WELCOME TO THE GREEN VILLAGE

Rene Tamboer

Groningen, 7th march 2019

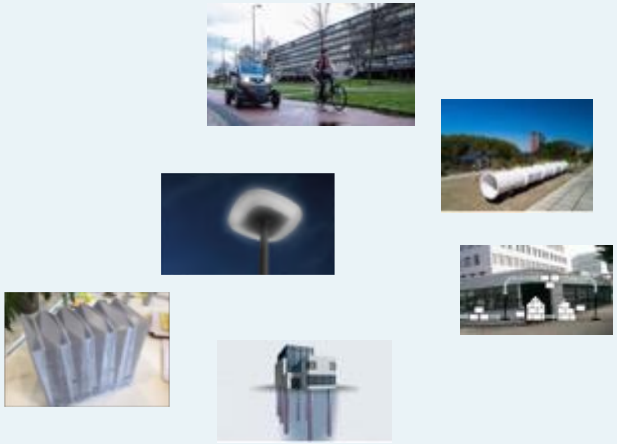
TU Delft

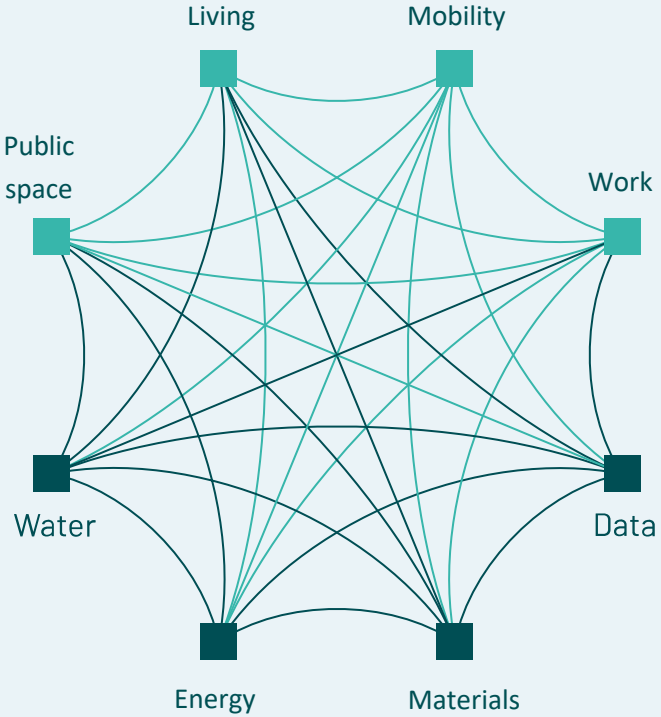
EUROPEAN UNION
EUROPEAN REGIONAL
DEVELOPMENT FUND

Content

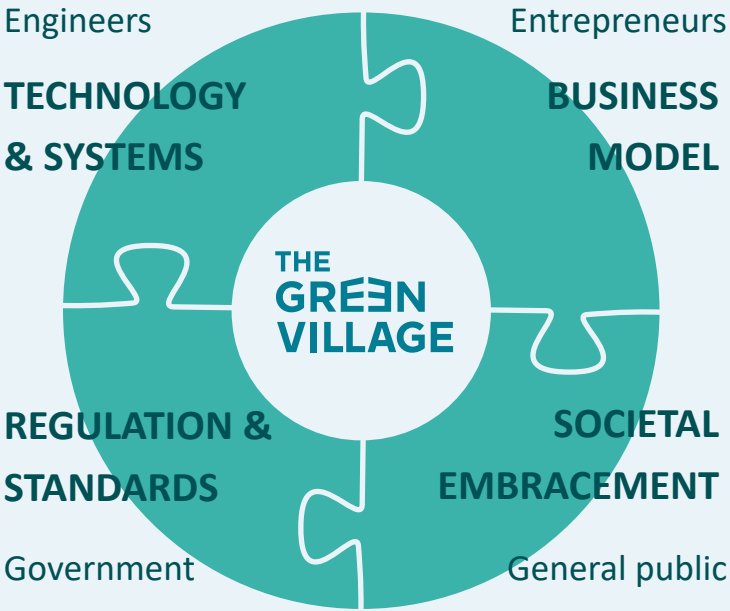
- **Introduction Green Village**
- **Data Platform**
- **Example projects**

Future cities will see **increasing integration** of previously independent domains

