



Clean energy: economic instruments

ENERGY LIVING LABS

AN INSTRUMENT TO DEVELOP A
CLEAR PATH FOR INNOVATIONS IN
THE CONTEXT OF SUSTAINABLE
SMART CITY DEVELOPMENTS

18TH IAEE EUROPEAN CONFERENCE

The Global Energy Transition Toward Decarbonization

JULY 26TH, 2023 in Milan, Bocconi University, ITALY

DR. PHILIPP RIEGEBAUER

A spin-off from



Fraunhofer

IAO



NorgeNstadt

City of the Future



01

Introduction

Why do we talk about
Energy Living Labs
at all and why are they
necessary?



We need to act fast and be agile!

**CRITICAL TIME for
strategic decision
making!**



2023



Current



2050

GHG Emissions,
Congestion, Air
Pollution, Pandemic,
limited public space

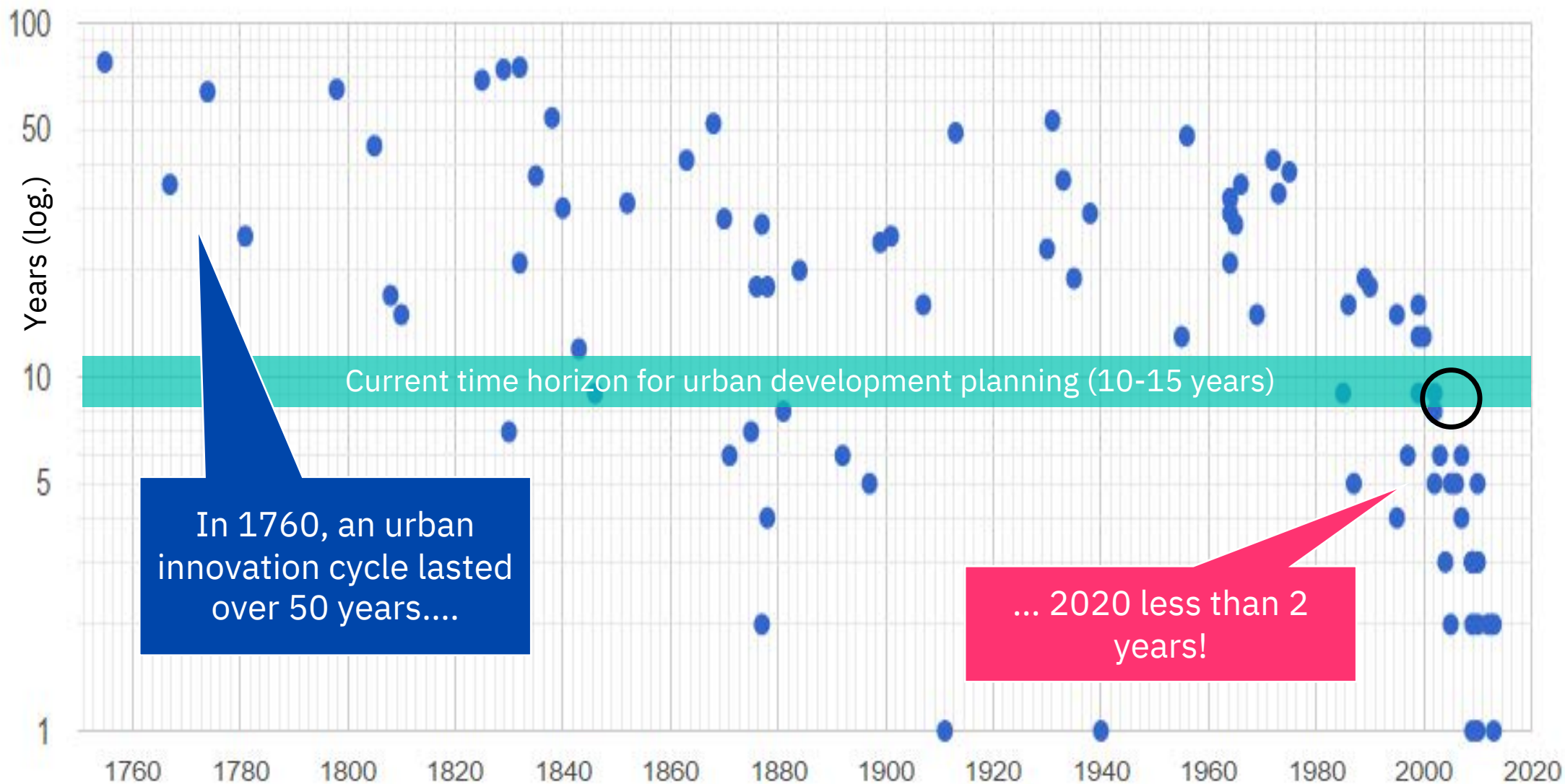
Infrastructure,
Policies, Technology

Clean Air, Active travel,
Environmentally
friendly mobility, Paris
Agreement Targets

