GeoSmartCity Building Data Model

Version 2.1e

28 Jan. 2016

Produced by: Sinergis

Data Specification

Documento generato dal programma GeoUMLcatalogue realizzato nell'ambito di un progetto co-finanziato CISIS - Politecnico di Milano.
Stato specifica: work in progress (01 agosto 2014 - 19:25:00)

Authors:	Sinergis, Epsilon Italia
References :	As a result of the activities carried out in the frame of Task 3.2 – Data harmonisation, this deliverable provides details about the GSC data models revision, the description of the Pilots' harmonisation process and the list of harmonised datasets. This document represents the SQL implementation of the INSPIRE "Buildings" data themes, extended with extra properties related to energy. The data model relies on the INSPIRE "Buildings" Implementing Rules, as defined in the COMMISSION REGULATION (EU) No 1253/2013, of 21 October 2013, amending Regulation (EU) No 1089/2010 implementing Directive 2007/2/EC as regards interoperability of spatial data sets and services [1] and the corresponding Technical Guidelines (http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_BU_v3.0.pdf)
Status:	
Scope:	To describe the data model needed for Green Energy Scenario (Buildings) and provide pilot parners a SQL structure where to manage ETL (mapping and transformation)
Context:	GeoSmartCity project

Abstract

The content of this specification is based on what defined in the INSPIRE Implementing Rules for the theme "Buildings", and more specifically it takes into consideration the Commission Regulation 1253/2013 and the Technical Guidelines (v.3.0) for what concerning that theme.

Table of Content

GROUP: **GCM** **Generic conceptual model**

Description

THEME: ***Base types*** **Base**

Description

CLASS <<ABSTRACT>>: **Life cycle info** **(LIFECYCLEINFO - LIFECYCLE)**

SUPERCLASS ***Disjoint complete*** ***DI*** ***[INSPIREID]***

Definition
In INSPIRE this is a stereotype.
If in an application schema a property is considered to be part of the life-cycle information of a spatial object, the property shall receive this stereotype.

Attributes				
	Attributes of CLASS			
	LIFESPAN	**LIFESPANVERSION**	**lifespan version [0..1]**	**Dateofevent (DataType)**
		In INSPIRE the life span is composed by two different attributes: - beginLifeSpanVersion [1]: date and time at which this version of the spatial object was inserted or changed in the spatial data set - endLifeSpanVersion [0..1]: date and time at which this version of the spatial object was superseded or retired in the spatial data set In this data model, the lifeSpan version is considered as a dataType having both attributes optional [0..1]		

CLASS: **Inspire id** **(INSPIREID - INSPIREID)**

SUBCLASS OF : LIFECYCLEINFO

SUPERCLASS Disjoint complete DI [ABSTRACTCONSTRUCTION]

Definition

External object identifier of the spatial object.
An external object identifier is a unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object. The identifier is an identifier of the spatial object, not an identifier of the real-world phenomenon.

Attributes			
Attributes of CLASS			
IDENTIFIER	**IDENTIFIER**	**identifier**	**Identifier (DataType)**
LIFESPAN	**LIFESPANVERSION**	**lifespan version [0..1]**	**Dateofevent (DataType)**
	In INSPIRE the life span is composed by two different attributes: - beginLifeSpanVersion [1]: date and time at which this version of the spatial object was inserted or changed in the spatial data set - endLifeSpanVersion [0..1]: date and time at which this version of the spatial object was superseded or retired in the spatial data set In this data model, the lifeSpan version is considered as a dataType having both attributes optional [0..1]		

***GROUP:* AnnexIII** **Geosmartcity buildings**

Description
This group is a logical set of CLASSs, attributes, dataTypes and enumerations to be considered for data collection related to "Buildings" in the GeoSmartCity project.

This group is structured into 2 sub-groups:
- Building base: contains the data models needed for the scenario 1 of Sunshine project
- Building extended: extends the previous with additional, conditional elements

The two options are alternative to each other.

THEME:* *Buildings and building units (base) ***BU_base***

Description
The following statements are included in the INSPIRE Implementing Rules document (Commission Regulation 1253/2013) available at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:331:0001:0267:EN:PDF

In addition to the definitions set out in Article 2, the following definitions shall apply:
(1) “2D data” means data where the geometry of spatial objects is represented in two-dimensional space.
(2) “2.5D data” means data where the geometry of spatial objects is represented in three-dimensional space with the constraint that, for each (X,Y) position, there is only one Z.
(3) “3D data” means data where the geometry of spatial objects is represented in three-dimensional space.
(4) “building component” means any sub-division or element of a building

***CLASS <<ABSTRACT>>:* Abstract construction** **(ABSTRACTCONSTRUCTION - ABS_CONSTR)**

SUBCLASS OF : INSPIREID

SUPERCLASS Disjoint complete DI [ABSTRACTBUILDING, INSTALLATION]

Definition
Abstract spatial object type grouping the semantic properties of buildings, building parts and of some optional spatial object types that may be added in order to provide more information about the theme Buildings.
The optional spatial object types that may be added to core profiles are described in the extended profiles. The ones inheriting from the attributes of AbstractConstruction are Installation and OtherConstruction.

Attributes				
	Attributes of CLASS			
	NAME	**NAME**	**name [0..1]**	**String(100)**
		Name of the construction. EXAMPLES: Big Ben, Eiffel Tower, Sacrada Familia		
	DATE_C	**DATEOFCONSTRUCTION**	**date of construction**	**Dateofevent (DataType)**
		Date of construction.		
	HEIGHT	**HEIGHTABOVEGROUND**	**height above ground**	**Height above ground (DataType)**
		Vertical distance between a low and a high reference		
	ELEVATION	**ELEVATION**	**elevation [0..*]**	**Elevation (DataType)**
		This data types includes the elevation value itself and information on how this elevation was measured.		
	ELEV_REF	**ELEVATIONREFERENCE**	**elevation reference [0..1]**	**Enum (Elevation reference)**
		Element where the elevation was measured.		

	CONDITION	CONDITIONOFCONSTRUCTION	condition of the construction	Enum (Condition of construction value)
		Status of the construction.		
	EXT_REF	EXTERNALREFERENCE	esternal reference [0..*]	External reference (DataType)
		Reference to an external information system containing any piece of information related to the spatial object.		
	OWNERSHIP	OWNERSHIPTYPE	ownership type [0..1]	Enum (Ownership type value)
		Type of ownership of the building (based on CityGML Energy ADE draft 0.5.0)		
	DATE_R	DATE_R	date of renovation [0..1]	Dateofevent (DataType)
		Date of last major renovation.		
	IDENTIFIER	IDENTIFIER	identifier	Identifier (DataType)
	LIFESPAN	LIFESPANVERSION	lifespan version [0..1]	Dateofevent (DataType)
		In INSPIRE the life span is composed by two different attributes: - beginLifeSpanVersion [1]: date and time at which this version of the spatial object was inserted or changed in the spatial data set - endLifeSpanVersion [0..1]: date and time at which this version of the spatial object was superseded or retired in the spatial data set In this data model, the lifeSpan version is considered as a dataType having both attributes optional [0..1]		

CLASS <<ABSTRACT>>: **Abstract building** **(ABSTRACTBUILDING - ABS_BUILDING)**

SUBCLASS OF : ABSTRACTCONSTRUCTION

SUPERCLASS Disjoint complete DI [BUILDINGS]

Definition

Abstract spatial object type grouping the common semantic properties of the spatial object types Building and BuildingPart.

