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22 JUNE 2021

Breakout sessions

Smart Cities – Interreg NWE 2014-2020

Peter Campobasso

Project Office – JS

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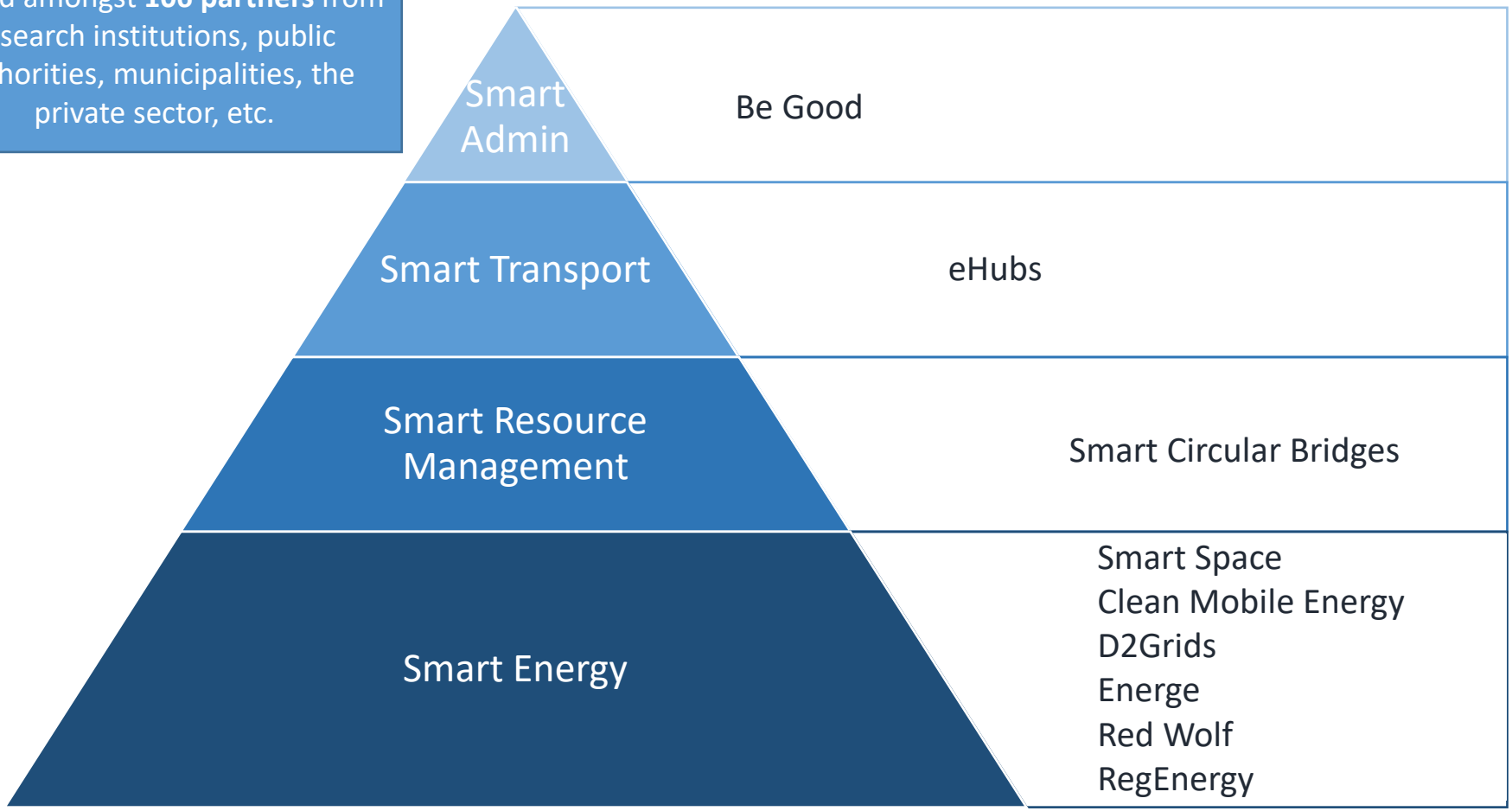
€51.12 Million ERDF committed to Smart City Projects in the 2014-2020 programming period

Spread amongst **106 partners** from research institutions, public authorities, municipalities, the private sector, etc.



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The Northwest Europe Programme provides a framework to act through cooperation

Priority 1: Innovation

Enhance business performance through research to develop new technologies, products, and processes

Priority 2: Low Carbon

Specific Objective 2: facilitate low carbon, energy, and climate protection strategies to reduce GHG emissions in Northwest Europe

Priority 3: Resource Efficiency

Specific Objective 5: Optimise (re)use of material and natural resources in Northwest Europe

Contributions to other Frameworks

EU Renewable Energy Directive

PSI Directive

2030 Energy Strategy
Energy Roadmap

SDGs:
- 7: Affordable and clean energy
- 11: Sustainable cities and communities

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Cooperation has produced new products, new processes, and has laid a foundation for more efficient public services, greenhouse gas savings, and smarter innovation.

Products

- Smart Platforms
- Smart sensors
- Smart energy storage systems
- New smart infrastructure installed and made operational
- Hubs for smart mobility

Processes

- New governance models to unlock the potential of smart cities
- New educational approaches to engage youth in energy consumption reduction

Results

- Thousands of tonnes of reduced greenhouse gas emissions
- New renewable energy capacity
- New funding leveraged
- Enterprises supported
- Cooperation with institutions to bring research mainstream
- Contributions to new policy frameworks at the EU, national, regional, and local levels