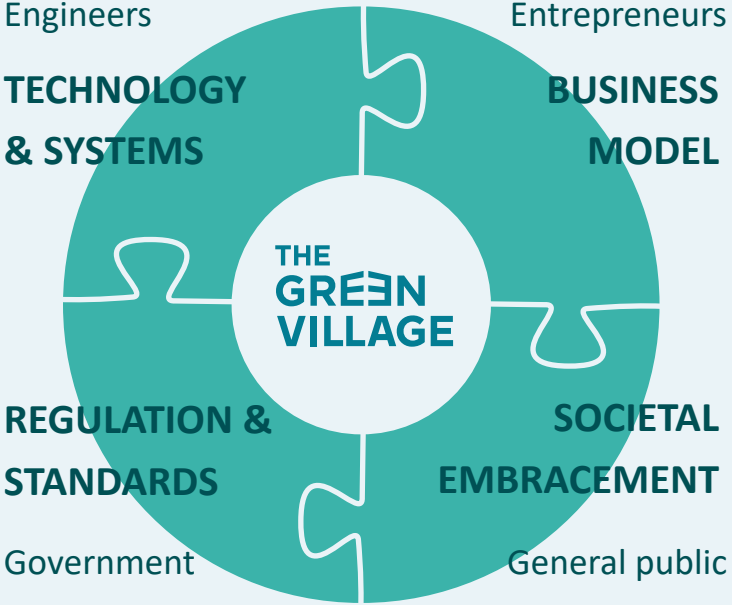


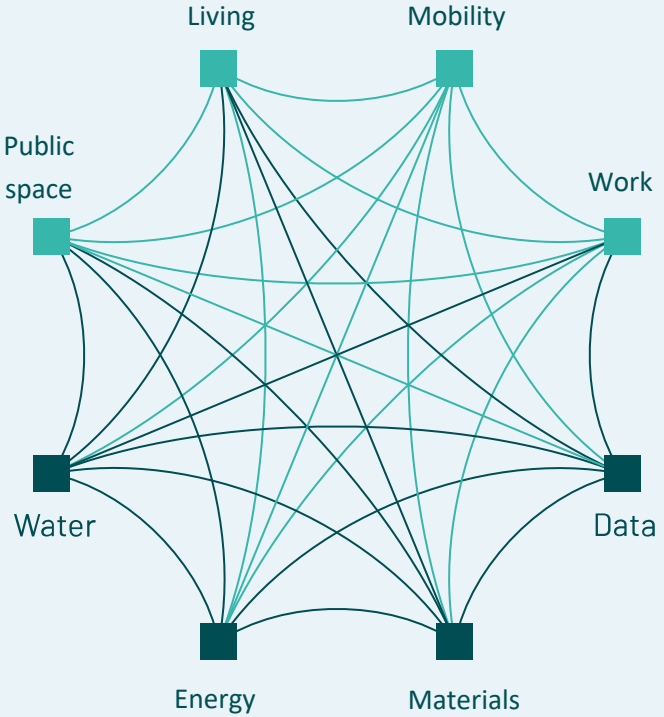


…and transition is placing high demands on our **societal system**



The Green Village unites **all stakeholders** on an integrative platform



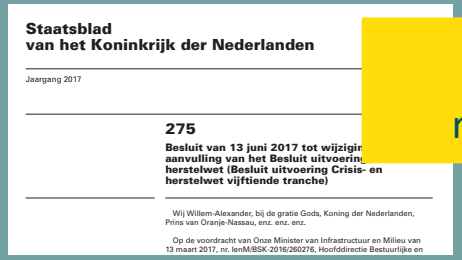


The platform offers a perfect and safe environment for **research**, **learning**, **discovery** and **demonstration**