Attributes				
	Attributes of CLASS			
	FLOORS	**NUMBEROFFLOORSABOVEGROUND**	**number of floors above ground [0..1]**	**Integer**
		Number of floors above the ground level.		
	NATURE	**BUILDINGNATURE**	**nature of the building [0..1]**	**Enum (Building nature value)**
		Characteristic of the building that makes it generally of interest for mappings applications. The characteristic may be related to the physical aspect and/or to the function of the building.		
	UNITS	**NUMBEROFBUILDINGUNITS**	**number of building units [0..1]**	**Integer**
		Number of units in the building. A BuildingUnit is a subdivision of Building with its own lockable access from the outside or from a common area (i.e. not from another BuildingUnit), which is atomic, functionally independent, and may be separately sold, rented out, inherited, etc.		
	USE_M	**MULTIPLEUSE**	**use of the building [0..*]**	**Current use (DataType)**
		Activities hosted within the building. This attribute addresses mainly the buildings hosting human activities		
	USE_S	**SINGLEORMAINUSE**	**main or single use use**	**Enum (Current use value)**
		Main (or single) activity hosted within the building. This attribute is alternative to "multipleUse" attribute (having cardinality 0..*) defined by INSPIRE		
	NAME	**NAME**	**name [0..1]**	**String(100)**
		Name of the construction. EXAMPLES: Big Ben, Eiffel Tower, Sacrada Familia		
	DATE_C	**DATEOFCONSTRUCTION**	**date of construction**	**Dateofevent (DataType)**
		Date of construction.		
	HEIGHT	**HEIGHTABOVEGROUND**	**height above ground**	**Height above ground (DataType)**
		Vertical distance between a low and a high reference		
	ELEVATION	**ELEVATION**	**elevation [0..*]**	**Elevation (DataType)**
		This data types includes the elevation value itself and information on how this elevation was measured.		
	ELEV_REF	**ELEVATIONREFERENCE**	**elevation reference [0..1]**	**Enum (Elevation reference)**
		Element where the elevation was measured.		

CONDITION	CONDITIONOFCONSTRUCTION	**condition of the construction**	Enum (Condition of construction value)
	Status of the construction.		
EXT_REF	EXTERNALREFERENCE	**esternal reference [0..*]**	External reference (DataType)
	Reference to an external information system containing any piece of information related to the spatial object.		
OWNERSHIP	OWNERSHIPTYPE	**ownership type [0..1]**	Enum (Ownership type value)
	Type of ownership of the building (based on CityGML Energy ADE draft 0.5.0)		
DATE_R	DATE_R	**date of renovation [0..1]**	Dateofevent (DataType)
	Date of last major renovation.		
IDENTIFIER	IDENTIFIER	**identifier**	Identifier (DataType)
LIFESPAN	LIFESPANVERSION	**lifespan version [0..1]**	Dateofevent (DataType)
	In INSPIRE the life span is composed by two different attributes: - beginLifeSpanVersion [1]: date and time at which this version of the spatial object was inserted or changed in the spatial data set - endLifeSpanVersion [0..1]: date and time at which this version of the spatial object was superseded or retired in the spatial data set In this data model, the lifeSpan version is considered as a dataType having both attributes optional [0..1]		

CLASS: **Buildings** **(BUILDINGS - BUILDINGS)**

SUBCLASS OF : ABSTRACTBUILDING

Definition

A Building is an enclosed construction above and/or underground, used or intended for the shelter of humans, animals or things or for the production of economic goods. A building refers to any structure permanently constructed or erected on its site. This type is a sub-type of AbstractBuilding.

Attributes				
	Attributes of CLASS			
	H_FLOOR	**AVERAGEFLOORHEIGHT**	**average floor height [0..1]**	**Real**
		Average value of height of floors, in meters.		
	REFURBISH	**REFURBISHMENT**	**level of refurbishment [0..1]**	**Enum (Refurbishment level)**
		Qualitative level of refurbishment (renovation) with retrofitting actions.		
	CONNECTION	**CONNECTION**	**connection [0..1]**	**Connection (DataType)**
		This attribute has been added to include optional info about the connection of the building to different types of networks (water, gas, electricity, ...)		
	VERT_SURF	**VERTICALSURFACE**	**vertical surface [0..1]**	**Real**
		Sum of the external vertical surfaces areas to be calculated for energy performance certification or estimation.		
	INST_THRPLANT	**PRESENCEOFTHERMALPLANTS**	**presence of thermal plants [0..1]**	**Boolean**
		Boolean attribute to easily identify if the building is containing one or more thermal plants installation. This property can be calculated on the basis of a topological relation between spatial features.		
	INST_SOLAR	**PRESENCEOFSOLARPANELS**	**presence of solar panels [0..1]**	**Boolean**
		Boolean attribute to easily identify if the building is containing one or more solar panels installation. This property can be calculated on the basis of a topological relation between spatial features.		
	INST_PHOTOV	**PRESENCEOFPHOTOVOLTAICPANELS**	**presence of photovoltaic panels [0..1]**	**Boolean**
		Boolean attribute to easily identify if the building is containing one or more photovoltaic panels installation. This property can be calculated on the basis of a topological relation between spatial features.		
	INST_METER	**PRESENCEOFELECTRICITYMETER**	**presence of electricity meter [0..1]**	**Boolean**
		Boolean attribute to easily identify if the building is containing one or more metering systems for electricity. This property can be calculated on the basis of a topological relation between spatial features.		
	BUILDINGTYPE	**BUILDINGTYPE**	**building type [0..1]**	**Enum (Building type)**
		Type of building position		
	DIST_FLOOR	**FLOORDISTRIBUTION**	**floor distribution**	**String(40)**
		The range(s) of floors of the building or building part. EXAMPLE: [0,5] for a 6 floors building located on ground		

ROOF_TYPE	ROOFTYPE	**roof type [0..1]**	**Enum (Roof type value)**
	The shape of the roof		
FACADE_MAT	MATERIALOFFACADE	**material of facade [0..*]**	**Enum (Material value)**
	Material(s) of the building or building part facade.		
ROOF_MAT	MATERIALOFROOF	**material of roof [0..*]**	**Enum (Material value)**
	Material(s) of the building or building part roof.		
STRUCTURE_MAT	MATERIALOFSTRUCTURE	**material of structure [0..*]**	**Enum (Material value)**
	Material(s) of the building structure. NOTE: generally, the building structure consists of the supporting walls or columns.		
RENEWABLE_POTENTIAL	RENEWABLEPOTENTIAL	**renewable energy potential [0..*]**	**Renewable energy potential (DataType)**
	Renewable energy potential for buildings.		
VOLUME	VOLUME	**volume [0..1]**	**Volume measurement (DataType)**
	Volume of the whole building, either measured or estimated.		
OCCUPANTS	OCCUPANTS	**occupants [0..1]**	**Integer**
	Number of occupants by type		
ENERGYAMOUNT	ENERGYAMOUNT	**energyamount [0..*]**	**Energy amount (DataType)**
	Amount of energy really used to satisfy specific end uses, such as heating, cooling, domestic hot water etc…		
FLOORS	NUMBEROFFLOORSABOVEGROUND	**number of floors above ground [0..1]**	**Integer**
	Number of floors above the ground level.		
NATURE	BUILDINGNATURE	**nature of the building [0..1]**	**Enum (Building nature value)**
	Characteristic of the building that makes it generally of interest for mappings applications. The characteristic may be related to the physical aspect and/or to the function of the building.		
UNITS	NUMBEROFBUILDINGUNITS	**number of building units [0..1]**	**Integer**
	Number of units in the building. A BuildingUnit is a subdivision of Building with its own lockable access from the outside or from a common area (i.e. not from another BuildingUnit), which is atomic, functionally independent, and may be separately sold, rented out, inherited, etc.		

USE_M	MULTIPLEUSE	**use of the building [0..*]**	**Current use (DataType)**
	Activities hosted within the building. This attribute addresses mainly the buildings hosting human activities		
USE_S	SINGLEORMAINUSE	**main or single use use**	**Enum (Current use value)**
	Main (or single) activity hosted within the building. This attribute is alternative to "multipleUse" attribute (having cardinality 0..*) defined by INSPIRE		
NAME	NAME	**name [0..1]**	**String(100)**
	Name of the construction. EXAMPLES: Big Ben, Eiffel Tower, Sacrada Familia		
DATE_C	DATEOFCONSTRUCTION	**date of construction**	**Dateofevent (DataType)**
	Date of construction.		
HEIGHT	HEIGHTABOVEGROUND	**height above ground**	**Height above ground (DataType)**
	Vertical distance between a low and a high reference		
ELEVATION	ELEVATION	**elevation [0..*]**	**Elevation (DataType)**
	This data types includes the elevation value itself and information on how this elevation was measured.		
ELEV_REF	ELEVATIONREFERENCE	**elevation reference [0..1]**	**Enum (Elevation reference)**
	Element where the elevation was measured.		
CONDITION	CONDITIONOFCONSTRUCTION	**condition of the construction**	**Enum (Condition of construction value)**
	Status of the construction.		
EXT_REF	EXTERNALREFERENCE	**esternal reference [0..*]**	**External reference (DataType)**
	Reference to an external information system containing any piece of information related to the spatial object.		
OWNERSHIP	OWNERSHIPTYPE	**ownership type [0..1]**	**Enum (Ownership type value)**
	Type of ownership of the building (based on CityGML Energy ADE draft 0.5.0)		
DATE_R	DATE_R	**date of renovation [0..1]**	**Dateofevent (DataType)**
	Date of last major renovation.		
IDENTIFIER	IDENTIFIER	**identifier**	**Identifier (DataType)**
LIFESPAN	LIFESPANVERSION	**lifespan version [0..1]**	**Dateofevent (DataType)**
	In INSPIRE the life span is composed by two different attributes: - beginLifeSpanVersion [1]: date and time at which this version of the spatial object was inserted or changed in the spatial data set - endLifeSpanVersion [0..1]: date and time at which this version of the spatial object was superseded or retired in the spatial		

	data set In this data model, the lifeSpan version is considered as a dataType having both attributes optional [0..1]

	Componenti spaziali della CLASS			
	geometry2D	**SHAPE**	**Geometry2d**	**GU_CXSurface2D - Complex Surface 2D**
	2D or 2,5D geometric representation of the building.			

