SUSTAINABLE PLACES 2024

23-25 September 2024

Luxembourg

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY | LIST

R2M SOLUTION

Digital Building Logbooks and Permit Processes

WORKSHOP

24/09/2024 09:00 – 12:30 (CET)

European Convention Center
Luxembourg

Digital Building Logbooks and Permit Processes for Sustainability

ACCORD | CHEK DIGITAL BUILDING PERMIT | DigiChecks | EUnet4DBP | Demo Blog | DR

www.sustainableplaces.eu

Welcome and agenda

Larissa De Rosso

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Agenda - First Part

9:00 - 09:30
Overview of the Research
Sustainable Development Goals - Introduction
Workshop participation - consent

9:30 - 10:30
Presentations from

- ACCORD, Rita Lavikka
- DigiChecks, Jeroen Werbrouck
- CHEK, Mayte Toscano
- Demo Blog, Henk Visscher
- EUnet4DBP and MSCA-DRF, Judith Fauth

10:30 - 11:00 Coffee Break

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Agenda - Second Part

11:00 - 11:20
Questions to the Audience - Interaction with Sli.do

11:20 - 12:30
Miro activities
General connections 5 min independent, shared discussion 10 min
Practices of DBP and DBL related to SDGs

12:30 Lunch

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Overview of the research and workshop participation

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Research information sheet

Sustainability of digital building permit processes and logbooks

Conducted by several research projects:

- ACCORD - no. 101056973 and UK Research and Innovation no. 10040207
- CHEK - no. 101058559
- DigiChecks – no. 101058541
- FUTUREROADS, the Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie no. 101034337

Contact information

- VTT Technical Research Centre of Finland Ltd
- Rita Lavikka rita.lavikka@vtt.fi, +358 50 384 1662

Request for participation

You are requested to participate in research that analyses the sustainability of digital building permit processes and logbooks, taking the UN's Sustainable Development Goals (SDGs) as an analysis framework.

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Research information sheet

Voluntariness

You may decline participation or interrupt your participation at any phase of the research without having a specific reason and without having to explain your reason for this.

Phases of the research

This workshop is used as one of the data collection points. Information for the research is also collected through literature of previous findings.

No financial compensation

Your participation in the research is not financially compensated.

Informing about research results

The findings are published in scientific papers and presentations. No processing of personal data.

CONSENT

By attending this workshop on the 24th of September, at the Sustainable Places conference, I consent to participate in the research.

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Sustainable Development Goals Introduction

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Goal 1 No Poverty - End poverty in all its forms everywhere.

Organisations contribute by supporting programs that provide job opportunities, vocational training, or microfinance initiatives for impoverished communities.

Goal 2 Zero Hunger - End hunger, achieve food security, and improve nutrition.

Organisations contribute by donating excess food to food banks or supporting agricultural projects that promote sustainable farming practices and increase access to nutritious food.

Goal 3 Good Health and Well-being - Ensure healthy lives and promote well-being for all.

Organisations contribute by organizing health and wellness programs for employees or supporting healthcare initiatives that provide access to affordable and quality healthcare services for communities in need.

Goal 4 Quality Education - Ensure inclusive and equitable quality education and promote lifelong learning opportunities.

Organisations contribute by supporting education-focused nonprofits, sponsoring scholarships, or providing training and mentorship programs for disadvantaged individuals.

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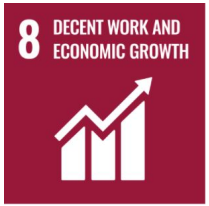
Goals 5 Gender Equality - Achieve gender equality and empower all women and girls.
Organisations contribute by implementing policies that promote diversity and inclusion in your company, providing equal opportunities for career advancement, or supporting organizations that advocate for women's rights.

Goal 6 Clean Water and Sanitation - Ensure availability and sustainable management of water and sanitation for all.
Organisations contribute by implementing water conservation measures, supporting clean water projects in areas lacking access, or promoting responsible water usage among employees.

Goal 7 Affordable and Clean Energy - Ensure access to affordable, reliable, sustainable, and modern energy for all.
Organisations contribute by transitioning to renewable energy sources, promoting energy efficiency practices, or supporting initiatives that provide clean energy solutions to underserved communities.



Goal 8 Decent Work and Economic Growth - Promote inclusive and sustainable economic growth, employment, and decent work for all.
Organisations contribute by providing fair wages, creating job opportunities, supporting entrepreneurship, or participating in skills development programs.

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Goal 9 Industry, Innovation, and Infrastructure - Build resilient infrastructure, promote sustainable industrialization, and foster innovation.
Organisations contribute by adopting sustainable business practices, investing in research and development, or supporting infrastructure projects that improve connectivity and access to essential services.

Goal 10 Reduced Inequalities - Reduce inequalities within and among countries.
Organisations contribute by implementing fair hiring practices, supporting marginalized communities, or participating in initiatives that promote social inclusion and equal opportunities.

Goal 11: Sustainable Cities and Communities - Make cities and human settlements inclusive, safe, resilient, and sustainable.
Organisations contribute by implementing environmentally friendly practices within your company, supporting urban development projects that prioritize sustainability and accessibility, or promoting public transportation.

Goal 12: Responsible Consumption and Production - Ensure sustainable consumption and production patterns.
Organisations contribute by reducing waste, implementing recycling programs, using eco-friendly materials, or supporting initiatives that promote responsible consumption.

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Goal 13: Climate Action - Take urgent action to combat climate change and its impacts.
Organisations contribute by reducing greenhouse gas emissions, implementing energy-efficient practices, supporting renewable energy projects, or advocating for climate-friendly policies.

Goal 14: Life Below Water - Conserve and sustainably use the oceans, seas, and marine resources.
Organisations contribute by reducing plastic waste, supporting marine conservation initiatives, or promoting sustainable fishing practices.

Goal 15 Life on Land - Protect, restore, and promote sustainable use of terrestrial ecosystems.
Organisations contribute contributes by implementing sustainable land management practices, supporting reforestation efforts, or participating in conservation projects that protect endangered species and habitats.

Goal 16 Peace, Justice, and Strong Institutions - Promote peaceful and inclusive societies, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels.
Organisations contribute contributes by promoting ethical business practices, supporting human rights organizations, or participating in initiatives that promote social justice.

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Goal 17 Partnerships for the Goals - Strengthen the means of implementation and revitalize the global partnership for sustainable development.
Organisations contribute by collaborating with other organizations, sharing knowledge and resources, or supporting initiatives that promote international cooperation for sustainable development.

Projects Presentations.
Please address the following questions

- **How do you contribute to a sustainable built environment with your project?**

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ACCORD project

Rita Lavikka

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Innovate UK

ACCORD

Vision: Transparent & resource-efficient building permit process

Concept design

Building/ infra design

Construction

Renovation /demolition

Machine-readable rules

CDE

Digital twin

Semantics

Inter-operability

Accessibility

Energy

CO_2 & circular economy

Safety

Preventive maintenance

Regulations

Concept approval

Building approval

Construction approvals

Renovation/demolition approvals

Healthy, safe & sustainable BE

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Process readiness towards digital building permitting

Paper or PDF exchange

Manual review

Online service, manual review

Current practice in many European countries

IFC open BIM

Semi-automated compliance checking

Finland and Estonia showing the way

BIM&GIS integrated

Automated compliance checking

Machine interpretable regulations

Future?

+ Regulatory push
+ R&D projects
+ Agility in BIM technology implementation
+ BIM requirements & guidelines
+ Upskilling

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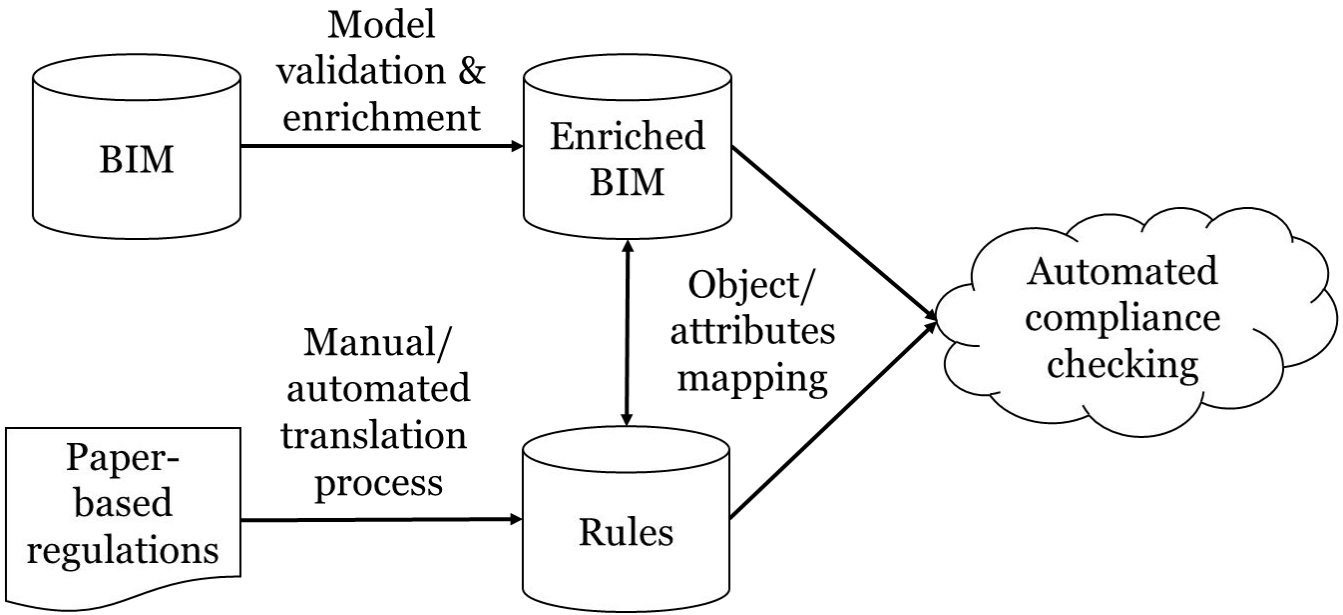
Two streams needed for automated code compliance checking