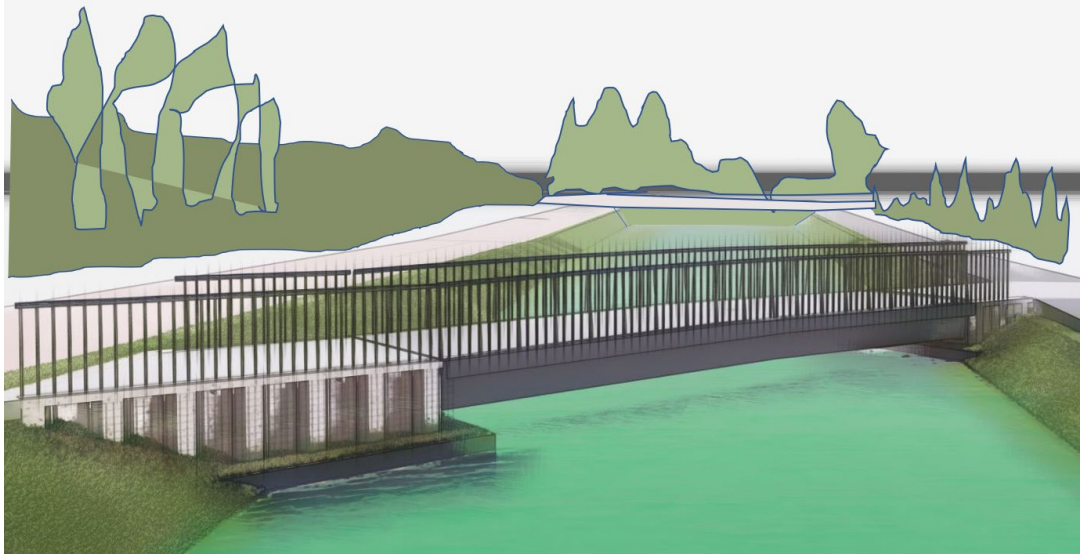
What's next for 2021-2027?

Thematic sessions Smart City

Smart Circular Bridge

Rijk Blok TU/e Eindhoven

https://www.nweurope.eu/smartcircularbridge



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Smart cities
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Started with Bio-Base Bridge Project, SIA Raak
O.a. Avans CoEBBE, Ro en Ad arch, NPSP
3TU student project
Bio-composite bridge TU/e 2016
TU/e
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Issues

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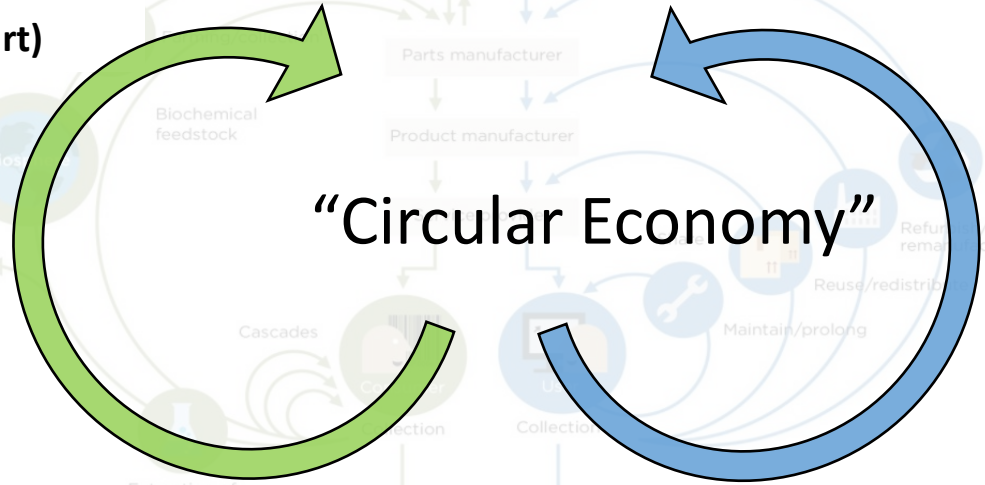
Cradle to Cradle (2002):
(Mc Donough and Braungart)



EU Interreg
Smart Circular Bridge:
Biocomposite materials

EU Horizon 2020
ReCreate:
Re-use of prefab. Concrete elements in new buildings

(Bio-) Renewables Management

Fossil Materials Stock Management

Adapted from: https://www.ellenmacarthurfoundation.org/circular-economy/interactive-diagram

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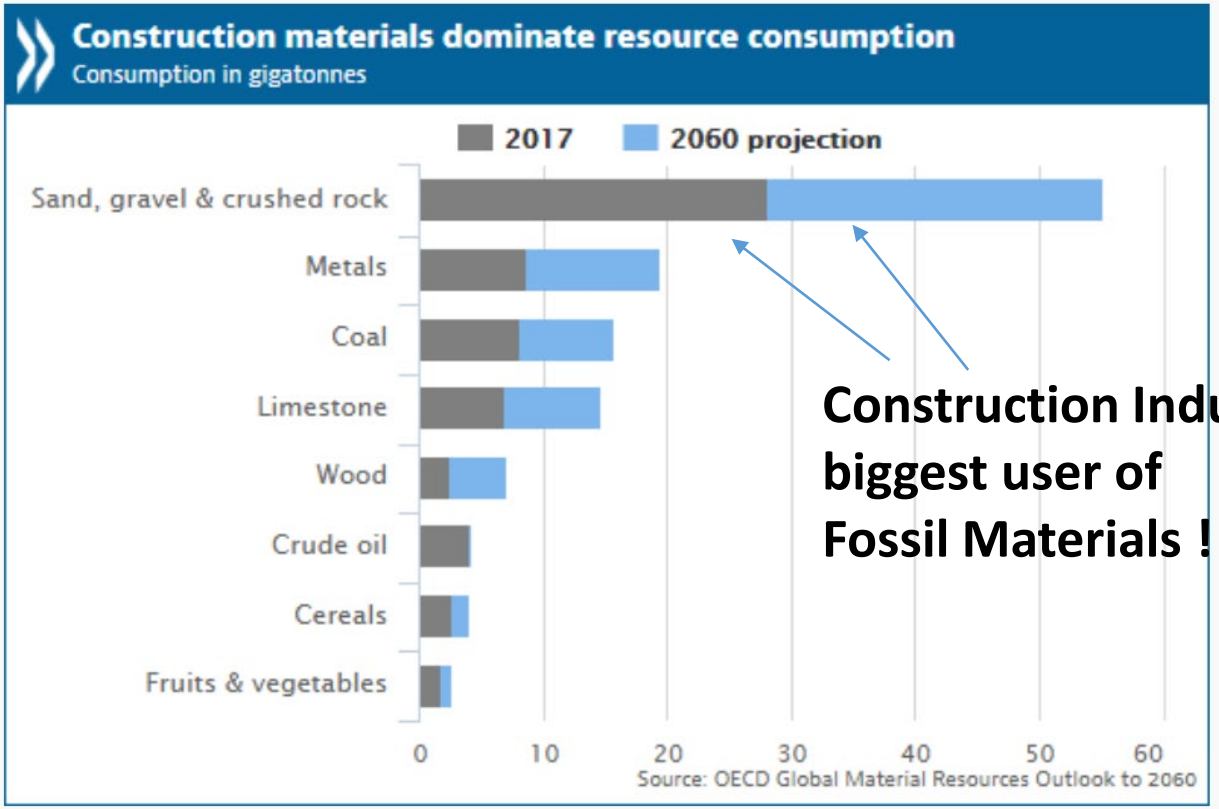

