specific consumption parameters for other types of buildings

The project will calculate daily hot water consumption, where water is 50º or higher, according to the minimum unit values listed in the following table:

Hospitals and clinics	80 litres/bed
Residential homes (old peoples homes, student residences, etc)	80 litres/bed
Schools	5 litres/student
Single family homes	40 litres/person
Multiple family homes	35 litres/person
Factories and workshops	20 litres/person
Offices	5 litres/person
Camp sites	60 litres/pitch
Hotels (according to the category)	60 to 100 litres/bed
Hostels/Guest houses	50 litres/bed
Rooms	30 litres/person
Gyms	30 to 40 litres/user
Laundries	5 to 7 litres/kg of clothes
Restaurants	8 to 15 litres/meal
Cafes	2 litres/lunch
Changing rooms/Collective showers	20 litres/service

4. Orientation and location of the collection system

1. The design plan will aim to achieve maximum solar energy collection efficiency. The collection subsystem will therefore face southwards and will cover a maximum scale of between +25º and -25º. The aforementioned orientation may be modified in exceptional circumstances, where natural structures or obstacles are present, or in order to improve the way the system integrates with the building structure.

2. In order to achieve maximum energy usage in the context of a predominantly stable, year-round hot water demand, the system will reflect geographical latitude of 42.49º, where the slope of the system compared to the horizontal is fixed. This slope may vary between +10º and -10º, according to hot water requirements; these limits will preferably apply in winter or summer.
When notable differences in demand are foreseen for different months or seasons of the year, the slope that appears to be most suited to these seasonal changes may be adopted. The comparative analytical justification will always be provided, in order to ensure that the slope corresponds to optimal usage, in the context of the overall annual cycle.

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3. In order to avoid prohibited visual effects, the thermal solar energy system will have to adopt the necessary means to achieve optimum integration with the building structure.

5. Solar radiation

The system will make calculations on the basis of the solar radiation collected, based on the orientation and slope of the collectors used. The solar radiation unit value incidents, in collectors located on horizontal terrain, without shade, in Pamplona, in kWh/m^2 per month, are those reflected in the following table:

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
40.67	68.54	131.8	141.4	172.9	199.4	200.3	180.4	119.9	83.11	50.46	35.03

Source: Government of Navarre. Perdón Meteorological Station.

The solar radiation data received via any scientifically admissible, analytical or experimental procedure should be verified in relation to system parameters.

6. Piping and other circuitry systems

The entire piping section for the system's cold and hot water, the circuitry for the electrical system and other elements that are considered necessary, will be located in shared sections of the building. These elements will be located in a suitable structure and will be easily accessible for any maintenance and repair work considered necessary.

7. Control system

The thermal solar system will include suitable devices to measure and control energy (temperatures, flow, and pressure), which will be placed in locations that are simple to access for taking readings, and to check that the system is functioning correctly.