1. Design data in structured format
2. Regulations in machine-readable format (rules)



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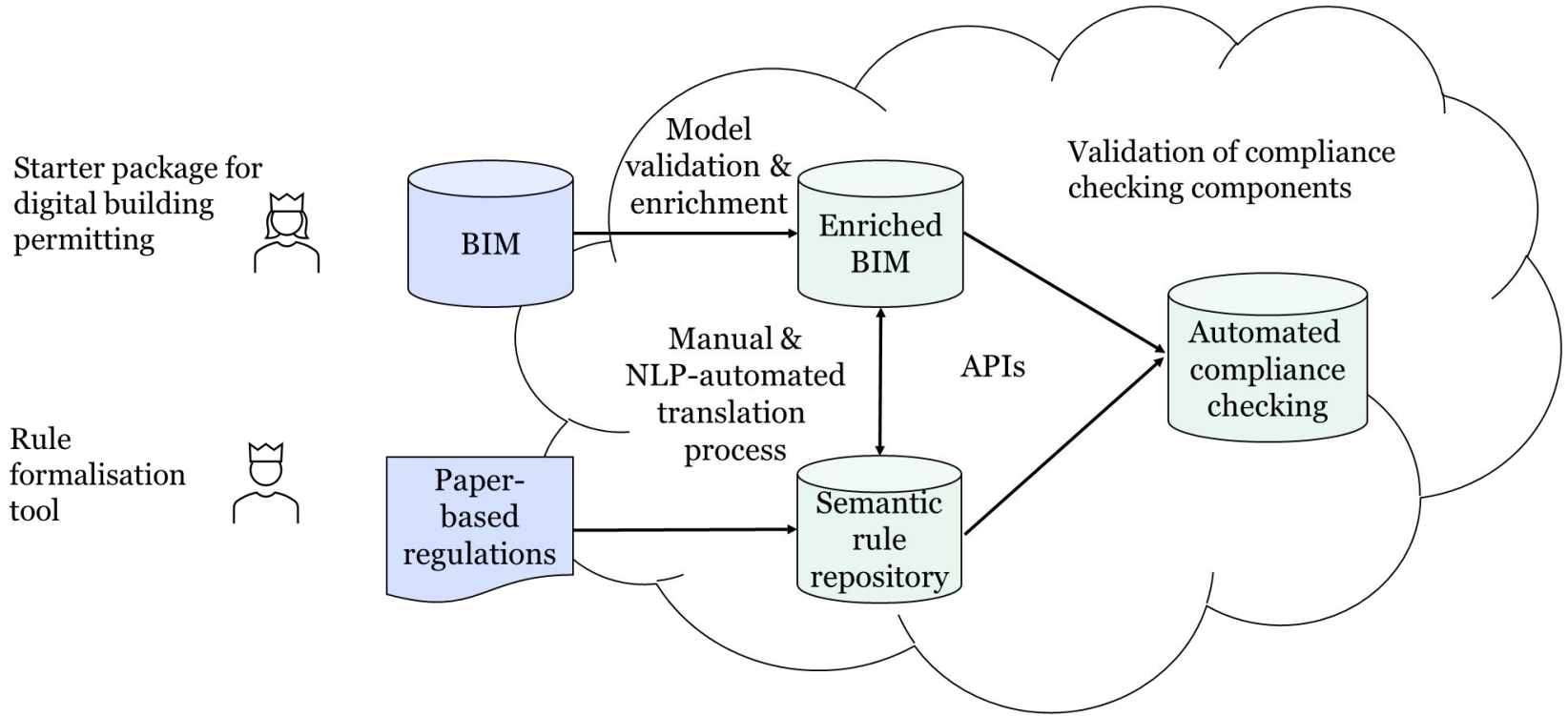
ACCORD Scope



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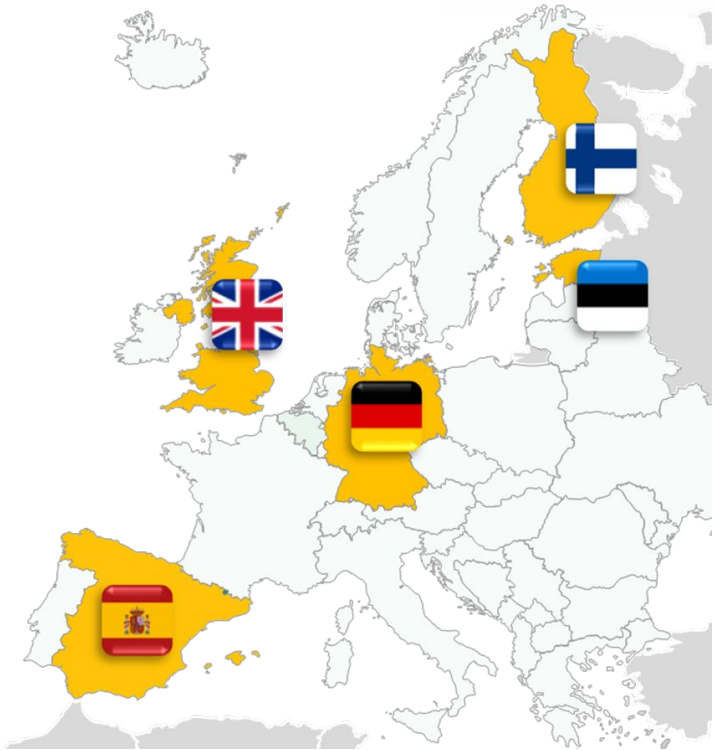
Demonstrations

- 5 countries
  Finland, Estonia, Germany, UK, Spain
- 13 use cases
  design codes, urban regulations, building acts and decrees
- 9 demo projects
  residential and non-residential, new buildings and renovations, concrete, steel and timber
- 2 data exchange standards
  IFC and CityGML



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Finnish demo

Use Cases

- Read **basic building data** from IFC (national building registry)
- Automate the compliance checking of selected geometry-based **requirements of accessibility and operational safety**
- Develop and test a method for **carbon footprint evaluation**

Targeted regulations in use cases

- 2010/128 Government Decree on the Population Information System
- 241/2017 Government Decree on Accessibility of Building
- 1007/2017 Government Decree on the Operational Safety of Buildings
- Draft of the Government Decree on Climate Declaration

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Actors and their roles

VTT leads

Cloudpermit (CP) provides a cloud-based permitting service

Solibri (SOL) provides compliance checking service

Senate Properties (State property owner) provides access to

- Courthouse in the City of Pori
- Courthouse in the City of Vantaa

Other actors

- Project main architects model the BIM models
- BIM coordinator
- Municipal building control

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Demo projects

Demo 1: Courthouse, City of Pori

- New building
- Area 5 419 m2 (net), Est. costs 23 M€
- Schedule 2023-2025
- Stakeholders
  - Senate Properties
  - Arkkitehtitoimisto Rosberg Ikävalko Oy (architect)
  - Gravicon Oy (BIM support for ACCORD)

Demo 2: Courthouse, City of Vantaa

- New building and renovation
- Area 10 664 m2, Est. costs 44 M€
- Schedule 2024-2026
- Stakeholders
  - Senate Properties
  - AFRY, A-Konsultit Oy (architects)
  - Granlund Oy (BIM coordinator)

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ACCORD and Sustainability

- ACCORD is digitalising building permitting and automating compliance checking processes
  - enhances the productivity and quality of design and construction
  - fosters innovation in the industry
  - supports transparency, sustainable practices
- ACCORD has created a proof-of-concept tool for the automatic calculation of building LCA based on BIM (AC(CO2)RD Tool)
  - supports emission reduction
  - promotes circular economy, resource efficiency

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ACCORD

Partners

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement no. 101056973

UKRI Innovate UK

- Twitter (@project_accord),
- LinkedIn (@ACCORD project)
- YouTube channel (@ACCORDProject).
- The hashtag currently used are #digitalbuildingpermit, #digitaleurope, #buildingregulations, #improvebuildingpermit, #innovationBIM, #improvedbuildingpermit.
- Newsletter on accordproject.eu

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Thank you!

Rita Lavikka

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Follow us

@project_accord

@ACCORD_Project

@ACCORD_Project

Access our website

https://accordproject.eu/

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DigiChecks

Jeroen Werbrouck

DigiChecks

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Data	36	6.5M€	13	05
	Months duration	Budget, where 5.1M€ are a EU contribution	Partners	EU countries

DigiChecks

BUREAU VERITAS · UNIVERSITEIT GENT · BDTA BUILDING DIGITAL TWIN ASSOCIATION · WE ARE DC · REALIA · Semmtech · FCC Construcción · Tekniker · IDP engineering · environment · architecture · Ibermática · neanex · CREE BUILDINGS · inome Attest

This Project has received Funding from the European Union´s Horizon Europe research and innovation programme - Project 101058541 — DigiChecks

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PILOT 1

CIVIL ENGINEERING CASE

PILOT 2

RESIDENTIAL CASE

PILOT 3

OFFICE CASE

“A digital framework for streamlining the processing and management of building permits”

DigiChecks

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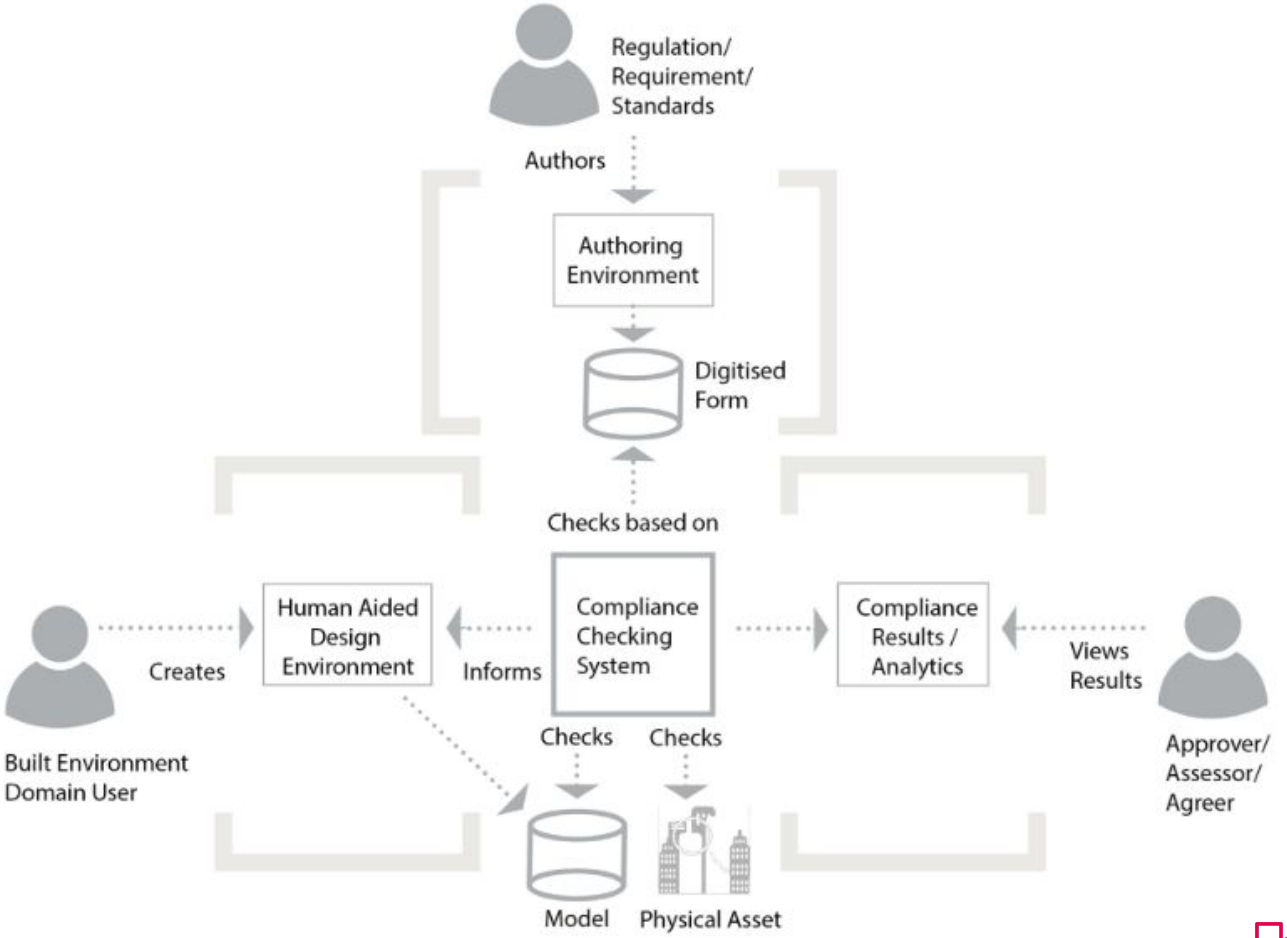