Construction Industry biggest user of Fossil Materials !

source: Organisation for Economic Co-operation and Development (OECD)

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Dust to Dust…?

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dumping site Thilafushi (Maladiven); Royalty free
https://www.dreamstime.com/photos-images/plastic-waste.html

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Ashes to Ashes…?

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Big River, near Anglers Rest, East Gippsland,

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Objectives

- *To Optimise (re)use of (natural) material and natural resources*
- *Promote Circular Infrastructure thus minimising CO2 impact*
- *Current EU market represent 340.K T /yr. raw/fossil materials for pedestrian an cyclist bridges*
- *Build 3 demonstration bridges in project, aiming for 250+ bridges in 5-10yrs. after project, thus avoiding 250 kT /yr raw/ fossil material use*

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Pushing results one step further
Material Selections

Reduce Fossil Material Use, use more Natural Materials

Flax Hemp: grow in one season, use for 20-30-…. years

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First Results

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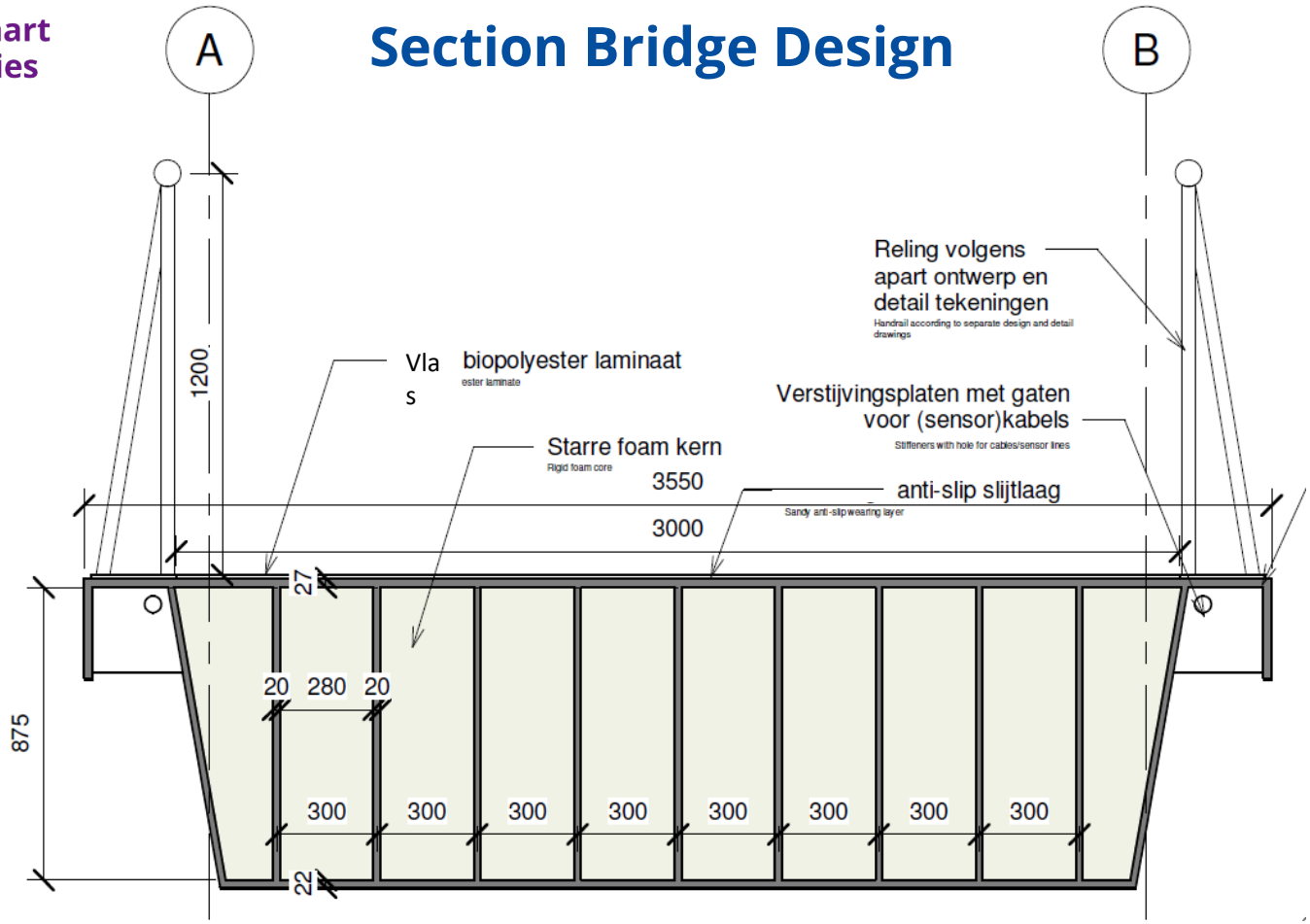
https://www.mvrdv.nl/projects/23/almere-floriade-2022?photo=17979 Copyright protected