Innovation Cycles

We need a new type of procurement

Source: Fraunhofer IAO, 2014



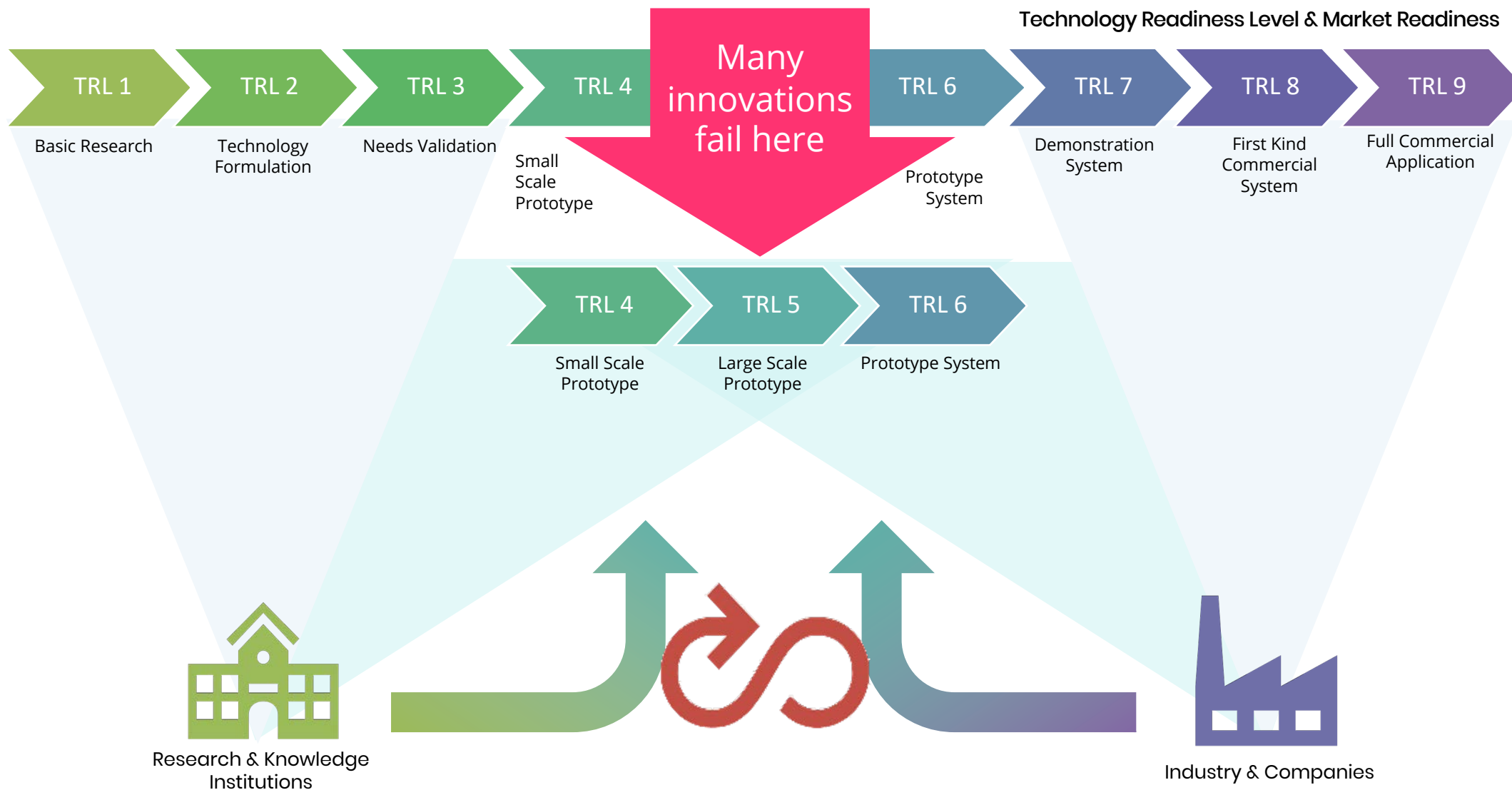


02

The role of tests and experiments

**What is their role in the
innovation process?**

THE INNOVATION PROCESS & THE 'VALLEY OF DEATH'



WHAT LIVING LABS CAN OFFER

A 'HOME' FOR PILOTING & DEMONSTRATION

THE ROLE OF TESTING & EXPERIMENTATION IN INNOVATION



LEARNING

Speeding up the necessary iterations by sharing knowledge and increasing feedback loops



FAILING

'Failing quickly and cheaply, spending a little to learn a lot'



SAVING

How much does it cost NOT to experiment?



IMPROVING

Iterations and (user) feedback loops lead to better products, services, and processes



03

Understand Living Labs

UNDERSTANDING LIVING LABS

LIVING LABS & OTHER TESTING ENVIRONMENTS

EXAMPLES OF WHAT THEY CAN DO

An outcome can be a new or improved...

- ▶ Product (or device): Flexible PV panels, efficient air filters, smart meters...
- ▶ Service: Dynamic electricity pricing and trading services
- ▶ Technology: Decentralised sanitation
- ▶ Application: E-vehicles as energy storing system at home
- ▶ Process: a participative neighbourhood development method
- ▶ System: new logistic waste collection system

Questions can be answered such as...

- ▶ Will commuters make use of ride sharing or switch to electric vehicles if parking and charging stations are distributed in a certain way? If so, what is the optimal distribution?
- ▶ Do the algorithms and sensors supporting autonomous vehicles really reduce accident rates on the streets? - What kind of sensors do we need?
- ▶ Do robots perform reliably in complex environments such as hospitals? – and what glitches exists?

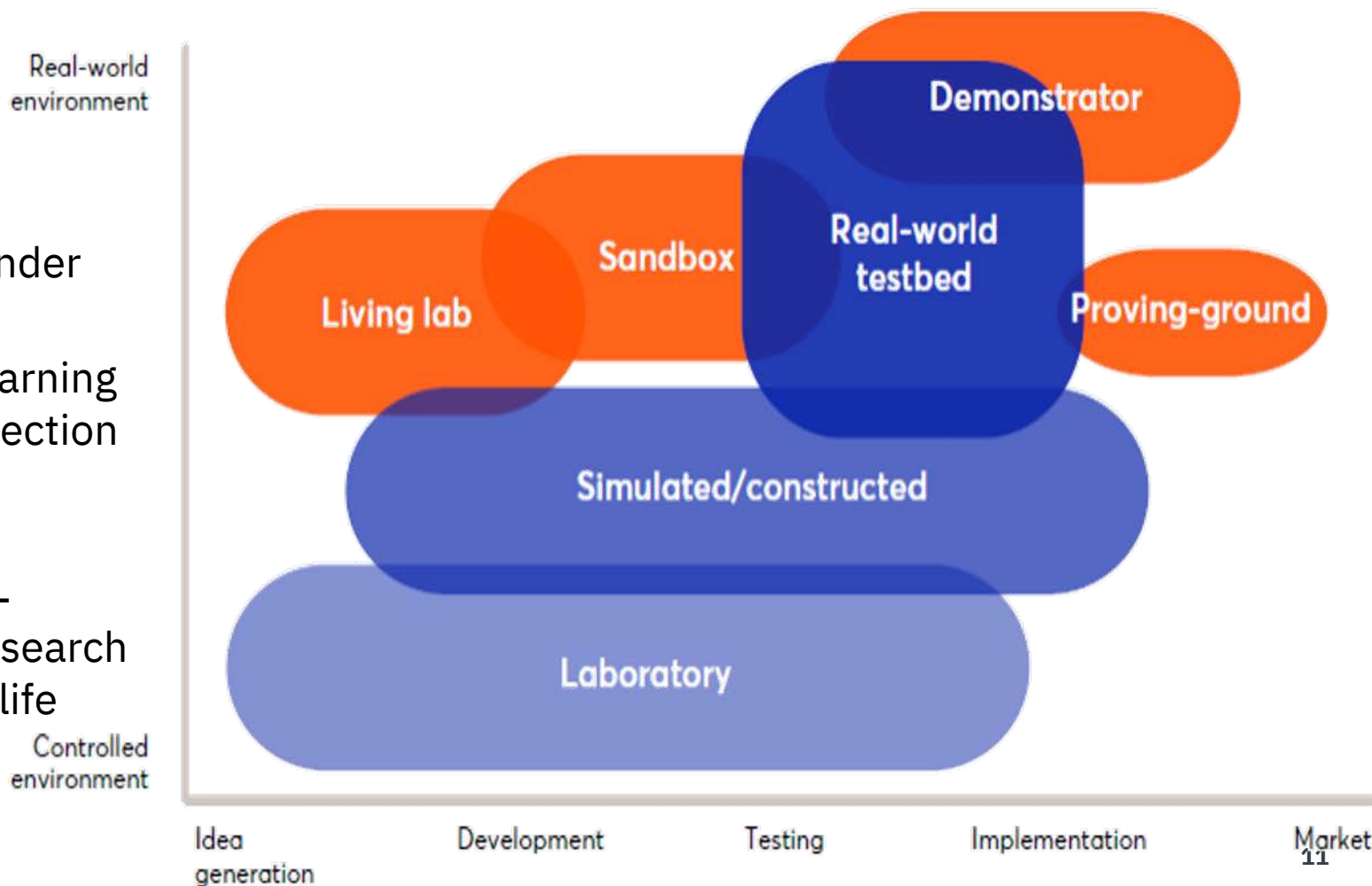
UNDERSTANDING LIVING LABS

LIVING LABS & OTHER TESTING ENVIRONMENTS

AVOIDING GETTING LOST IN DEFINITIONS

Living Labs may vary in term of the focus of their application:

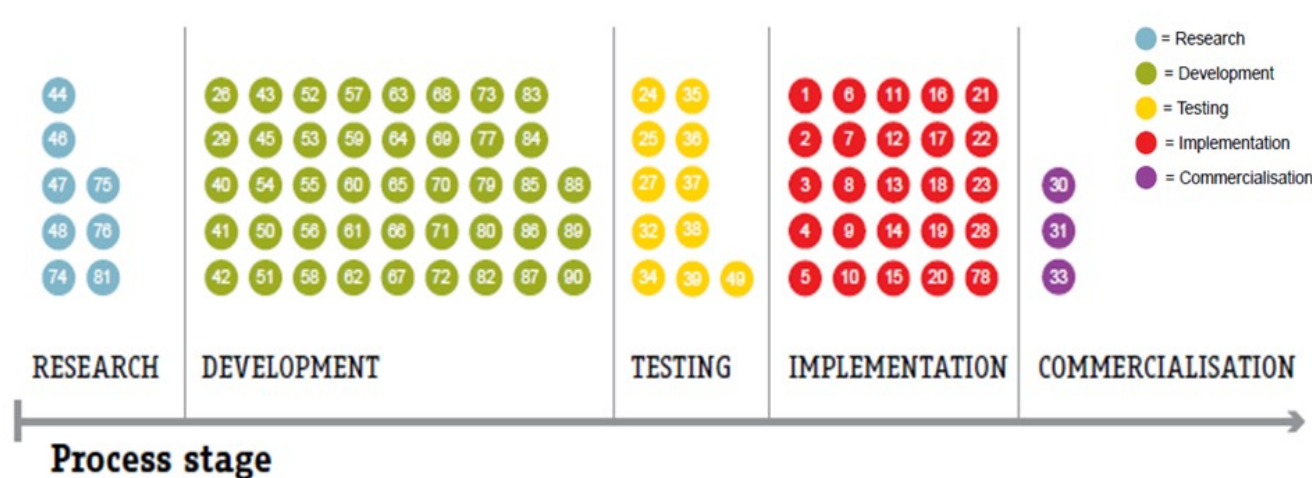
- ▶ Focus on technology testing: demonstrating the viability and scalability of new technologies under realistic operational conditions
- ▶ Focus on user-centred design: learning from user feedback and data collection prior to commercial rollout
- ▶ Focus on user-driven and open innovation: multi-stakeholder co-creation processes integrating research and innovation processes in real life communities and settings –often called PPPs or 4Ps



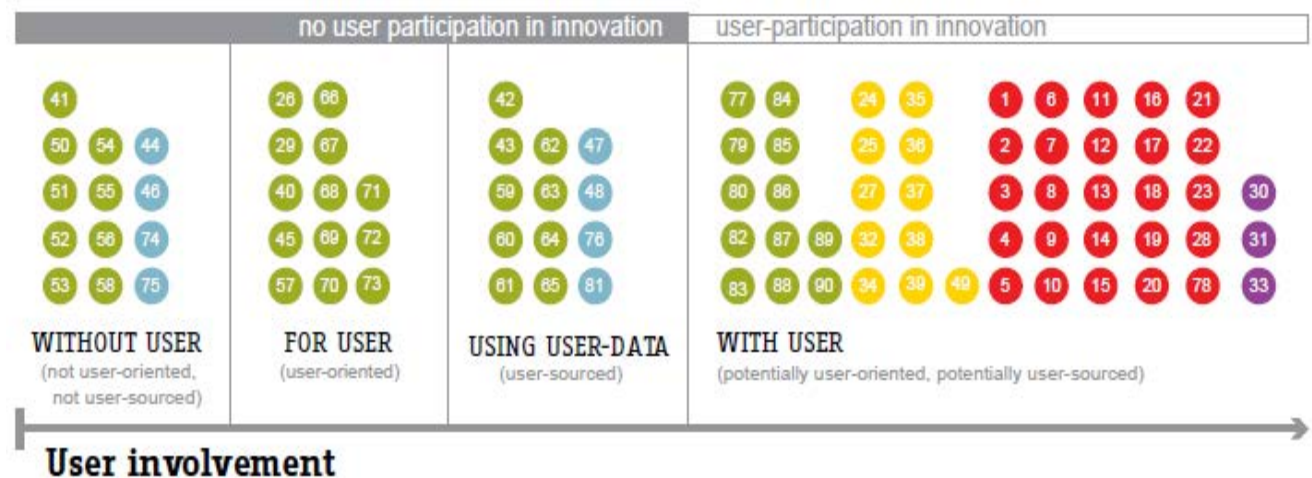
UNDERSTANDING LIVING LABS

LIVING LABS & OTHER TESTING ENVIRONMENTS

THEY CAN INVOLVE A RANGE OF ACTIVITIES WITH DIFFERENT FOCUS



**A STUDY LOOKED AT
90 INNOVATION
PROJECTS IN
AMSTERDAM**



06

Short Introduction into the 'Urban Laboratory'