Open to the public

Plug & play infrastructure

Real people

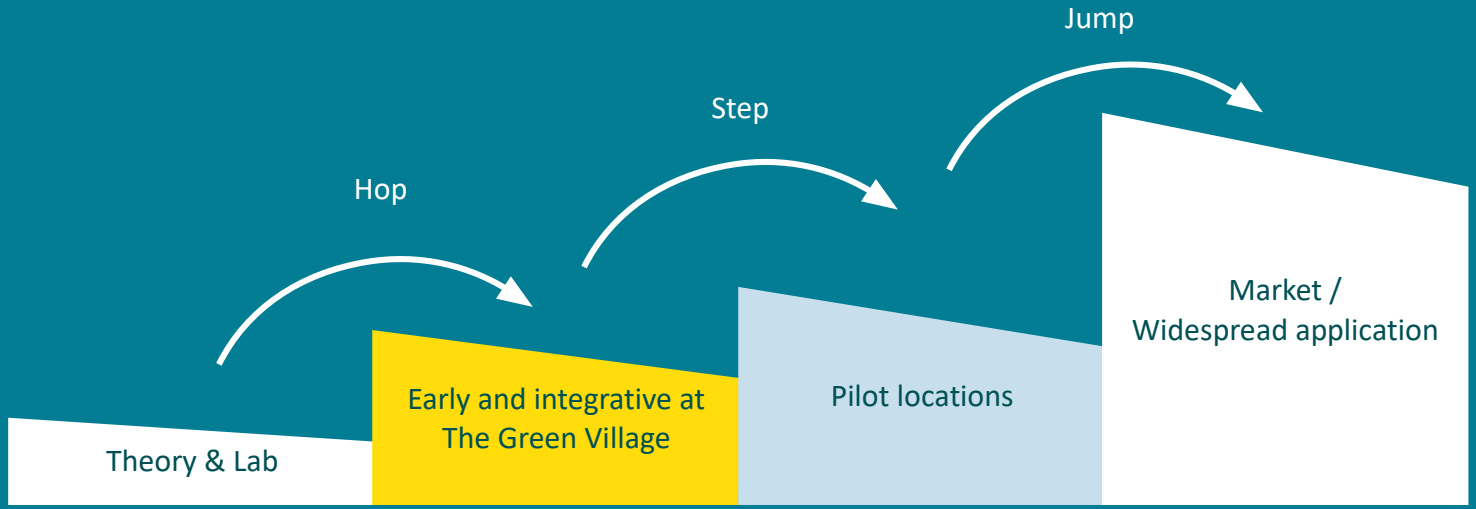


Lenient regulation

Workshops & matchmaking

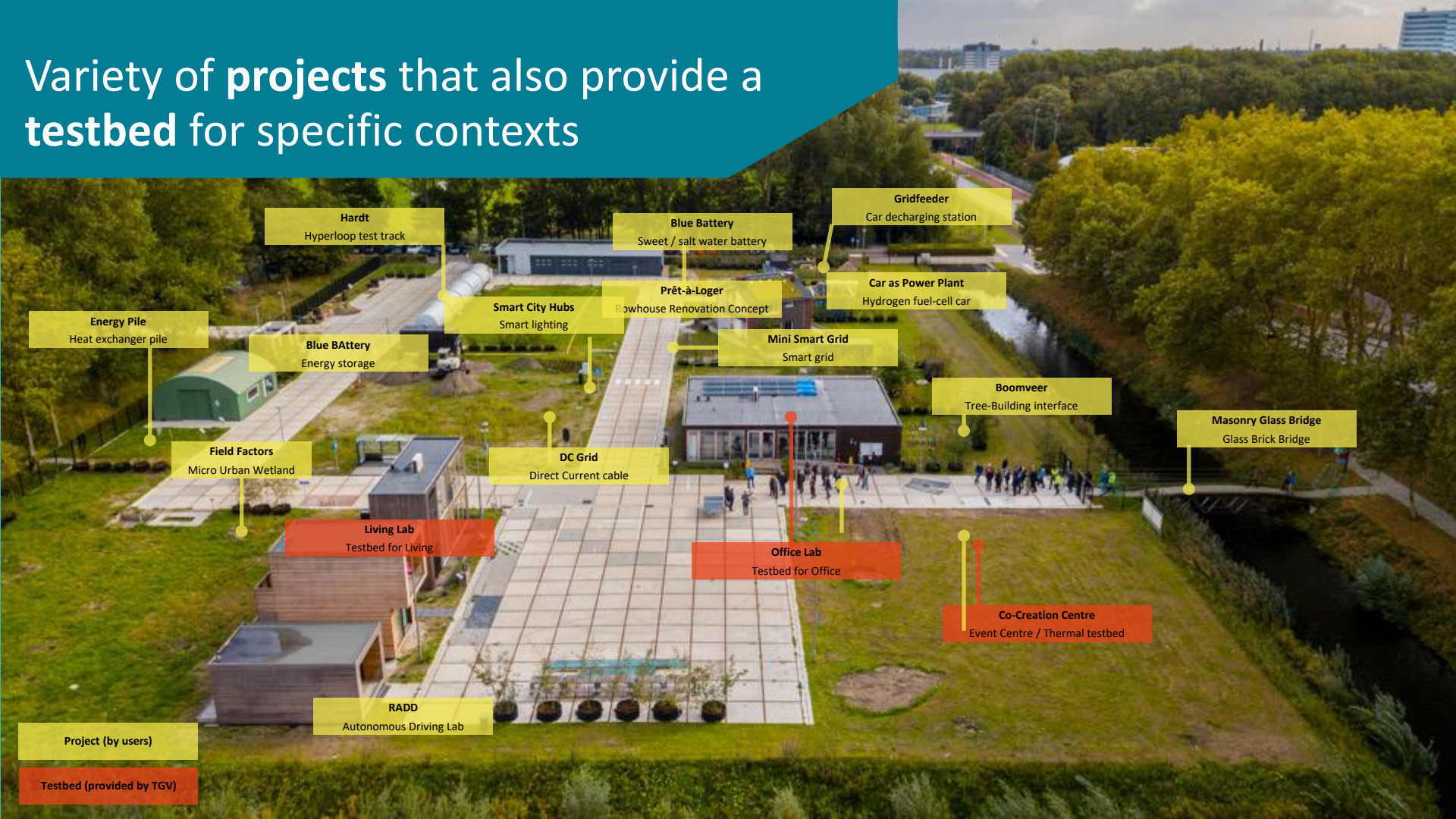
Data platform

All stakeholders join to **learn** what is needed to **accelerate widespread application** of innovations



Technology & systems	System questions	➔ Local reliability	➔ Robust technology
Business model	No business model	➔ Business *case*	➔ Business *model*
Societal embracement	Concerns	➔ Local interest	➔ General embrace
Regulation & standards	Framework n/a	➔ Exceptions	➔ Appropriate framework

Variety of **projects** that also provide a **testbed** for specific contexts



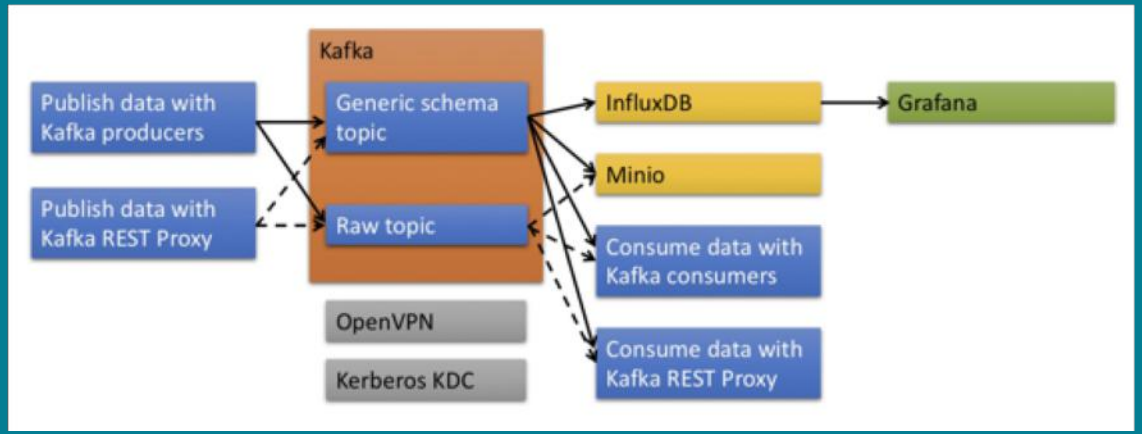
Objective dataplatform

- An infrastructure to collect, store, and share live data among different projects and stakeholders

  - The Green Village data platform should facilitate sharing and combining data from different participants as the data is being generated
  - Allow access to that data in a standardised way
  - Available for later research and for revisiting/re-evaluating (scientific) results and findings
  - Safe and secure environment

Project Specific

- The core services are centered around an Apache Kafka cluster which hosts topics (a queue of messages or records) for the attached projects.
- It forms a common layer used by every project hosted on the platform.
- At a project level, additional set of services is deployed to provide the desired functionality of the platform.
- These services are isolated on a project basis to guarantee security and reliability.