Section Bridge Design



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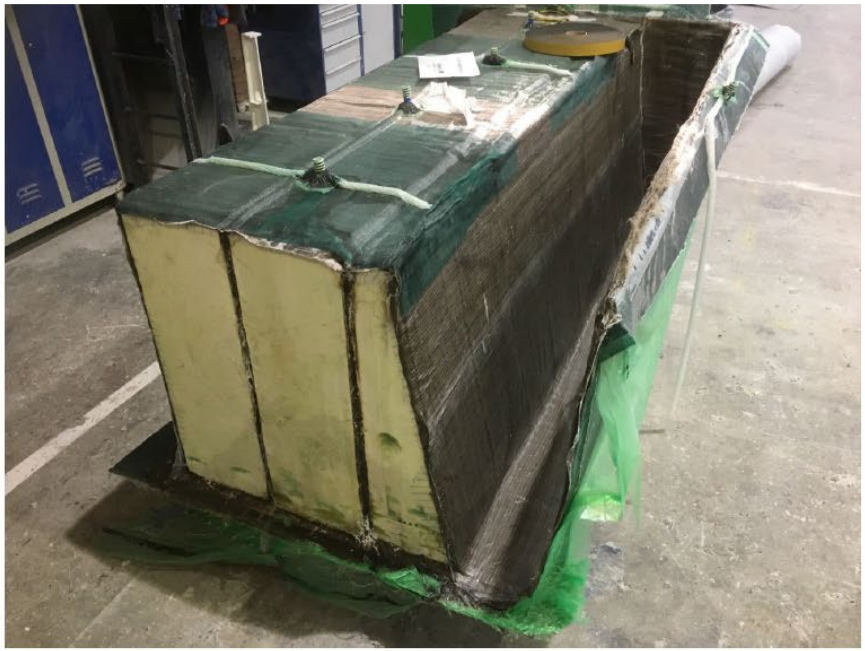
Models and Material Testing

04-Mechanical Test Model



03-Full Height Specimen

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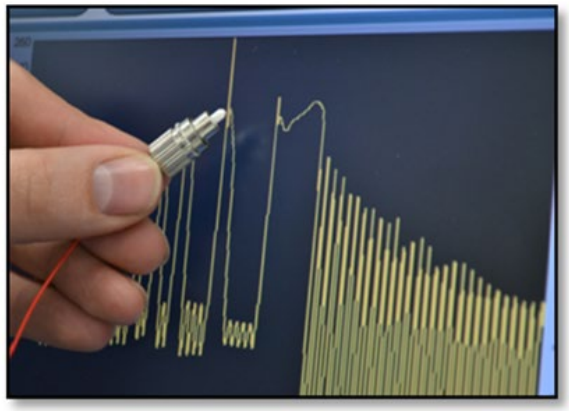
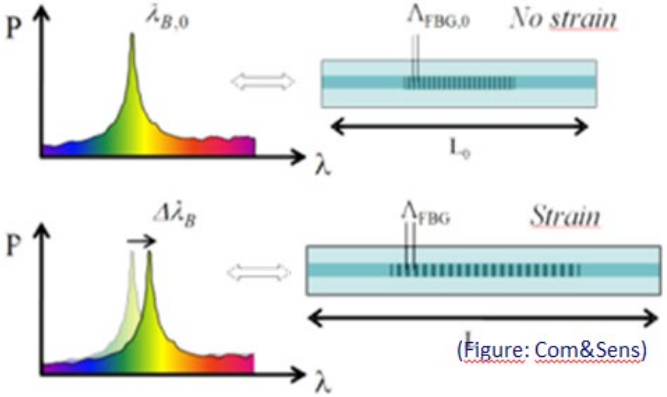
Pushing results one step further: Structural Health Monitoring and Bridge Management System

Optical FBrag Sensors in Bio-Composite City Bridge Eindhoven





(Figure: Com&Sens)

Shift in Spectrum is accurate measure for Strains

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Test set-up for SHM System Interreg Project

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Extra Sensor-lines

Bridge deck Extra Strain sensors
blue lines 5 and 6:
SG 05-01 tm 14
SG 06-01 t/m 14

Extra Temperature Sensors
T 1 t/m T6
(-20° - +110° C res. 0.3 ° C)