Ruoli

	Building to therma zone
	Building to therma zone [1..*]: **BUILDINGPART** inverso **Thermal zone to building** [1]

CLASS: **Installation** **(INSTALLATION - INSTALLATION)**

SUBCLASS OF : ABSTRACTCONSTRUCTION

Definition

An external construction (of small size) or an external device serving the building or building part.
EXAMPLES: stairway, solar panel, external lift

Attributes				
	Attributes of CLASS			
	PURPOSE	**PURPOSE**	**purpose [0..1]**	**String(40)**
	DATE_ACTIVATION	**DATEOFACTIVATION**	**date of activation [0..1]**	**Date**
		Date of entry into operation (yy/mm/dd).		
	TYPE		**type [0..1]**	**Enum (Type value)**
		Free-standing or bulding-integrated plants		
	INSTALLATION_NATURE	**INSTALLATIONNATURE**	**installation nature**	**Enum (Installation nature value)**
		A description of the installation that represents its intended nature or current function.		
	ENERGY_PRODUCED	**REALENERGYPRODUCED**	**real energy produced [0..1]**	**Real**
		Real energy produced in the year (kWh / year)		
	ENERGY_ESTIMATED	**ESTIMATEDENERGYPRODUCED**	**estimated energy produced [0..1]**	**Real**
		Estimated energy produced in the year (kWh / year)		
	POWER	**POWER**	**power [0..1]**	**Real**
		Defines the power plant in kW (for Photovoltaic panel)		
	SURFACE	**SURFACE**	**surface [0..1]**	**Real**
		Surface of installed solar thermal panels in sq.meters (for Solar Panels)		
	NAME	**NAME**	**name [0..1]**	**String(100)**
		Name of the construction. EXAMPLES: Big Ben, Eiffel Tower, Sacrada Familia		
	DATE_C	**DATEOFCONSTRUCTION**	**date of construction**	**Dateofevent (DataType)**
		Date of construction.		
	HEIGHT	**HEIGHTABOVEGROUND**	**height above ground**	**Height above ground (DataType)**
		Vertical distance between a low and a high reference		
	ELEVATION	**ELEVATION**	**elevation [0..*]**	**Elevation (DataType)**

	This data types includes the elevation value itself and information on how this elevation was measured.			
	ELEV_REF	**ELEVATIONREFERENCE**	**elevation reference [0..1]**	**Enum (Elevation reference)**
	Element where the elevation was measured.			
	CONDITION	**CONDITIONOFCONSTRUCTION**	**condition of the construction**	**Enum (Condition of construction value)**
	Status of the construction.			
	EXT_REF	**EXTERNALREFERENCE**	**esternal reference [0..*]**	**External reference (DataType)**
	Reference to an external information system containing any piece of information related to the spatial object.			
	OWNERSHIP	**OWNERSHIPTYPE**	**ownership type [0..1]**	**Enum (Ownership type value)**
	Type of ownership of the building (based on CityGML Energy ADE draft 0.5.0)			
	DATE_R	**DATE_R**	**date of renovation [0..1]**	**Dateofevent (DataType)**
	Date of last major renovation.			
	IDENTIFIER	**IDENTIFIER**	**identifier**	**Identifier (DataType)**
	LIFESPAN	**LIFESPANVERSION**	**lifespan version [0..1]**	**Dateofevent (DataType)**
	In INSPIRE the life span is composed by two different attributes: - beginLifeSpanVersion [1]: date and time at which this version of the spatial object was inserted or changed in the spatial data set - endLifeSpanVersion [0..1]: date and time at which this version of the spatial object was superseded or retired in the spatial data set In this data model, the lifeSpan version is considered as a dataType having both attributes optional [0..1]			

	Componenti spaziali della CLASS			
	geometry2D	**GEOMETRY2D**	**Geometry 2d**	**GU_Point2D - Point 2D**
	2D or 2,5 D geometric representation of the other construction.			

THEME: ***Building extended CLASSs*** ***BU_ext***

Description

According to INSPIRE "Buildings" Technical Guidelines [1] the extended profiles contain the recommendations to provide more detailed information about theme buildings. In addition to building and building part, the main features represented are other constructions, building units and installations.

[1] http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_BU_v3.0.pdf

CLASS: **Thermal zone (building part)** **(BUILDINGPART - THERMALZONE)**

Definition

(from CityGML Energy ADE, version 0.5.0)
A thermal zone is a zone of a building which serves as unit for the building heating and cooling simulation. For the simulation, a thermal zone is considered as isothermal. It is a semantic object, which may be or not related to a geometric entity. In GeoSmartCity it corresponds to a subdivision of the building (e.g. building part) with homogeneous energy property.

Attributes			
Attributes of CLASS			
energyPerformance	**ENERGY_PERF**	**energyperformance [0..1]**	**Energy performance (DataType)**
	The energy performance of the building or building part or building unit . NOTE: The energy performance is required by the Energy Performance of Building Directive for the new buildings being rent or sold.		
heatingSource	**HEAT_SOUR**	**heatingsource [0..*]**	**Enum (Energy source value)**
	The source of energy used for the heating		
heatingSystem	**HEAT_SYST**	**heatingsystem [0..*]**	**Enum (Heating system value)**
	The system of heating. EXAMPLES : stove, central heating, heat pump		
officialArea	**OFFICIALAREA**	**officialarea [0..*]**	**Official area (DataType)**
	The area of the building or building part or building unit as registered in an official information system		
occupants	**OCCUPANTS**	**occupants [0..1]**	**Occupants (DataType)**
	Number of occupants by type		
energyAmount	**ENERGYAMOUNT**	**energy amount [0..*]**	**Energy amount (DataType)**
	Amount of energy really used to satisfy specific end uses, such as heating, cooling, domestic hot water etc…		
volume	**VOLUME**	**volume [0..1]**	**Volume measurement (DataType)**
	Volume of the building part (Thermal zone) from energy certification or estimated.		

Ruoli

	Thermal zone to building
	Thermal zone to building [1]: **BUILDINGS** inverso **Building to therma zone** [1..*]

CLASS: **Conversion class** **(CONVERSIONCLASS - CONVERSION)**

Definition

This class is introduce to manage the conversion factors to transform values from one UoM into another, also considering the year and the location.

Attributes				
	Attributes of CLASS			
	LOCATION	**LOCATION**	**location [0..1]**	**Enum (Location)**
		The location corresponds to the area where the conversion factor is applicable.		
	YEAR		**year of refernce [0..1]**	**Date**
		Year of reference of the conversion factor		
	INPUT		**input**	**Enum (Unit of measure)**
		Input value to be converted from one UoM into another		
	OUTPUT		**output**	**Enum (Unit of measure)**
		Output value to be considered in the conversion from one UoM into another		
	VALUE		**value**	**Real**
		Value of the conversion factor		

DATATYPE

DATATYPE: *Connection (CONNECTION - CONNECTION)*

Definition
This dataType has been added to manage all types of connections between the building and networks.