Data Formats

- The Green Village data platform makes use of a strict Avro schema for messages in topics where schema enforcement is in place.

The format of the **generic schema** is the following:

- **Metadata**:
  - project_id
  - device_id
  - latitude
  - longitude.
  - altitude
  - topic_partition
  - manufacturer
  - serial: Serial number of the device
  - placement_timestamp:
  - location
- Data:
  - Timestamp
  - values:

    name

    description

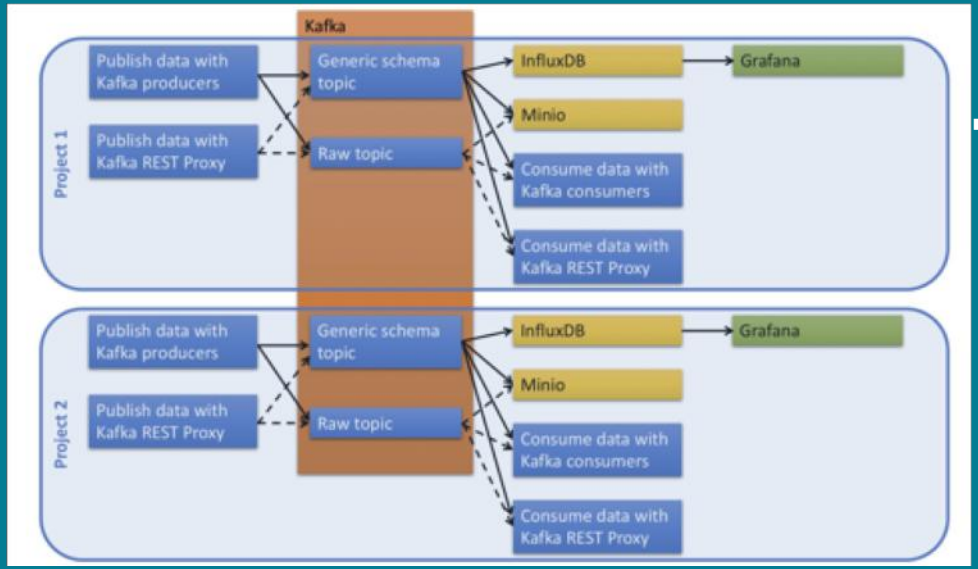
    unit

    type

    value

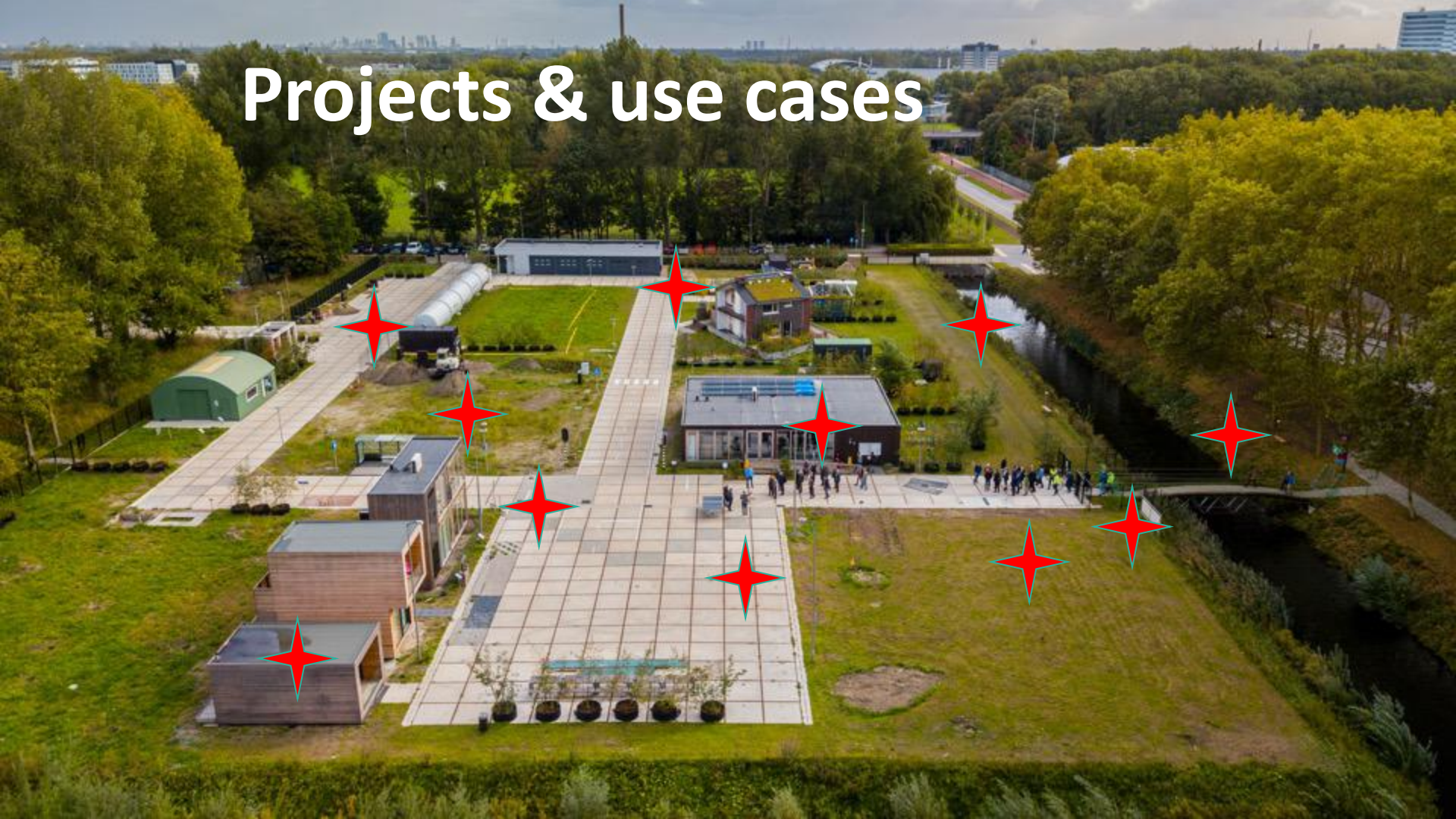
Data Sharing

- Multiple projects are deployed in the Green Village data platform in an isolated way. Every project gets its own instance of