

The European Commission's science and knowledge service

Joint Research Centre

Pilot project on energy extending INSPIRE buildings 2D

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Marne-La-Vallee (FR), 20 June 2017
Workshop on INSPIRE extension





Outline

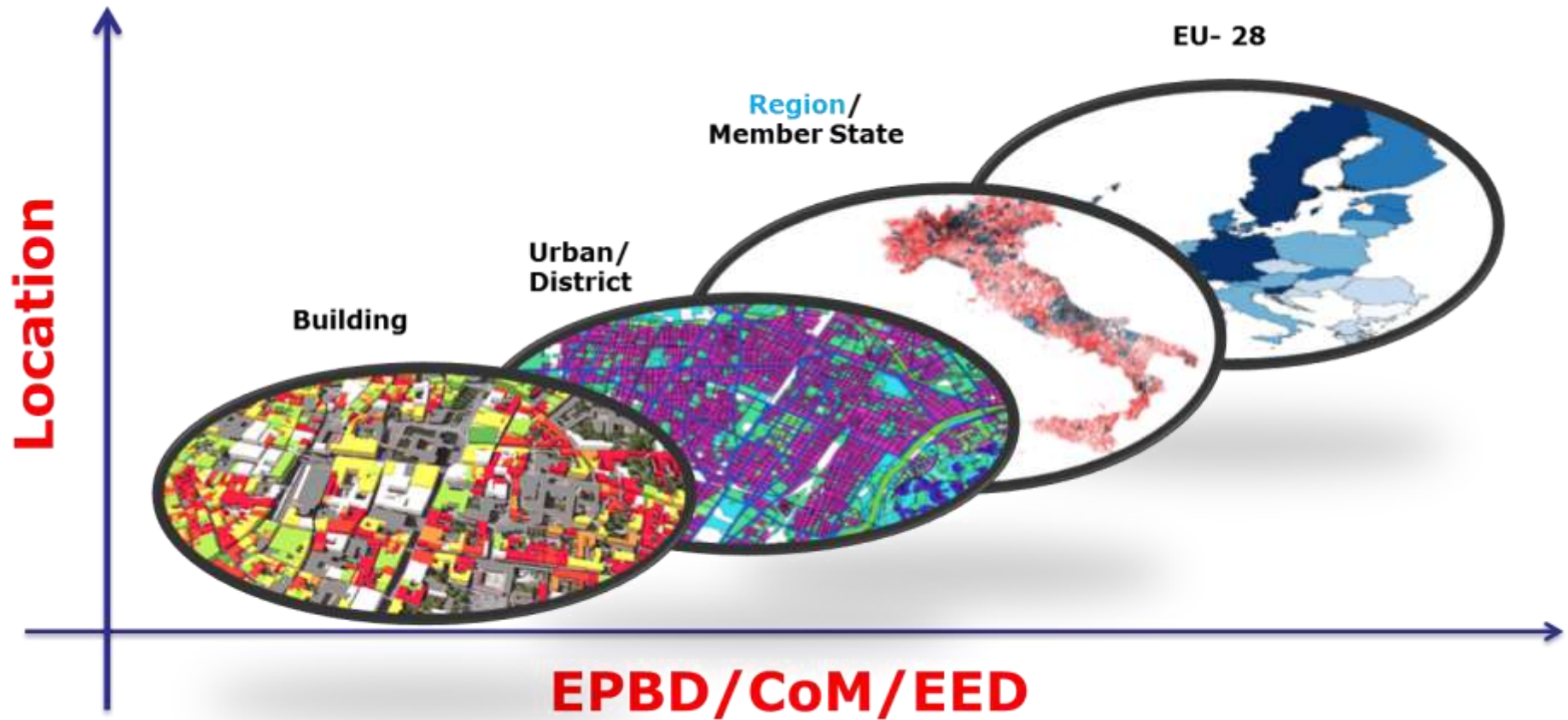
- Context
- INSPIRE core schemas extension
- Re3gistry implementation
- Data transformation
- Data validation
- Data publication
- Data use
- Next steps

Context (EULF/ELISE energy pilot overview)



- The EU is giving more and more emphasis to its energy policy, whose strategy and actions are included in the Energy Union Package and the 2030 Framework for Climate and Energy.
- Buildings in which people live and work are responsible for an important portion of the energy consumption in Europe.
- Several policies and initiatives aim at improving the energy performance of buildings and to collect data of sufficient quality on the effect of energy efficiency policies on building stock across Europe.

Context (scaling-up methodologies)



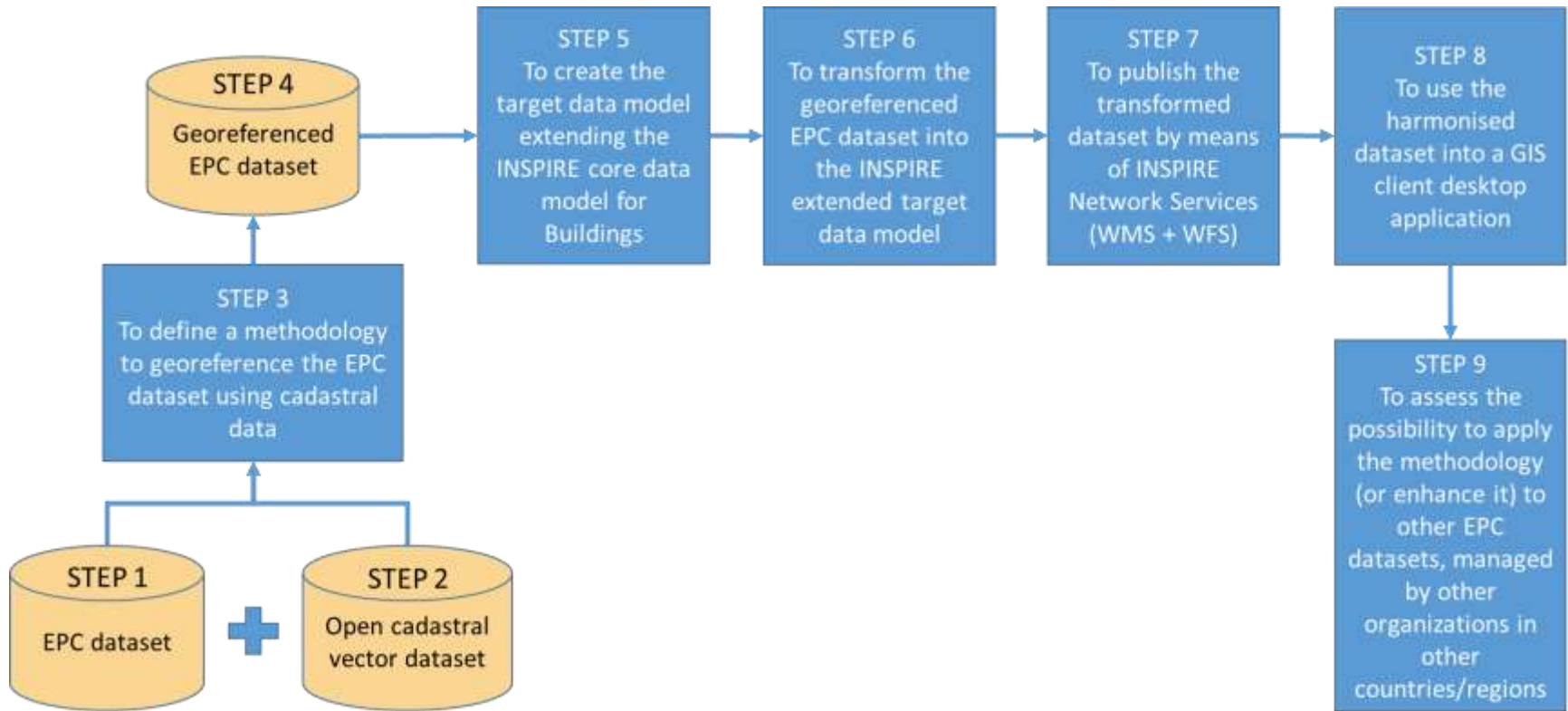


Context (use case overview)

- **Name**: INSPIRE Harmonization of existing Energy Performance Certificate datasets and creation of a web application for accessing them.
- **Goal**: To establish an accessible and interoperable common knowledge base for EPC datasets to support local government and private sector involved in energy efficiency policies.
- **Description**: To harmonize according to INSPIRE existing EPC datasets and to create a user friendly web application to make them accessible and re-usable.

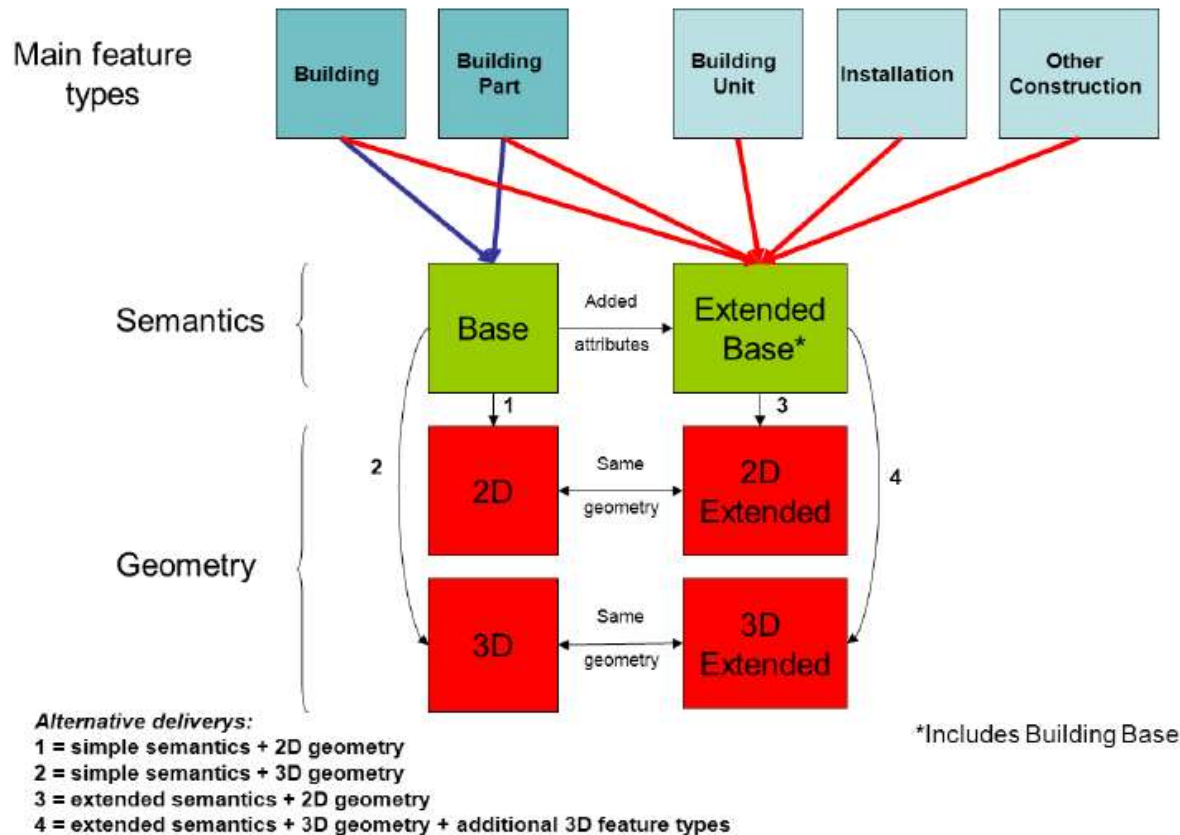


Context (use case workflow)