Attributes del Datatype				
	ELECTRICITY	CONNECTIONTOELECTRICITY	**connection to electricity [0..1]**	**Boolean**
		An indication if the building or building part or building unit is connected or not to the public electricity network.		
	GAS	CONNECTIONTOGAS	**connection to gas [0..1]**	**Boolean**
		An indication if the building or building part or building unit is connected or not to the public gas network.		
	SEWAGE	CONNECTIONTOSEWAGE	**connection to sewage [0..1]**	**Boolean**
		An indication if the building or building part or building unit is connected or not to the public sewage network.		
	WATER	CONNECTIONTOWATER	**connection to water [0..1]**	**Boolean**
		An indication if the building or building part or building unit is connected or not to the public water network.		
	THERMAL	CONNECTIONTOTHERMAL	**connectiontothermal [0..1]**	**Boolean**
		An indication if the building or building part or building unit is connected or not to the district thermal network.		

DATATYPE: *Current use (CURRENTUSE - CURR_USE)*

Definition
This data type enables to detail the current use(s).

Attributes del Datatype				
	currentUse	USE_VALUE	**currentuse**	**Enum (Current use value)**
		The current use.		
	percentage	USE_PERC	**percentage [0..1]**	**Integer**
		The proportion, given as a percentage, devoted to this current use.		

DATATYPE: *Dateofevent (DATEOFEVENT - DateOfEvent)*

Definition
This data type includes the different possible ways to define the date of an event.
The data type DateOfEvent enables to supply temporal information about an event (construction, renovation, demolition) in the following cases:
- a data producer has the date of the event but without any other information about which phase of the event the date refers to
- a data producer does not have the date of the event but has the information as an interval (e.g. before 1950, between 1800 and 1900); this case applies mainly for old buildings
- a data producer has several dates corresponding to different points of the event, e.g. the beginning and the end of the event.

EXAMPLES (for date of construction):

- producer knows that construction date is 1978
  * beginning: void
  * end: void
  * anyPoint: 1978

- producer knows that construction took place before 1950
  * beginning: void
  * end: 1950
  * anyPoint: void

- producer knows that construction took place between 1800 and 1900
  * beginning: 1800
  * end: 1900
  * anyPoint: void

- producer knows that construction took place between 12/04/2008 and 25/12/2010
  * beginning: 12/04/2008
  * end :25/12/2010
  * anyPoint: void

Attributes del Datatype				
	Beginning	**BEGIN**	**beginning [0..1]**	**Integer**
		Date and time when the event begun.		
	end	**END**	**end [0..1]**	**Integer**
		Date and time when the event ended.		

DATATYPE: Elevation (ELEVATION - ELEVATION)

Definition

This data type includes the elevation value itself and information on how it was measured

Attributes del Datatype				
	elevationReference	**ELEV_REF**	**elevationreference [0..1]**	**Enum (Elevation reference)**
		Element where the elevation was measured.		
	ELEV_VAL	**ELEVATIONVALUE**	**elevation value**	**Integer**
		Value of the elevation.		

DATATYPE: Energy amount (ENERGYAMOUNT - EnergyAmount)

Definition

The amount of energy used by a building, building part or building unit.

Attributes del Datatype				
	e_Source	**ENERGYSOURCE**	**energy source**	**Enum (Energy source value)**
		The source of energy used by a building, building part or building unit.		
	e_Use	**ENERGYUSE**	**energy use**	**Enum (Energy use value)**
		Use of the energy (heating, domestic hot water, etc.)		
	e_Type	**ENERGYTYPE**	**energy type**	**Enum (Energy type value)**

		Type of the energy (estimated, demand, final, primary, etc.).		
	e_Amount	ENERGYAMOUNTVALUE	**energy amount value**	**Real**
		Amount of energy		
	e_uom	ENERGYAMOUNTUOM	**energy amount unit of measure**	**Enum (Unit of measure)**
		Unit of measure of the energy amount (e.g. m3, kWh, ...)		
	e_Year	ENERGYREFERENCEYEAR	**energy reference year**	**Date**
	estimatedCO2	ESTIMATEDCO2	**estimated co2 equivalent [0..1]**	**Real**
		In equivalent tons.		

DATATYPE: ***Energy performance*** ***(ENERGYPERFORMANCE - ENERGY_PERF)***

Definition

This data type describes the energy performance of the building or building unit.

Attributes del Datatype				
	PERF_VALUE	ENERGYPERFORMANCEVALUE	**energy performance value [0..1]**	**Integer**
		The numerical value of energy performance of the building part (thermal zone) calculated in the energy certificate or estimated.		
	PERF_DATE	OFASSESSMENT	**dateofassessment [0..1]**	**Date**
		The date when the energy performance of the building or building unit was assessed.		
	PERF_METHOD	ASSESSMENTMETHOD	**assessmentmethod [0..1]**	**String(100)**
		The reference to the document describing the assessment method of energy performance.		
	PERF_UOM	ENERGYPERFORMANCEUOM	**unit of measure of the energy performance**	**Enum (Unit of measure)**
		Unit of measure of Energy Performance varies according to national/regional legislation.		
	PERF_CLASS	ENERGYPERFORMANCECLASS	**energy performance class**	**Enum (Energy performance class)**
		The literal value of energy performance of the building part (thermal zone) indicated in the energy certificate or estimated.		

DATATYPE: ***External reference*** ***(EXTERNALREFERENCE - EXT_REF)***

Definition

Reference to an external information system containing any piece of information related to the spatial object.

Attributes del Datatype				
	IDENTIFIER	IDENTIFIER	**informationsystem**	**String(100)**

		Uniform Resource Identifier of the external information system.		
	INF_SYS_NAME	INFORMATIONSYSTEMNAME	**information system name**	String(100)
		The name of the external information system. EXAMPLES: Danish Register of Dwellings, Spanish Cadastre.		
	REFERENCE	REFERENCE	**reference**	String(40)
		Thematic identifier of the spatial object or of any piece of information related to the spatial object. NOTE: This reference will act as a foreign key to implement the association between the spatial object in the INSPIRE data set and in the external information system. EXAMPLE: The cadastral reference of a given building in the national cadastral register.		

DATATYPE: Height above ground (HEIGHTREFERENCE - HEIGHT)

Definition

Vertical distance (measured or estimated) between a low reference and a high reference.

Attributes del Datatype				
	HEIGHT_REF	HEIGHTREFERENCE	**height reference**	Enum (Elevation reference)
		Element used as the high reference. EXAMPLE: The height of the building has been captured up to the top of building.		
	HEIGHT_LOW	LOWREFERENCE	**low reference [0..1]**	Enum (Elevation reference)
		Element as the low reference. EXAMPLE: the height of the building has been captured from its the lowest ground point.		
	HEIGHT_VAL	VALUE	**value**	Real
		Value of the height above ground.		
	HEIGHT_STAT	STATUS	**status**	Enum (Height status value)
		The way the height has been captured.		

DATATYPE: Identifier (IDENTIFIER - identifier)

Attributes del Datatype				
	ID_LOC	LOCALID	**local identifier**	String(40)
	ID_NAME	NAMESPACE	**namespace**	String(40)
	ID_VERS	VERSIONID	**version id [0..1]**	String(40)

DATATYPE: Occupants (OCCUPANTS - OCCUPANTS)

Definition

This dataType contains two attributes, useful to quantify number of occupants of the building or building part of building unit, by type of occupancy

Attributes del Datatype

	OCC_ VALUE	OCCUPANCYVALUE	occupancy value	Integer
		Number of occupants		
	OCC_TYPE	OCCUPANCYTYPE	occupancy type	Enum (Occupancy type value)
		Type of occupancy		

DATATYPE: ***Official area*** ***(OFFICIALAREA - OFF_AREA)***

Definition
This data types includes the official area of the building, building part or building unit and information about the exact meaning of this area.

Attributes del Datatype				
	AREA_REF	OFFICIALAREAREFERENCE	official area reference	Enum (Clge official area reference value)
		The type of official area may be described either by using the values provided by the CLGE measurement code for the floor area of buildings (which values are provided by the CLGE_OfficialAreaReferenceValue) or by using another standard (which values are provided by the empty code list OtherStandard OfficialAreaReferenceValue, this code list having to be defined at Member State level). The CLGE (Council of European Geodetic Surveyors) is the measurement code for the floor area of buildings providing possible references for the official area of a building.		
	VALUE	CLGE_VALUE	value	Real
		The value of the official area.		

DATATYPE: ***Renewable energy potential*** ***(RENEWABLEPOTENTIAL - RENEWABLEPOTENTIAL)***

Definition
Renewable energy potential for buildings.