3 Accelerometer sensors
(Compared with optical accelerometers)

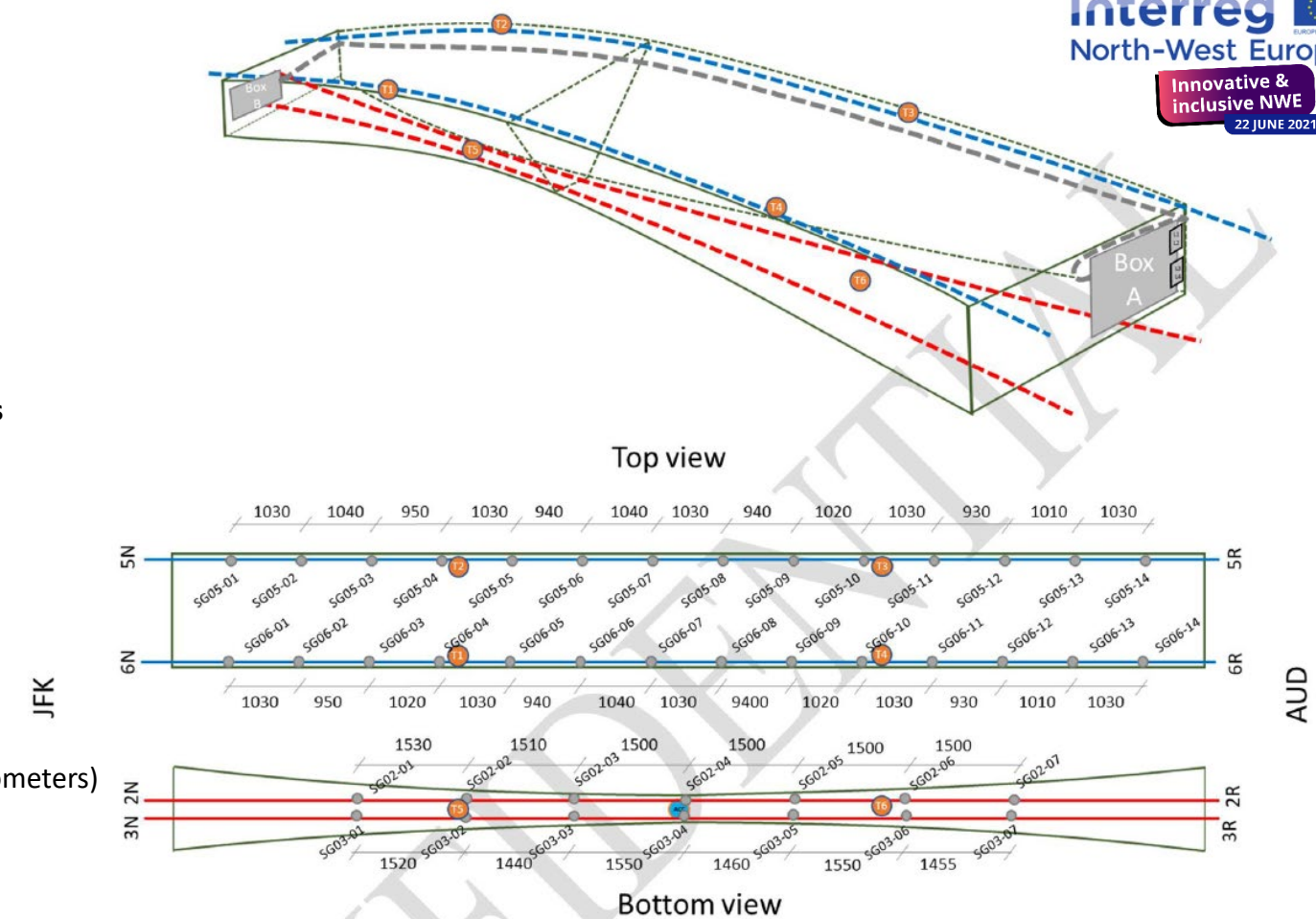

Figure 2: Location of the strain and temperature sensors as-built (ACC point in centre only used for demonstration)

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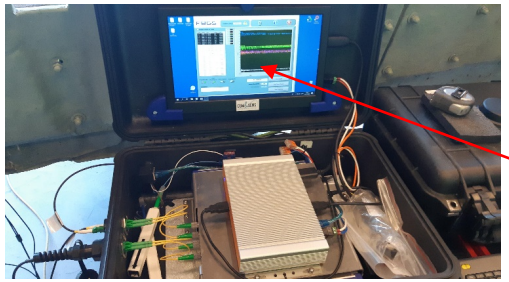
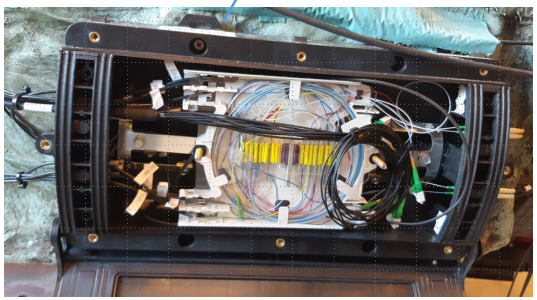
TU/e Campus bridge



interrogator/ read-out equipment

sensor-data with thresholds



Connection of all sensor lines

router and internet connection

2- 2 ACC-hi new status

A alarm@com-sens.eu
To Blok, R.

Alarm status Not OK
Index: 2- 2
Name: ACC-hi
Value: 11575,0 µS

generated email warning

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Partnership in Smart Cicular Bridge

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	Project partner	Country
5 Universities	TU/e (Lead Partner)	NL
	KU Leuven	BE
	University Stuttgart	D
	Vrije Universiteit Brussel	BE
	Avans University of Applied Science	NL
5 Companies	FiberCore Europe	NL
	Com&Sens	BE
	24SEA	BE
	Lineo	FR
	Volker Infra	NL
3 Cities	City of Almere	NL
	City of Ulm	D
	City of Bergen Op Zoom	NL

Project ca. 4 Years
End: **December 2023**

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Structural Health Monitoring (SHM)

Bridge Management System:

- Collect in situ bridge behaviour data during the Service Life of Bridge
- Relate in situ bridge behaviour to Material tests Lab.
- Not just Building Application check but a Continuous insight in the bridge Safety
- Much more precise estimate of Remaining Service Life >>
- Inproved Maintenance and Renewal planning
- Crowd control: Historic as well as Real Time data on bridge traffic

use Innovative and much more circular materials in Infra Structure

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Smart Circular Bridge project

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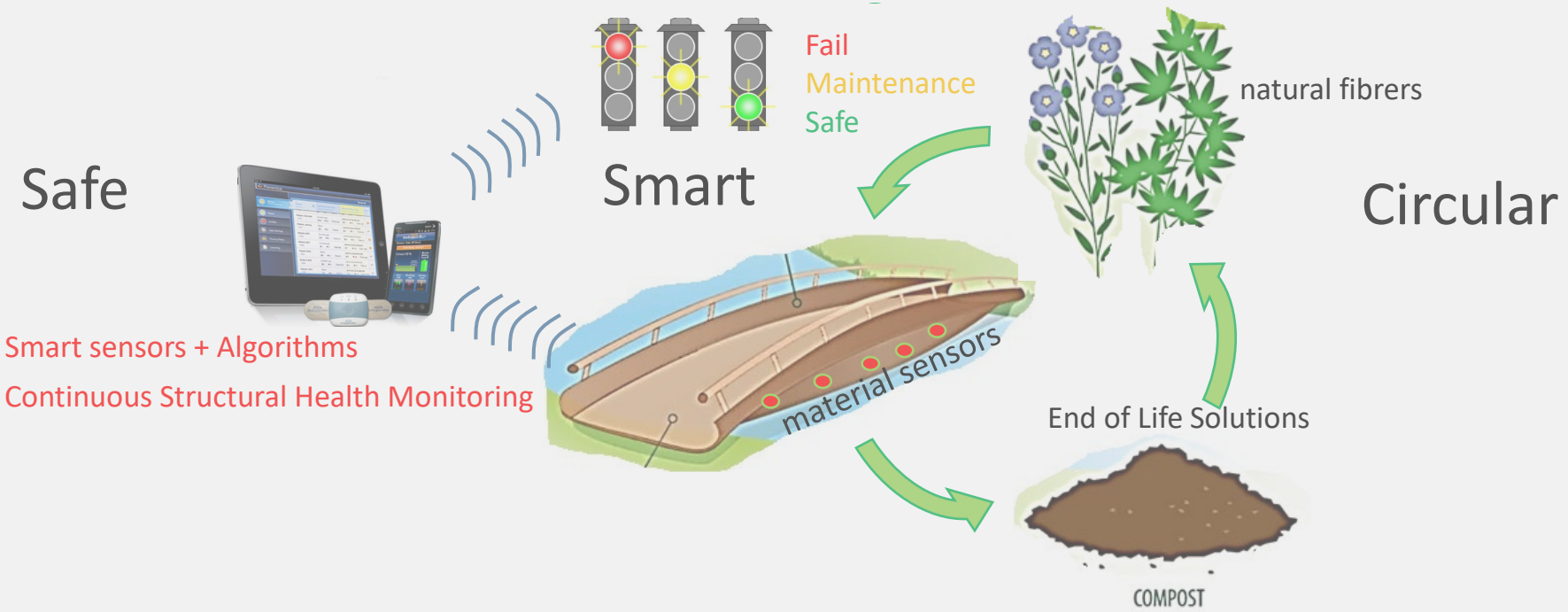