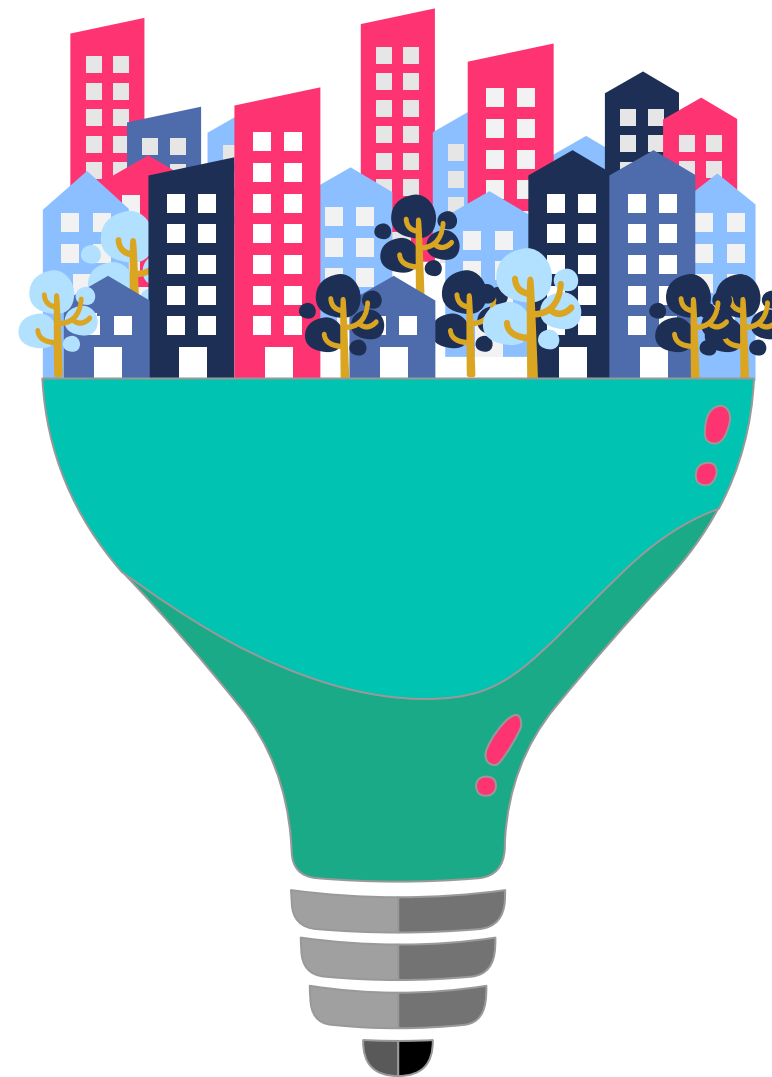
UNDERSTANDING LIVING LABS

DEFINITION OF URBAN LIVING LABS

“

An Urban Living Lab is an approach to innovation and learning by engaging all stakeholders, who will form public-private-people-partnerships (4Ps); co-create and test new technologies, services, products, systems and/or discourses in a real-life urban setting; and critically reflect on the whole process, challenges, and results

”



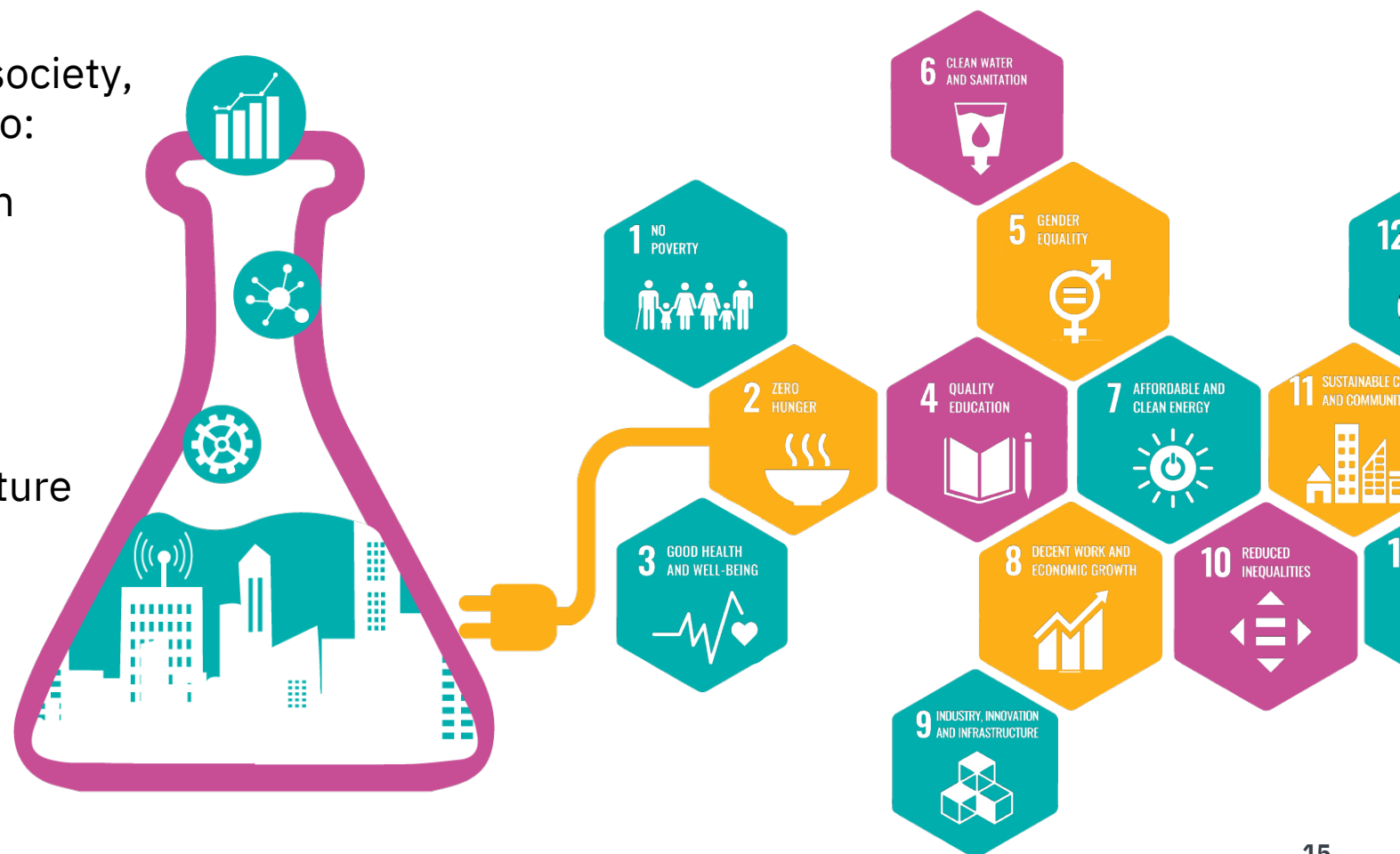
LIVING LABS AS POLICY TOOLS FOR INNOVATION