INSPIRE core schemas extension

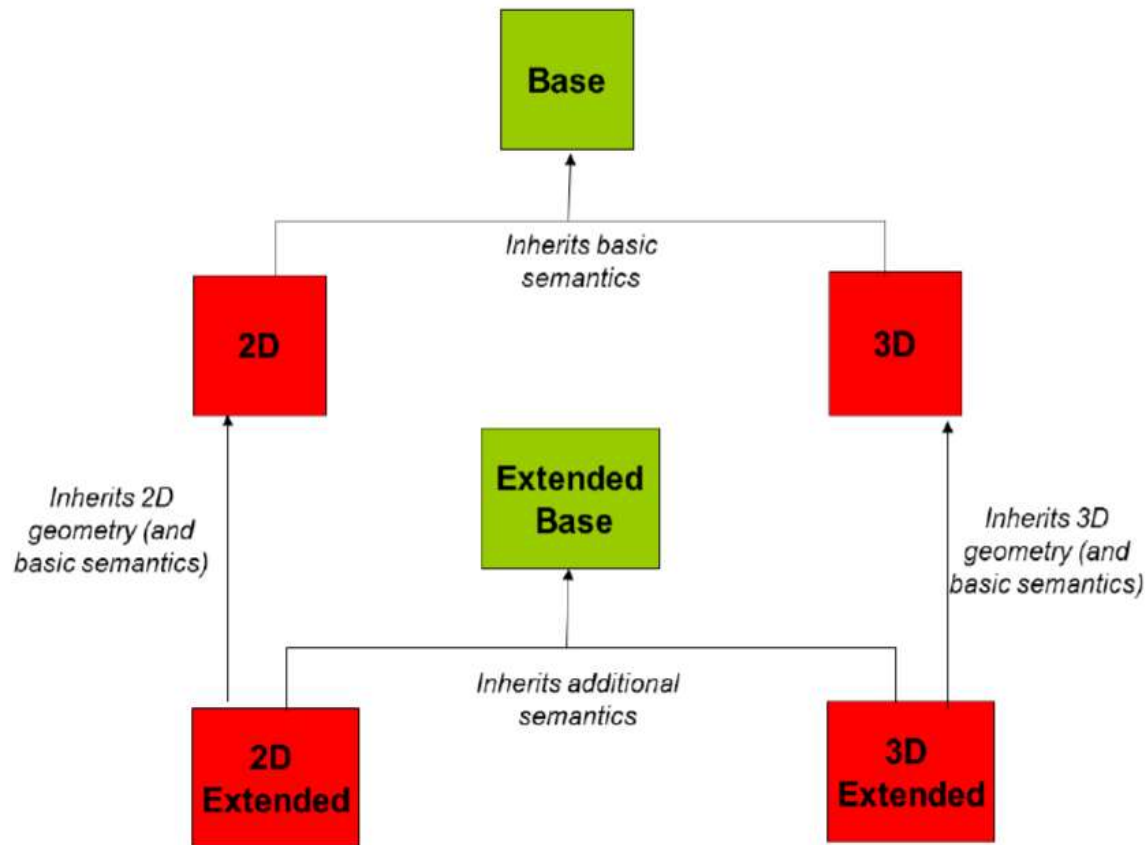
- Content and structure of INSPIRE application schemas for theme Buildings