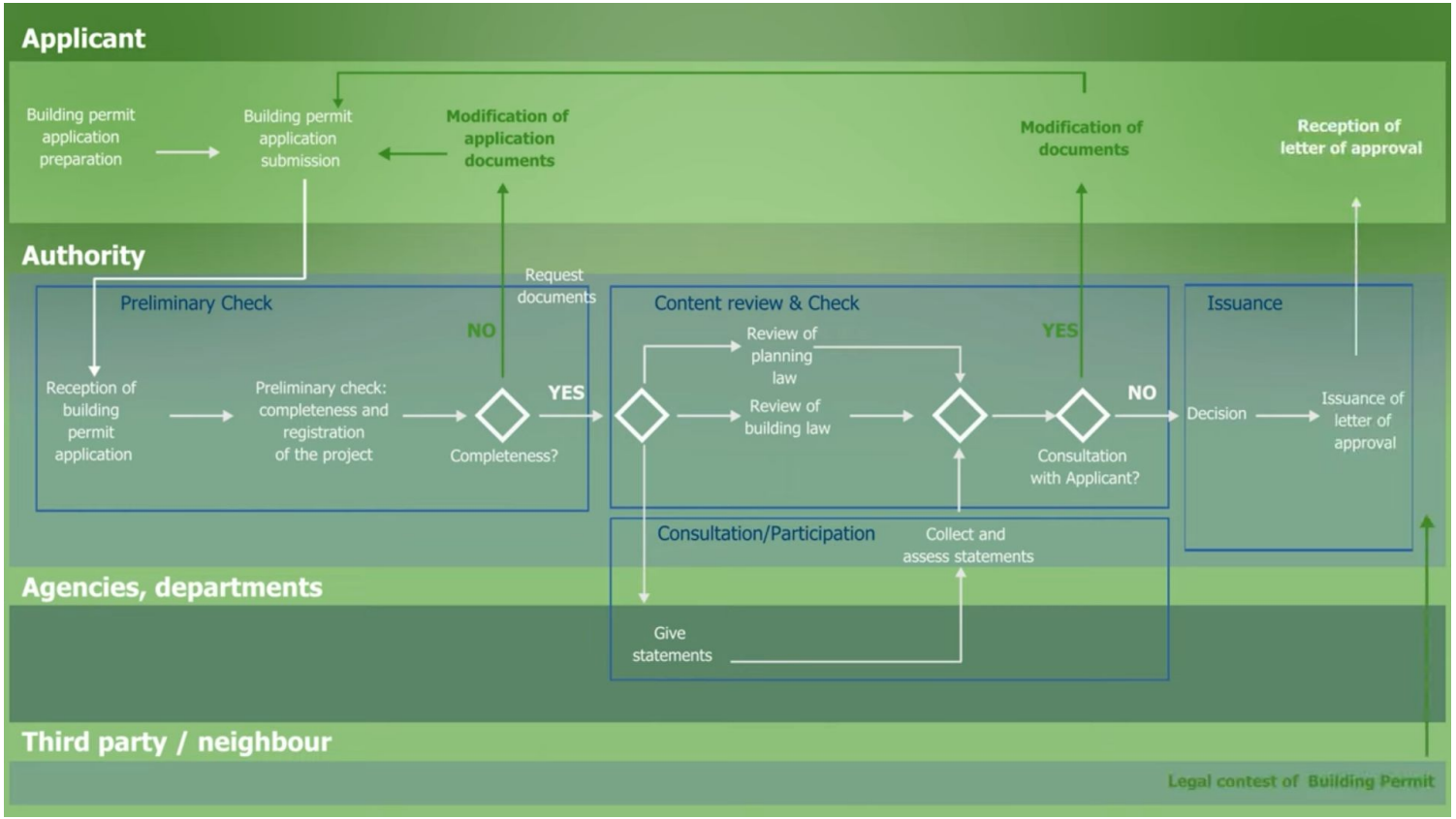
Fig. 2. A vision for automated regulatory compliance.

Principles of the DigiChecks framework

- The framework is a federated ecosystem
- The framework allows a modular and scalable approach, where project or third party services can be included and swapped easily (best-of-breed)
- The framework uses a shared set of conceptual information models (ontologies), that align with existing domain ontologies
- Data that is generated within the framework (construction project data, rules, compliance reports) is formalised based upon open and widely-accepted standards, including W3C Linked Data standards.

Technologies used in the DigiChecks framework

- **Interoperability**: Semantic Web Ontologies
- **Data Federation**: The Semantic Web & Linked Data
- **Rule Creation:** DMN
- **Rule Checking**: DROOLS, SHACL, DMN
- **Data Sovereignty**: Data Spaces


Applicant
Building permit application preparation
Building permit application submission
Modification of application documents
Modification of documents
Reception of letter of approval
Authority
Preliminary Check
Request documents
NO
Reception of building permit application
Preliminary check: completeness and registration of the project
YES
Completeness?
Content review & Check
Review of planning law
Review of building law
YES
NO
Consultation with Applicant?
Issuance
Decision
Issuance of letter of approval
Consultation/Participation
Collect and assess statements
Give statements
Agencies, departments
Third party / neighbour
Legal contest of Building Permit

Contributions to sustainability

CONTRIBUTIONS BY PROJECT OUTCOMES

CONTRIBUTIONS BY THE PROJECT

CHEK
DIGITAL BUILDING PERMIT

CHEK

Mayte Toscano

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Change Toolkit for Digital Building Permit

CHEK
DIGITAL BUILDING PERMIT

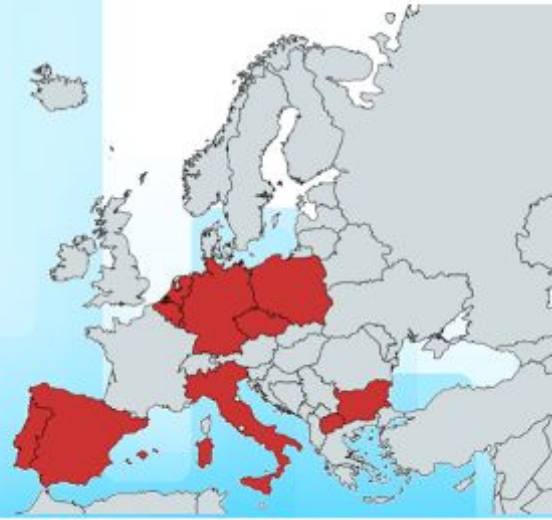
The CHEK consortium consists of **18 multidisciplinary and multisectoral coverage** (research, software development, design, construction, municipalities, and standardization) entities from **12 countries in Europe.**

HORIZON Innovation Actions — 36 months

Project Timeline

1 October 2022 — Project starting date

30 September 2025 — Project end date



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Change Toolkit for Digital Building Permit

Take away barriers for municipalities to adopt digital building permit processes

- Innovative methodological and technical toolkit for **digitising building permits and automated compliance checks** of building designs and renovations in urban areas and European regions.
- Develop the **DBP process, new technologies and data exchange** based on open **standards**.
- Bridging **knowledge gaps** through education, for renewed municipal processes and for technology deployment

Change Toolkit for Digital Building Permit

CHEK DIGITAL BUILDING PERMIT

Demonstration Sites

Lisbon (PT)

Short Description: Building in urban context on an empty plot

Construction Method: New Construction

Occupancy Type: Mixed Use: Residential and Commercial

Vila Nova de Gaia (PT)

Short Description: Detached single house

Construction Method: New Construction

Occupancy Type: Residential

Ascoli Piceno (IT)

Short Description: Urban Renovation

Construction Method: Demolition of old buildings and new construction

Occupancy Type: Mixed Use: Residential and Commercial and Services (70% minimum residential)

Prague (CZ)

Short Description: Public school planned to be built within development project called Žižkov Freight Station

Construction Method: New Construction

Occupancy Type: Educational

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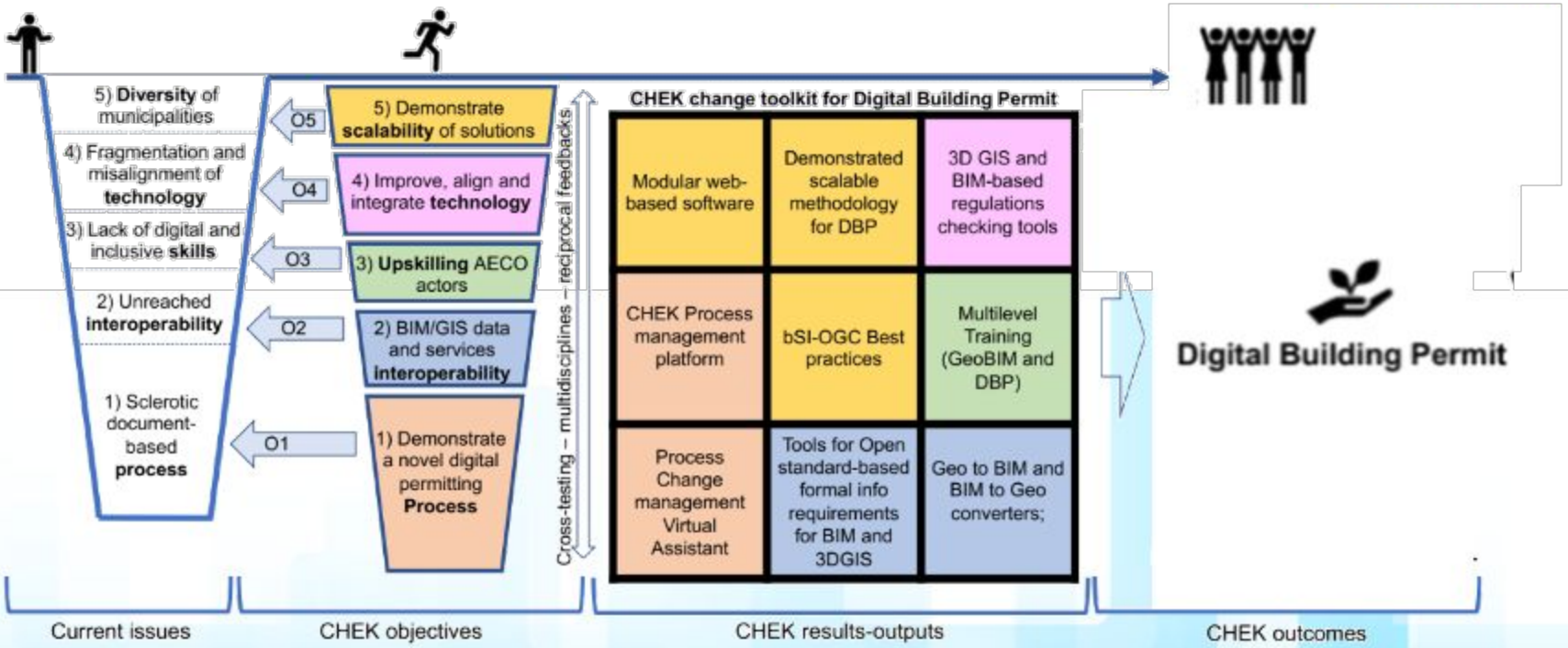
Change Toolkit for Digital Building Permit

CHEK
DIGITAL BUILDING PERMIT



60% efficiency improvement and the adoption of the DBP by 85% of European municipalities.

The results will be demonstrated in the working environment of municipalities and designers.