THE POTENTIAL IMPACT OF LIVING LABS

IN THE URBAN AND BROADER CONTEXT

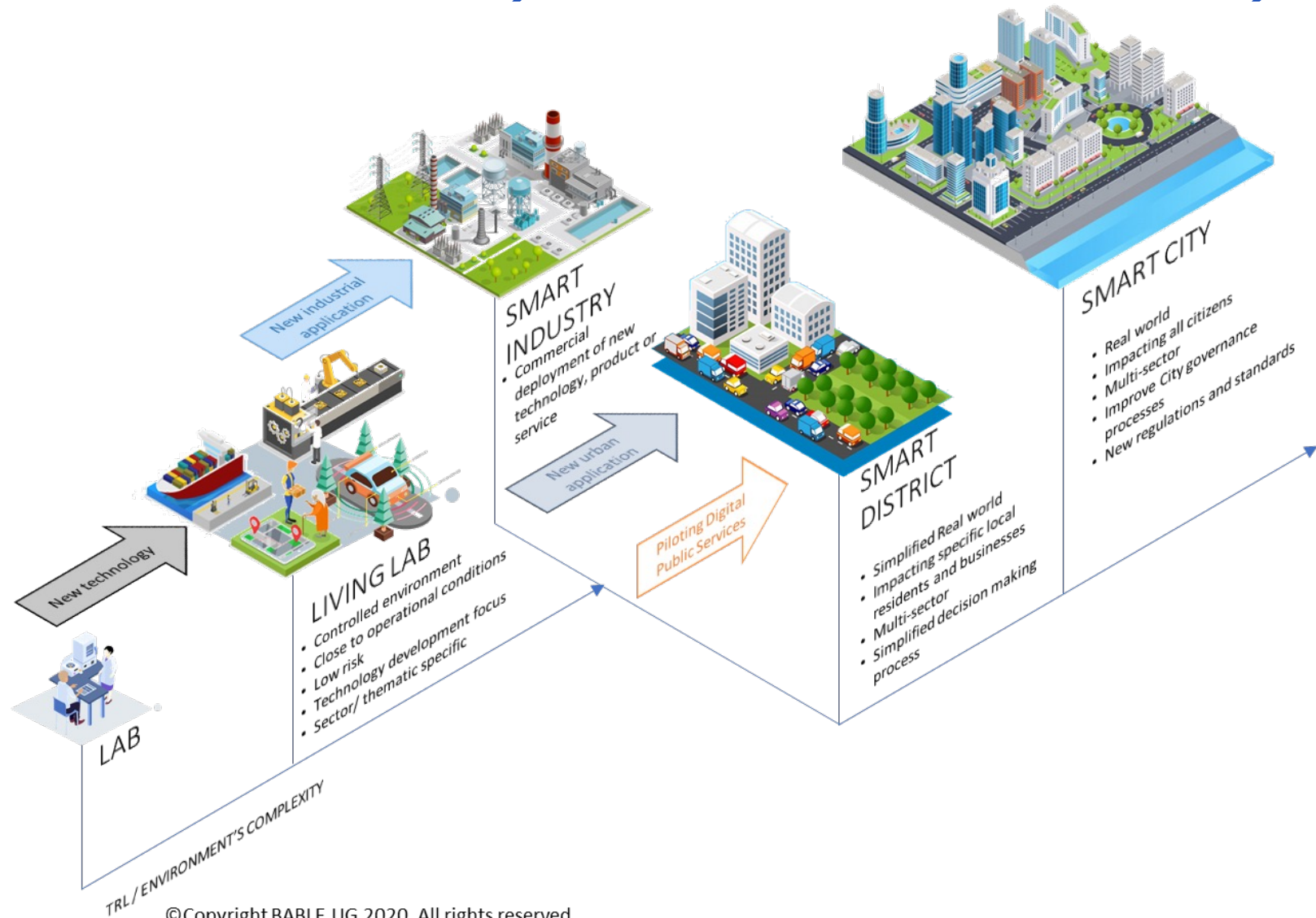
With the potential to deliver radical transformations on technology and society, Living Labs are used as policy tools to:

- ▶ Guide local or regional innovation ecosystems towards ‘grand societal challenges’
- ▶ Channel funding streams to address market failures
- ▶ Strengthen innovation infrastructure of the city or region, providing innovators with capabilities to solve greater challenges
- ▶ Develop Regional Innovation Network (RINs), building competitive advantage and creating economic value