INSPIRE core schemas extension



- Dependencies between application schemas of theme Buildings





INSPIRE core schemas extension

- Modular approach for modelling Buildings theme

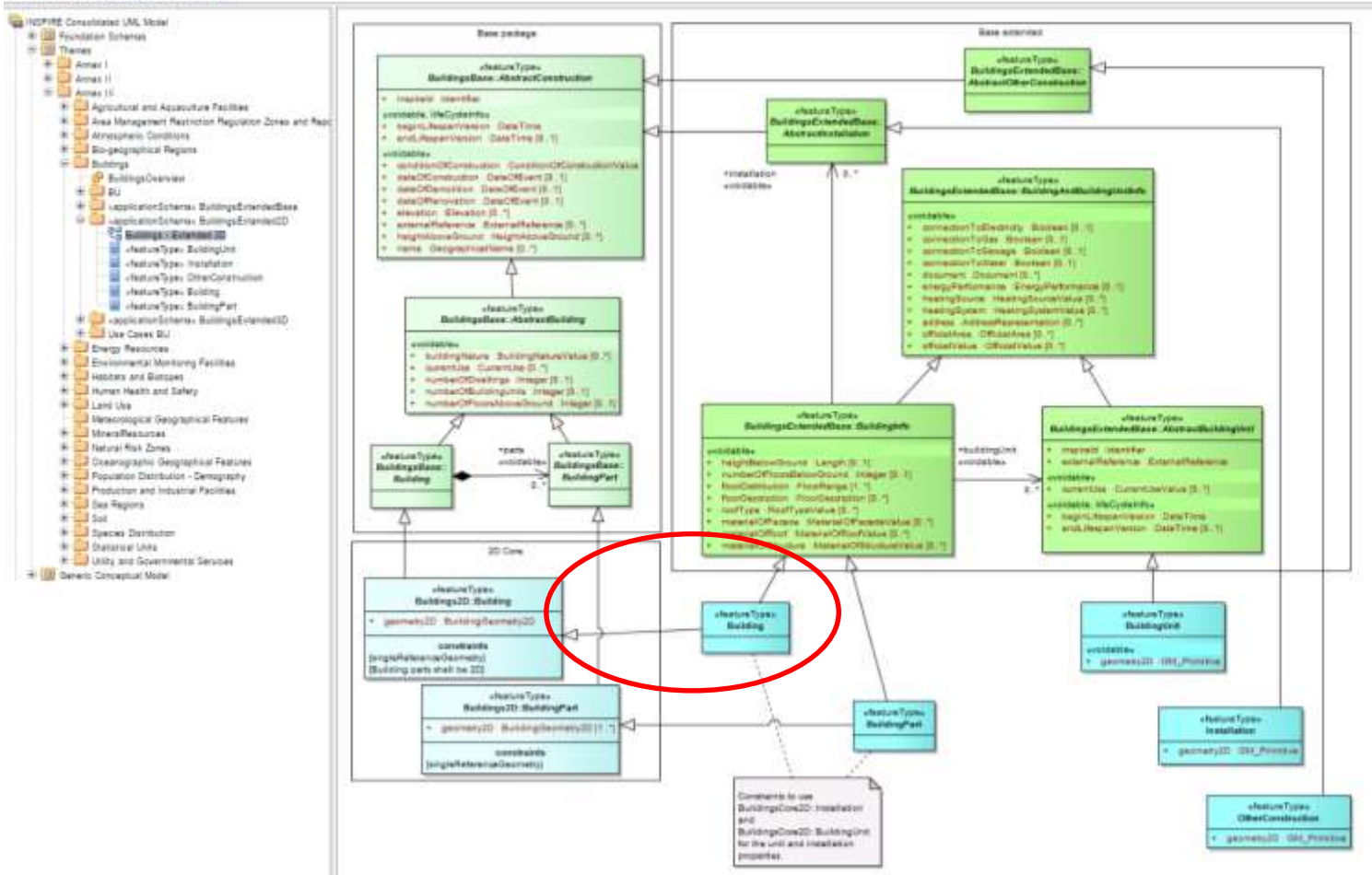


INSPIRE core schemas extension

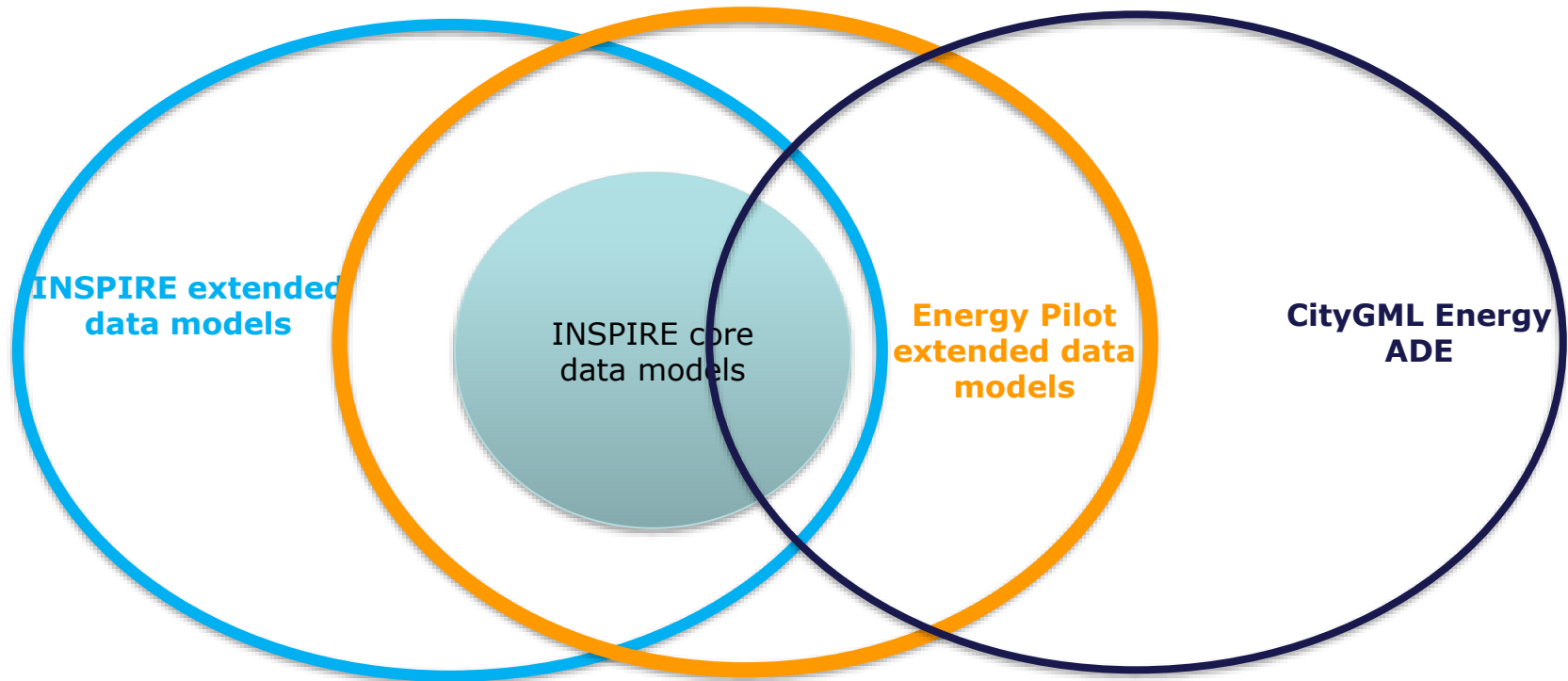


- Issues in the draft INSPIRE extended schemas

INSPIRE Consolidated UML Model



INSPIRE core schemas extension



The INSPIRE DS extension approach



INSPIRE
Infrastructure for Spatial Information in Europe

INSPIRE Generic Conceptual Model

Title	D2.5: Generic Conceptual Model, Version 3.4
Status	Version for Annex II/III data specifications v3.0
Creator	Drafting Team "Data Specifications"
Date	2014-04-08
Subject	Generic Conceptual Model of the INSPIRE data specifications
Publisher	Drafting Team "Data Specifications"
Type	Text
Description	Generic Conceptual Model of the INSPIRE data specifications
Contributor	Members of the INSPIRE Drafting Team "Data Specifications", INSPIRE Spatial Data Interest Communities & Legally Mandated Organisations, INSPIRE Consolidation Teams and other Drafting Teams
Format	Portable document format (pdf)
Source	Drafting Team "Data Specifications"
Rights	Public
Identifier	D2.5_v3.4
Language	En
Relation	n/a
Coverage	Project duration

Annex F (informative)

Example for an extension to an INSPIRE application schema

F.1 Introduction

The agreement on harmonised data specifications addresses the need of users, in particular pan-European users, to combine multiple spatial data sets without repetitive manual intervention and in such a way that the result is coherent. This requires an effort to transform the existing spatial data to the new harmonised data specifications. In the long-term, it is the hope that less and less effort will be required for such transformations and that data providers start to re-use the harmonised data specifications as the basis for their spatial data sets in case they are restructured. Since national spatial data sets will in almost all cases contain information not covered by the INSPIRE data specifications, national SDIs or community SDIs will typically have to extend the INSPIRE data specification for their own purpose.

The Generic Conceptual Model has been designed to support such extensions. This annex provides an example for a simple extension.

F.2 General rules

The INSPIRE data specifications have been developed through a process involving the European stakeholders. While the future maintenance of the specifications has not yet been fixed, it is reasonable to assume that this will be the case in the future, too. The INSPIRE

Extending an INSPIRE data specification would imply at a minimum that:

- the extension does not change anything in the INSPIRE data specification but normatively references it with all its requirements
- the extension does not add a requirement that breaks any requirement of the INSPIRE data specification

However, the extension may, for example, do any of the following:

- add new application schemas importing INSPIRE or other schemas as needed
- add new types and new constraints in your own application schemas
- extend INSPIRE code lists as long as the INSPIRE data specification does not identify the code list as a centrally managed, non-extensible code list
- add additional portrayal rules

In addition to these general rules that are mainly implied by the rules of UML, further harmonisation will be achieved, if the extensions conform to all requirements of this document and the document "Guidelines for the encoding of spatial data", too.

INSPIRE core schemas extension



inspire-extensions.wetransform.to/patterns/index.html

INSPIRE Data Specification Extensions

1. Introduction
2. Results of the Survey
3. Inventory of Model Extensions
4. The INSPIRE Model-Driven Methodology
5. The Extension Methodology
6. **The Pattern Catalogue**
 - i. Model Patterns
 - ii. Class Patterns
 - iii. Property Patterns



This project is maintained by
wetransform.

[View the Project on GitHub](#)
wetransform/inspire-extensions

The Purpose of Patterns

In software engineering, a software design pattern is a general reusable solution to a commonly occurring problem. It is a description or template for how to solve a problem that can be used in many different situations. Design patterns are formalized best practices that the designers or programmers can use to solve common problems when building a system.

Software design patterns falls into multiple categories such as structural and behavioural patterns. Structural pattern show relationships between classes that are static. In our extension design context, we define several new categories of design patterns. Based on the information given for each pattern, you will be able to make informed choice about how to design your model extension, and how to make it INSPIRE compatible.

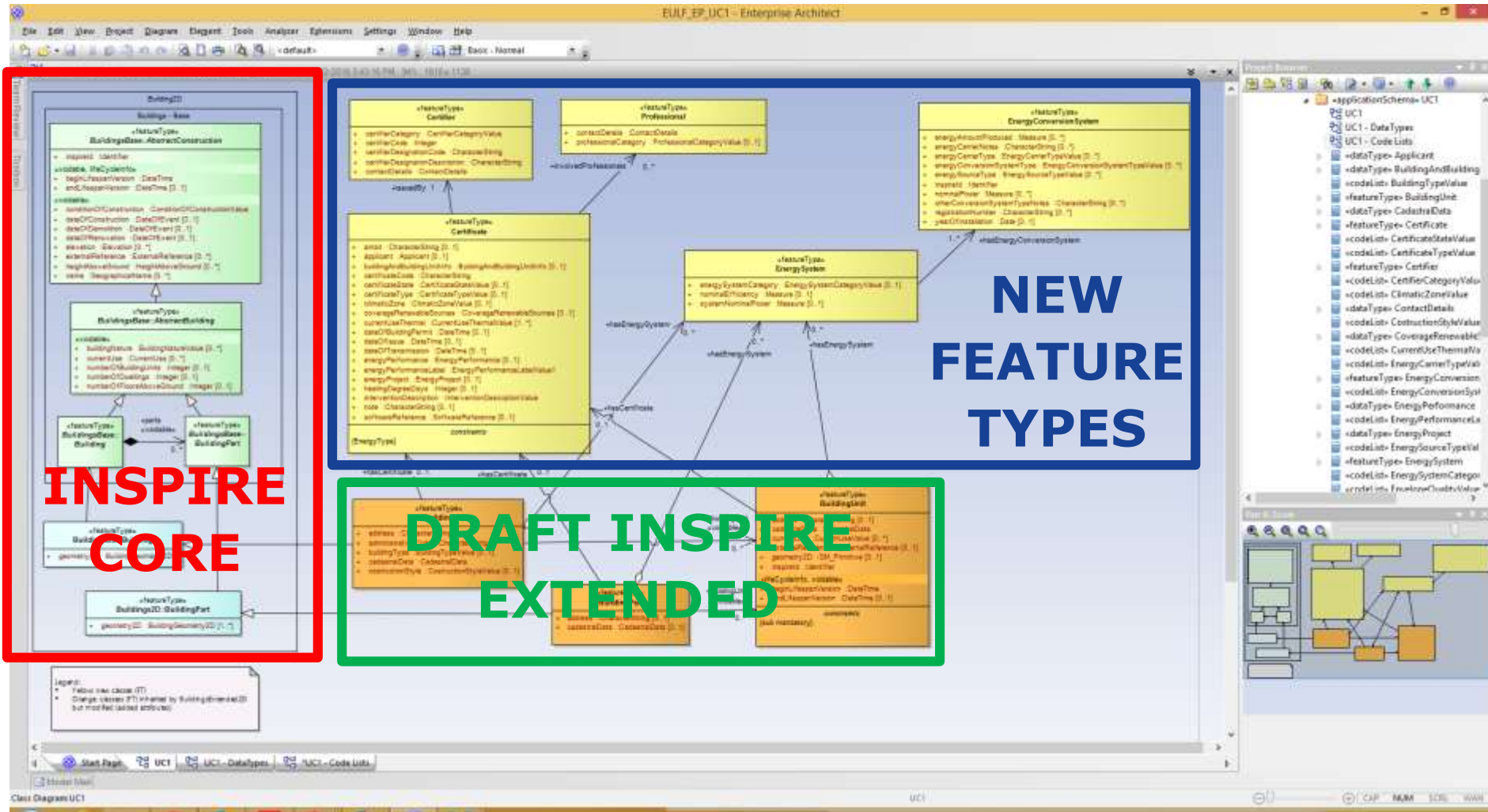
Types of Patterns for INSPIRE Extensions

Model extension design as described in the [extension methodology](#) is a hierarchical top-down process, where you first design a wide scope, and then drill down to make individual aspects concrete. We start at the level of the entire model, the proceed with adding classes, and then define these classes in detail by adding properties. For each of these phases, there are different patterns you can apply:

1. **Patterns for Model compliance:** These patterns define restrictions you can apply to ensure compliance of your model to INSPIRE and to other frameworks where you want to comply to.
2. **Patterns for adding classes and properties:** These patterns describe how one or multiple classes are linked to classes in the INSPIRE data specification you'd like to extend. If in another language they describe which language features you use to implement them, and what consequences there are on a conceptual and implementation level.
3. **Patterns for modifying properties:** Property modification patterns describe how you can extend individual properties, e.g. by adding new constraints or by extending code lists. They also include consequences there are on a conceptual and implementation level.