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Smart cities

The SMART-SPACE project

Kristof Verhoest, Project Leader (City of Ostend)

https://www.nweurope.eu/smart-space

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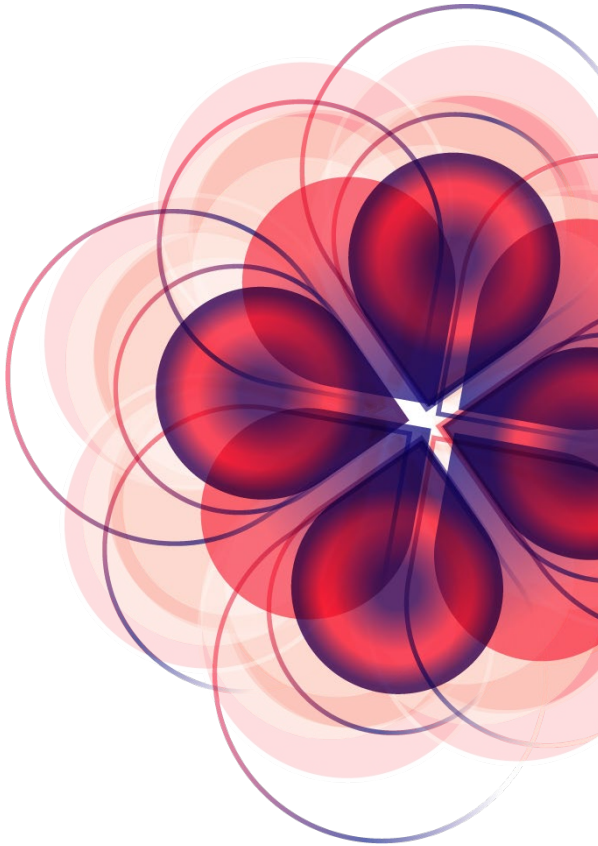
Project video

https://www.youtube.com/watch?v=OgS6ucax0Cw



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Challenge

NWE : great **challenge** to shift towards **low carbon economy by 2050**

(2030:At least 40% cuts in GHG Emissions (from 1990 levels))

Optimising public lighting: big **potential** to contribute to **energy efficiency** and **carbon reduction** in significant way

Step 1	Step 2
ledification ongoing save **>50% on actual energy consumption** *(depending on lamp types used)*	smart public lighting already available but **lack of large-scale roll-out**!

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Objective

AIM

- facilitate the **uptake of smart lighting**
- enhance **energy-efficiency**
- **reduce CO2 emission**

FOR WHOM

- small & mid-sized **municipalities**

HOW

- implementing smart lighting infrastructure in **4 pilot cities**
- starting from the **needs and wishes** of the **users** of the public space
- improving **energy use and liveability** in the public space

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Objective (project main outputs achievement):

- 3.01.:Number of adopted or applied low carbon technologies:
  1 interoperable and adaptable smart light system;

- CO26.: 2 enterprises co-operating with research institutions;

- CO34.: Estimated annual decrease of GHG: 452 ton CO2/year;

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Results

- What has the project achieved up to now?
  - A **methodology to engage stakeholders** and users of the public space in the design of a smart light system;
  - A **framework for a smart lighting system** for NEW cities and light experts;
  - A **SMART-SPACE Knowledge Center** for NWE cities and light experts (49 users);
  - **4 Pilot cities** (Tipperary, Middelburg, Sint-Niklaas and Oostende) with a smart light system (*installation ongoing*);
  - A **transition roadmap and accompanying implementation toolbox** to stimulate the roll-out of smart light systems in the NEW-region (*implementation workshops foreseen autumn 2021*);
- Determination of the **real annual CO2 decrease**: after monitoring phase!