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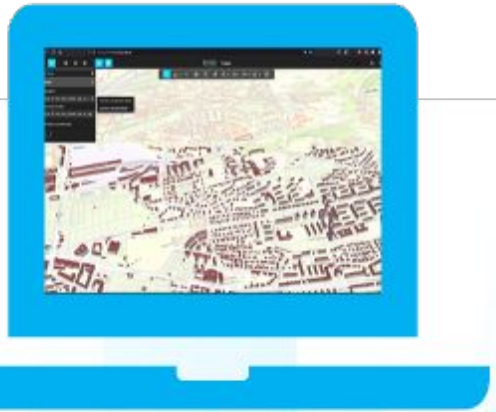
Change Toolkit for Digital Building Permit

CHEK
DIGITAL BUILDING PERMIT

Bimserver.center
Framework for institutions to handle building permits and developers to access BIMserver.center via API

Open BIM Site
Defines initial site conditions, manages maps, topography, and site elements like parcels and buildings.



API REST
Open API for managing data in BIMserver.center platform, ensuring tool interoperability for the permitting process.

OGC Data exchange toolkit
Provides geospatial data requirements and validation in human and machine-readable formats.

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Change Toolkit for Digital Building Permit

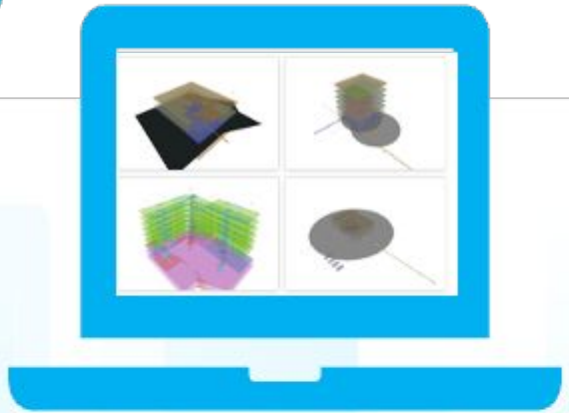
CHEK
DIGITAL BUILDING PERMIT

Open BIM Accessibility

Tool for verifying accessibility requirements in building projects using IFC models.

IFC Digital Signature

Digitally signs and validates IFC files without altering structure, ensuring compliance with trusted providers.



CYPEURBAN

Free tool for urban planning compliance on BIM models in IFC format, checking against municipal bylaws.

IFC Exporter

Exports BIM models for different municipalities with predefined IDS, simplifying export workflows.

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Change Toolkit for Digital Building Permit

CHEK
DIGITAL BUILDING PERMIT

IFC Georeferencing

Georeferences IFC files during the digital permitting process.

CityGML to IFC, IDS

Converts CityGML/CityJSON to IFC using Semantic Web-based libraries, with IDS validation.

IFC to CityGML

Converts IFC file outer shell to CityJSON, automating multi-scale conversions.

BIM+GIS Viewer

Combines IFC, CityJSON, and CityGML formats in a unified viewer on BIMserver.center.

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Change Toolkit for Digital Building Permit

CHEK
DIGITAL BUILDING PERMIT

Verify 3D

SaaS rule-based model checker, integrated with CHEK platform for building permit rule validation.

VC Map + VC Map CHEK Plugin

Web-based 2D/3D viewer providing geospatial tools for spatial context checks like parcels and 3D buildings.

Plugin CityJSON to Revit

Integrates CityJSON data into Revit BIM projects, enhancing GeoBIM interoperability.

CHEK change virtual assistant

Interactive assistant helping municipalities plan digital transformation with tools like chatbot and roadmaps.

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Change Toolkit for Digital Building Permit

- 80% more efficient process
- 50% faster
- Higher value of human work
- Fair tax charges
- Scalable solutions
- Transparency and predictability
- **Higher quality of the checking:**
  - Accuracy and objectiveness
  - New advanced análisis
- **Digitally-led process:**
  - Management from remote (less CO2)
  - Paper and resources saving
  - More efficient use of construction-generated data

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Change Toolkit for Digital Building Permit

CHEK
DIGITAL BUILDING PERMIT

The **CHEK project** contributes to sustainability by digitising the building permit process, enabling **greater energy efficiency in the planning and construction of buildings.**

By **automating the verification** of regulations through technologies such as BIM and GIS, it promotes a **more efficient use of resources, reducing time and human error, and encouraging greener and more sustainable building practices.**

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Demo Blog

Henk Visscher

Demo Blog

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Demo-BLog

Development and Demonstration of Digital Building Logbooks

A Horizon Europe project

prof. dr. ir. Henk Visscher (h.j.visscher@tudelft.nl)

ir. Sun-Ah Hwang (s.a.hwang@tudelft.nl)

Co-funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme, under grant agreement No. 101091749

Our Partners

Demo BLog

Demo-BLog Team:

- 14 partners
- 5 countries

Co-funded by the European Union

Project Vision

Demo-BLog brings together:

- **5 different DBLs** with a total of 4.5 million registered units and a wide variety of target groups offering scale and diversity.
- **4 diverse functionalities** addressing key societal challenges, ranging from ‘quick wins’ (renovation and advice and (community driven) decarbonisation pathways) to complex industrial transaction objectives (circularity).

Co-funded by the European Union

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The 5 DBLs

Demo Blog

Woningpas (BE)

- ***Flanders (Belgium)***
- **Public** (Owned by 3 government bodies: VEKA, OVAM, Wonen-Vlaanderen)

CLÉA (FR)

- ***France***
- **Private** (Owned by QUALITEL)

CHIMNI (UK)

- ***United Kingdom***
- **Private** (Owned by Chimni)

CAPSA (DE)

- ***Germany**, Scotland, the Netherlands, Italy, India etc.*
- **Private** (Owned by Chillservices)

CIRDAX (NL)

- ***The Netherlands** (to be tested in Belgium)*
- **Private** (Owned by Re-Use Materials)

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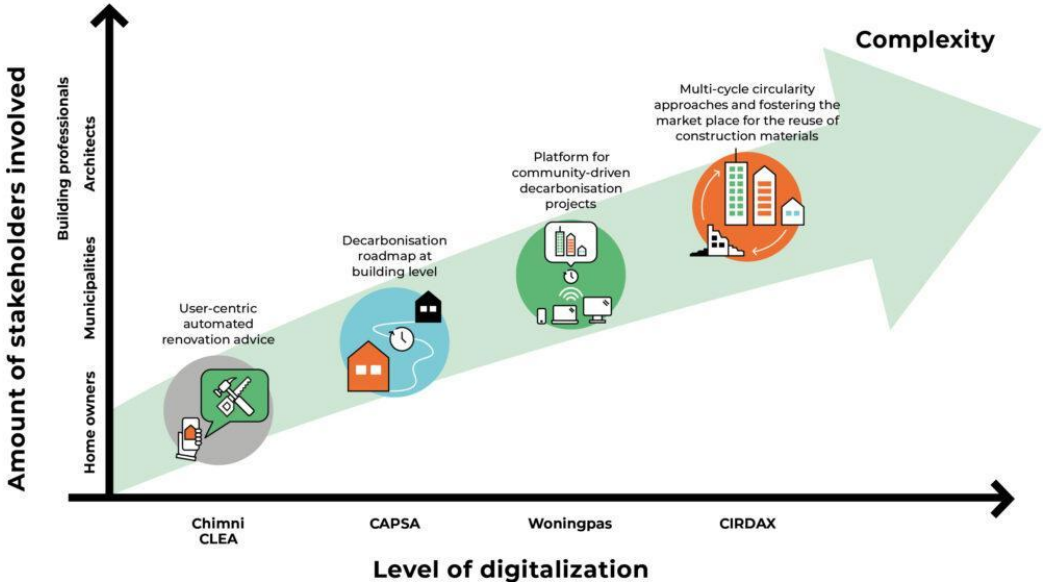
The 4 Functionalities

Demo Blog



1. User-centric automated renovation advice *(via CHIMNI and CLÉA)*
2. Decarbonisation roadmap at building level *(via CAPSA)*
3. Platform for community driven decarbonisation projects *(via Woningpas)*
4. Multi-cycle approaches and fostering the marketplace for the reuse of construction materials *(via CIRDAX)*

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Value Proposition

Demo Blog

Woningpas (BE)

- Using the DBL to demonstrate a collective approach to renovation by **enhancing energy-communities**.
- Enabling the **sharing and integration of data** from 3rd parties (both private and public).
- **Integrating smart data** from new technologies for monitoring.

CLÉA (FR)

- **Developing new services** to improve energy performance of the home.
- **Strengthening linkages** with external data platforms.
- **Improving data verification** and **reliability**.

CHIMNI (UK)

- **Developing new services** to improve energy performance of the home.
- **Creating linkages** with external data platforms.
- Creating an **open API** to draw retrofit advice from **retrofit calculators.**

CAPSA (DE)

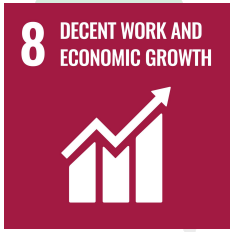
- **Automating** the currently semi-automated **decarbonisation roadmap functionality**.
- **Strengthening linkages** with external data platforms.

CIRDAX (NL)

- **Applying data-analytics** to improve the characterisation of building performance features to **ensure a higher quality of data**.
- **Developing a framework** that encourages the reusing of building materials to build a circular marketplace.

Relation to SDG's

Demo Blog



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Thank you!

Demo Blog

Contact us

https://demo-blog.eu/

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ir. Sun-Ah Hwang (s.a.hwang@tudelft.nl)

EUnet4DBP

EUnet4DBP

Judith Fauth

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Digital Building Permit challenges

Need for **intersectoral** collaboration

Need for **multidisciplinary** collaboration

High **diversity**

Need for **interoperability** and standardisation

EUnet4DBP

Start 2020

Mission - To **accelerate the digital transformation** of the building permit process.

Vision - Development of **flexible, scalable and re-usable** digital and (semi-) automated building permit tools and methods in a common effort and under the umbrella of an open science framework, by sharing experiences and building-up knowledge.

Process

Including human practices and bureaucratical workflows to be taken into account and likely changed to adopt the new digital approach.

Rules and requirements

As formulation of criteria and guidelines to be followed for the successful achievement of the objectives in all the steps and aspects of the use case, including rule interpretation and model preparation.

Technology

Regarding any aspect related and allowing the successful implementation of the previous ones.

Goal 1

Support the building permit process in becoming more **efficient and automated**.

Goal 2

Support to rule interpretation and information requirements in becoming as **simple** and as **machine readable** as possible in order to guarantee a certain level of automation.

Goal 3

Support the wide adoption of **interoperable** technologies based on open standards.

EUnet4DBP principles

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Principles

If you would like to participate, read the description and manifesto of the network and the FAQ page. If you agree with them and want to jump in, fill the form:

Commitment to share

We share our knowledge, our experiences, our ideas with the other members of the network in order to turn our Vision into reality.

Commitment to openness

We support the development of open formats, open standards and interoperable software. Our deliverables are open access resources, are published in open channels and all are freely to use them.

Commitment to be collaborative

We voluntarily collaborate with others to grow the network impacts on the digital transformation of the built environment.

Commitment to be ethic

We work together in a fair environment, giving credits correctly to single participants and to the network, and keeping as confidential any un-published shared material.

Commitment to be practical

We develop tools and methods that address the real needs of current and future users.

Commitment to be innovative

We believe in innovation as the only way to improve the quality of our present and future challenges. We aim at providing innovative solution of an innovative word.

Commitment to be competent

We lead activities that require our competences.