INSPIRE core schemas extension



Building unit



One Building with 2
BuildingParts

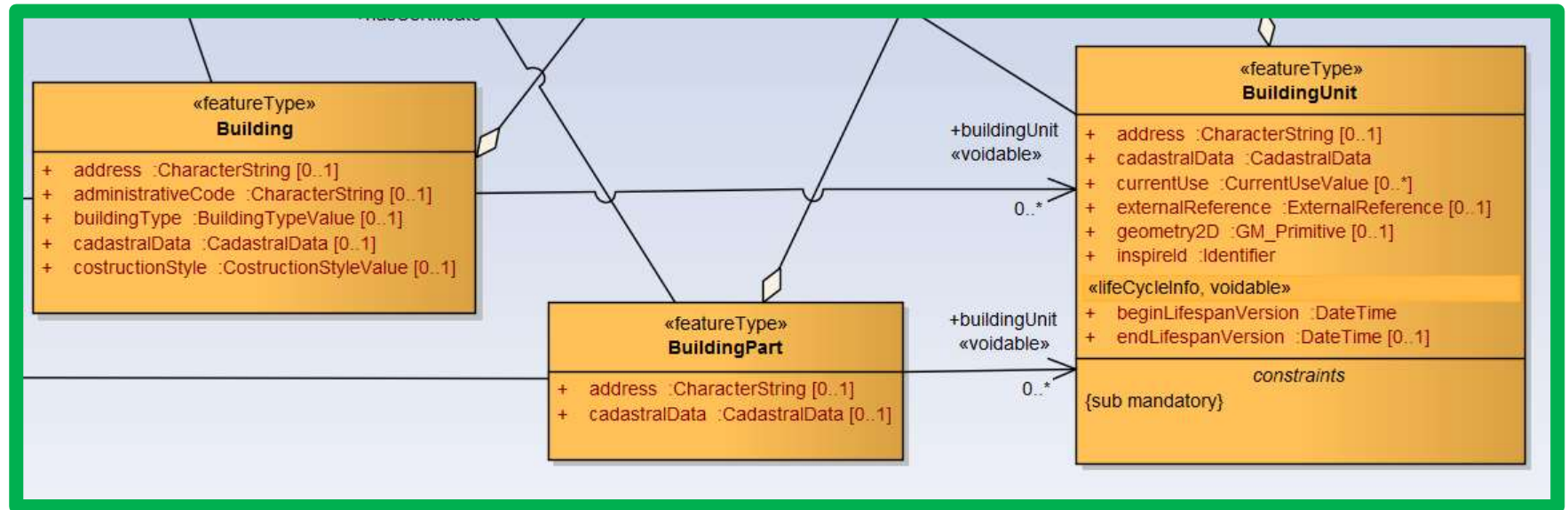


From City GML

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.

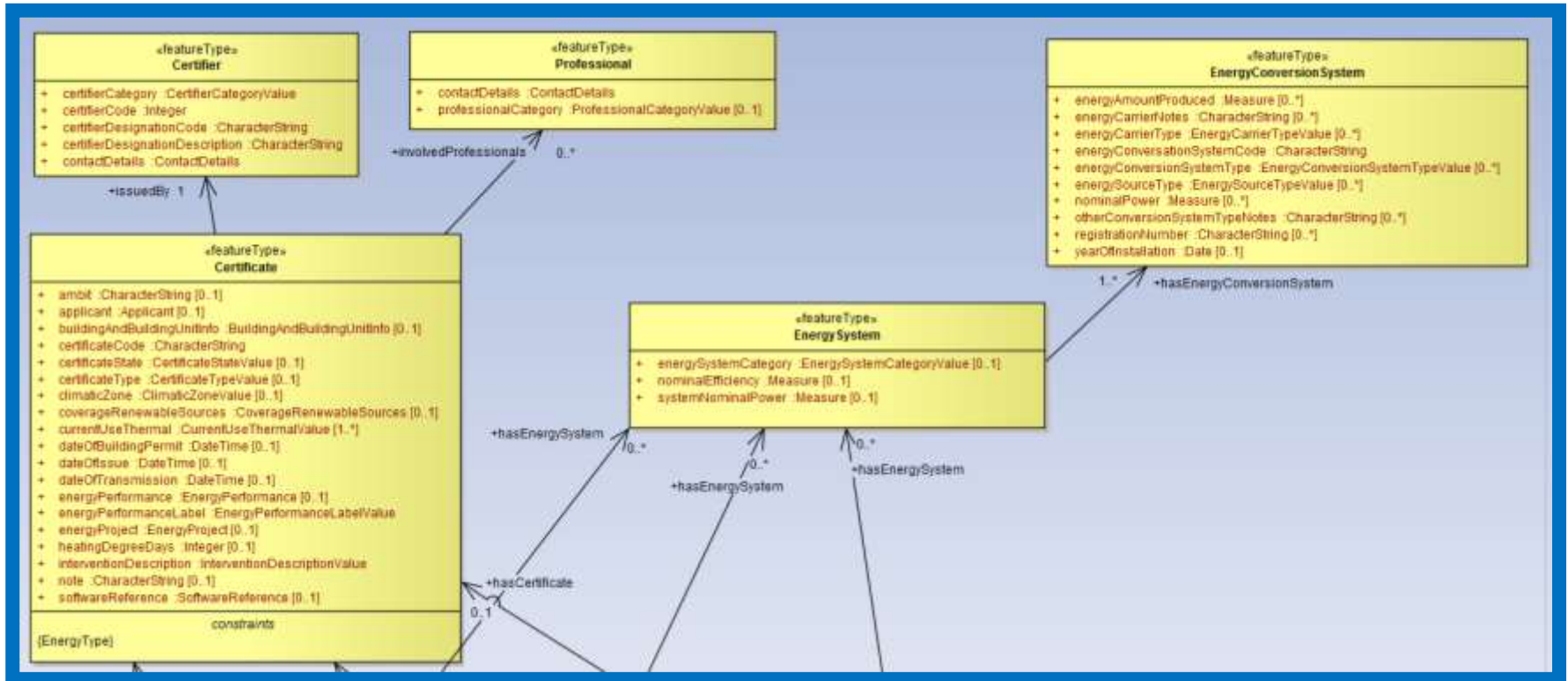
INSPIRE core schemas extension

- Modified feature types of INSPIRE BuildingsExtended2D draft schema



INSPIRE core schemas extension

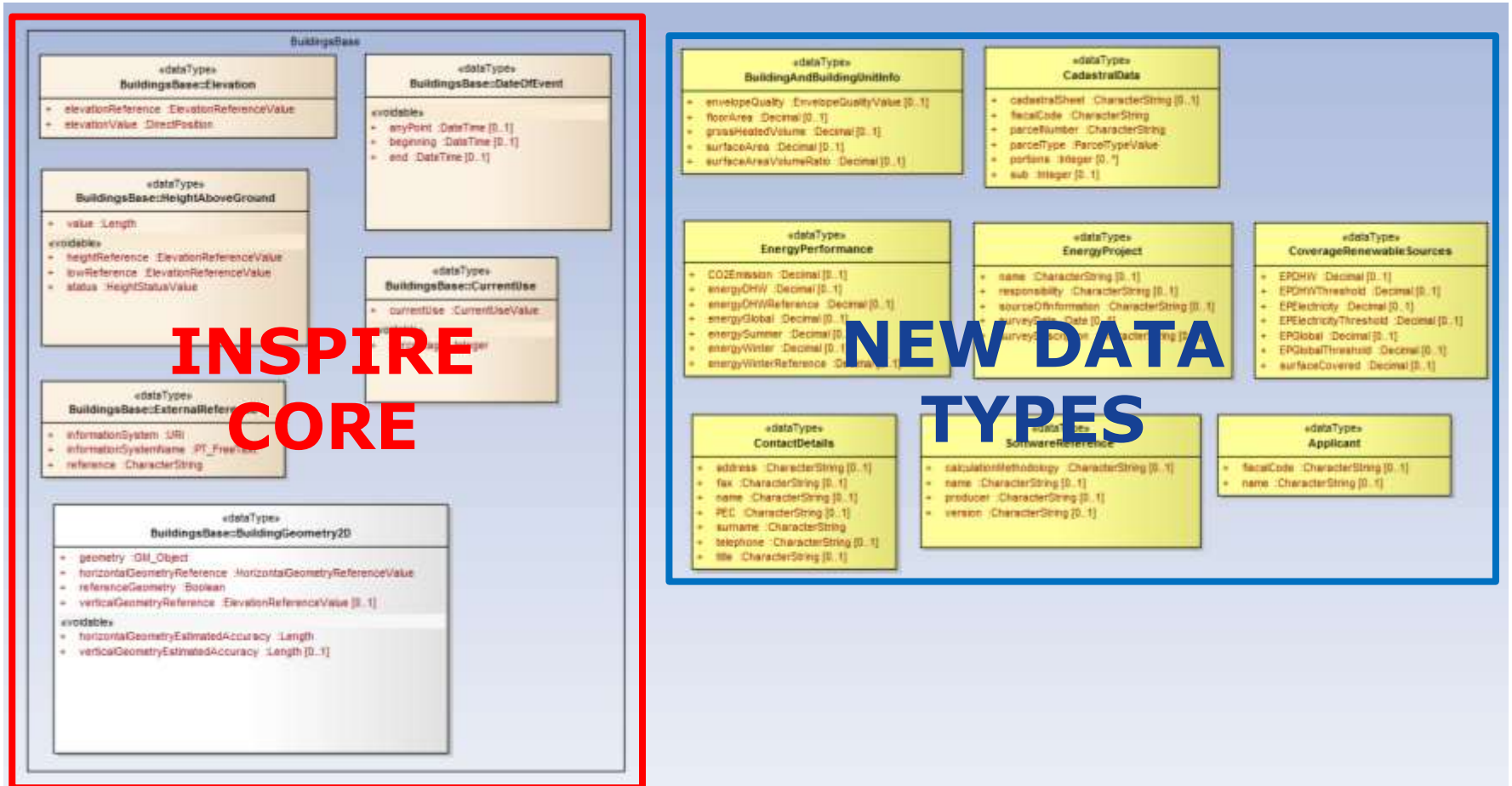
- New feature types of Use Case extended data model