Attributes del Datatype				
	RENEWABLE_SOURCE	RENEWABLEENERGYSOURCE	renewable energy ource	Enum (Energy source value)
		Source of renewable energy		
	VALUE	ANNUALVALUE	annual value	Real
		Annual value of the energy potential (in kWh/m2/a)		

DATATYPE: ***Volume measurement*** ***(VOL_MEASURE - vol_measure)***

Definition
Volume of the thermal zone (by energy certification or estimated)

Attributes del Datatype				
	value	VALUE	value	Real
		The value of the volume		
	source	SOURCE	source	String(40)
		Source of the measure		

DOMAINS

DOMAIN: ***Building nature value*** *(BUILDINGNATURE)*

Definition

Values indicating the nature of a building.
The allowed values for this code list comprise the values specified in the table below and additional values at any level defined by data providers.

This is a partial list of the BuildingNatureValue codelist values provided by INSPIRE

Values			
bunker		**bunker**	A facility, partly underground, intended for or used by the military either for location of command/control centers or for troop encampment.
canopy		**canopy**	An overhead roof providing shelter to things below. Canopies may be free standing frameworks over which a covering is attached or may be linked or suspended to the outside of a building
caveBuilding		**cavebuilding**	A space hosting human or economic activity which is usually enclosed within rock with the addition of man-made exterior walls and which may contain structures comparable to the interior structures of freestanding buildings
chapel		**chapel**	A Christian place of worship, usually smaller than a church.
castle		**castle**	A large ornate or fortified building usually constructed for the purpose of a private residence or security
church		**church**	Building or structure whose primary aim is to facilitate the religious practice of a Christian community
dam		**dam**	A permanent barrier across a watercourse used to impound water or to control its flow
shed		**shed**	A building of light construction, which usually has one or more open sides, that is typically used for storage.
arch	**ARCH**	**arch**	A man-made structure in the form of an arch.
greenhouse		**greenhouse**	A building that is often constructed primarily of transparent material (for example: glass), in which temperature and humidity can be controlled for the cultivation and/or protection of plants.
lighthouse		**lighthouse**	A tower designed to emit light from a system of lamps and lenses.
mosque		**mosque**	A building or structure whose primary purpose is to facilitate the muslim cult
silo		**silo**	A large storage structure, generally cylindrical, used for storing loose materials.
stadium		**stadium**	A place or venue for sports, concerts or other events and consists of a field or stage either partly or completely surrounded by a structure designed to allow spectators to stand or sit and view the event.
storageTank		**storagetank**	A container usually for holding liquids and compressed gases.
synagogue		**synagogue**	A building or structure whose primary purpose is to facilitate the israelit cult.
temple		**temple**	A building or structure whose primary purpose is to facilitate the meeting of a religious sect.
tower		**tower**	A relatively tall, narrow structure that may either stand alone or may form part of another structure.
windmill		**windmill**	A building which converts the energy of the wind into rotational

		motion by means of adjustable sails or blades.
windTurbine	**windturbine**	A tower and associated equipment that generates electrical power from wind.

DOMAIN: ***Building type*** ***(BUILDINGTYPE)***

Definition
Values of position of the building

Values			
SFH	**SINGLEFAMILYHOUSE**	**single family house**	
TH	**TERRACEDHOUSE**	**terraced house**	
MFH	**MULTIFAMILYHOUSE**	**multifamilyhouse**	
AB	**APARTMENTBLOCK**	**apartment block**	

DOMAIN: ***Clge official area reference value*** ***(CLGE)***

Definition
List of values for the reference of official area, as defined in the CLGE measurement code for the floor area of buildings.
SOURCE: http://www.eureal.eu/

Values			
constructedArea	**CONSTRUCTEDAREA**	**constructedarea**	Constructed area is the difference between the external area and the internal area of the building or building unit. NOTE: Constructed area is mainly used as technical data.
externalArea	**EXTERNALAREA**	**externalarea**	External area is the area within the outer perimeter boundary of a building or building unit, including any outer cladding, measured at floor level. NOTE: External area is mainly used for spatial planning purpose.
internalArea	**INTERNALAREA**	**internalarea**	Internal area is the area within the interior perimeter of a building or building unit, measured above skirting-board level. Internal area is mainly used as reference unit of measure in valuation, property transaction, renting and building management.
internalPrimaryArea	**INTERNALPRIMARYAREA**	**internalprimaryarea**	Internal primary area is the sum of all floor areas with a heightroom superior or equal to heightParameter and that are associated with the principal uses of the building. Internal primary area includes: - in housing: living areas (dining rooms, bedrooms), toilet, areas (bathrooms, lavatories), interior space and passageways, storage areas... - in offices: work areas, meeting rooms, annexes, recreational areas, toilets, interior space and passageways...
internalOtherArea	**INTERNALOTHERAREA**	**internalotherarea**	Internal other area is the sum of all floor areas with a heightroom < heightParameter and that are associated with the main uses of the building. Internal other areas includes in particular garages, passageways and non-enclosed covered area (canopies, car-ports, ...).
internalResidualAr	**INTERNALRESID**	**internalresidualarea**	Internal residual area is the sum of all floor areas regardless of height that are not consistent with the principal use of the

ea	**UALAREA**		building. Internal residual area includes in particular underground storage and archive rooms, cellars, parking garage, balconies, upper floor terraces, loggias.
internalServiceArea	**INTERNALSERVICEAREA**	**internalservicearea**	Internal service area is the sum of all floor areas used for building services, irrespective of their height or occupation. Internal service area includes in particular lift shafts, stairwells, access ramps, maintenance and technical areas serving the building.

DOMAIN: ***Condition of construction value*** ***(CONDITIONOFCONSTRUCTION)***

Definition
INSPIRE Definition: Values indicating the condition of a construction.
Extensibility: none
Identifier: http://inspire.ec.europa.eu/codelist/ConditionOfConstructionValue
Values: The allowed values for this code list comprise only the values specified in Annex C .

Values			
declined	**DECLINED**	**declined**	The construction cannot be used under normal conditions, though its main elements (walls, roof) are still present. EXAMPLE: A house whose windows have been for a long time broken or walled up (even if occupied by squatters).
demolished	**DEMOLISHED**	**demolished**	The construction has been demolished. There are no more visible remains.
functional	**FUNCTIONAL**	**functional**	The construction is functional. NOTE: The construction may be used under normal conditions for its current use value(s).
projected	**PROJECTED**	**projected**	The construction is being designed. Construction has not yet started.
ruin	**RUIN**	**ruin**	The construction has been partly demolished and some main elements (roof, walls) have been destroyed. There are some visible remains of the construction.
under construction	**UNDER CONSTRUCTION**	**under construction**	The construction is under construction and not yet functional. This applies only to the initial construction of the construction and not to maintenance work.

DOMAIN: ***Elevation reference*** ***(ELEVATIONREFERENCE)***

Definition
List of possible elements considered to capture a vertical geometry.
The allowed values for this code list comprise only the values specified in the table below.

Values		
aboveGroundEnvelope	**abovegroundenvelope**	The elevation has been captured at the level of the maximum extent of the above ground envelope of the construction.
bottomOfConstruction	**bottomofconstruction**	The elevation has been captured at the bottom of the usable part of the construction.
entrancePoint	**entrancepoint**	The elevation has been captured at the entrance of the construction, generally the bottom of entrance door.
generalEave	**generaleave**	The elevation has been captured at eave level, anywhere between the lowest and the highest eave levels of the construction
generalGround	**generalground**	The elevation has been captured at ground level, anywhere between the lowest and the highest ground points of the construction.
generalRoof	**generalroof**	The elevation has been captured at roof level, anywhere between

		the lowest edge roof level and the top of the construction.
generalRoofEdge	**generalroofedge**	The elevation has been captured at roof edge level, anywhere between the lowest and the highest roof edges of the construction.
highestEave	**highesteave**	The elevation has been captured at the highest eave level of the construction.
highestGroundPoint	**highestgroundpoint**	The elevation has been captured at the highest ground point of the construction.
highestPoint	**highestpoint**	The elevation has been captured at the highest point of the construction, including the installations, such as chimneys and antennas.
highestRoofEdge	**highestroofedge**	The elevation has been captured at the highest roof edge level of the construction.
lowestEave	**lowesteave**	The elevation has been captured at the lowest eave level of the construction.
lowestFloorAboveGround	**lowestflooraboveground**	The elevation has been captured at the level of the lowest floor above ground.
lowestGroundPoint	**lowestgroundpoint**	The elevation has been captured at the lowest ground point level of the construction.
lowestRoofEdge	**lowestroofedge**	The elevation has been captured at the lowest roof edge level of the construction
topOfConstruction	**topofconstruction**	The elevation has been captured at the top level of the construction.