the Minio storage, InfluxDB database and Grafana. Kafka is used for all projects, where every project gets its own topics protected by dedicated access rights.



- Other parties can consume data from the Kafka topics related to a project. This can be achieved by creating a new consumer group for each party interested in running their own consumers.

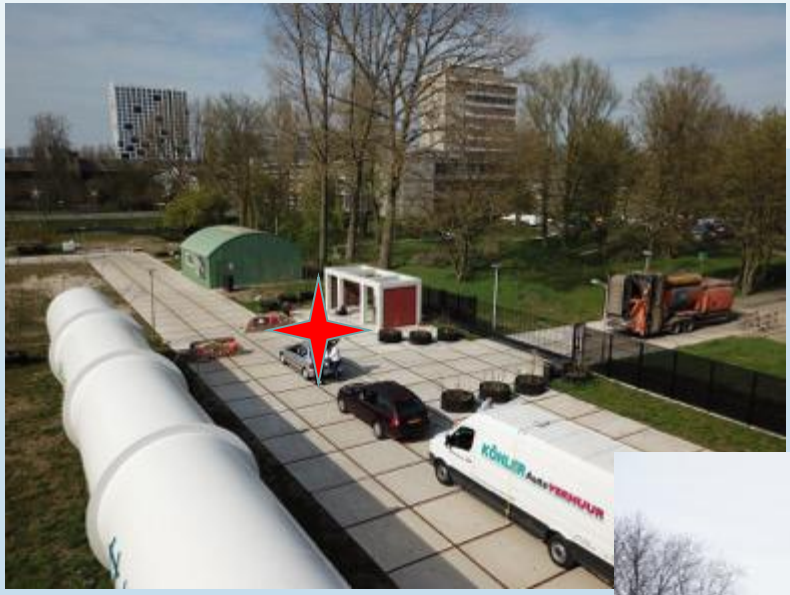
Projects & use cases

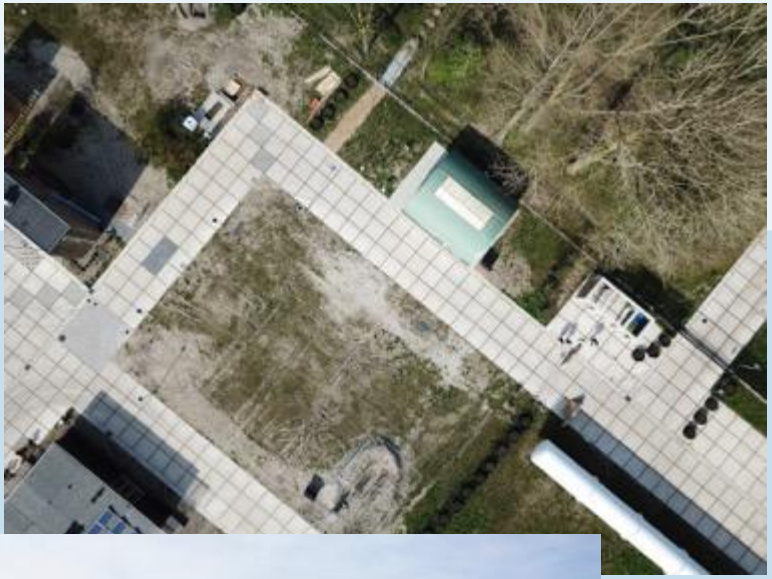


iTRACK

iTRACK aims at improving protection and safety of humanitarian missions

Creating an open-source real-time tracking and threat detection system providing intelligent decision support, navigation, logistics, and coordination and humanitarian disasters.