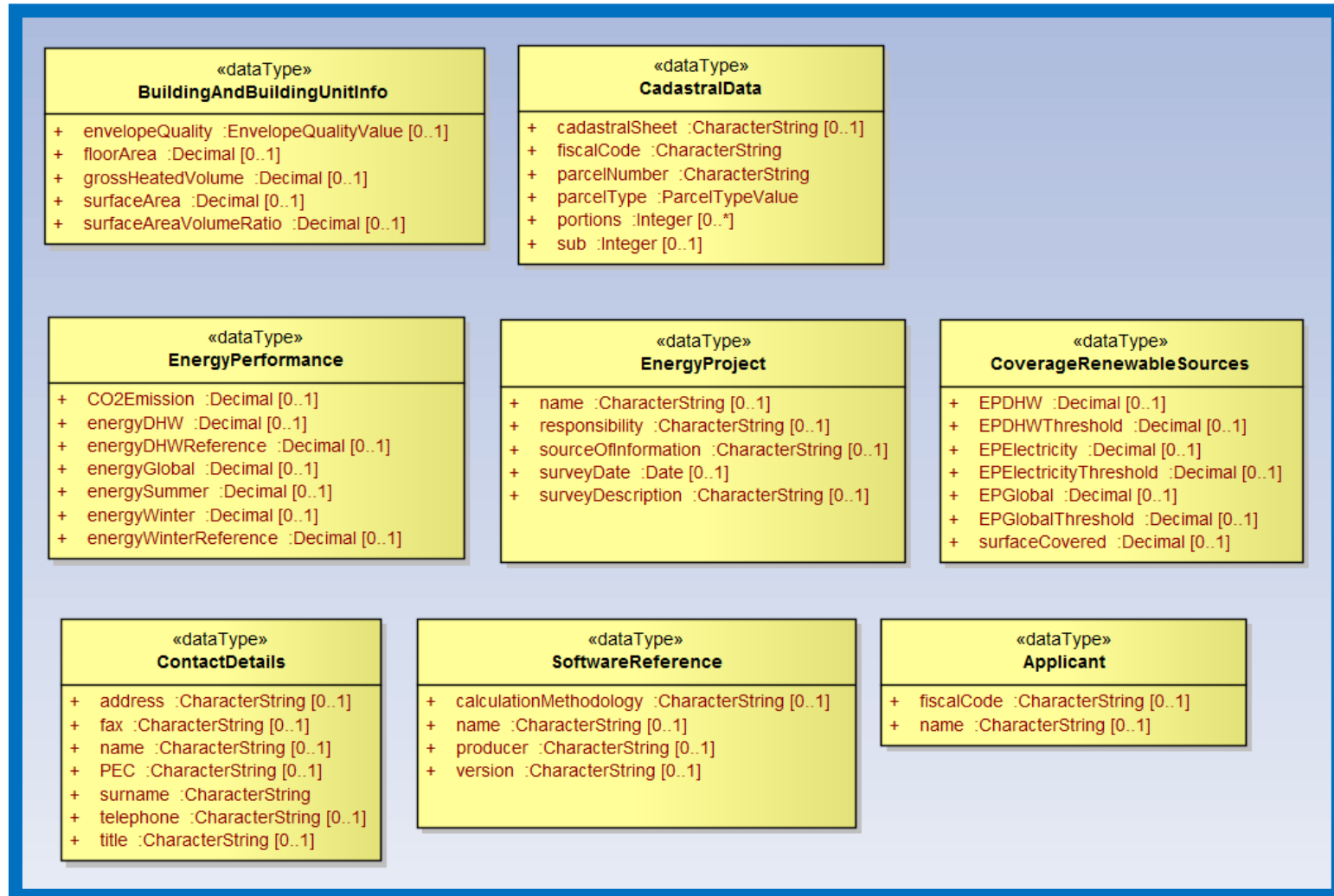
INSPIRE core schemas extension

- Data types of the extended data model



INSPIRE core schemas extension

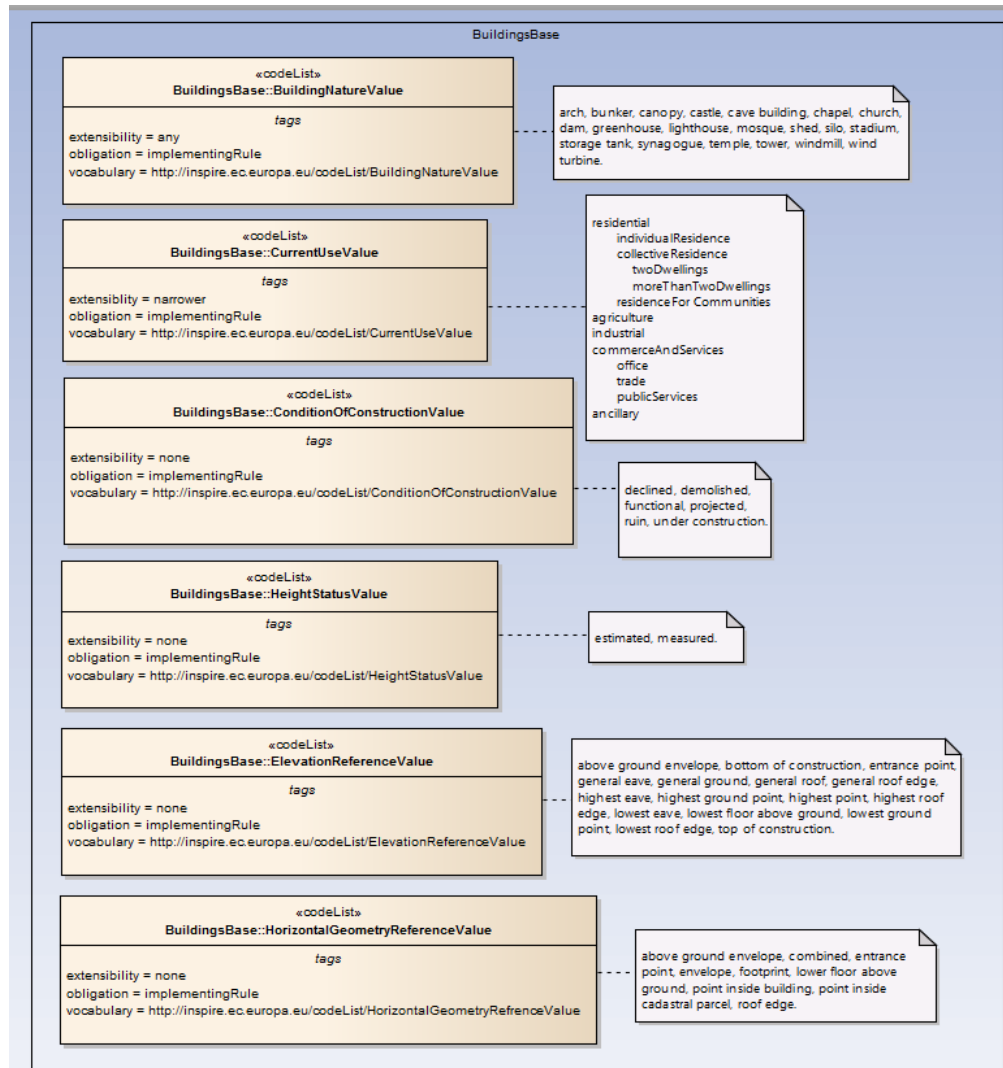
- New data types



INSPIRE core schemas extension



- Code lists of the INSPIRE BuildingBase core schema



INSPIRE core schemas extension



- New (sixteen) code lists

<p>«codeList» EnergySystemCategoryValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/EnergySystemCategoryValue</p>

<p>«codeList» CertifierCategoryValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/CertifierCategoryValue</p>

<p>«codeList» ProfessionalCategoryValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/ProfessionalCategoryValue</p>

<p>«codeList» InterventionDescriptionValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/InterventionDescriptionValue</p>

<p>«codeList» EnergyCarrierTypeValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/EnergyCarrierTypeValue</p>

<p>«codeList» EnergyConversionSystemTypeValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/EnergyConversionSystemTypeValue</p>

<p>«codeList» ParcelTypeValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/ParcelTypeValue</p>	<p>Edificiale, Fondiaria</p>
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<p>«codeList» EnergySourceTypeValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/EnergySourceTypeValue</p>

<p>«codeList» ClimaticZoneValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/ClimaticZoneValue</p>

<p>«codeList» CertificateStateValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/CertificateStateValue</p>	<p>Definitivo, In_reduzione</p>
---	---------------------------------

<p>«codeList» CertificateTypeValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/CertificateTypeValue</p>

<p>«codeList» ConstructionStyleValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/ConstructionStyleValue</p>

<p>«codeList» EnergyPerformanceLabelValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/EnergyPerformanceLabelValue</p>	<p>A+, A, B+, B, C+, C, D, E, F, G</p>
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<p>«codeList» EnvelopeQualityValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/EnvelopeQualityValue</p>	<p>I, II, III, IV</p>
---	-----------------------

<p>«codeList» BuildingTypeValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/BuildingTypeValue</p>

<p>«codeList» CurrentUseThermalValue</p> <p>tags</p> <p>extensibility = any vocabulary = http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/odelist/CurrentUseThermalValue</p>	<p>E1-1, E1-2, E1-3, E2, E3, E4-1, E4-2, E4-3, E5, E6-1, E6-2, E6-3, E7-1, E7-2, E8</p>
---	---

INSPIRE core schemas extension



In green background are shown the attributes of the use case extended data model taken as-is from CityGML Energy ADE modules

FeatureType	Attribute	Values
Building	costructionStyle	CostructionStyleValue
Building	buildingType	BuildingTypeValue
Certificate	climaticZone	ClimaticZoneValue
EnergyConversionSystem	yearOfInstallation	Date
EnergyConversionSystem	energyCarrierType	EnergyCarrierTypeValue
EnergyConversionSystem	energyAmountProduced	Measure
EnergyConversionSystem	energyConversationSystemCode	CharacterString
EnergyConversionSystem	registrationNumber	CharacterString
EnergyConversionSystem	energyCarrierNotes	CharacterString
EnergyConversionSystem	otherConversionSystemTypeNotes	CharacterString
EnergyConversionSystem	nominalPower	Measure
EnergyConversionSystem	energySourceType	EnergySourceTypeValue
EnergyConversionSystem	energyConversionSystemType	EnergyConversionSystemTypeValue
EnergySystem	energySystemCategory	EnergySystemCategoryValue
	hasEnergyConversionSystem	EnergyConversionSystem
EnergySystem	nominalEfficiency	Measure
EnergySystem	systemNominalPower	Measure

Re3gistry implementation



Europe X Giacomo

ec.europa.eu/isa/ready-to-use-solutions/re3gistry_en.htm

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- Security
- Cross border collaboration services
- e-Participation
- Collections of software, standards and specifications**
- Interoperable IT architecture & services

Re3gistry

A tool to manage and share reference codes



© micha360/Thinkstock

When is this solution for you? You would like to **exchange data cross-border and cross-sector using reference codes**. These are used in data exchange between applications, making sure that the parties involved understand univocally the key concepts to which the data refer. They can be used to define sets of permissible values for a data field, or to provide a reference or context for the data being exchanged. Examples are enumerations, controlled vocabularies, taxonomies, thesauri or, simply, 'lists of things'.

You would like to **manage and share reference codes**.

What can we offer you? Re3gistry provides a **central access point** that allows labels and descriptions for reference codes to be easily looked up by humans, or retrieved by machines. It supports

ARE³NA A Reusable INSPIRE Reference Platform

Re3gistry implementation



EULF Energy Pilot code list register

inspire-sandbox.jrc.ec.europa.eu/codelist

About | Contact | Legal notice

English (en)



EULF ENERGY PILOT

Registry

EULF Energy Pilot registry > EULF Energy Pilot code list register

EULF Energy Pilot code list register

ID: <http://inspire-sandbox.jrc.ec.europa.eu/codelist>

Label: **EULF Energy Pilot code list register**

Content Summary: This code list register contains code lists and their values, as defined in the EULF Energy Pilot use cases. NOTE: None of the code lists referred to in this register are contained in any of the code lists referred to in the INSPIRE code list register.