DOMAIN: ***Energy performance class*** ***(PERF_CLASS)***

Definition

Code list for possible values of energy performance class of a building or building part or building unit.
The codelist includes recommended CLASSs that may be used by data providers.

Values			
A	**A**	**a**	First class according to the energy performance of the building (i.e. the most efficient buildings for energy performance).
B	**B**	**b**	Second class according to the energy performance of the building.
C	**C**	**c**	Third class according to the energy performance of the building.
D	**D**	**d**	Fourth class according to the energy performance of the building.
E	**E**	**e**	Fifth class according to the energy performance of the building.
F	**F**	**f**	Sixth class according to the energy performance of the building.
G	**G**	**g**	Seventh and last class according to the energy performance of the building (i.e. the least efficient buildings for energy performance).
H	**H**	**h**	

DOMAIN: ***Energy type value*** ***(ENERGYTYPE)***

Definition

Type of the energy (estimated, demand, final, primary, etc.)

Values			
estimated	**ESTIMATED**	**estimated**	

demand	**DEMAND**	**demand**	
final	**FINAL**	**final**	
primary	**PRIMARY**	**primary**	

DOMAIN: ***Energy use value*** ***(ENERGYUSE)***

Values			
heating	**HEATING**	**heating**	
cooling	**COOLING**	**cooling**	
domestic HotWater	**DOMESTICHOTWATER**	**domestic hot water**	
electrical Appliances	**ELECTRICALAPPLIANCES**	**electrical appliances**	
electrical Equipments	**ELECTRICALEQUIPMENTS**	**electrical equipments**	

DOMAIN: ***Heating system value*** ***(HEATINGSYSTEM)***

Definition
Code list giving the possible values for the heating system of a building, building part or building unit.

Values			
centralHeating	**CENTRALHEATING**	**centralheating**	Central heating system performed at building or at building unit level.
districtHeating	**DISTRICTHEATING**	**districtheating**	The public heat network is connected to the central heating of the building by a heat exchanger. The warm water or steam used in the district heating system is not mixed with the water of the central heating system in the building.
electricRaditors	**ELECTRICRADITORS**	**electricraditors**	Electric radiators could be single portable units or an integrated installation of the building.
heatPump	**HEATPUMP**	**heatpump**	The heating is performed by a heat pump that transfers thermal energy from an air source or geothermal source. The device is sometimes connected to the central heating system in the building.
portableGasHeating	**PORTABLEGASHEATING**	**portablegasheating**	Heating is performed by a portable device using liquefied petroleum gas.
solarHeating	**SOLARHEATING**	**solarheating**	The heating is performed by a solar collector heating the air or liquid based heating system. This value is usually not used for solar cells producing electricity.
stove	**STOVE**	**stove**	Stove includes all kinds of devices designed to burn solid fuel, traditionally wood etc. including masonry fireplaces, tile stoves and fire stoves made of cast iron.

DOMAIN: ***Height status value*** ***(HEIGHTSTATUS)***

Definition
From INSPIRE IRs:

Values indicating the method used to capture a height.
The allowed values for this code list comprise only the values specified in the list below.

Values		
estimated	**estimated**	The height has been estimated and not measured.
measured	**measured**	The height has been (directly or indirectly) measured

DOMAIN: ***Installation nature value*** ***(INSTALLATIONNATURE)***

Definition
Code list giving the possible values of an installation nature.

Values			
airConditioningUnit	**AIRCONDITIONINGUNIT**	**air conditioning unit**	An air conditioning unit or air conditioner is a home appliance, system, or mechanism designed to dehumidify and extract heat from an area. Only the external air conditioning units located outside the building shall be considered as Installation.
airDuct	**AIRDUCT**	**air duct**	Ducts for incoming (fresh) and outgoing (stale) air.
antenna	**ANTENNA**	**antenna**	A transducer designed to transmit or receive electromagnetic waves (includes radio and television masts, radar towers and satellite telecommunications). Only antennas attached to buildings shall be considered as Installation. Self-standing antennas shall be considered as OtherConstruction
arcade	**ARCADE**	**arcade**	An arcade is a covered passage, usually with shops on one or both sides.
balcony	**BALCONY**	**balcony**	A balcony is a upper accessible platform within a storey, not fully enclosed by wall(s).
chimney	**CHIMNEY**	**chimney**	A vertical structure containing a passage or flue for discharging smoke and gases of combustion. Only chimneys attached to buildings shall be considered as Installation. Self-standing chimneys shall be considered as OtherConstruction.
cradle	**CRADLE**	**cradle**	A small suspended platform that can be moved up and down the outside of a high building, used by people cleaning or maintaining windows or facades, etc. The cradles that are permanently installed in a building and may be used for emergency evacuation are of interest for INSPIRE.
dormer	**DORMER**	**dormer**	A dormer is a structural element of a building that protrudes from the plane of a sloping roof surface. Dormers are used, either in original construction or as later additions, to create usable space in the roof of a building by adding headroom and usually also by enabling addition of windows.
externalLift	**EXTERNALLIFT**	**externallift**	Lift moving along the outside of a building.
railing	**RAILING**	**railing**	A handrail is a rail that is designed to be grasped by the hand so as to provide stability or support.
ramp	**RAMP**	**ramp**	A ramp is an inclined plane installed in addition to or instead of stairs. A ramp may generally be used by wheelchairs.
solarPanel	**SOLARPANEL**	**solarpanel**	A solar panel is a packaged, connected assembly of solar cells, also known as photovoltaic cells. The solar panel can be used as a component of a larger photovoltaic system to generate and supply

			electricity in commercial and residential applications. Only the solar panels attached to the building should be considered as installations. The self-standing solar panels should be classified under OtherConstruction.
stairway	**STAIRWAY**	**stairway**	Stairway is a construction designed to bridge a large vertical distance by dividing it into smaller vertical distances, called steps. Stairways may be straight, round, or may consist of two or more straight pieces connected at angles.
tower	**TOWER**	**tower**	A relatively tall, narrow structure that may either stand alone or may form part of another structure. May be considered as installations only the small towers that form part of a building, especially if they are not attached to the ground. More significant and/or more independent towers shall be considered as Building or BuildingPart.
windTurbine	**WINDTURBINE**	**windturbine**	A device that converts kinetic energy from the wind into mechanical energy. Only the (generally small) wind turbines attached to or serving a building shall be classified under installations. The self-standing and generally big wind-turbines shall be classified under Building.
PHOTOVOLTAIC PANEL	**PHOTOVOLTAIC PANEL**	**photovoltaic panel**	

DOMAIN: ***Material value*** ***(MATERIAL)***

Definition

Code list for the possible values of MaterialOfFacade and MaterialOfRoof.
The allowed values for this code list comprise the values specified in Annex C and additional values at any level defined by data providers. Annex C includes recommended values that may be used by data providers.

Values			
adobe	**ADOBE**	**adobe**	Use of a particular type of masonry for the fa?ade, that involves the use of clay bricks (adobe) formed in moulds and (traditionally) dried in the sun.
asbestos	**ASBESTOS**	**asbestos**	Facade constructed out of asbestos. Set of six naturally occurring silicate minerals, which all have in common their eponymous asbestiform habit: long (roughly 1:20 aspect ratio), thin fibrous crystals, with each visible fiber composed of millions of microscopic "fibrils" that can be released by abrasion and other processes
ceramicTiles	**CERAMICTILES**	**ceramictiles**	Ceramic tiles of different colours and design are used for covering the facade of the building
composite	**COMPOSITE**	**composite**	Composite material, such as plastics, PVC and fibreglass are used to cover the facade of the building
composition	**COMPOSITION**	**composition**	Composition shingles are the most widely used roofing material. They are also called asphalt shingles that could either be organic fibre mat or fibreglass core. Both types are steeped in asphalt and then coated with mineral granules to add colour and texture. Most shingles have an adhesive back that when reinforced with tacks, staples or nails for attaching on roof frames would result in a tight fit.
concreteTile	**CONCRETETILE**	**concretetile**	Roofing material consisting of shingles, simulated wood shakes, lighter-weight tiles and concrete panels manufactured from a variety of fibre-reinforced cement products. NOTE 1: Some are coated with plastics, enamels, or thin metals, and some contain recycled material. NOTE 2: Many concrete tiles mimic the appearance of wood shakes, while improving on the durability and fire protection that