EUnet4DBP – the network 2023

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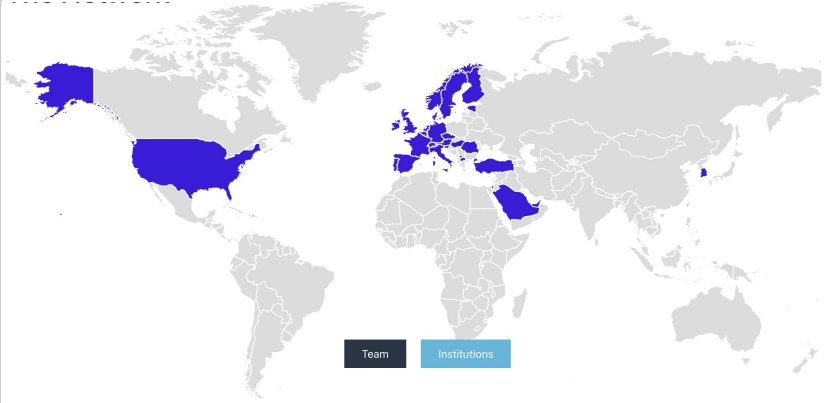
The EUnet4DBP

The activities

Conclusion



> 80 institutions

	R	G	C
(3D) geoinformation	11	11	5
GeoBIM integration	12	9	8
standardization, interoperability	18	12	14
BIM	24	14	21
AEC	16	4	18
Planning, regulations	16	15	15
Software development	11	4	16

buildingSMART regulatory room
EuroSDR
EU-BIM
OGC

and more…

EUnet4DBP activities – Quarterly meetings

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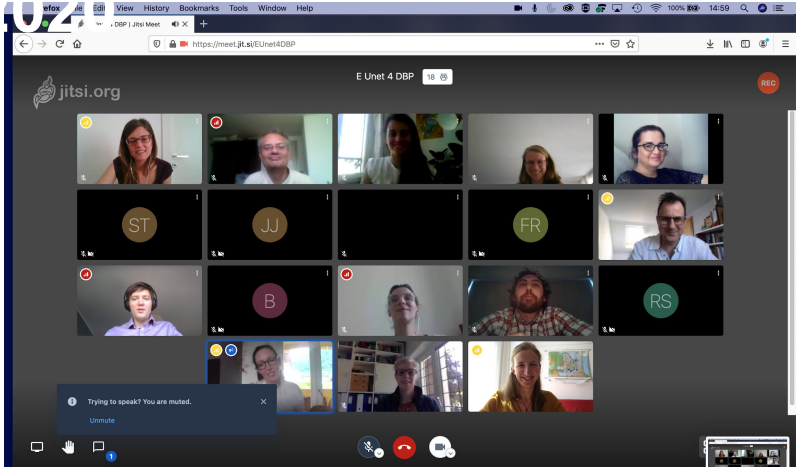

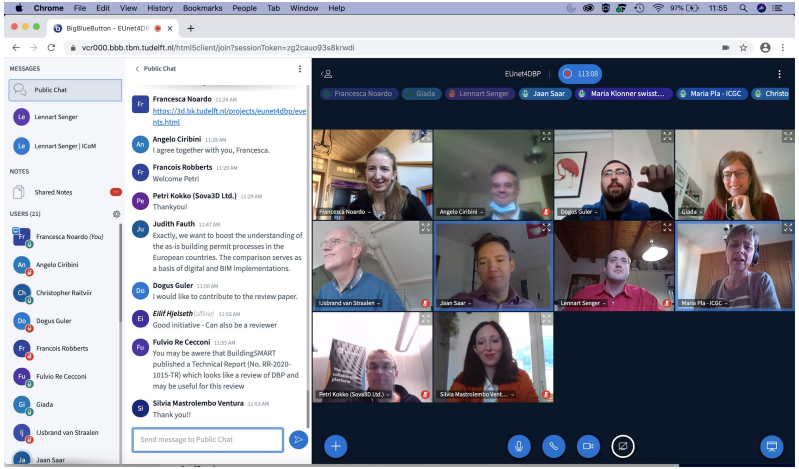

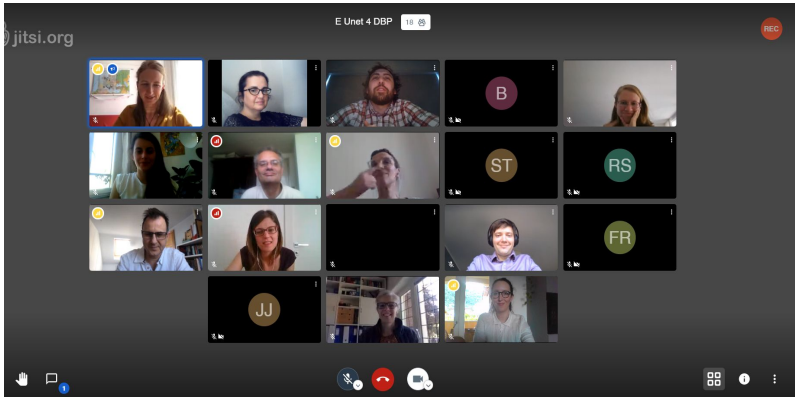

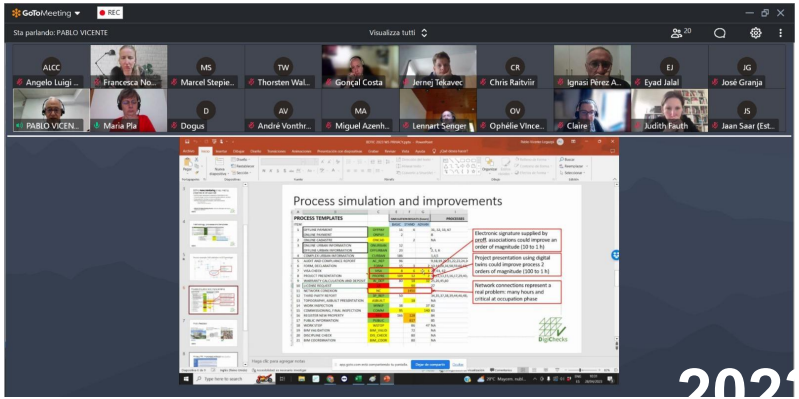

EUnet4DBP activities – EUnet4DBP talks

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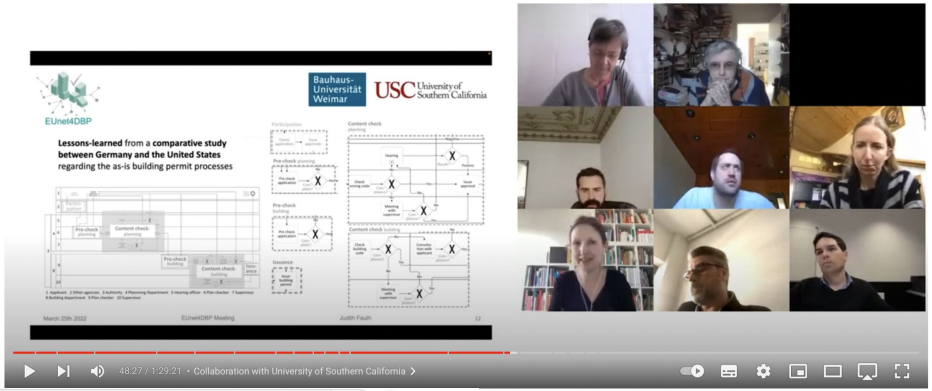

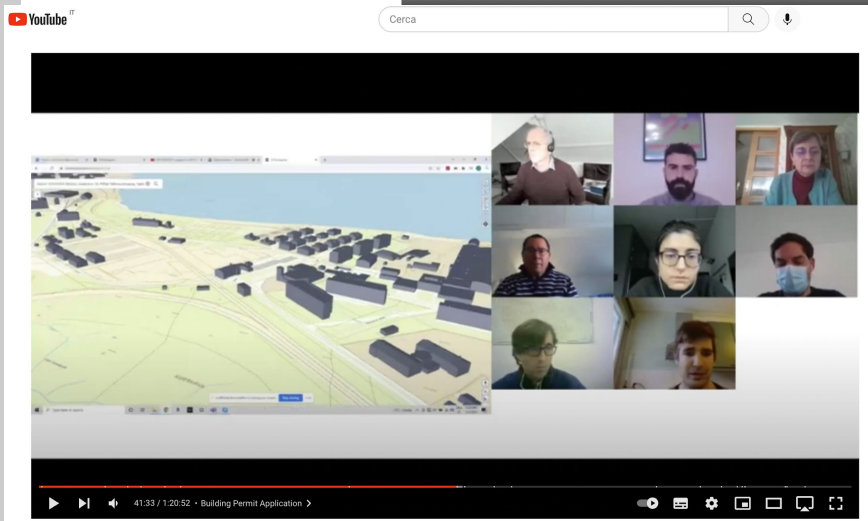

EUnet4DBP talk - Demo session

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Building and Environment 213 (2022) 108854

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Unveiling the actual progress of Digital Building Permit: Getting awareness through a critical state of the art review

Francesca Noardo [a,*], Dogus Guler [b], Judith Fauth [c], Giada Malacarne [d], Silvia Mastrolembo Ventura [e], Miguel Azenha [f], Per-Ola Olsson [g], Lennart Senger [h]

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ARTICLE INFO

Keywords:
Digital building permit
BIM
GIS
GeoBIM
Compliance checking
Rule checking

ABSTRACT

Growing interest is awarded to the digitalization of the building permitting use case and many works are developed about the topic. However, the subject is very complex and many aspects are usually tackled separately, making it very hard for traditional literature reviews to grasp the actual progress in the overall topic. This paper unveils the detailed state of the art in Digital Building Permitting (DBP) by critically analysing the literature by means of a set of coding tags (research progress, implementation, affected DBP workflow steps, ambitions addressed) assigned by a multidisciplinary team. The executed research shows that the mainly addressed aspects of the digitalization of building permit process are the technologies to check the compliance of design proposals against regulations, followed by the digitalization of regulations. Improvable aspects identified in the entire building permit system are instead e.g. the involvement of officers, scalability of solutions and interoperability of data, intended both as data validation and as integration of geospatial data with building models.

The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XLIV-4/W1-2020, 2020
3rd BIM/GIS Integration Workshop and 15th 3D GeoInfo Conference, 7–11 September 2020, London, UK

INTEGRATING EXPERTISES AND AMBITIONS FOR DATA-DRIVEN DIGITAL BUILDING PERMITS – THE EUNET4DBP

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KEY WORDS: Digital Building Permits, 3D city models, BIM, Interoperability, Procedures, Regulations

ABSTRACT:

The digitalization of the process for building permit (involving the use of 3D information systems) is seen as a priority in a wide part of the world. Since it is a very multidisciplinary use case, involving a variety of stakeholders tackling complex issues and topics, some of them joined their efforts and skills in the European Network for Digital Building Permit. The initial activity of the network, after a review of on-going experiences, was a workshop to share knowledge about the topics involved and to identify the main ambitions of the network with respect to three pillars (i.e. Process – Rules and Requirements – Technology) and the related requirements. It was achieved through a collective brainstorming activity guided by digital tools, whose results were further analysed in a post-processing phase. Such results are presented in this paper and will be the base for planning the future network activity.