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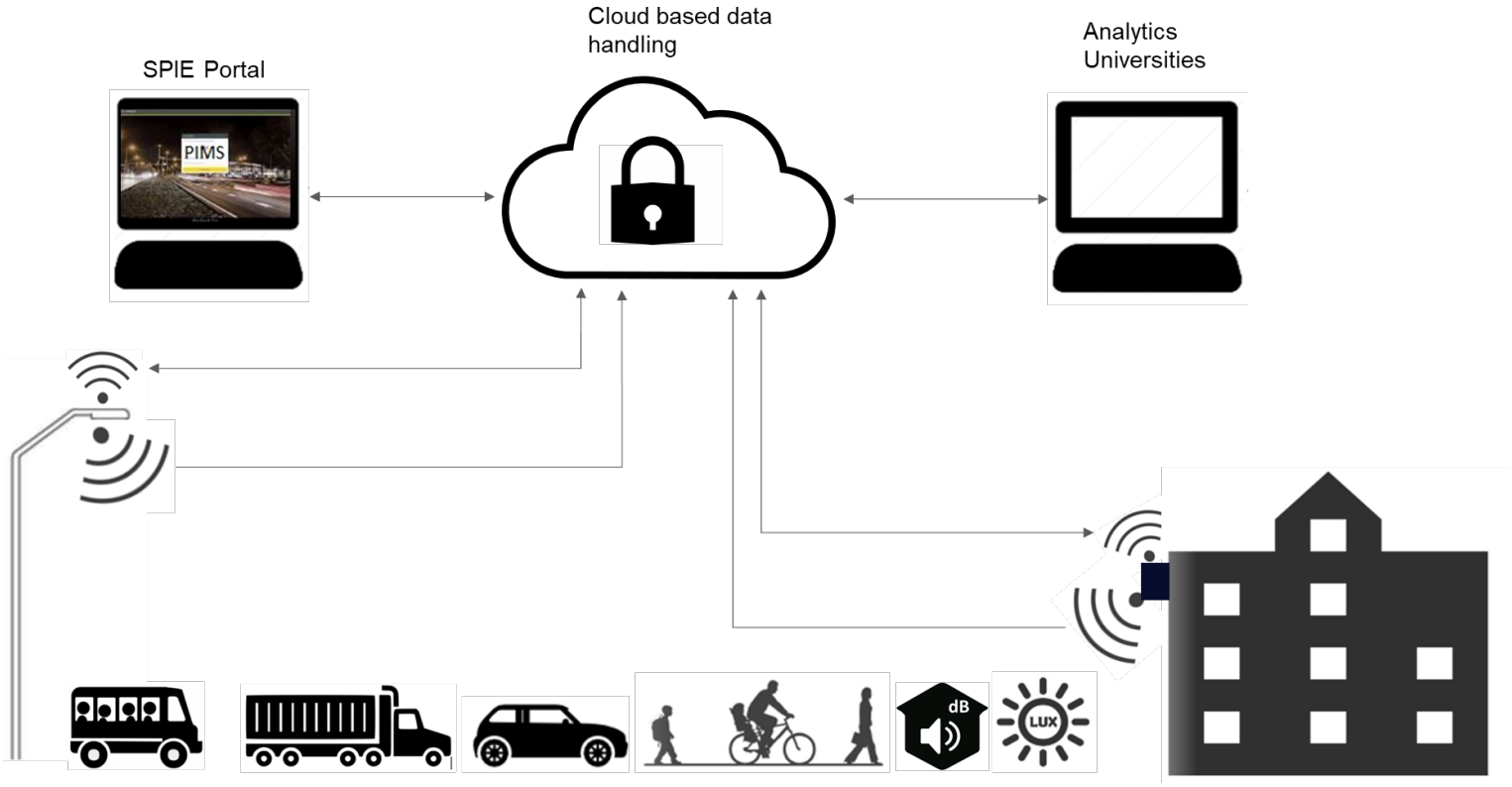
Results

- Architecture of the smart light system:



Results

- **Challenges** building the smart light system:
  - Use an **integral design** in the beginning of the process – coordinate the decisions on hardware, light design and functionalities;
  - The translation from needs and wishes of stakeholders to technical design specifications requires **a lighting designer**;
  - Building a smart lightings system is **challenging** to realise if components are from different companies (⇔ fender lock in);
  - Interoperability requires **standards**:
    - On the level of hardware (telecontrollers);
    - On the level of communication (API's);
  - A **Data manifest with code of conduct** on data collection, processing, storing, sharing, and authorization complying to GDPR :
    - For some types of sensors (passenger-by contour) a **DPAI** has been processed leading to **a processing agreement** between the company & municipalities;

Pushing results one step further

- A **replication potential and a long-term potential report** has been delivered to determine the potential on the long run. Together with other products of the project this must facilitate the large-scale roll-out of Smart Public Lighting (*target AF: 50 municipalities/5 years after project closure*);

- A challenge for the partnership and project itself is the redaction of a **post-project Service Level Agreement** between the private compagnies and municipalities/grid operators;

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Partnership

- Partnership =**right mix** for this project: municipalities (end users), private compagnies and research institutions;
- **Good match** between practice and research =>broadly applicable outputs of the project;
- Working together on the NWE-level gives a good insight in the **different approach**, legislation & stakeholders regarding to smart public lighting;
- The base for a new project with the same partnership must be a well-defined **partnership agreement** at the beginning of the project;

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Smart Cities – Interreg NWE

Matthias Verhegge

National Contact Point

How the topic will be covered in 2021-2027

- Questions to answer:

  - Where does a ‘smart city project’ fit the programme?

  - Who are the target groups?

  - Input stakeholder consultation?

  - What types of actions are being considered?