LIVING LABS AS POLICY TOOLS FOR INNOVATION

LIVING LABS, SMART DISTRICTS, & SMART CITIES

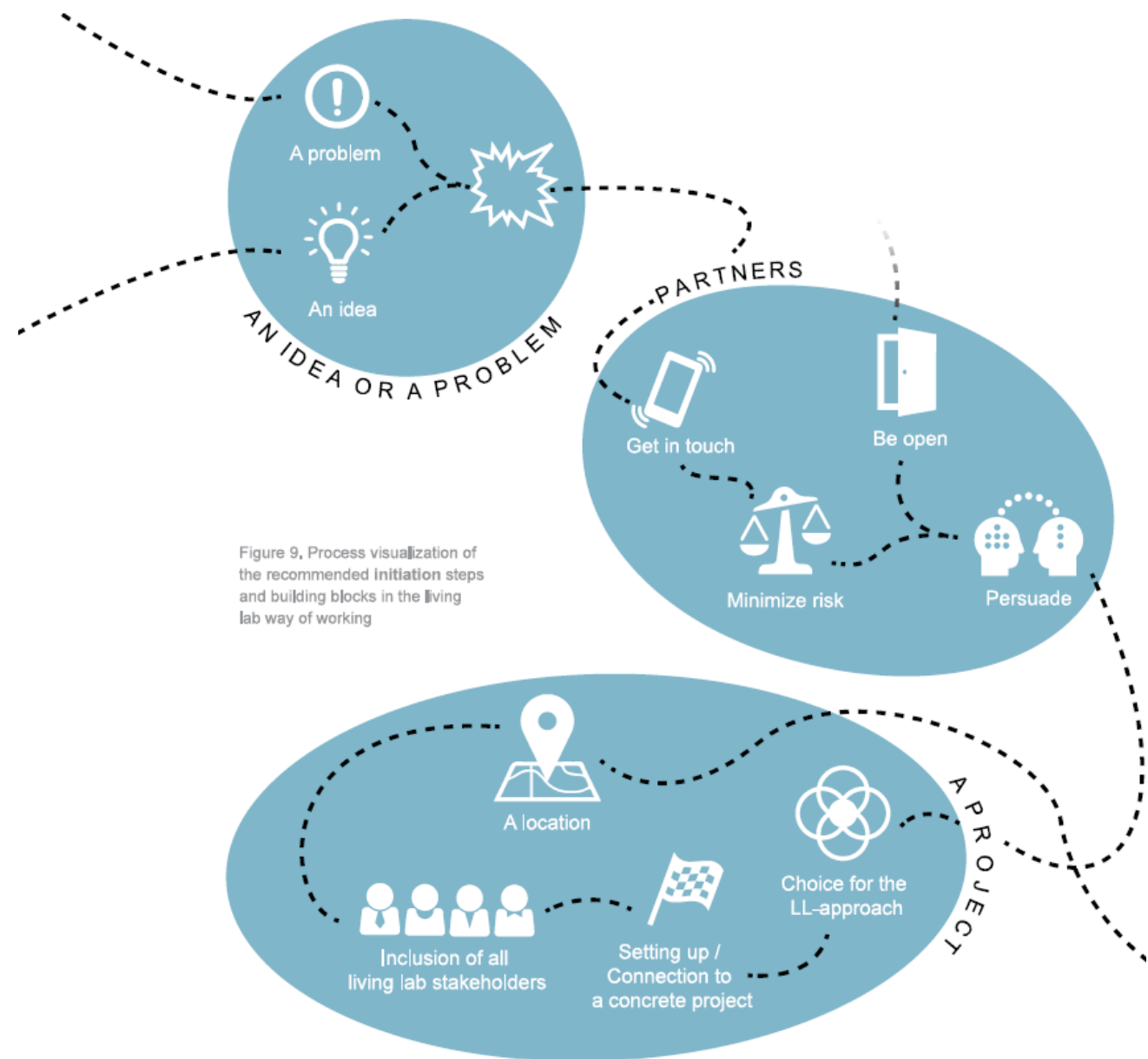


QUICK GUIDE TO URBAN LIVING LABBING

STEP 1: INITIATION

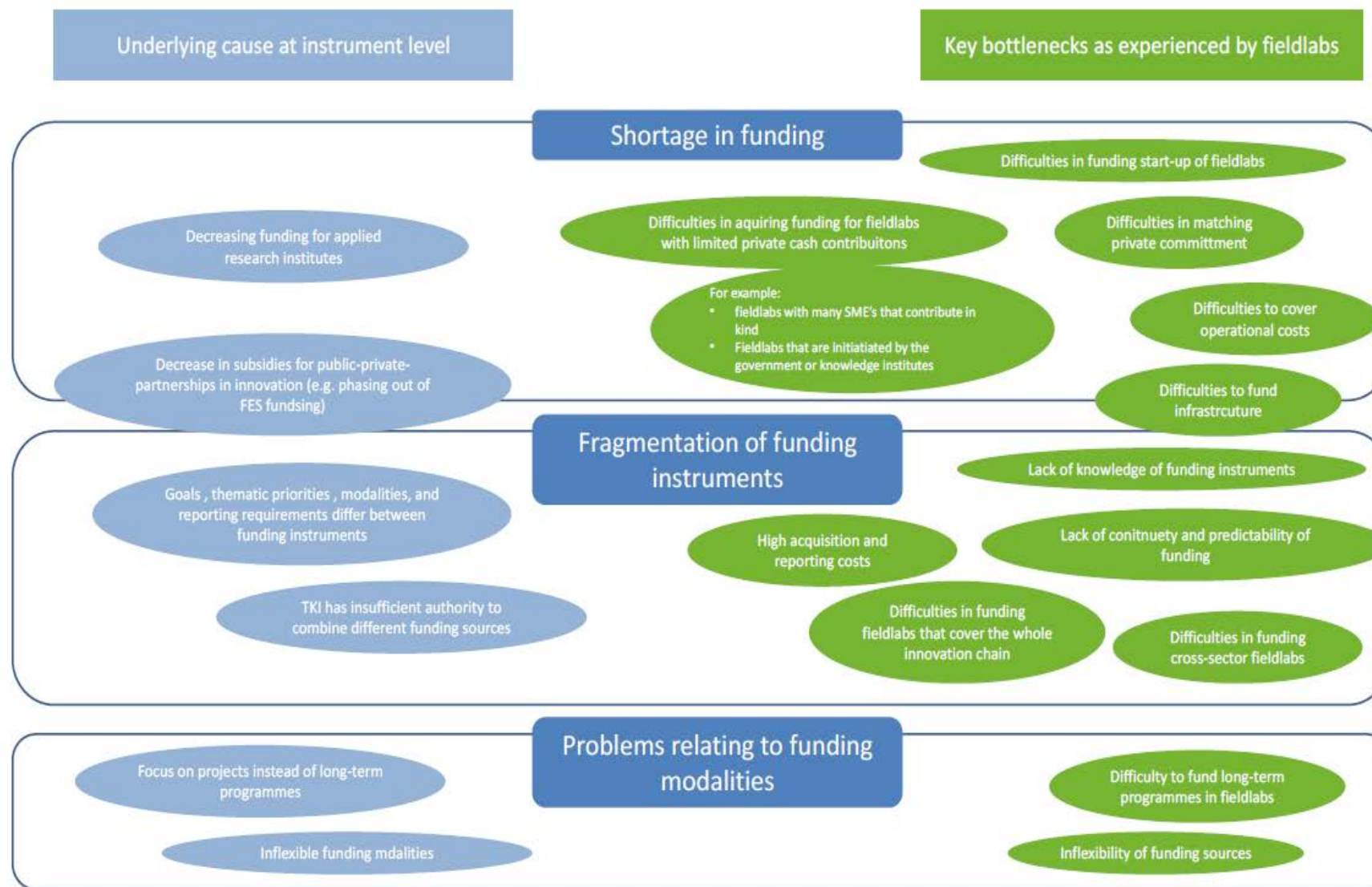
RECOMMENDATIONS

- ▶ Facilitate interactions of similar ‘thinkers’ and ‘innovative minds’
- ▶ Start contacting partners with a concrete idea, compelling case, and clear message to get buy-in
- ▶ Finding partners can be a lot easier with a ‘first-contact’ infrastructure or platform
- ▶ Foster an open innovation culture
- ▶ Don’t start from scratch – Leverage existing resources and work with existing communities



QUICK GUIDE TO URBAN LIVING LABBING

STEP 2: PLANNING WITH FOCUS ON FINANCING



04

Examples for Urban Living Labs



LIVING LABS AS POLICY TOOLS FOR INNOVATION

LIVING LABS & INDUSTRY 4.0 STRATEGIES

EXAMPLE: SMART INDUSTRY FIELDLABS (NETHERLANDS)

FIELDLABS



Fieldlabs are public-private partnerships for shared resources and facilities to collaboratively develop, demonstrate and scale up Smart Industry Solutions into commercial applications.

FACTS

- Launched in 2014 by TNO as part of the Smart Industry Action Agenda
- Their number increased from 10 in 2015 to 39 in 2019 –more to come
- Open application procedure to the Smart Industry Programme Office (by TNO)
- Financing: 40% private, EU 11%, State 27%, Region 12%, KI 10% - €240M total in 2018
- Annual budget per Fieldlab ranges €100k - €30M – average €7.1M
- 87% of Fieldlabs focused on non-commercial activities –only 17% on commercial activities
- 773 partners (656 industry), 466 employees, 5815 students, 433 new jobs, 11 spin-offs