			real wood affords. It can approximate the look of clay tile or slate while mitigating the structural problems caused by the weight of the real material.
concrete	**CONCRETE**	**concrete**	The surface of the facade is constructed out of (reinforced, with bars or fibres-other than asbestos) concrete
corrugatedSheet	**CORRUGATEDSHEET**	**corrugatedsheet**	Roofs of corrugated sheet may be of fibreglass, PVC or metal; less frequent is the use of galvanized iron sheet.
glass	**GLASS**	**glass**	The surface is constructed out of glass, typically used in roofs covering internal atriums or in greenhouses. In case of facade, structural glass is used for glazing the facade of buildings through the use of curtain wall systems, frameless glazing systems, polycarbonate sheeting or architectural flat glass.
hotMoppedAsphalt	**HOTMOPPEDASPHALT**	**hotmoppedasphalt**	Hot mopped asphalt roofing is usually applied to flat or semi-flat residential roofs that have good access and proper drainage. NOTE: In residential use it is often covered with a layer of decorative stone to improve the appearance.
limestone	**LIMESTONE**	**limestone**	The facade of the building is composed of limestone, a sedimentary rock composed largely of calcite and/or aragonite. Limestone was commonly used for the construction of many medieval churches and castles in Europe, it was widely used in the 19th and early 20th centuries, and in countries like Malta, for a long time, the only building material available.
masonry	**MASONRY**	**masonry**	The facade consists of individual units made of fired clay brick or concrete block laid in and bound together by mortar.
metal	**METAL**	**metal**	The surface of the building is covered with metal in the form of galvanized steel with paint, aluminium with paint, stainless steel, zinc, lead or copper.
reinforcedConcrete	**REINFORCEDCONCRETE**	**reinforcedconcrete**	Roofs constructed out of reinforced concrete, normally along flat or semi-flat surfaces used in terraces or inclined roofs. For facades and structures, the load resisting system is made of reinforced concrete, a combination of steel reinforcement bars embedded in concrete that act together in resisting forces. Reinforced concrete buildings may be constructed as moment resisting frames (beams and columns framing at nodes), or in combination with shear walls.
naturalStone	**NATURALSTONE**	**naturalstone**	The facade is covered with natural stone, such as granite or marble, and may come in different colours and finishing.
slate	**SLATE**	**slate**	Slate is a shingle-like sliver of rock or natural stone, offering a natural look laid out in a variety of patterns. It comes in different sizes and colours, although colours are limited to those found in nature.
thatch	**THATCH**	**thatch**	Roofs are built by thatching, which is the craft of building a roof with dry vegetation such as straw, water reed, sedge, rushes and heather, layering the vegetation so as to shed water away from the inner roof.
vegetatedGreenRoof	**VEGETATEDGREENROOF**	**vegetatedgreenroof**	Also known as eco-roofs, a vegetated or green roof is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane. It may also include additional layers such as a root barrier and drainage and irrigation systems.
vegetated	**VEGETATED**	**vegetated**	The facade is covered with vegetation and a growing medium, planted over a waterproofing membrane
wood	**WOOD**	**wood**	The facade of the building is covered with wood, timber or lumber
woodShinglesOrSha	**WOODSHINGLE**	**woodshinglesorshakes**	Wood shingles or shakes are differentiated by size and texture. Shingles are cut to a specific size and have smooth finish. Shakes

kes	**SORSHAKES**		are rough-textures and are irregular in shape.
reinforcedMasonry	**REINFORCEDMASONRY**	**reinforcedmasonry**	Buildings of this type have exterior walls consisting of grouted (with concrete) masonry (clay brick or concrete block masonry) with internal reinforcing steel rods. Reinforced masonry buildings are relatively thick walled box-like structures and often have small windows and at least two mostly solid walls.
rubleStoneMasonry	**RUBLESTONEMASONRY**	**rublestonemasonry**	Ruble stone is field stone. Is a masonry technique that incorporates any material found or recovered, such as dressed blocks, broken fragments, brick or flint. NOTE 1: The success of rubble depends on the thickness of the wall and the strength of the binding mortar. If either is too thin, the structure will fail. As it is almost impossible to construct a thin rubble wall, owing to the irregularity of the material and the size of the gaps to be filled by the mortar, in areas or building traditions lacking dressed stone and ashlar technology, rubble walls are likely to be very thick.
steel	**STEEL**	**steel**	The load resisting system of the building is made of structural steel, which may be made composite with reinforced concrete at floor slabs. Steel structures may be constructed as moments resisting frames, as concentrically or eccentrically braced frames, or as spatial trusses. The members of the structure may be bolted or welded.
stoneMasonryBlock	**STONEMASONRYBLOCK**	**stonemasonryblock**	The load resisting system of the building is made of wood, timber or lumber. Two systems of construction are possible, one based on a frame, the other on a skeleton. Framing is a building technique based around structural members, usually called studs, which provide a stable frame to which interior and exterior wall coverings are attached. In skeleton houses the posts and the horizontal crossbars form a frame (whose strength is sometimes increased by the use of additional diagonal bracings or stiffeners) that is filled in with wood (post or frame and plank constructions) or other materials such as clay, stone, or brick. This category is also known as timber framing or half-timbered.
adobeBlockWalls	**ADOBEBLOCKWALLS**	**adobeblockwalls**	Also known as moulded earth, is a building technique that involves the use of clay bricks (adobe) formed in moulds and (traditionally) dried in the sun. NOTE: These unbaked bricks consist of sand, sometimes gravel, clay, water and often straw or grass mixed together by hand, formed in wooden moulds and dried by the sun. When machinery is not available, earth is manually tamped in the mould; else, mechanical compression is used (manual, or motorized presses), in order to accommodate large production outputs of compressed earth blocks.
concreteBlockMasonry	**CONCRETEBLOCKMASONRY**	**concreteblockmasonry**	Unreinforced concrete block masonry, with lime/cement mortar. Buildings of this type have perimeter walls, and possibly some interior walls, constructed of unreinforced concrete blocks joined with lime/cement mortar. These perimeter walls are sometimes used as load bearing walls and have no internal reinforcing steel rods. Anchor plates are sometimes used to tie the walls to the floors and roof and are conspicuous from the outside of the structure.
earth	**EARTH**	**earth**	Rammed earth or pneumatically impacted stabilized earth. Rammed earth construction (also referred to as tapial in Spanish, or else, pis? de terre, in France) is conducted by erecting wooden or metal forms for the walls and filling them with a moist cement stabilized earth mix which is compacted by pounding with hand tools (with conical or flat heads) or with a mechanical compactor. Metal rebar is often added to further increase ductility.
firedBrick	**FIREDBR**	**firedbrickmasonry**	Parts of slums/squatters. Informal constructions are

Masonry	**ICKMASONRY**		non-engineered and are built by self-builders without any professional input (i.e. neither during the design phase, nor the construction one).
massiveStoneMasonry	**MASSIVESTONEMASONRY**	**massivestonemasonry**	Massive stone masonry with lime/cement mortar. Is constructed with a coursed double leaf masonry, with the outer layers of stonework levelled as the construction progresses and follows a well established masonry bond. The stone units are cut in regular dimensions. To improve the connection between cross walls better quality units are used for the bond in these areas.
mobileHomes	**MOBILEHOMES**	**mobilehomes**	A structure designed or adapted for human habitation which is capable of being moved from one place to another (whether by being towed, or by being transported on a motor vehicle or trailer) and any motor vehicle so designed or adapted.
mudWalls	**MUDWALLS**	**mudwalls**	Mud walls may be made of stacked earth or poured earth. Stacked earth consists in forming balls of plastic soil, which are freshly stacked on each other. Poured earth walls on the other hand are erected between formwork using a sandy material with coarse to fine granular particles. The ultimate finish can be natural - from the formwork- or sand blasted.
precastConcrete	**PRECASTCONCRETE**	**precastconcrete**	Precast wall panel construction. Buildings of this type are low-rise structures with precast reinforced concrete wall panels that are often poured on the ground and tilted into place. Roofs are often composed of either plywood sheathing or metal decking, and glass curtain walls may exist at the building perimeter.