SMART CITY

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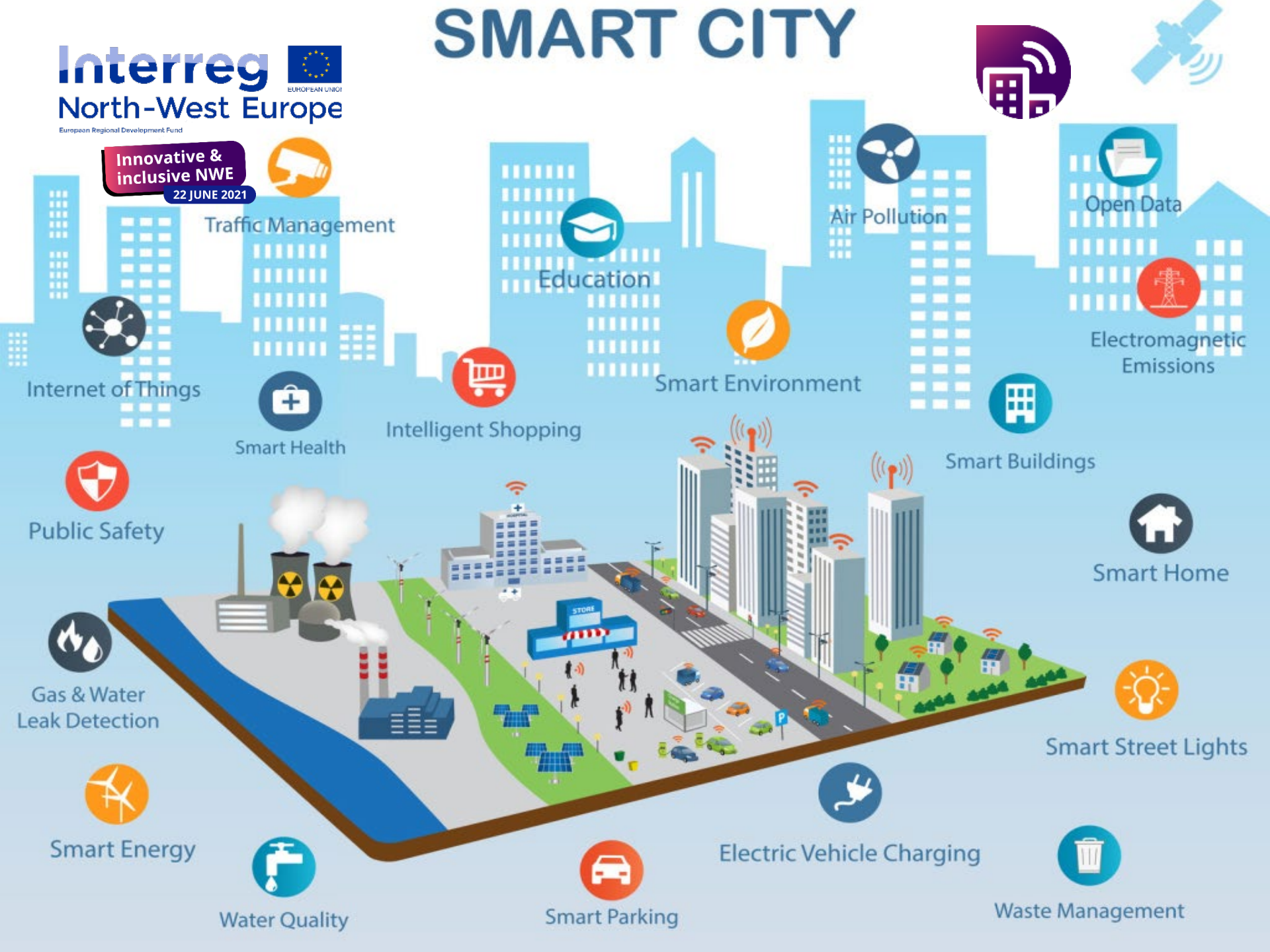

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1. Territorial challenges within the different SOs

<u>Expectations</u> on fit under priority 4 'innovation capacity':

- Reduce territorial innovation gaps by making villages or cities smarter, through uptake of solutions.

- Addressing citizen's needs by making services, smarter, more efficient, providing services where they're currently lacking. Co-creation!

- Implementing smart city and/or smart region strategies.

  e.g. building the right framework and tools for using and disclosing data.

- Always make sure there's a **transnational angle and vision** to your project.

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1. Territorial challenges within the different SOs

All priorities:

- If actions fit a specific selected topic of a priority.

  e.g. air quality sensoring, water capacity measurement, smart energy grids.

- Demonstration and uptake of solutions to make services and infrastructure smarter in answer to citizen's needs.

- Definition or upgrading of integrated (data-driven) monitoring systems and observatories to facilitate evidence-based decisions.

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2. Input from the stakeholder consultation

- Innovative approaches for urban and rural areas.
- Identify what makes territories resilient and attractive.
- Bring back services in remote areas.
- Develop strategies to reduce the use of cars.
- Testing new solutions in the provision of public services.
- Create standards for data sharing and service provision.

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3. Stakeholders and target groups

- Local, regional, national public authorities Governmental agencies, public bodies.
- Universities, public research centres, private research units, schools and higher education, training centres.
- Businesses, SMEs, Business support organisations.
- Sectoral associations, NGOs, lobby organisations, citizens groups.

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4. Categories of actions for projects

All projects should contribute to at least one of the categories of activities:

a) Elaboration and implementation of joint strategies and action plans.
e.g. action plan to increase the access to data for policy-making

b) Pilot actions for testing tools and uptake of solutions.
e.g. demonstration of new smart solutions
e.g. testing new public services

c) Capacity building and awareness raising activities.
e.g. training schemes on monitoring of data

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Browse through our latest publication to find out more about the impact of our projects.

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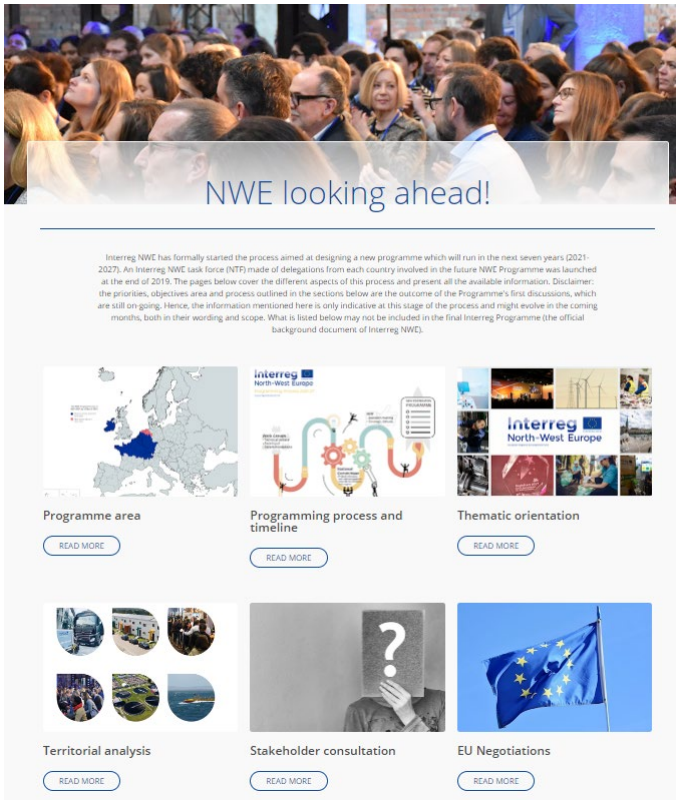
Visit our Future Programme section for up-to-date content on Interreg NWE 2021-2027



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