1. INTRODUCTION

the digitalisation of the building permit process was especially pushed by the Directive 2014/24/EU of the European

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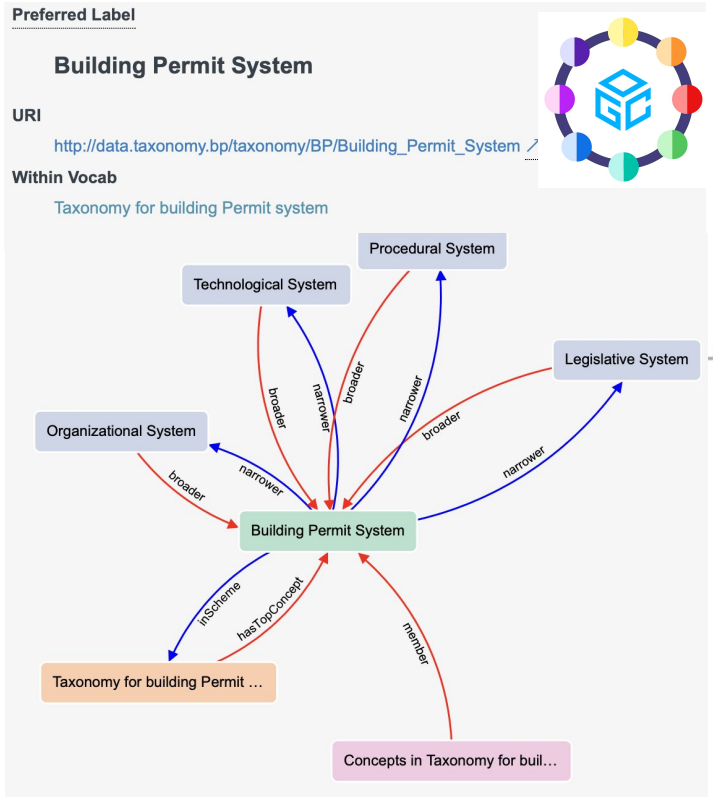
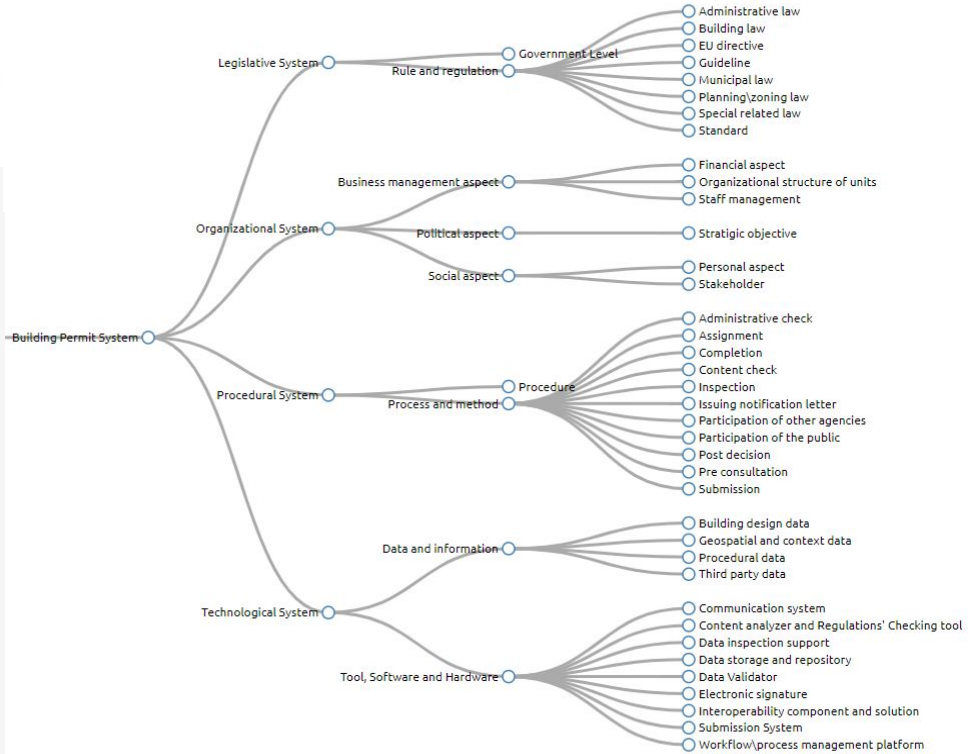
Conclusion

Judith Fauth, Tanya Bloch, Jernej Tekavec, Francesca Noardo, Nicholas Nisbet, Stefanie Brigitte Kaiser, Peter Nørkjær Gade, *submitted - Advanced Engineering Informatics*

Taxonomy for building permit system - organizing knowledge for building permit digitalization.

http://defs-dev.opengis.net/vocprez-hosted/object?uri=http%3A//data.taxonomy.bp/taxonomy/BP





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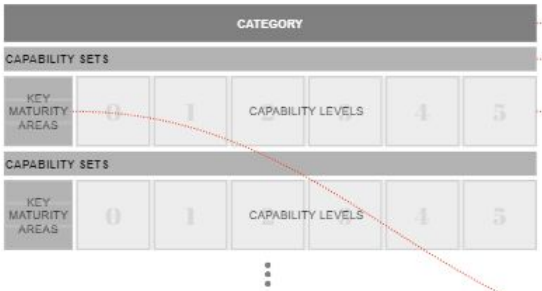
Digital Building Permit Maturity Model (in progress)

coordinated with CHEK project
Based on the DBP Taxonomy



Summary of the CHEK DBP Maturity Model:

PROCESS						
1.2 Regulatory						
1.1.1 1.1.2	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
1.1 Process and Methods						
1.2.3 1.2.4 1.2.5	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
1.3 Procedure						
1.3.6 1.3.7 1.3.8	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
ORGANIZATION						
2.4 Readiness for changes						
2.4.9 2.4.10 2.4.11 2.4.12 2.4.13	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
2.5 Organization structure of units						
2.5.14 2.5.15 2.5.16	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
2.6 Social aspect						
2.6.17 2.6.18	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
TECHNOLOGY						
3.7 Technology for data management						
3.7.19 3.7.20 3.7.21 3.7.22	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
3.8 Technology for data analysis						
3.8.23 3.8.24 3.8.25	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
3.9 Interoperability and open format						
3.9.26 3.9.27	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
INFORMATION						
4.10 Data standardisation and quality						
4.10.28 4.10.29 4.10.30	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
4.11 Data and information						
4.11.31 4.11.32	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized
4.12 Codes and regulation						
4.12.33 4.12.34	Level 0 Non-Existent	Level 1 Initial	Level 2 Defined	Level 3 Managed	Level 4 Integrated	Level 5 Optimized / Automatized

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European building permit process analysis (in progress)

•DOI: 10.1080/09613218.2024.2400467

>60 interviews in 17/19 countries in Europe about as-is building permit process

Main process steps from taxonomy (level 1)	Sub processes (level 2)	Austria	Belgium	Czech Republic	Denmark	Estonia	Finland	France
Pre consultation		N	YES (J)	N	Opt	N	Y	N
Submission		Y	Y	Y	Y	Y	Y	Y
	Confirmation of recieval of application	Y (JO)	Y	Y (JO)	Y	Y (JO)	Y	Y
Administrative check		Y	Y	Y	Y	Y	Y	Y
	Preliminary review	Y (JO)	Y	Y	Y	Y	Y	Y
	Filtering documentation/ processing supplementary documentation	N	N	Y (JO)	Y	Y (JO)	N	Y
	Hearing event	Y (JO)	N	Y (JO)	Y	N	N	N
	Registration of application	Y	Y	Y (JO)	Y	Y	Y	Y
Assigning procedure to clerk/technician		Y (JO)	YES (J)	Y (JO)	N	Y	N	N
Participation of other agencies		Y	Y	Y	Y	Y	Y	
	Public agencies	N	Y	Y (JO)	Y	Y (JO)	Y	Y
	Private agencies	Y (JO)		N	Opt	Y (JO)		
	Internal referral departments	Y (JO)	Y (JO)	Y (JO)	Y	Y (JO)	Y	Y (JO)
	External referral departments	Y (JO)	Y (JO)	Y (JO)	Opt	Y		
	Involvement of different boards	Y (JO)		Y	Y	Y (JO)	Y	
Participation of public		Y	Y	Y	Y	Y	Y	
	Neighbor participation	Y (JO)	N	Y (JO)	Y	Y	Y	
	Public inquiry	N	Y	N	Opt	Y	N	
Content check		Y	Y	Y	Y	Y	Y	Y
	Planning/ zoning review	Y (JO)	Y (JO)	Y (JO)	Y	Y (JO)	Y	Y
	Building/ technical review	Y (JO)		Y (JO)	N	Y	Y	
	Committee meeting	Y (JO)	Y (J)	N	Opt	Y (JO)		
	Internal discussion	N	Y (J)	Y	Opt	N		
	Legal check/ examination check (combined planning a	Y (JO)	N	Y (JO)	N	Y (JO)	N	N
Issuing notification letter		Y	Y	Y	Y	Y	Y	Y
	Completing documentation	Y	Y	Y (JO)	Y	Y	Y	Y
	Request further documentation	N	N	Y	Y	N	N	N
	Check/ request for payment of taxes and fees	Y (JO)	N	N	N	Y (JO)	N	Y
	Issuance of construction certificate	N	N	N	N	N	N	N
Inspection		Y (JO)	YES (J)	N	Opt	N	N	N

									Opt	Y	N		Y			Y	Y	
									Opt	Y (JO)			Y (JO)			Y		
									Opt	Y			N			N	N	
									Y	Y	Y (J)	Y	Y	Y	Y	Y	Y	Y
									YES (J)	Y (JO)	Y	Y	Y (JO)					
									YES (J)	Y (JO)	Y	Y	Y (JO)	Y	Y		Y	Y
									N	N			N					
									YES (J)	N	YES (J)		N					
									Y	Y (JO)	N	N	Y (JO)		Y	N	N	N
									Y	Y	Y	Y	Y	Y	YES (J)	Y	YES (J)	Y
									Y	Y	Y	Y	Y (JO)	Y	Y	Y	Y	Y
									Y	N	N	N	N			N		N
									N	Y	Y	N	Y (JO)	Y		N		N
									N	N	N	N	N	N	N	N	N	Y
									N	Y (JO)	N	N	N	Y	N	N	N	Y

EUnet4DBP activities - Events

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EuroSDR

European Spatial Data Research

August 2021

DIGITAL BUILDING PERMIT:
A STATE OF PLAY

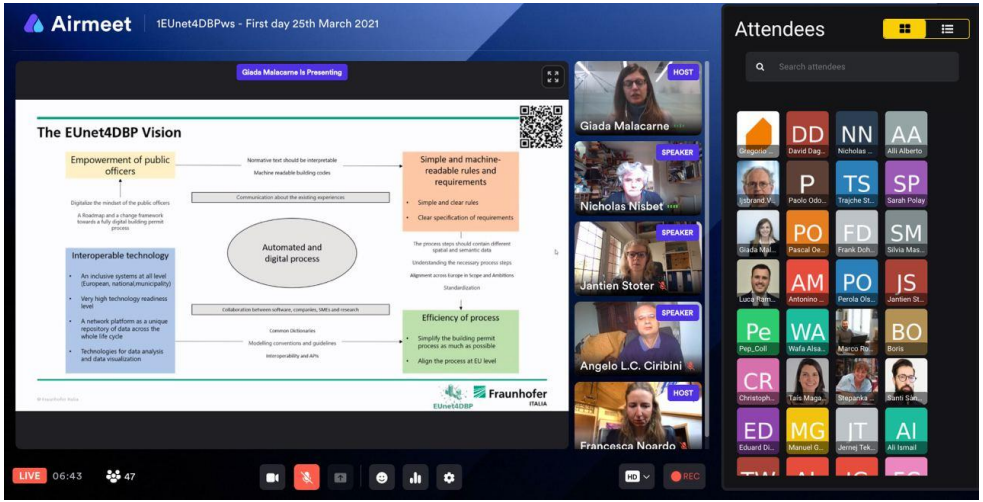
I EUnet4DBP International workshop
on Digital Building Permit

Organized by:
EUnet4DBP - EuroSDR - buildingSMART - EU-BIM

March 25th - 26th 2021 – Online Conference

Editors: Francesca Noardo, Giada Malacarne

Workshop Report



EUnet4DBP activities – Next Events

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Proceedings:
DOI: 10.5281/zenodo.12760552

Conclusions

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- *Enjoy multidisciplinarity and intersectoral views*
- *Common framework and harmonizable results*
- *Find collaborators*
- *New projects*
- *Give momentum to ongoing activities*
- *Wide audience and higher impact of ongoing initiatives*

How do you contribute to a sustainable built environment with your project?