Owner: **European Union**

Register manager: **European Commission, Joint Research Centre**

Control body: **European Commission, Joint Research Centre**

Submitter: **European Commission, Joint Research Centre (EULF Energy Pilot)**

Contact point: [EULF Energy Pilot Registry Team](#)

Licence: [Europa Legal Notice](#)

Other formats:



Code Lists

Filter Label	Filter Themes	Filter Application schema	Filter Status
Label	Themes	Application schema	Status
BuildingType	http://inspire.ec.europa.eu/theme/bu	EULF Energy Pilot UC1	Valid
CertificateState	http://inspire.ec.europa.eu/theme/bu	EULF Energy Pilot UC1	Valid
CertificateType	http://inspire.ec.europa.eu/theme/bu	EULF Energy Pilot UC1	Valid
CertifierCategory	http://inspire.ec.europa.eu/theme/bu	EULF Energy Pilot UC1	Valid

Data transformation



Source_data_model_v07_MF.xlsx - Excel

currentUseThermal

Types	Attributo	Associazione role	Costante	Attributo / Associazione role / Costante	Attributo / Associazione role / Costante	Valore	Multipli	Esempio valore	FeatureType	Attributo	Valore	Attributo	Valore		
edificio	edificioAccorciato (hotel)	unitàInvolabile	indirizzo		CharacterString	0.1	MADEIRAFEDD 12-36122 TRENTO	Building	address	CharacterString					
			annoCostruzione		Integer	0.1	1969	AbstractConstruction	dateOfConstruction	DateOfEvent					
			comuneCanale		Integer	1	406		chicagoCode	CharacterString					
			tipoParticella		CodeList	1	EDIFIALE		parcelType	ParcelType/Value					
			numeroParticella		Integer	1	2610		parcelNumber	CharacterString					
			datCensali (L..)		Integer	1	9	Building	realtimeData	CharacterDate					
			lotto		Integer	0.1	54		cadastreOffice	CharacterString					
			porzioniMateriali (L..)		Integer	0.1	7		porzion	Integer					
			edificioNonAccorciato (luxury)	particella	particella (L..)	contiene_istatuale tipoParticella numeroParticella	Contiene i dati delle porzioni materiali che si riferiscono ad una particella o ad un abitato. Contiene i dati statistici della singola attività e sul suo range. Indirizzo non strada accorciata.	CodeList Integer Integer	1 1 1						
			edificio	certificazione	certificazione	indirizzo		CharacterString	1	PAT	Certificate	addr	CharacterString		
classificazione		CodeList				0.1	F	Certificate	energyPerformanceLabel	EnergyPerformanceLabel/Value					
codiceCertificato		Integer				1	42	Certificate	certificateCode	CharacterString					
proprietario		CharacterString				1	Internally left blank	Certificate	applicant	Applicant	name	CharacterString			
codiceFiscale		CharacterString				1	Internally left blank				taxCode	CharacterString			
copertura di superficie rinnovabile	EPGeniva					Real	0.1				EPGeniva	Decimal			
	EPGenivaSoglia					Real	0.1				EPGenivaThreshold	Decimal			
	EPSolaria					Real	0.1				EPGeniva	Decimal			
	EPSolariaSoglia					Real	0.1				EPGenivaThreshold	Decimal			
	EPSolaria					Real	0.1				EPGlobal	Decimal			
superficie coperta	EPSolariaSoglia		Real	0.1				EPGlobalThreshold	Decimal						
	superficieCoperta		Real	0.1				surfaceCovered	Decimal						
dataInizio	dataInizio		Date/Time	0.1	2014-06-05	Certificate	dateOfIssue	Date/Time							
	dataInizio		Date/Time	1	2014-06-27	Certificate	dateOfTransmission	Date/Time							
	dataInizio		Date/Time	0.1	At 1900-01-01	Certificate	dateOfValidityPeriod	Date/Time							
descrizione evento	descrizione evento		CodeList	0.1	TRASFERIMENTO	Certificate	eventDescriptor	EventDescriptor/Value							
	descrizione evento (L..)	descrizioneEvento		CodeList	1..	ET-1	Certificate	currentUseThermal	CurrentUseThermal/Value						
emissione CO2	emissione CO2		Real	0.1	45.3			CO2Emission	Decimal						
	emissione CO2		Real	0.1	242.5			energyGlobal	Decimal						
	emissione CO2		Real	0.1				energySummer	Decimal						
emissione CO2	emissione CO2		Real	0.1				energyGlobal	Decimal						
	emissione CO2		Real	0.1				energySummer	Decimal						
emissione CO2	emissione CO2		Real	0.1				energyGlobal	Decimal						
	emissione CO2		Real	0.1				energySummer	Decimal						

Data transformation

The screenshot shows the HUMBOLDT Alignment Editor 3.0.0 interface. The window title is "HUMBOLDT Alignment Editor 3.0.0 - APE_IRC_UC1 - D:\AreaShared\KULFEP_UC1_data\mod\UC1_v1.1_FV_hale". The interface is divided into several panes:

- Schema Explorer:** Shows the source schema "type filter test" with a tree structure. The "attestatoCertificazioneEnergetica" class is expanded, showing various attributes like "ambito", "classificazione", "codiceCertificato", "codiceFiscale", "coperturaFontiRinnovabili", etc.
- Target:** Shows the target schema "type filter test" with a list of attributes including "currentUse", "dateOfConstruction", "dateOfDemolition", "dateOfRenovation", "description", "elevation", "endLifespanVersion", "externalReference", "geometry2D", "hasCertificate", "hasEnergySystem", "heightAboveGround", "id", "identifier", "ingresso", "metaDataProperty", "name", "numberOfBuildingUnits", "numberOfDwellings", "numberOfFloorsAboveGround", "parts", "EnergyConversionSystem", "location", "boundedBy", "description", "descriptionReference", "energyAmountProduced", "energyCarrierTypes", "energyConversionSystemCode", "energyConversionSystemType", "energySourceType", "id", "identifier", "metaDataProperty", "name", "nominalPower", "otherConversionSystemTypeNotes", "registrationNumber", and "yearOfInstallation".
- Alignment:** Shows a mapping between source and target attributes. A "Join" operation is shown between "406cp000_FAB" and "Building". Below it, a "Rename" operation is shown for "certificato.ambito" to "to.Certificate.ambito". A "Formatted string" operation is shown for "certificato.classificazione" to "to.formanceLabel.href". Other operations include "Rename" for "certificato.codiceCertificato" to "to.code.certificateCode", "certificato.codiceFiscale" to "to.applcant.fiscalCode", "certificato.dataEmissione" to "to.dateOfIssuance", "certificato.dataInizio" to "to.dateOfTransmission", "certificato.dataTitoloEdilizio" to "to.toOfBuildingPermit", "certificato.destinazioneUso" to "to.intUseThermal.href", "certificato.emissioneCO2" to "to.emission.CO2Emission", "certificato.giaEstrivaUbicazione" to "to.ce.energySummer", "certificato.giataUbicazione" to "to.ce.energyGlobal", "certificato.invernoUbicazione" to "to.ce.energyWinter", and "certificato.invernoUbicazione" to "to.emission.energyWinter".

Data validation



```
uc1.gml [C:\Users\Fabrizio\degree\EIAP-UC\data\uc1.gml] - << nlygen >> KMA Editor
File Edit Find Project Options Tools Document Window Help
SPatch 2.0 - D:\Execute\SPatch on Current\FW
uc1.gml x
1 <?xml version="1.0" ?>
2 <gml:FeatureCollection xmlns:gml="http://www.interactive-instruments.de/ShapeChange/AppInfo"
3 xmlns:iso="http://www.w3.org/2001/XMLSchema" xmlns:geo="http://www.iso211.org/2005/geo"
4 xmlns:ifp="http://www.w3.org/2001/XMLSchema-baseFacetAndProperty"
5 xmlns:bu-core3d="http://inspire.ec.europa.eu/schemas/bu-core3d/4.0"
6 xmlns:gml="http://www.opengis.net/gml/3.2"
7 xmlns:base="http://inspire.ec.europa.eu/schemas/base/1.1"
8 xmlns:gb="http://www.iso211.org/2005/gml" xmlns:gelex="http://www.opengis.net/gml/3.2/exr"
9 xmlns:uml="http://www.epalim-italia.it/public/EnergyPilot/schemas/uml/1.1"
10 xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0"
11 xmlns:igr="http://www.iso211.org/2005/geo" xmlns:grs="http://www.iso211.org/2005/geo"
12 xmlns:gb="http://inspire.ec.europa.eu/schemas/gb/4.0"
13 xmlns:rlink="http://www.w3.org/1999/xlink" xmlns:geo="http://www.iso211.org/2005/geo"
14 xmlns:iso="http://www.w3.org/2001/XMLSchema-instance"
15 gml:id="_Sclcl765-4039-6bee-9066-53167De644cc"
16 xsi:schemaLocation="http://www.epalim-italia.it/public/EnergyPilot/schemas/uml/1.1 http://www.epalim-italia.it/public/EnergyPilot/schemas/uml/1.1/uml.xsd"
17 <gml:featureMember>
18 <uc1:Building gml:id="_a5333e2e-88b0-439b-af6d-85641c7235e4">
19 <bu-base:beginLifeSpanTermin gml:bool="true"/>
20 <bu-base:conditionOfConstruction xsi:bool="true"/>
21 <bu-base:inspireId>
22 <base:Identifier>
23 <base:localId>Building_localId_4c73e6eb-5ec5-4536-9055-3f80ed6239eb</base:localId>
24 <base:namespace>II.BU.Trento</base:namespace>
25 </base:Identifier>
26 </bu-base:inspireId>
27 <bu-core3d:geometry2D>
28 <bu-base:BuildingGeometryID>
29 <bu-base:geometry>
30 <gml:Polygon gml:id="_6401287c-c02d-4908-bb1f-573cc8ed6e68"
31 xmlns:ex="http://www.opengis.net/ex/3.0" xmlns:exr="http://www.opengis.net/exr/3.0"
32 <gml:exterior>
33 <gml:LinearRing>
34 <gml:posList>5109006.08852988 661054.2923922008
35 5109006.349406277 661065.4129751298 5109030.533551915
36 661060.1544478262 5109021.944444454 661022.7040824103
37 5109010.8371230615 661029.3634296593 5109016.668132379
38 661051.5382456912 5109006.08852988
39 661054.2923922008</gml:posList>
40 </gml:LinearRing>
41 </gml:exterior>
42 <gml:Polygon>
43 </bu-base:geometry>
44 </gml:Polygon>
45 </bu-base:geometry>
46 </uc1:Building>
47 </gml:featureMember>
48 </gml:FeatureCollection>
49 </pre>
```