DOMAIN: ***Occupancy type value*** ***(OCCUPANCYTYPE)***

Definition
List of possible types of occupancy

Values			
OTHER	**OTHERORCOMBINATION**	**other or combination**	
PATIENTS	**PATIENTS**	**patients**	
RESIDENTS	**RESIDENTS**	**residents**	
STUDENTS	**STUDENTS**	**students**	
VISITORS	**VISITORS**	**visitors**	
WORKERS	**WORKERS**	**workers**	

DOMAIN: ***Refurbishment level*** ***(REFURBISHMENTLEVEL)***

Definition
Level of refurbishment of the building

Values			
norefurbishment	**NOREFURBISHMENT**	**no refurbishment**	No refurbishment occurred for the building.
standard	**STANDARD**	**standard**	Basic refurbishment occurred for the building.

advanced	**ADVANCED**	**advanced**	High refurbishment occurred for the building.

DOMAIN: ***Roof type value*** ***(ROOFTYPE)***

Definition
Code list for the possible values of attribute roofType.

Values			
archRoof	**ARCHROOF**	**archroof**	archRoof
conicalRoof	**CONICALROOF**	**conicalroof**	
domedRoof	**DOMEDROOF**	**domedroof**	
dualPentRoof	**DUALPENTROOF**	**dualpentroof**	
flatRoof	**FLATROOF**	**flatroof**	
gabledRoof	**GABLEDROOF**	**gabledroof**	
halfHippedRoof	**HALFHIPPEDROOF**	**halfhippedroof**	
hippedRoof	**HIPPEDROOF**	**hippedroof**	
hyperbolicParabaloidalRoof	**HYPERBOLICPARABALOIDALROOF**	**hyperbolicparabaloidalroof**	
mansardRoof	**MANSARDROOF**	**mansardroof**	
monopitchRoof	**MONOPITCHROOF**	**monopitchroof**	
pavilionRoof	**PAVILIONROOF**	**pavilionroof**	
pyramidalBroachRoof	**PYRAMIDALBROACHROOF**	**pyramidalbroachroof**	
sawToothRoof	**SAWTOOTHROOF**	**sawtoothroof**	

DOMAIN: ***Type value*** ***(TYPEVALUE - TYPE_VALUE)***

Values			
ONBUILDING	**ONBUILDING**	**on building**	
ONOTHERCONSTRUCTION	**ONOTHERCONSTRUCTION**	**on other construction**	

INTEGRATED	**INTEGRATED**	**integrated**	
PARTIALLYINTEGRATED	**PARTIALLYINTEGRATED**	**partially integrated**	
NOTINTEGRATED	**NOTINTEGRATED**	**not integrated**	
BIPV	**BIPV**	**bipv**	
OTHER	**OTHER**	**other**	

HIERARCHICAL DOMAINS

DOMAIN: Current use value (CURRENTUSE)

Definition
Values indicating the current use.
The allowed values for this code list comprise the values specified in the table below and narrower values defined by data providers.
This code list is hierarchical.

Values		
residential	**residential**	The building (or building component) is used for residential purpose.
individualResidence	**individualresidence**	The building (or building component) hosts only one dwelling.
collectiveResidence	**collectiveresidence**	The building (or building component) hosts more than one dwelling.
moreThanTwoDwelling	**morethantwodwelling**	The building (or building component) hosts at least 3 dwellings.
twoDwellings	**twodwellings**	The building (or building component) hosts two dwellings.
residenceForCommunities	**residenceforcommunities**	The building (or building component) hosts a residence for communities.
agriculture	**agriculture**	The building (or building component) is used for agricultural activities.
industrial	**industrial**	The building (or building component) is used for secondary sector activities (industrial).
commerceAndServices	**commerceandservices**	The building (or building component) is used for any service activities. This value addresses the buildings and building components dedicated to tertiary sector activities (commercial and services).
publicServices	**publicservices**	The building (or building component) hosts public services. Public services are tertiary services provided for the benefit of the citizens.
office	**office**	The building (or building component) hosts offices.
trade	**trade**	The building (or building component) hosts trade activities.
ancillary	**ancillary**	A building (or building component) of small size that is used only in connection with another larger building (or building component) and generally does not inherit the same function and characteristics as the building (or building component) it is linked to.

DOMAIN: Energy source value (ENERGYSOURCE)

Definition
Code list for the possible values of the heating source of a building, building part or building unit.

Values			
biogas	**BIOGAS**	**biogas**	Biogas may come from a local biogas plant or more rarely be produced on a household scale.
electricity	**ELECTRICITY**	**electricity**	The source is electricity distributed from power plant.
liquidFuels	**LIQUIDFUELS**	**liquidfuels**	Liquid fuels include all sorts of liquids, petroleum, fuel oil etc.
naturalGas	**NATURALGAS**	**naturalgas**	The source is fossil gas distributed by pipeline.

solidFuels	**SOLIDFUELS**	**solidfuels**	Solid fuels include wood, charcoal, peat, coal, tablets and pellets made from wood.
straw	**STRAW**	**straw**	The source is solid biofuels from straw and agricultural waste.
warmwarmWaterOrStream	**WARMWATERORSTREAM**	**warmwaterorstream**	Warm water or stream is generally distributed by central district heating.
renewable	**RENEWABLE**	**renewable**	
solar	**SOLAR**	**solar**	
biofuel	**BIOFUEL**	**biofuel**	
geothermal	**GEOTHERMAL**	**geothermal**	
hydro	**HYDRO**	**hydro**	
wind	**WIND**	**wind**	
biomass	**BIOMASS**	**biomass**	

DOMAIN: ***Location*** ***(LOCATION)***

Definition
List of possible values for geographical areas

Values		
WORLD	**world**	Entire world
EUROPE	**europe**	
PT	**portugal**	
IT	**italy**	
ITD	**regione emilia-romagna**	ITD is the NUTS code for Regione Emilia-Romagna.
GR	**greece**	

DOMAIN: ***Ownership type value*** ***(OWNERSHIPTYPE)***

Definition
List of possible types of ownership.

Values			
CORPORATION	**CORPORATION**	**corporation**	
GOVERNMENT	**GOVERNMENT**	**government**	
REGIONAL		**regional**	
NATIONAL		**national state**	
EUROPEAN		**european**	
MUNICIPAL	**MUNICIPAL**	**municipal**	

NONOCCUPANTPRIVATE	NONOCCUPANTPRIVATEOWNER	**non occupant private owner**	
NGO	NONPROFITORGANISATION	**non-profit organisation**	
OCCUPANTPRIVATE	OCCUPANTPRIVATEOWNER	**occupant private owner**	
OTHER	OTHER	**other or combination**	
PROPERTYCOMPANY	PROPERTYCOMPANY	**property management company**	

DOMAIN: ***Unit of measure*** ***(UOM_VALUE - UOM)***

Definition

Unit of measures for energy amount or energy performance of buildings, according to national/regional legislations

Values			
E_Performance	ENERGYPERFORMANCE	**energy performance**	
KWH-M2-A		**kwh/m2/a (kwh per square meter / annum)**	Kilowatt per hour for single square meter, at annual base
KWH-M3-A		**kwh/m3/a (kwh per cube meter / annum)**	Kilowatt per hour for single cube meter, at annual base
AREA		**area**	Unit of measures for areas
M2		**square meter**	
F2		**square feet**	
VOLUME		**volume**	Unit of measure for volumes.
M3		**cube meter**	
E_Amount	ENERGYAMOUNT	**energy amount**	
MWH	MEGAWATTHOUR	**megawatt hour**	
KWH	KILOWATTHOUR	**kilowatt hour**	
WH	WATTHOUR	**watt hour**	

DOMAIN OF NULL VALUES

Lista delle tipologie di valore nullo:

CODE	DESCRIPTION
91	Unpopulated: the characteristic is not part of the dataset maintained by the data provider. However, the characteristic may exist in the real world. For example when the “elevation of the water body above the sea level” has not been included in a dataset containing lake spatial objects, then the reason for a void value of this property would be ‘Unpopulated’. The characteristic receives this value for all objects in the spatial data set.
99	Unknown: the correct value for the specific spatial object is not known to, and not computable by the data provider. However, a correct value may exist. For example when the “elevation of the water body above the sea level” of a certain lake has not been measured, then the reason for a void value of this property would be ‘Unknown’. This value is applied on an object-by-object basis in a spatial data set.