EUnet4DBP

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Thank you!

SUSTAINABLE PLACES 2024

Judith Fauth
jf805@cam.ac.uk

MSCA-DRF

Judith Fauth

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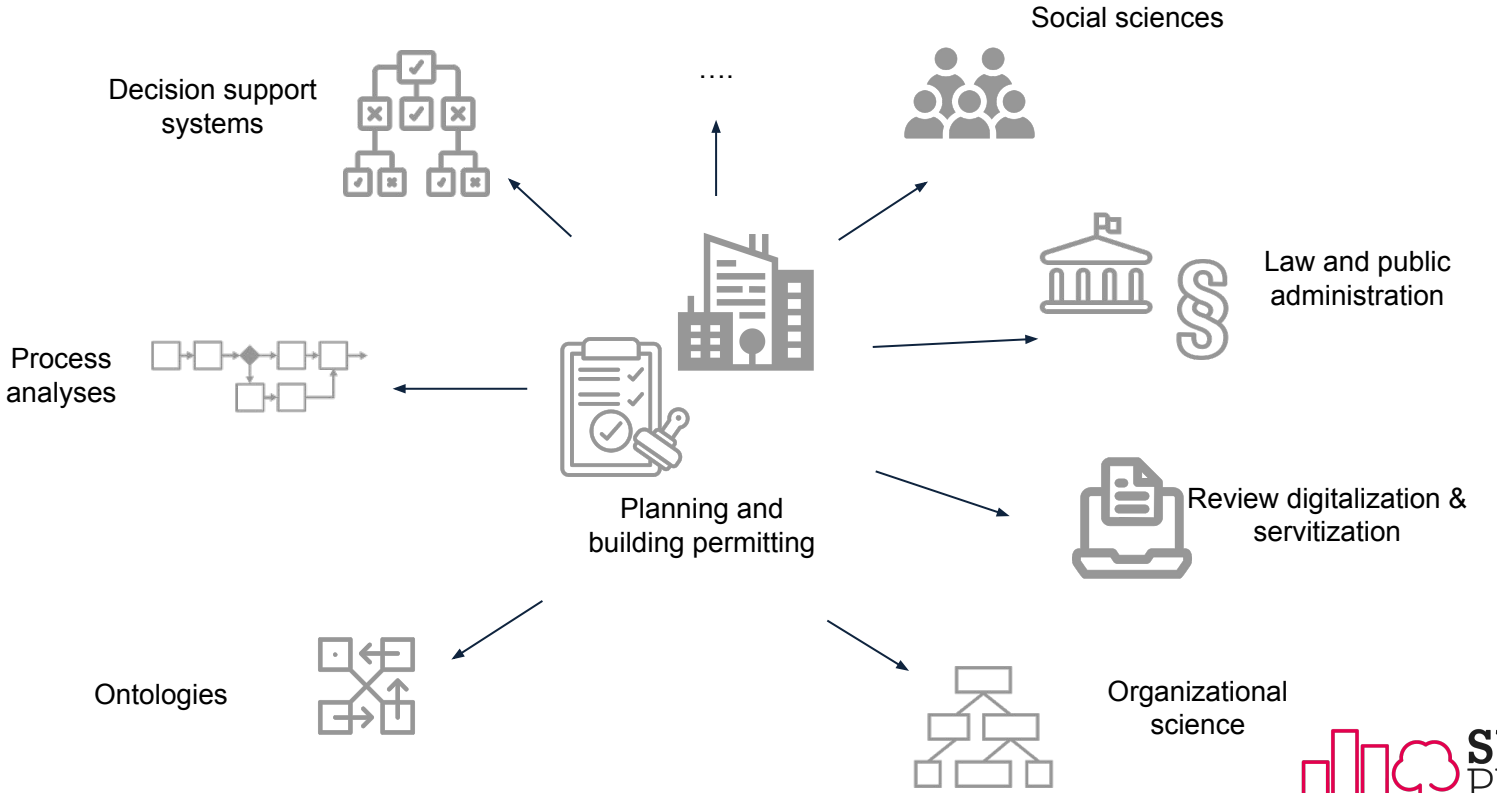
Research focus



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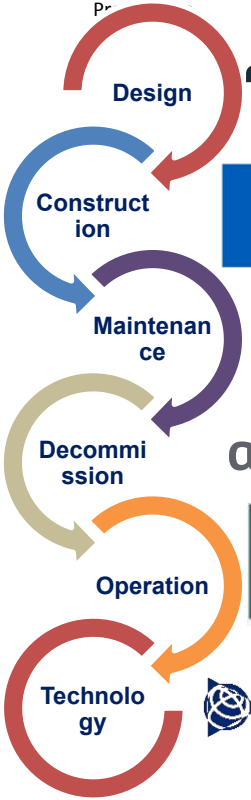

AtkinsRéalis AECOM RAMBOLL

Jacobs ARCADIS

COSTAIN GallifordTry keltbray bam nuttall

Balfour Beatty KIER EUROVIA VINCI ferrovial construction

amey TRL Ordnance Survey COLAS

Department for Transport national highways telent

Trimble SAP Versarien PLC Bentley

Together with

European Commission

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101034337.

Contact: drf-initiative@eng.cam.ac.uk

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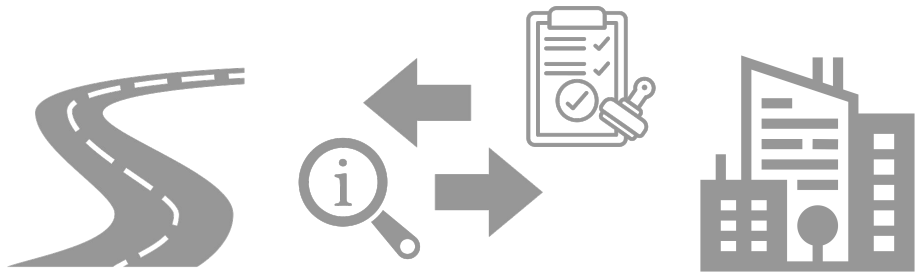
Description of the project

Title: Advanced Planning and Building Permits through Road Digital Twins

- Challenge DT6: How can Road Digital Twins generate value from connecting areas?



- Objective:

- Linking road digital twins and building permits,

- reuse information, and

- leverage the connection to generate value

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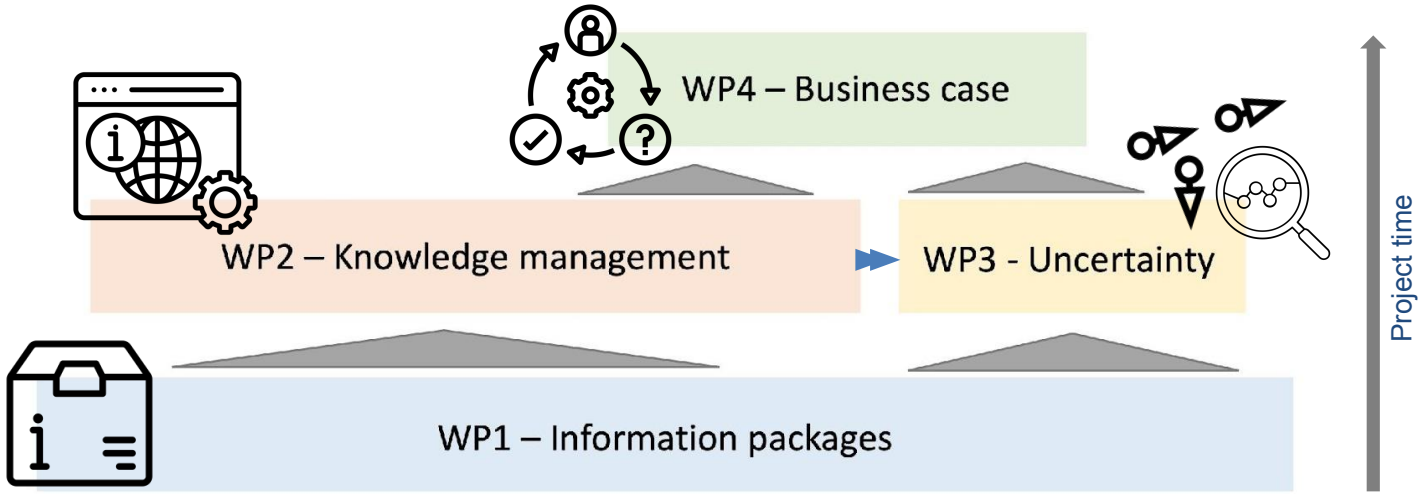
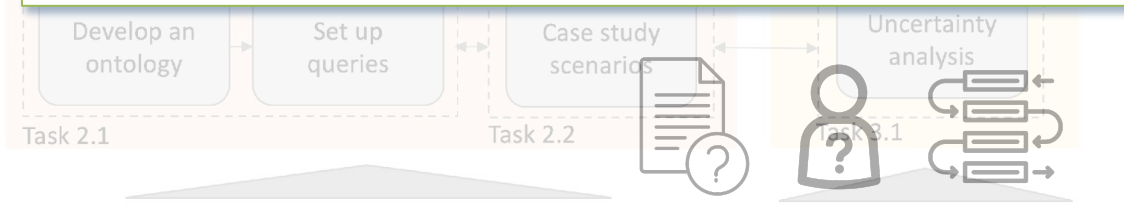
Description of the project

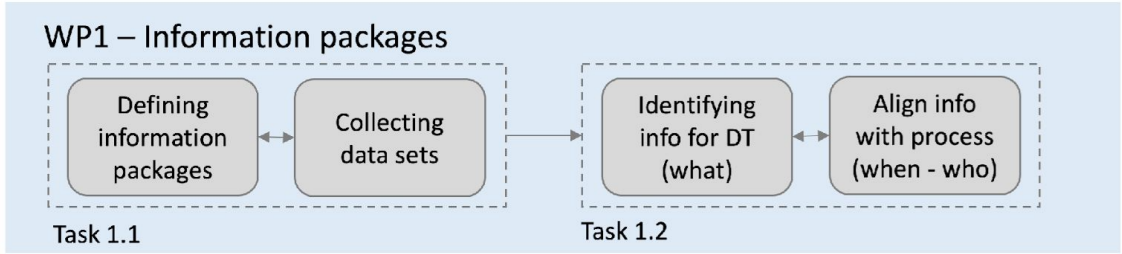


WP1

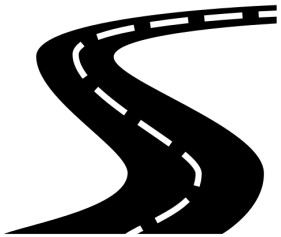
Examples of information packages:

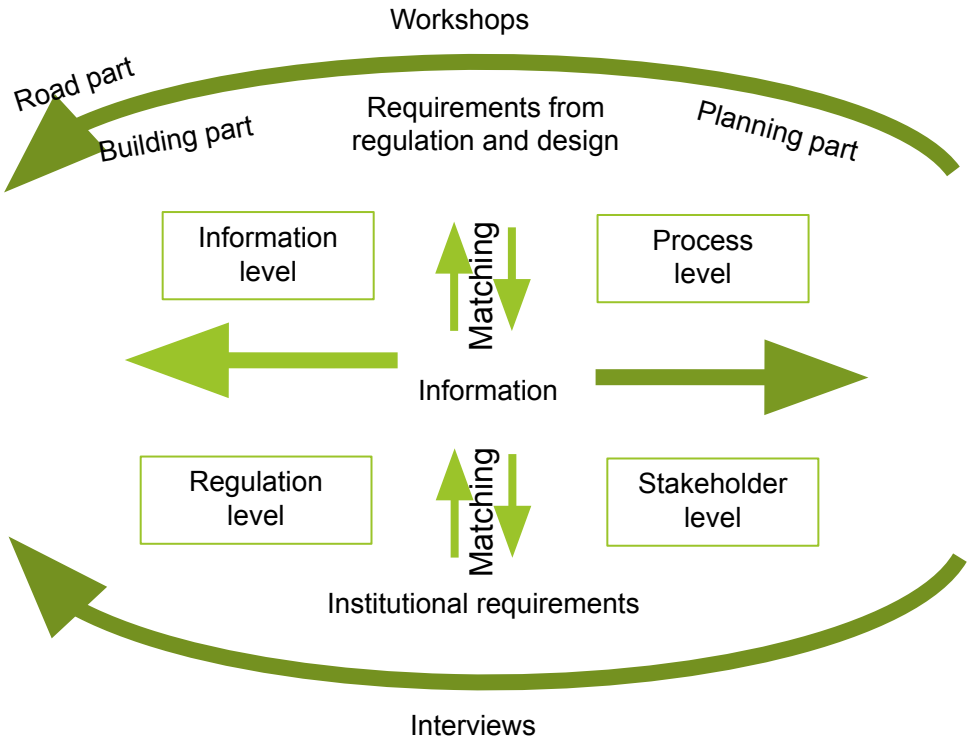
1. Assurance of site development
2. Accessibility of plot of land and utilities provision (water, sewage, disposal, etc.)
3. Usage rights documentation
4. Justification of objections from neighbors and prevention of downstream legal actions
5. Participation of other involved agencies of public interest
6. Dynamic regulations





Ongoing work





UK
New Zealand
Canada
…

SUSTAINABLE PLACES 2024

WP2

WP4 – Business case

Develop business model

Task 4.1

WP2 – Knowledge management

Develop an ontology

Set up queries

Case study scenarios

Task 2.1

Task 2.2

WP3 - Uncertainty

Uncertainty analysis

Task 3.1

WP1 – Information packages

Defining information packages

Collecting data sets

Task 1.1

Identify info for (what

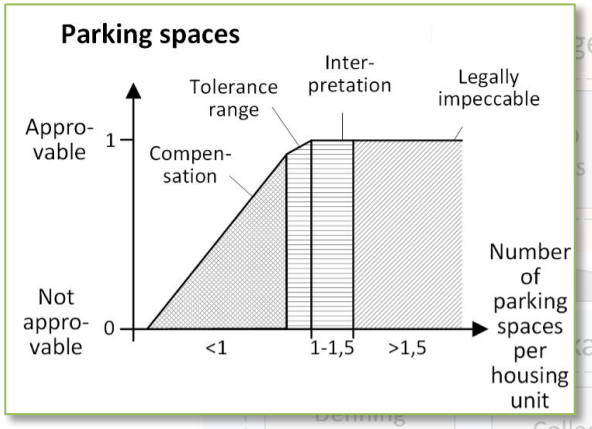
Task 1.2

Example queries:

1. „Give me all information required for usage rights documentation“
2. ”Give me all information required for the building application document”

SUSTAINABLE PLACES 2024

WP3



WP4 – Business case

Develop business model

Task 4.1

WP3 - Uncertainty

Uncertainty analysis

Task 3.1

Case study scenarios

Task 2.2

Identifying info for DT (what)

Collecting data sets

Task 1.1

Task 1.2

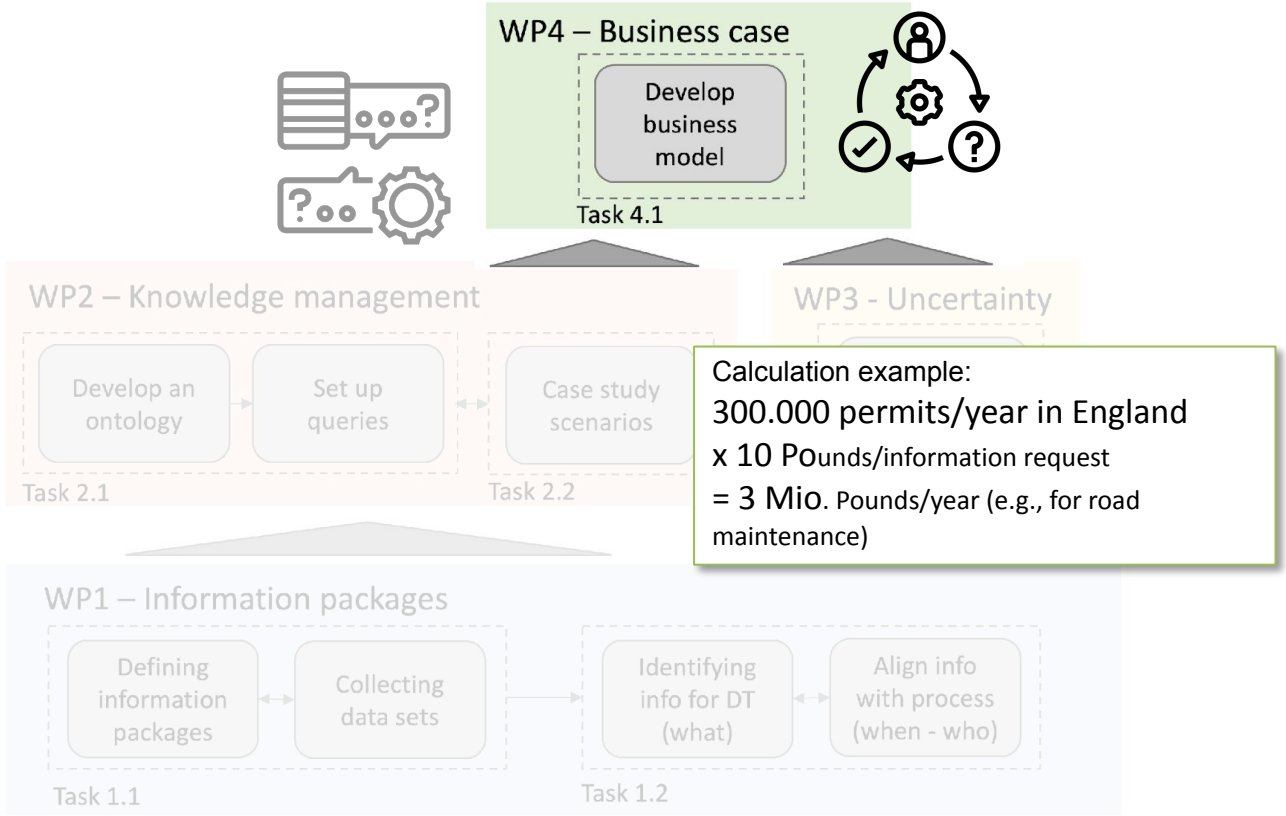
Target outcome:

Decision model

Features:

Resilient, flexible and scalable (accommodate the unknown case, cross-border)

WP4



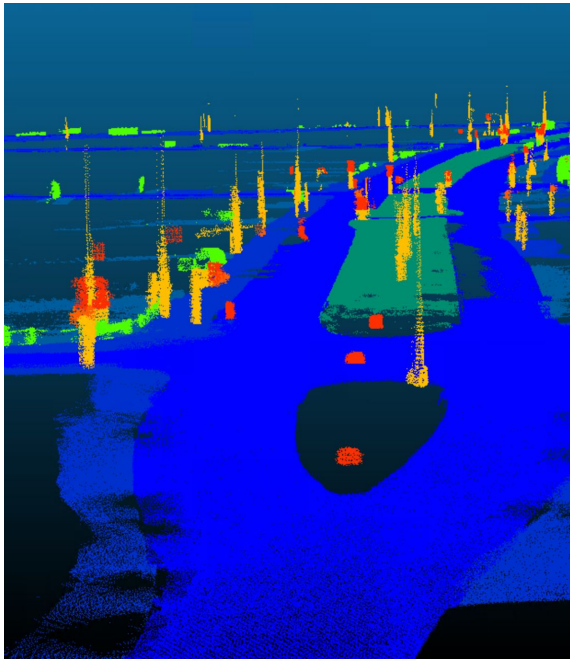
Calculation example:
300.000 permits/year in England
x 10 Pounds/information request
= 3 Mio. Pounds/year (e.g., for road maintenance)

Sustainability aspect

How do you contribute to a sustainable built environment with your project?

To what SDGs your project contributes to?

SUSTAINABLE PLACES 2024



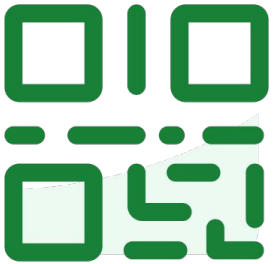
Thank you

Judith Fauth
jf805@cam.ac.uk
https://drf.eng.cam.ac.uk/

SUSTAINABLE PLACES 2024

See you at 11:00

slido



Join at slido.com
#DBPLB

ⓘ Click **Present with Slido** or install our Chrome extension to display joining instructions for participants while presenting.

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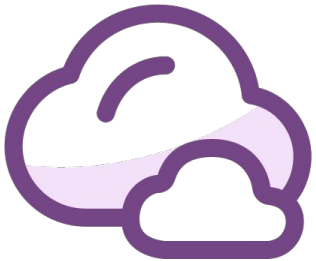

Which country do you live?

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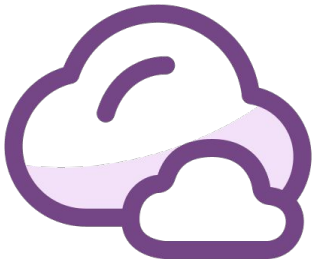

What is your professional title?

ⓘ Click **Present with Slido** or install our Chrome extension to activate this poll while presenting.

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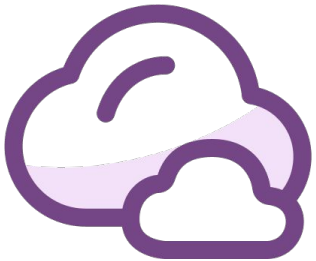

In which field do you work?

ⓘ Click **Present with Slido** or install our Chrome extension to activate this poll while presenting.

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What is your level of knowledge on Digital Building Permit?

ⓘ Click **Present with Slido** or install our Chrome extension to activate this poll while presenting.

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What is your level of knowledge on Digital Logbooks?

ⓘ Click **Present with Slido** or install our Chrome extension to activate this poll while presenting.

Miro Board

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