Text Grid Author
X Find: Search Next Previous All Incremental Case sensitive
C:\Users\Fabrizio\degree\EIAP-UC\data\uc1.gml Document is valid. U+000A 19 / 59

Data validation



```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<gnl:featureMember>
  <cucl:Building gml:id="_5B02e48-e568-4a2b-9448-a8090b1d4b45">
    <bu-base:beginLifeSpanVersion sml:nil="true"/>
    <bu-base:conditionOfConstruction sml:nil="true"/>
    <bu-base:dateOfConstruction>
      <bu-base:DateOfEvent>
        <bu-base:beginning>1998-12-31T23:00:00Z</bu-base:beginning>
      </bu-base:DateOfEvent>
    </bu-base:dateOfConstruction>
    <bu-base:inspireId>
      <base:Identifier>
        <base:localId>Building_localId_4706c1c5-0ea3-467e-94e2-a5254b36e0b9</base:localId>
        <base:namespace>IT.BU.Trento</base:namespace>
      </base:Identifier>
    </bu-base:inspireId>
    <bu-base:numberOfDwellings>1</bu-base:numberOfDwellings>
    <bu-core:geometry2D> (22 lines)
    <cucl:hasCertificate>
      <cucl:Certificate gml:id="_d4d076dd-8092-4b74-83f6-830d229785e">
        <cucl:issuedBy>
          <cucl:Certifier gml:id="_fe4d2884-d872-494b-906e-c5888bddd0c"> (17 lines)
        </cucl:issuedBy>
        <cucl:softwareReference>
          <cucl:SoftwareReference> (8 lines)
        </cucl:softwareReference>
        <cucl:note>L'edificio oggetto del presente certificato è un capannoni ad uso cantiere comunale. Esso presenta forme molto compatte e strutture
        <cucl:interventionDescription>
          <link href="http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/InterventionDescription/value/CERTIFICAZIONE_VOLONTARIA"
          <link title="CERTIFICAZIONE_VOLONTARIA"/>
        </cucl:heatingDegreeDays>2567</cucl:heatingDegreeDays>
        <cucl:energyProject>
          <cucl:EnergyProject> (4 lines)
        </cucl:energyProject>
        <cucl:energyPerformanceLabel>
          <link href="http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/EnergyPerformanceLabelValue/C"
          <link title="C"/>
        </cucl:energyPerformance>
          <cucl:EnergyPerformance>
            <cucl:energyWinterReference>22.66</cucl:energyWinterReference>
            <cucl:energyGlobal>23.17</cucl:energyGlobal>
            <cucl:energyDhwReference>0.51</cucl:energyDhwReference>
            <cucl:CO2Emission>4.83</cucl:CO2Emission>
          </cucl:EnergyPerformance>
        </cucl:Certificate>
      </cucl:hasCertificate>
    </cucl:Building>
  </gnl:featureMember>
```

Document is valid.

Data publication



```
Click entity for XPath. Double-click to collapse/expand. Enter XPath or XML string then click XPath/Parse for results or to XML Tree-ify, respectively. Source (XPath) XPath/Parse XML 1.0
```

```
<wfs:FeatureCollection xmlns:schemaLocation="http://www.opengis.net/wfs/2.0 http://schemas.opengis.net/wfs/2.0/wfs.xsd http://www.opengis.net/gml/3.2 http://schemas.opengis.net/gml/3.2.1/gml.xsd http://www.epsilon-italia.it/public/EnergyPilot/schemas/uc1/1.1 http://localhost:8080/services/uc1_WFS?SERVICE=WFS&VERSION=2.0.0&REQUEST=DescribeFeatureTypes&OUTPUTFORMAT=application%3Fgml%3Dxml%3B+version%3D3.2&TYPENAME=uc1:Building&NAMESPACE xmlns(uc1, http://www.epsilon-italia.it/public/EnergyPilot/schemas/uc1/1.1) timeStamp="2016-09-23T15:02:33Z" numberMatched="unknown" numberReturned="2" xmlns:xs="http://www.w3.org/2001/XMLSchema-instance" xmlns:wfs="http://www.opengis.net/wfs/2.0" xmlns:gml="http://www.opengis.net/gml/3.2">  
  <!--NOTE: numberReturned attribute should be "unknown" as well, but this would not validate against the current version of the WFS 2.0 schema (check logging). See change logs-->  
  <wfs:FeatureCollection>  
    <uc1:Building gml:id="ae503a2e-88b1-439b-a8a8-85641c7235ef" xmlns:uc1="http://www.epsilon-italia.it/public/EnergyPilot/schemas/uc1/1.1">  
      <bu-base:beginLifespanVersion xsi:nil="true" xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0"/>  
      <bu-base:conditionOfConstruction xsi:nil="true" xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0"/>  
      <bu-base:inspireId xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0">  
        <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">  
          <base:localId>Building_localId_4c73e6eb-5ec5-4538-9055-3f00ed6259eb</base:localId>  
          <base:namespace>IT.BU.Trento</base:namespace>  
        </base:Identifier>  
      </bu-base:inspireId>  
      <bu-core2d:geometry2D xmlns:bu-core2d="http://inspire.ec.europa.eu/schemas/bu-core2d/4.0">  
        <bu-base:BuildingGeometry2D xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0">  
          <bu-base:geometry>  
            <!--Inlined geometry '6401287c-c02d-4500-bb3f-575cc9ad6ca8'-->  
            <gml:Polygon gml:id="6401287c-c02d-4500-bb3f-575cc9ad6ca8" xmlns:gml="http://www.opengis.net/gml/3.2">  
              <gml:exterior>  
                <gml:Ring>  
                  <gml:curveMember>  
                    <gml:LineString gml:id="GEOMETRY_78a7e652-a8f60010-0410-02bf54418da7" xmlns:gml="http://www.opengis.net/gml/3.2">  
                      <gml:posList>5109006.084 661054.292 5109008.309 661065.413 5109030.534 661060.154 5109021.844 661022.704 5109010.837 661025.363 5109016.868 6610  
                    </gml:posList>  
                  </gml:LineString>  
                </gml:curveMember>  
              </gml:Ring>  
            </gml:exterior>  
          </gml:Polygon>  
        </bu-base:geometry>  
        <bu-base:referenceGeometry true</bu-base:referenceGeometry>  
        <bu-base:horizontalGeometryReference xmlns:link:href="http://inspire.ec.europa.eu/codelist/HorizontalGeometryReferenceValue/footPrint" xmlns:link="http://www.w3.org/1999/xmlink"/>  
        <bu-base:horizontalGeometryEstimatedAccuracy uom="unknown" xsi:nil="true"/>  
      </bu-base:BuildingGeometry2D>  
    </uc1:Building>  
  </wfs:FeatureCollection>
```