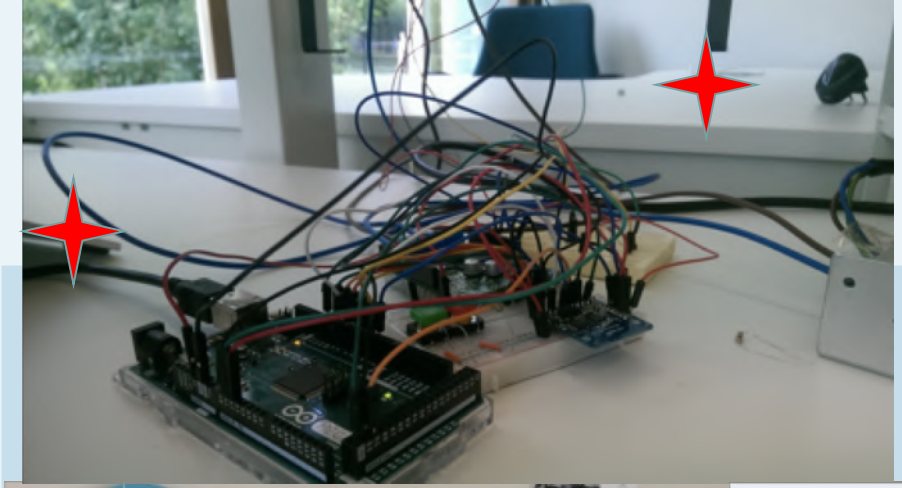


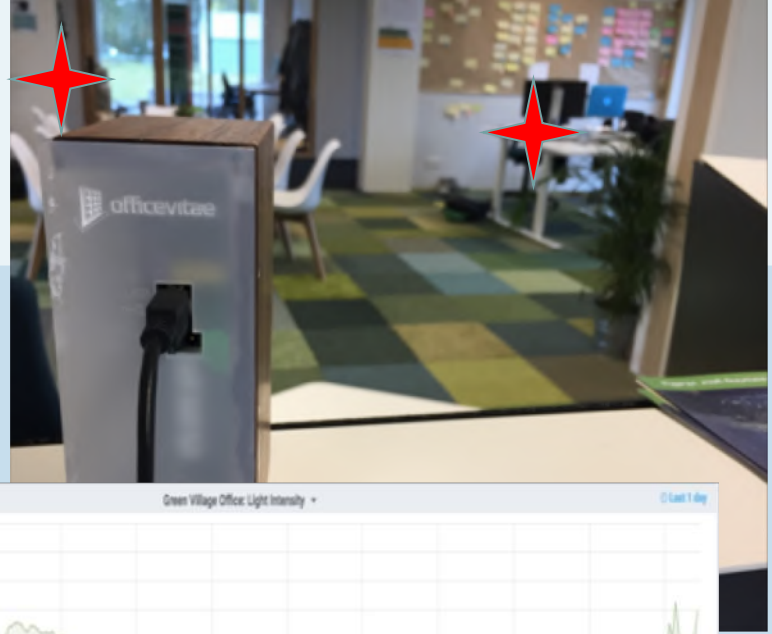


Office Vitae

OfficeVitae provides an integrated approach to obtain real-time insights of the **office environment and occupant's health and vitality**.

Together with Climotion, expert in hardware and software for BMS, OfficeVitae demonstrates **the value of specific local climate zones in office buildings** based on occupants needs.




officevitae


officevitae


Green Village Office: Light Intensity
Light intensity in lux
3.0K
2.5K
2.0K
1.5K
1.0K
500
0
12:00
14:00
16:00
18:00
20:00
22:00
00:00
02:00
04:00
06:00
08:00
10:00
OFFICELAB:226 - lux
OFFICELAB:237 - lux
Green Village Office: Motion
Motion as percentage
100
75
50
25
0
OFFICELAB:226 - Motion
OFFICELAB:237 - Motion

Researchlab Automated Driving Delft

The Researchlab Automated Driving Delft (RADD) on the TU Delft campus provides room for experimenting with automated transportation in real-life conditions.

User acceptance and interacting with other traffic, reacting to unexpected situations, and integration in the mobility system are the main topics.

From March 18

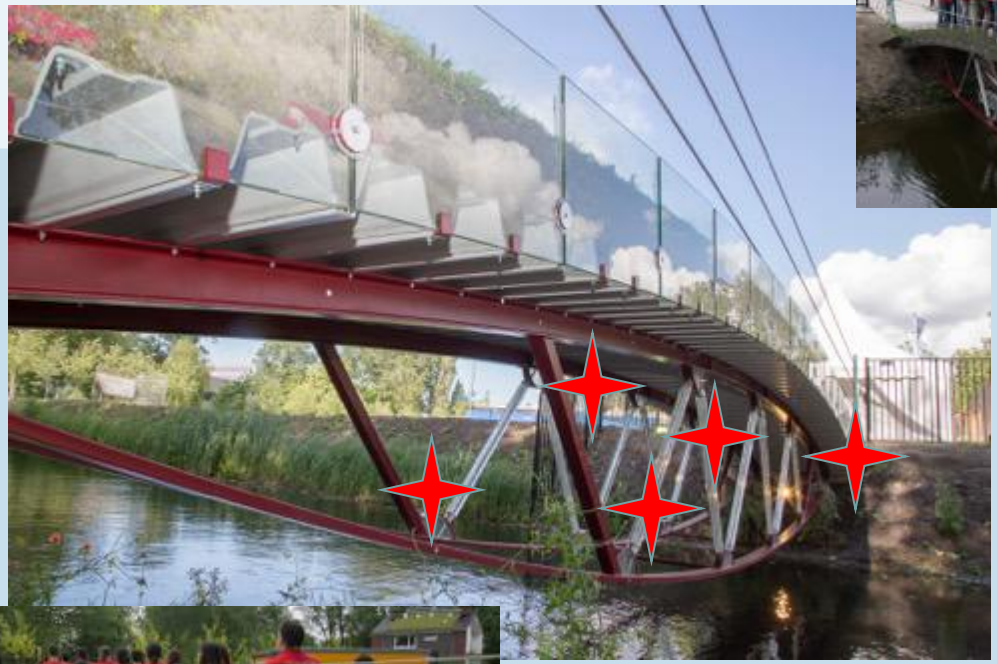
Researchlab Automated Shipping

RESEARCHLAB
AUTOMATED DRIVING
DELFT

Glass Masonry Bridge

The idea of the Glass Masonry Bridge was born to pave the way for glass as a new structural material for bridges.