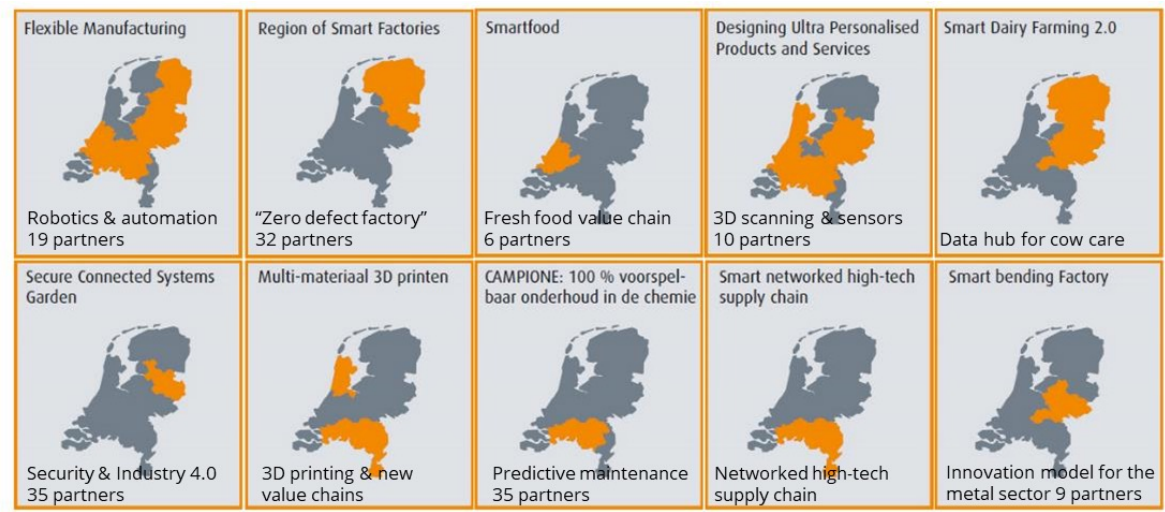


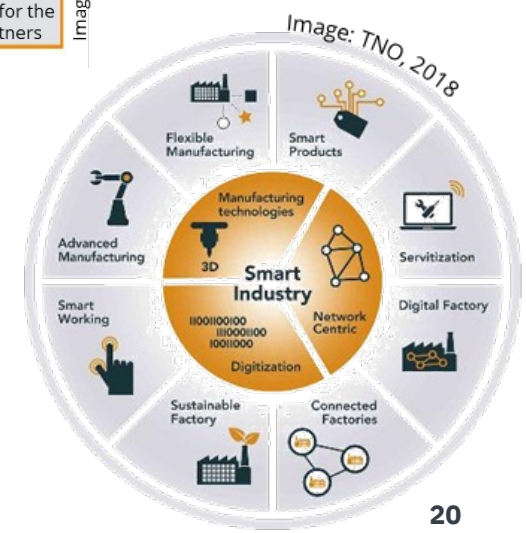
Image: De Ingenieur, 2015

Success factors for the programme:

- ▶ Supported by a demand-driven industry policy framework
- ▶ Guided by a clear digital transformation roadmap
- ▶ Reinforced by a strong collaboration culture

Major implementation challenges were financial:

- ▶ Need to prove added value to attract private funding
- ▶ Shortage of funding instruments for PPP and R&D+I.



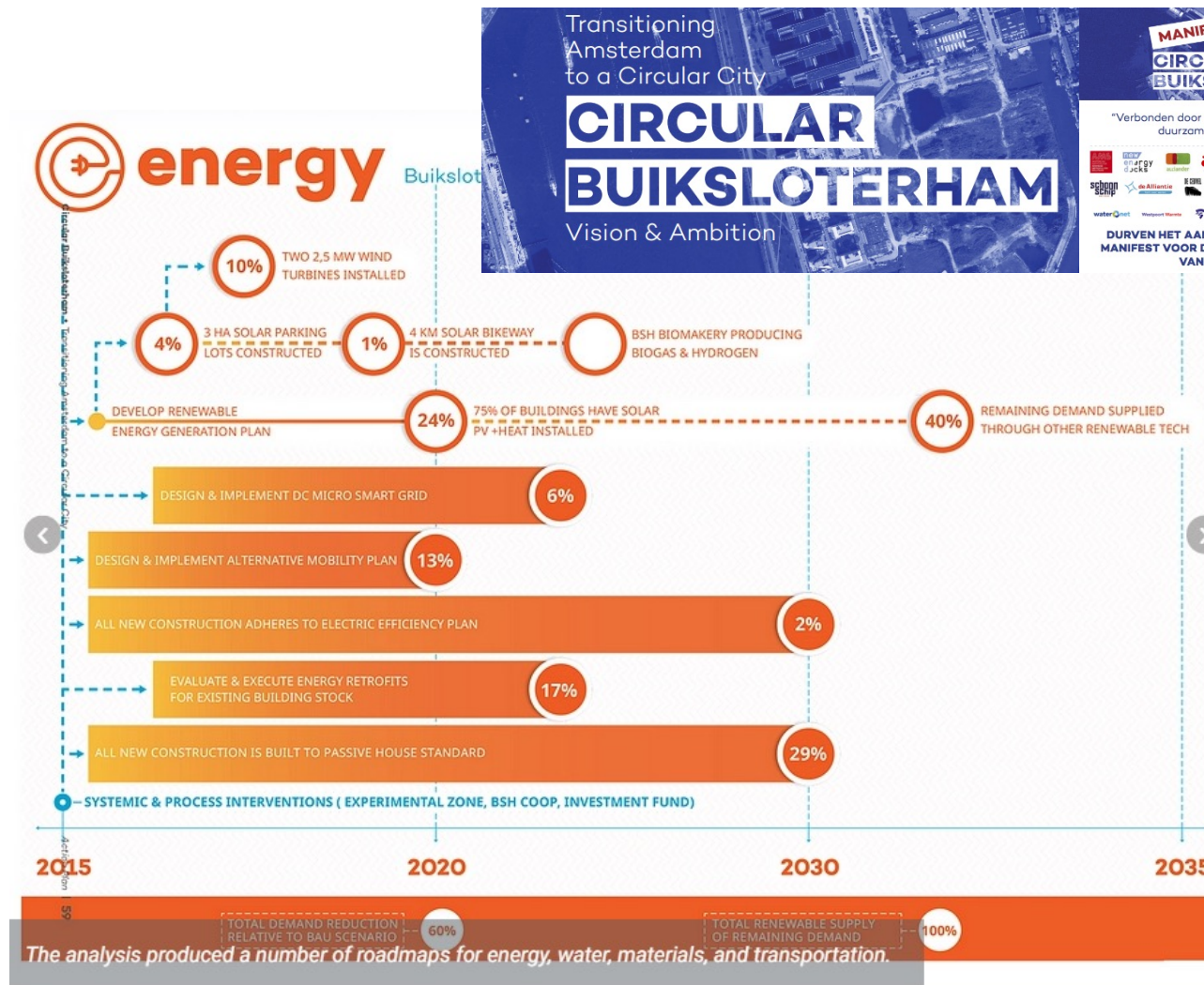
LIVING LABS AS POLICY TOOLS FOR INNOVATION

LIVING LABS & CIRCULAR WORKPLACE

EXAMPLE: CIRCULAR BUIKSLOTERHAM (NETHERLANDS)

PROJECT

- ▶ Large-scale mixed-use redevelopment of the industrial area which was put on hold in 2008
- ▶ Organic kick-start: project of sustainable self-build homes and the circular creative workplace De Ceuvel
- ▶ Then followed more integration, more relaxed regulations, and a mandate for sustainable intervention and experimentation signed by many stakeholders