WFS with deegree memory feature store

Data publication

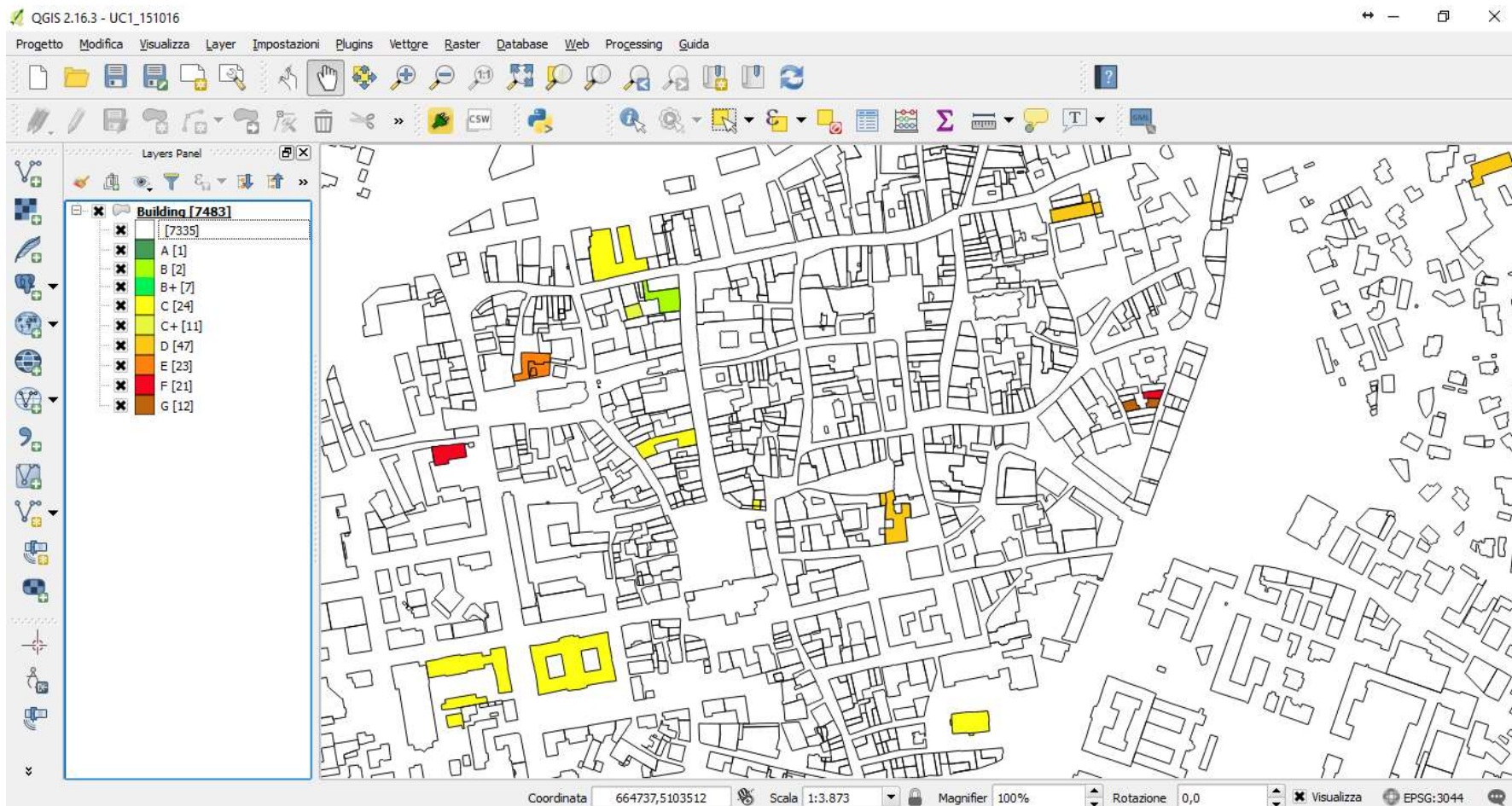


```
http://localhost:3000/services/uc1_WFS?service=WFS&request=GetFeature&typeName=uc1:Building&version=1.0.0
localhost
Google hasC
Effettua la ricerca
Condividi Altro
Entra

</gml:Ring>
</gml:exterior>
</gml:Polygon>
</bu-base:geometry>
<bu-base:referenceGeometry> true </bu-base:referenceGeometry>
<bu-base:horizontalGeometryReference xlink:href="http://inspire.ec.europa.eu/codelist/HorizontalGeometryReferenceValue/footPrint"
  xmlns:xlink="http://www.w3.org/1999/xlink"/>
<bu-base:horizontalGeometryEstimatedAccuracy xsi:nil="true" uom="unknown"/>
</bu-base:BuildingGeometry2D>
</bu-core2d:geometry2D>
</uc1:Building>
</wfs:member>
- <wfs:member>
- <uc1:Building gml:id="*_05b02a43-e568-4a2b-9448-a8090b1b6b45*" xmlns:uc1="http://www.epsilon-italia.it/public/EnergyPilot/schemas/uc1/1.1">
  <bu-base:beginLifeSpanVersion xsi:nil="true" xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0"/>
  <bu-base:conditionOfConstruction xsi:nil="true" xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0"/>
  - <bu-base:dateOfConstruction xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0">
    - <bu-base:DateOfEvent>
      <bu-base:beginning> 1989-12-31T23:00:00Z </bu-base:beginning>
    </bu-base:DateOfEvent>
  </bu-base:dateOfConstruction>
  - <bu-base:inspireId xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0">
    - <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">
      <base:localId> Building_localId_4706c1c5-cea3-467e-94e2-a5254b36e0b9 </base:localId>
      <base:namespace> IT.BU.Trento </base:namespace>
    </base:Identifier>
  </bu-base:inspireId>
  <bu-base:numberOfDwellings xmlns:bu-base="http://inspire.ec.europa.eu/schemas/bu-base/4.0"> 1 </bu-base:numberOfDwellings>
  + <bu-core2d:geometry2D xmlns:bu-core2d="http://inspire.ec.europa.eu/schemas/bu-core2d/4.0">
  - <uc1:hasCertificate>
    <!-- Inlined feature "_d4d076dd-8082-4b74-93f4-430df2f9785e"-->
    - <uc1:Certificate gml:id="_d4d076dd-8082-4b74-93f4-430df2f9785e">
      + <uc1:issuedBy>
      + <uc1:softwareReference>
      <uc1:note> L'edificio oggetto del presente certificato è un capannone ad uso cantiere comunale. Esso presenta forma molto compatta e
        strutture poco performanti (pareti esterne a pannelloni prefabbricati e serramenti in alluminio). Un possibile intervento di miglioramento
        energetico è la realizzazione di una coibentazione a cappotto sull'intero edificio (compatibilmente con i vincoli urbanistici). Si consiglia
        inoltre la sostituzione dei serramenti con serramenti più performanti. </uc1:note>
      <uc1:interventionDescription xlink:href="http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/InterventionDescriptionValue/CERTIFICAZIONE_VOLONTARIA"
        xmlns:xlink="http://www.w3.org/1999/xlink"/>
      <uc1:heatingDegreeDays> 2567 </uc1:heatingDegreeDays>
      + <uc1:energyProject>
      <uc1:energyPerformanceLabel xlink:href="http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/EnergyPerformanceLabelValue/C"
        xmlns:xlink="http://www.w3.org/1999/xlink"/>
      - <uc1:energyPerformance>
        - <uc1:EnergyPerformance>
          <uc1:energyWinterReference> 22.66 </uc1:energyWinterReference>
          <uc1:energyGlobal> 23.17 </uc1:energyGlobal>
          <uc1:energyDHWReference> 0.51 </uc1:energyDHWReference>
          <uc1:CO2Emission> 4.63 </uc1:CO2Emission>
        </uc1:EnergyPerformance>
      </uc1:energyPerformance>
    </uc1:Certificate>
  </uc1:hasCertificate>

```

Data use



Data use



QGIS 2.16.3 - UC1_151016

Progetto Modifica Visualizza Layer Impostazioni Plugins Vettore Raster Database Web Processing Guida

Layers Panel

- Building [7483]
 - [7335]
 - A [1]
 - B [2]
 - B+ [7]
 - C [24]
 - C+ [11]
 - D [47]
 - E [23]
 - F [21]
 - G [12]
- Bing Aerial

Coordinata 1237502.6,5790849.6 Scala 1:2.500 Magnifier 100% Rotazione 0,0 Visualizza EPSG:3857 (OTF)

Data use



Complex GML Info

```

Selected feature [1]
uc1:Building
  @gml:id "_s1d6a93b-072e-445c-a04d-0a23068b6ac"
  bu-base:beginLifespanVersion
  bu-base:conditionOfConstruction
  bu-base:dateOfConstruction
  bu-base:dateOfEvent
    bu-base:beginning "1893-12-31T23:00:00Z"
  bu-base:inspired
  bu-base:inspired
    bu-base:identifier
      bu-base:localid "Building_localid_4b502e33-0962-44f3-a2a4-4b5eaa66c6a"
      bu-base:namespace "IT.BUI.Trento"
  bu-base:numberOfDwellings
    #text "1"
  uc1:addressViaName "5"
  uc1:administrativeCode "22255"
  uc1:buildingType
    @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/BuildingTypeValue/MULTIBLOCCO"
  uc1:cadastreData
    uc1:fiscalCode "406"
    uc1:parcelNumber "1663"
    uc1:parcelType
      @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/ParcelTypeValue/edificale"
      uc1:sub "0"
  uc1:constructionStyle
    @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/ConstructionStyleValue/PESANTE"
  uc1:hasCertificate
    uc1:Certificate
      @gml:id "_3aed02a1-df48-4193-970e-14945edafda"
      uc1:ambit "PAT"
      uc1:applicant
        uc1:Applicant
          uc1:fiscalCode "0033746224"
          uc1:name "Provincia Autonoma di Trento"
      uc1:buildingAndBuildingUnitInfo
        uc1:BuildingAndBuildingUnitInfo
          uc1:envelopeQuality
            @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/EnvelopeQualityValue/T"
            uc1:floorArea "13573.24"
  
```

```

uc1:groundAreaVolume "60184.03"
uc1:surfaceArea "14982.4"
uc1:surfaceAreaVolumeRatio "0.278"
uc1:certificateCode "162"
uc1:certificateDate
  @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/CertificateDateValue/DEFINITIVO"
uc1:certificateType
  @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/CertificateTypeValue/ALTRD"
uc1:climaticZone
  @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/ClimaticZoneValue/T"
uc1:currentUseThermal
  @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/CurrentUseThermalValue/E7-2"
uc1:dateOfBuildingPermit "1899-12-31T23:00:00Z"
uc1:dateOfIssue "2016-08-09T22:00:00Z"
uc1:dateOfTransmission "2016-08-09T22:00:00Z"
uc1:energyPerformance
  uc1:energyPerformance
    uc1:CO2Emission "6.46"
    uc1:energyDHWReference "0.26"
    uc1:energyGlobal "31.37"
    uc1:energyWinterReference "31.11"
  uc1:energyPerformanceLabel
    @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/EnergyPerformanceLabelValue/C"
uc1:energyProject
  uc1:EnergyProject
    uc1:name "sol termica tav-E9-4ajlo-89"
    uc1:responsibility "Per. bui Laureato Tomasin Claudio"
    uc1:sourceOfInformation "Rilevo in situ"
    uc1:surveyDate "2016-07-18-02:00"
    uc1:surveyDescription "Rilevo delle strutture dipendenti della P. Ed. 2252"
  uc1:thermalSourceFlux "567"
uc1:interventionDescription
  @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/InterventionDescriptionValue/C"
uc1:issuedBy
  uc1:Certifier
    @gml:id "_1944257-b41f-43a8-8289-77730d796d2c"
    uc1:certifierCategory
      @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/CertifierCategoryValue/C"
    uc1:certifierCode "289"
    uc1:certifierDesignationCode "AA"
    uc1:certifierDesignationDescription "Odetele è l'Organismo di abilitazione e certificazione di Heitech"
    uc1:contactDetails
      uc1:ContactDetails
        uc1:PEC "claudio.tomasin@pec.appt.it"
        uc1:fax "0461240827"
        uc1:name "Claudio"
        uc1:surname "Tomasin"
        uc1:telephone "0461240837"
        uc1:title "PER. ING."
    uc1:note "Edificio sede del Dipartimento di Economia e Management dell'Università degli Studi di Trento La PE..."
  uc1:softwareReference
    uc1:SoftwareReference
      uc1:calculatorTechnology "Autocertificazione di conformità (vch_75 al CTI del CUCI/16) snc/LA2C..."
      uc1:name "CCTSP"
      uc1:producer "Edilcine Srl"
      uc1:version "7"
uc1:hasEnergySystem
  uc1:EnergySystem
    @gml:id "_379c2dc-4862-482b-f16b-1cbbd116540"
    uc1:energySystemCategory
      @link:href "http://inspire-sandbox.jrc.ec.europa.eu/energy-pilot/codelist/EnergySystemCategoryValue/RE"
    uc1:hasEnergyConversionSystem
      [0]
      @link:href "EnergyConversionSystem_157682"
      [1]
      @link:href "EnergyConversionSystem_157683"
      [2]
      @link:href "EnergyConversionSystem_157684"
      [3]
      @link:href "EnergyConversionSystem_157685"
      [4]
      @link:href "EnergyConversionSystem_157686"
  
```

Data use



European Commission

ELISE - ENERGY PILOT

Use case 1: INSPIRE Harmonisation of Energy Performance Certificates (EPC) datasets

European Commission > ELISE > Use case 1

English (en)

Legenda Base Layer selector

- A+
- A
- B+
- B
- C
- D
- E
- F
- G

Energy label: C

Build date: 1985

Building type: SINGOLO

Floor area: 1024,6

Global energy: 27,8



Next steps

- Improve Persistent Identifier management in the target schema
- Apply HALE alignment to all dataset
- Deploy WFS on a publicly accessible server
- Enrich code list register content with more detailed description of code list values and translation in English
- Support partner to operationalize the pilot workflow into its organization
- Develop a web application facilitating the access to and use of harmonized data
- Re-use pilot workflow in other Regions/Countries



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LinkedIn: european-commission-joint-research-centre



<http://inspire.ec.europa.eu/>



website: http://ec.europa.eu/isa/actions/02-interoperability-architecture/2-13action_en.htm

EULF Joinup Community: <https://joinup.ec.europa.eu/community/eulf/description>

Email: eulf-info@jrc.ec.europa.eu