However, people do not yet trust in the strength of glass. A bridge is the best way to demonstrate the material's load-bearing capacity and safety.
Strength tested in real-life..

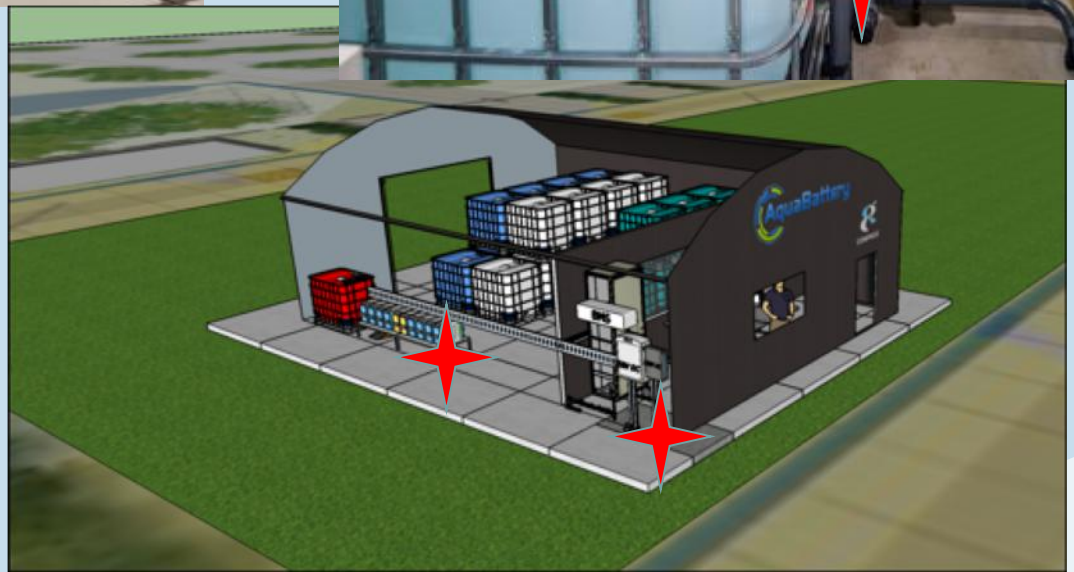


Blue Battery

The Blue Battery is the only **electrical storage system** that is 100% sustainable. AquaBattery has developed an innovative product that stores electricity solely **using water and table salt**.

AquaBattery wants to stop the use of toxic materials, such as the acids used to build conventional batteries. Those systems are obsolete and extremely damaging to the environment.