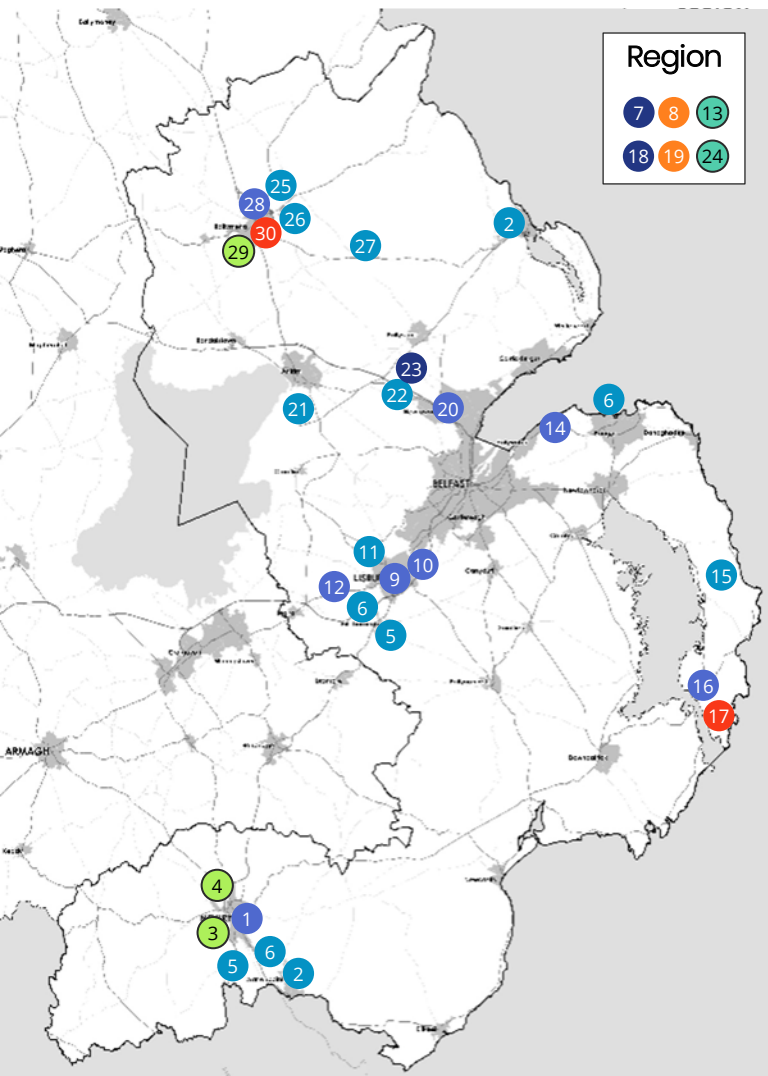
TARGETS

- ▶ 100% renewables,
- ▶ 100% water self-sufficiency and waste water mgmt.,
- ▶ 50-70% nutrient recovery,
- ▶ 10-30% food production

LIVING LABS AS POLICY TOOLS FOR INNOVATION

BRCD DIGITAL INNOVATION ECOSYSTEM

EXAMPLE: BELFAST REGION (NORTHERN IRELAND)



Innovation Hubs	8
Shared Spaces	5
Cooperation Networks	6
Data Platforms	5
Digital Infrastructure	2
Urban Innovation	2
Supporting Services	3
Testbeds	10

Each of the 30 identified project ideas falls into one or more of these 8 categories.

Creative Industries	2
Logistics & Distribution	4
Tourism	3
Cross-sector	5
Advanced Manufacturing	7
Agri-food	4
ICT	2
Urban Development	2
Energy & Environment	1



30
Projects

Altogether, the 30 project ideas support 9 sectors

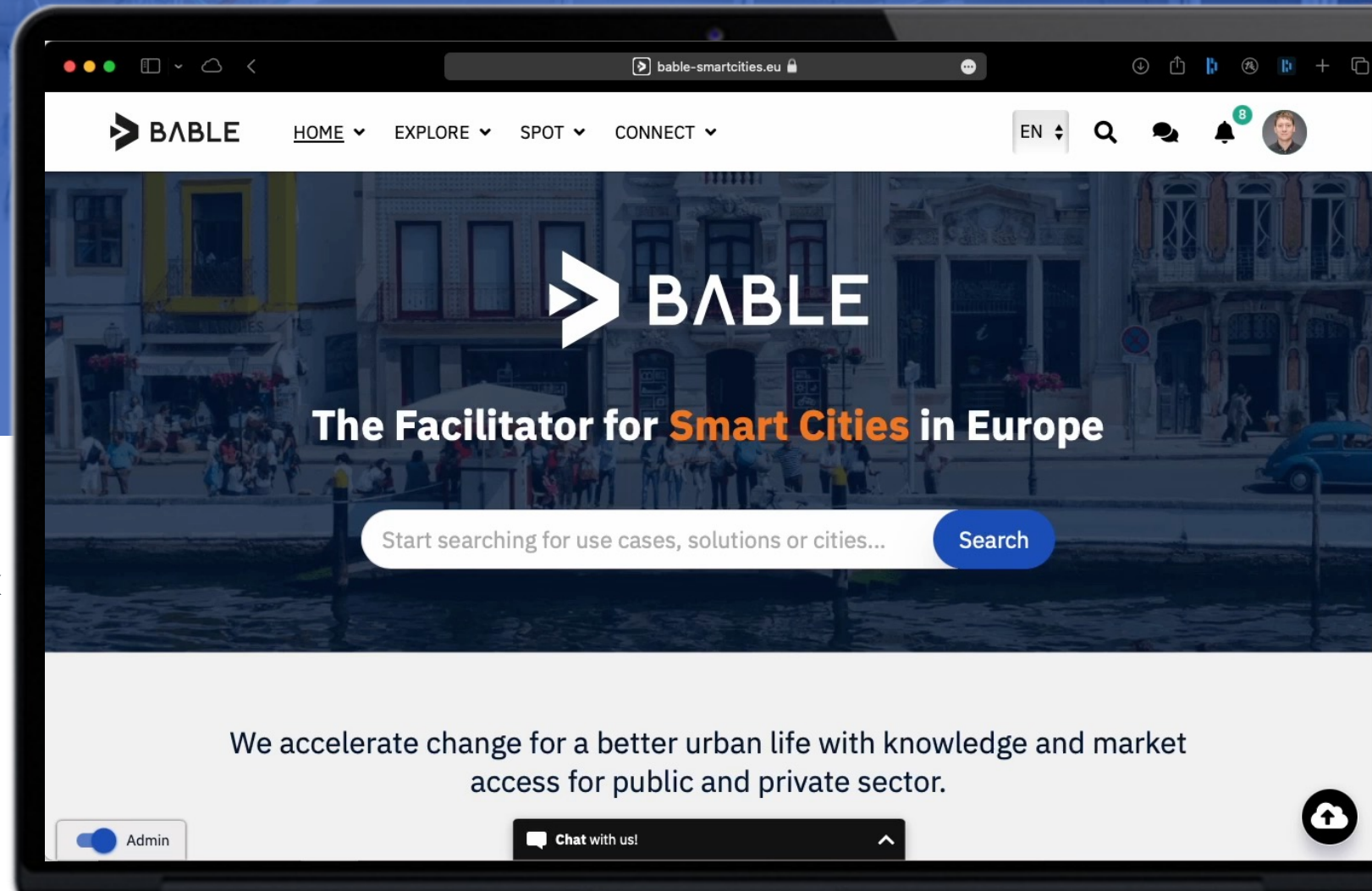
300+ Best-Practices from Cities and Companies

BABLE collects data from Smart City projects – for you to FIND WHAT YOU NEED.

Providing the latest insights in partnership with our quickly expanding community

-  >170 Cities in 30+ countries
-  >550 Companies in our network
-  >400 Use Cases & Solutions
-  >100k Smart City Tenders
-  3rd growing German start-up

Neutral information
BABLE Platform



Our BABLE Platform was launched in a joint [Morgenstadt](#) & [URBACT](#) event in Porto in June 2017



BABLE Innovation Market Watch: Top 50 Smart City Companies in 2023



BABLE

A spin-off from





**Feel free to contact us.
Whenever you like.**



Dr. Philipp Riegebauer

Chief Project Officer (CPO)

philipp@bable-smartcities.eu