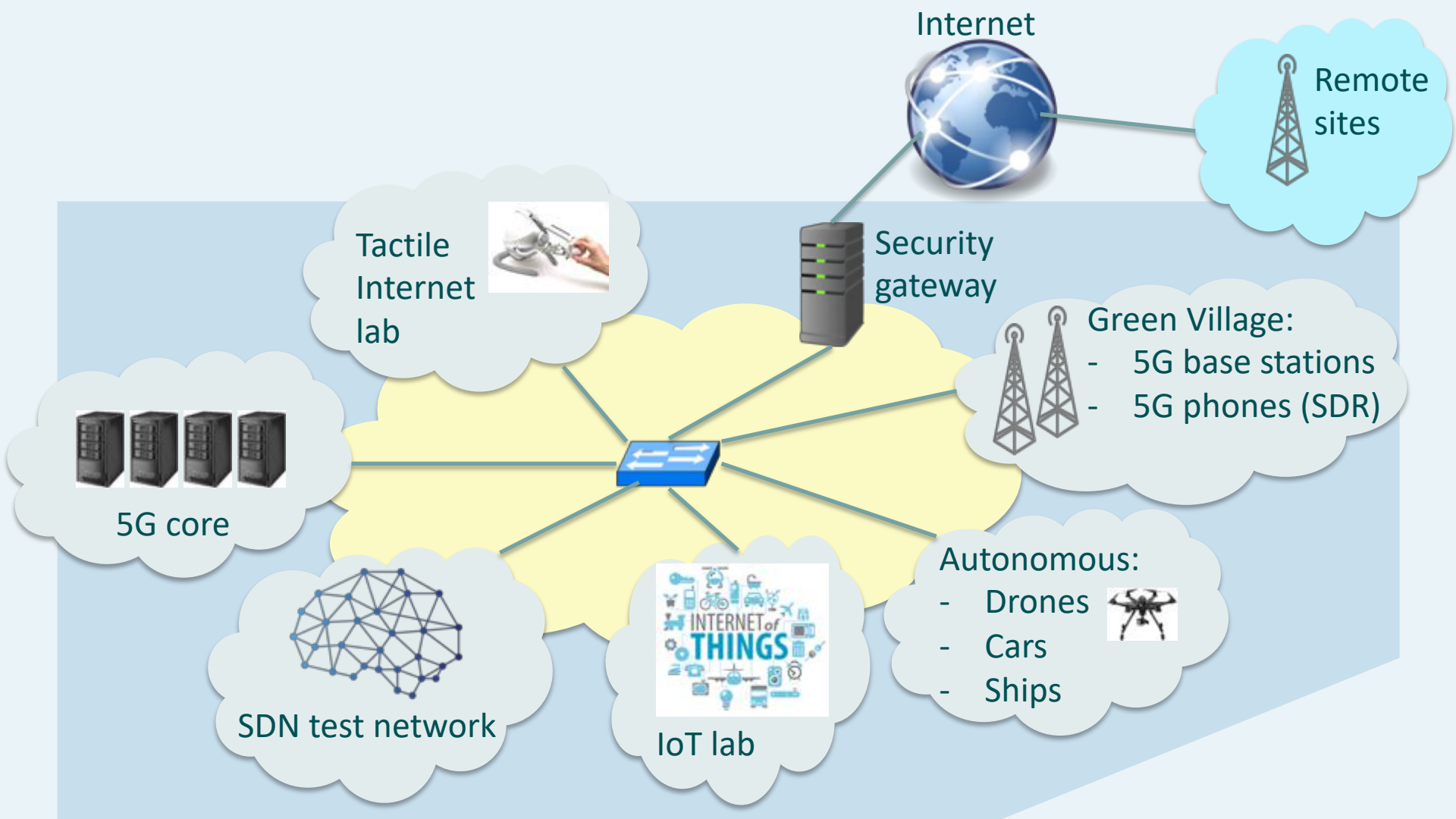

FRESH - 1


AquaBattery

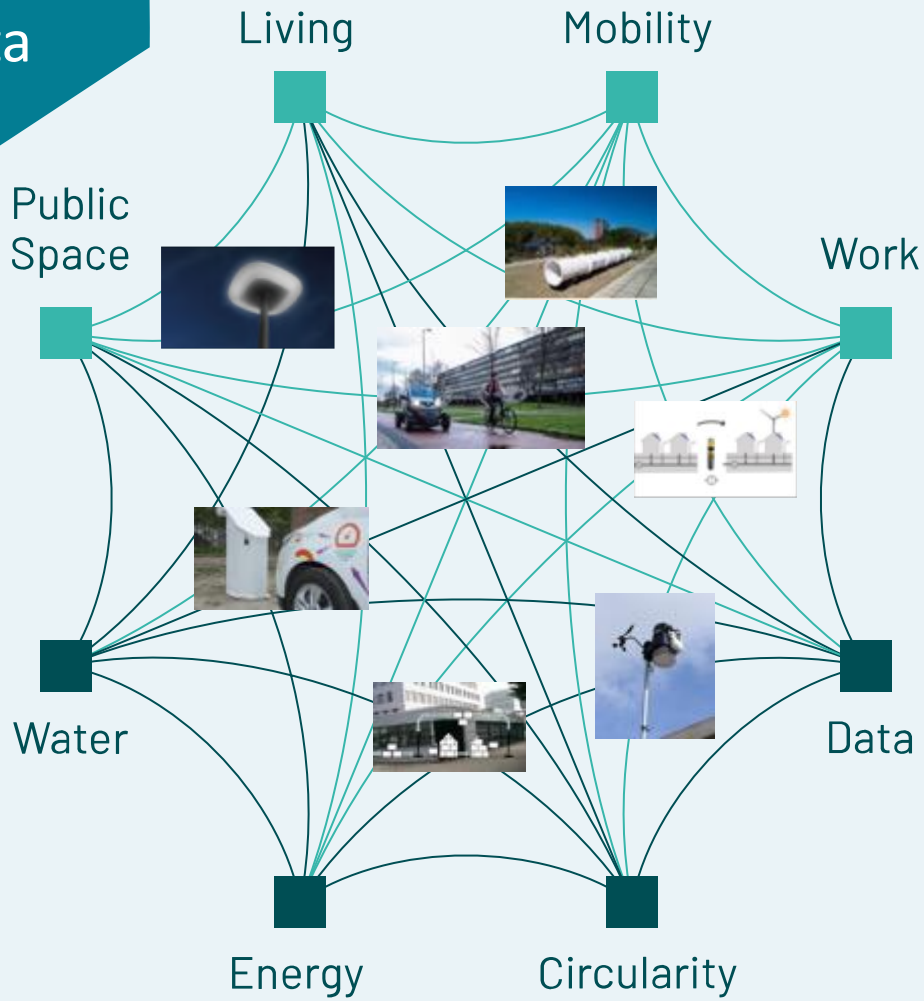
Do IoT. : Delft on Internet of Things

Through Internet connectivity and equipped with embedded sensors and actuators, "things" can harness the compute and artificial intelligence capabilities of cloud infrastructure to intelligently adapt their behavior based on data and knowledge captured from various sources.

Smart cities, industry 4.0, autonomous driving, and the tactile Internet are but a few examples to illustrate that the Internet-of-Things (IoT) permeates and stands to improve all aspects of society.


Internet
Remote sites
Tactile Internet lab
Security gateway
Green Village:
- 5G base stations
- 5G phones (SDR)
5G core
Autonomous:
- Drones
- Cars
- Ships
SDN test network
INTERNET of THINGS
IoT lab

@ Green Village a diversity of data streams emerges…



Dataplatform will help connecting the projects, and faclitate the step

Projects in 5 categories:

1. Connection from single project
- DC Office
- CityTec

2. Added value from conection
- Blockchain for energy
- Visualisation of energy flows

3. Infrastructure for use cases
- 5G for autonomous driving (RADD)
- 5G for autonomous shipping (RAS)
- 5G for Smart City Security

4. Optimalisation of digital infra
- 5G in practice in urban environment

5. Use digital models
- BIM on the TUDelft campus
- 3D model

Facilities

A
Dataplatform
Technology and governance to share data

B
Advanced infrastructure
Hardware, incl. 5G (expected)

C
Digital model
Digital version of real life

Ohter locations that can be connected

Sharing best-practices on infrastructure and digital models

Locations elsewhere:

- Campus TU Delft
- AMS
- 4TU Living Labs
- ……
- …..
- …..
- Delft-Zuid

THE GREEN VILLAGE

Rene Tamboer

Groningen, 7th March 2019

TU Delft

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND