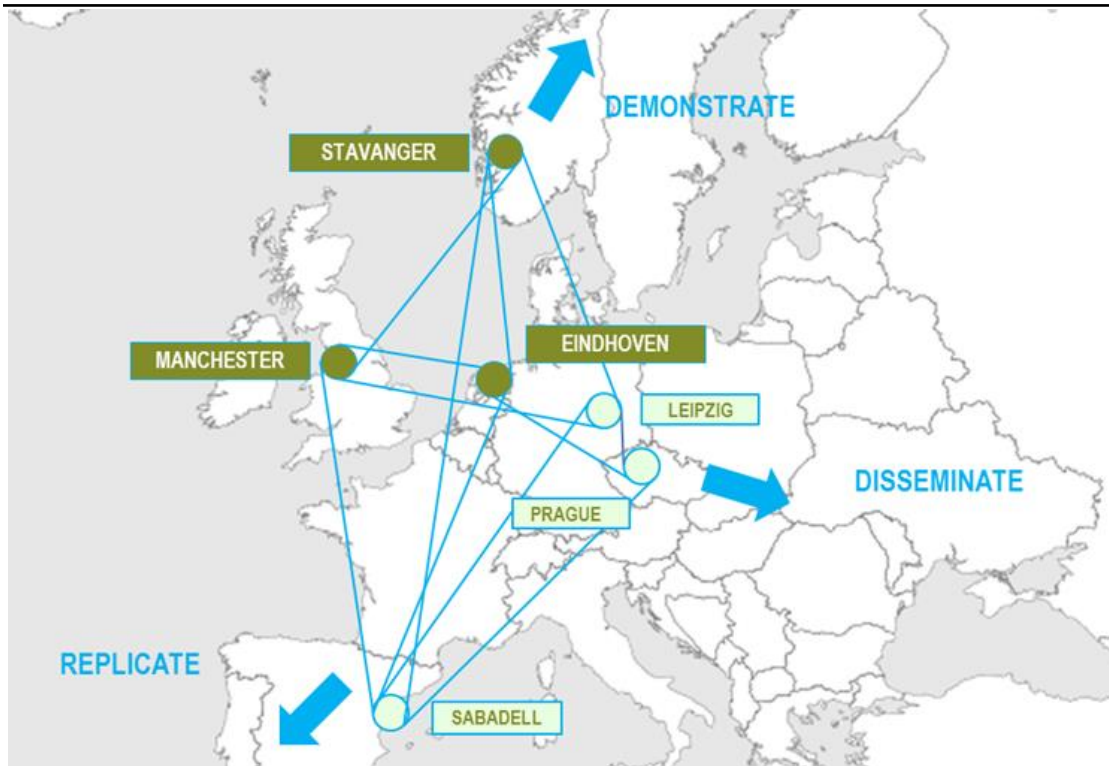


TRIANGULUM

THE THREE POINT PROJECT.

DEMONSTRATE. DISSEMINATE. REPLICATE.



DEMONSTRATE • DISSEMINATE • REPLICATE

TRIANGULUM

THE THREE POINT PROJECT.
DEMONSTRATE. DISSEMINATE. REPLICATE.

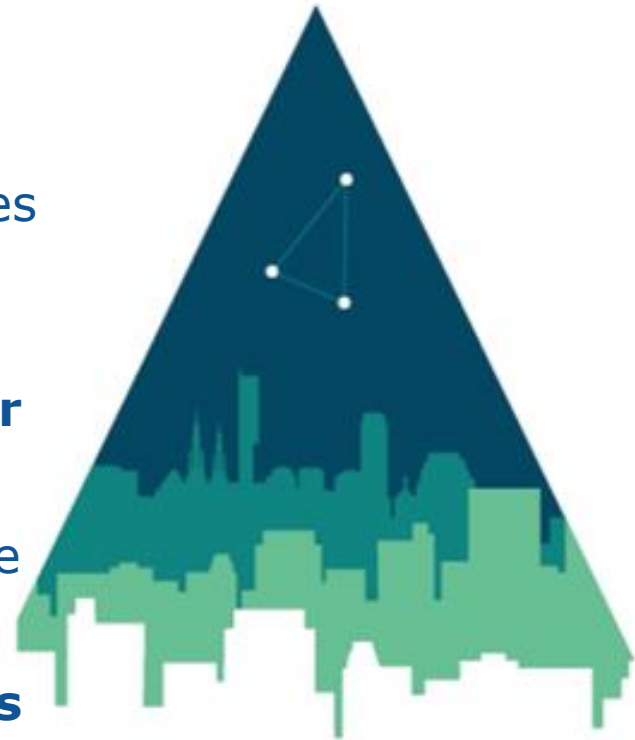
USPS

- **Hidden City Champions** as Lighthouse Cities
- Transformation of **innercity mixed-use districts**
- Empowerment of local **start-ups** to develop new ICT based services to drive green economy
- **Joint ICT-architecture** as cross-cutting element for smart city development

DEMONSTRATE • DISSEMINATE • REPLICATE

Project

- Develop **smart urban districts**
- **Facilitate replication** to Follower Cities
- **22 European partners** from municipalities, research and industry.
Coordinator: **Fraunhofer Institute for Industrial Engineering IAO**
- Show how systems innovation can drive dynamic smart city development
- Built upon **advanced smart city plans**



DEMONSTRATE • DISSEMINATE • REPLICATE

Lighthouse and Follower Cities

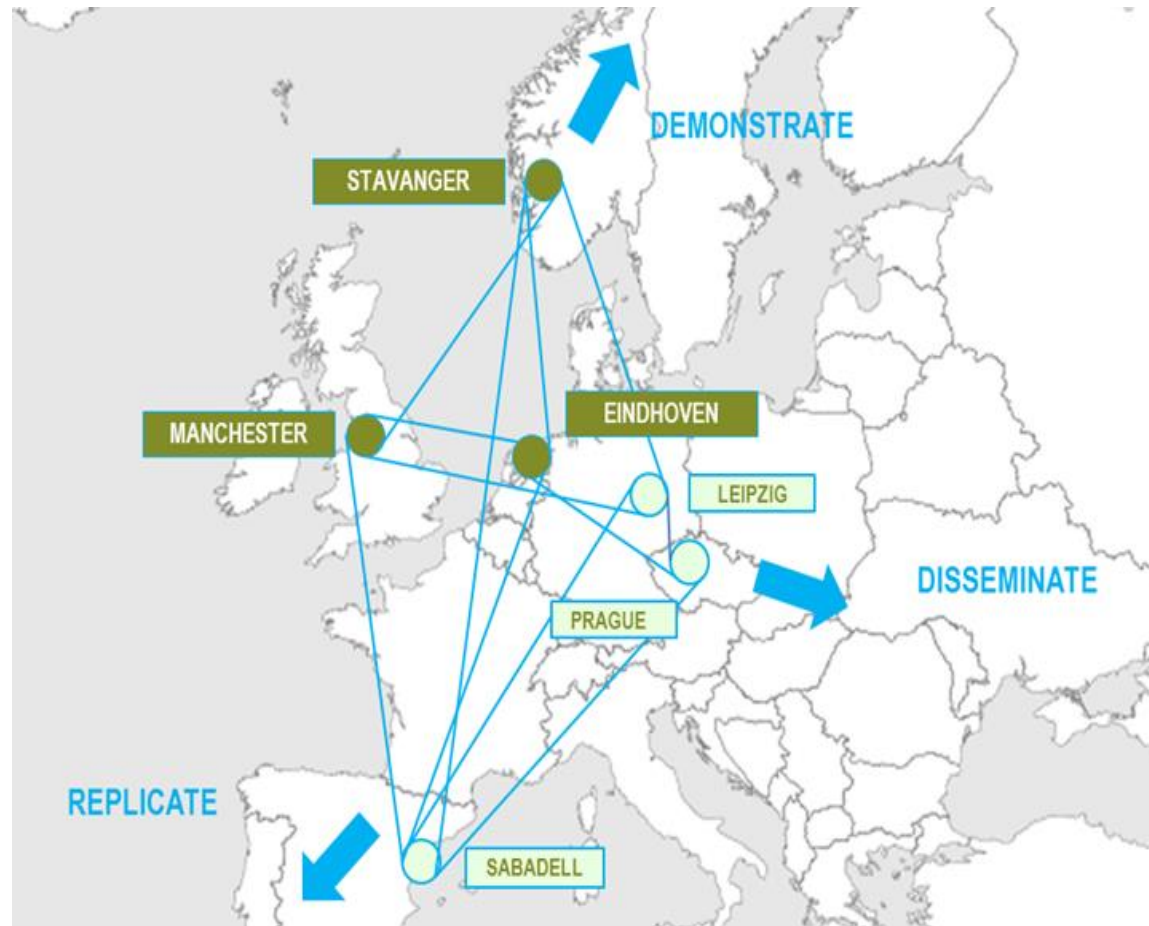
3 Lighthouse Cities:

- Manchester (GB)
- Eindhoven (NL)
- Stavanger (NOR)

3 Follower Cities:

- Prague (CZ)
- Sabadell (ES)
- Leipzig (GER)

Tianjin in China as
observer city for wider
international markets





Lead: Fraunhofer and support-team



Universität Stuttgart



Manchester



MANCHESTER
CITY COUNCIL



Manchester
Metropolitan
University



The University of Manchester

SIEMENS



Eindhoven



EINDHOVEN



Technische Universiteit
Eindhoven
University of Technology



kpn



VolkerWessels



Stavanger



STAVANGER KOMMUNE
– Sammen for en levende by



ROGALAND
FYLKESKOMMUNE



University
of Stavanger



GREATER
STAVANGER
ECONOMIC
DEVELOPMENT



Replication/ Follower Cities



IPR
PRAHA



Ajuntament
de Sabadell



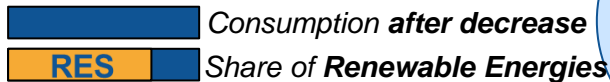
Stadt Leipzig



ENERGY

- Reduce **energy consumption of buildings** (>100,000 m²) by factor 3 or higher
- > **75%** of remaining energy from **renewable sources**

Current energy consumption of buildings



ICT

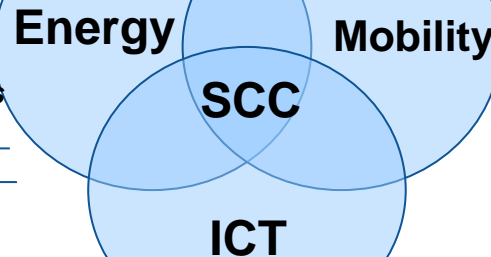
- Integration of **intelligent energy management** for energy efficiency
- Development of a **dynamic ICT data hub**: buildings' energy use, users' mobility demand, provision of RE
 - to monitor
 - to develop value added services and smart city appliances

MOBILITY

- Increase utilisation levels of **electric vehicles and charging infrastructure** (e-cars, e-bikes, e-buses)

INTEGRATION on local level

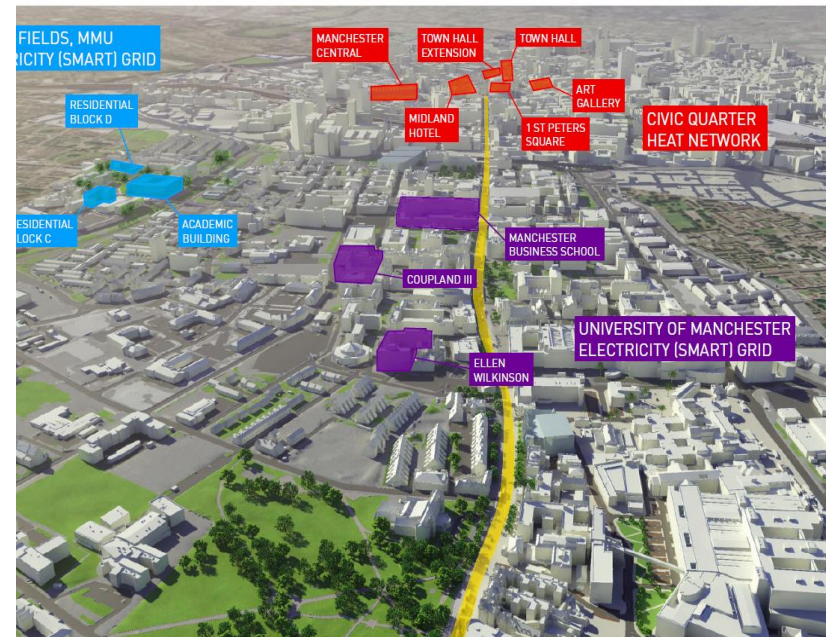
- Participatory approach to involve citizens
- provide a **'test bed'** for industrial partners to develop new business models
- drive forward **investments** across the light house cities
- design and implement **innovative business models**



Lighthouse City Manchester

Transformation of the student district '**Manchester Corridor**' into a car-free 'smart quarter' through:

- An **open data and service engine**
- Developing an autonomous **smart city grid** (including geothermal, district heating, fuel cell)
- **Refurbishment** of historical buildings > 80.000m²
- Using ICT for **e-mobility**: creation of an advanced inner-city logistic system based on e-bikes and sustainable procurement



Lighthouse City Eindhoven

Intelligent transformation of two districts:

1.) Strijp-S: former industry site to high-innovation mixed-use district

- Smart street light system
- Smart Mobility Management: control of **EV and fuel cell vehicles charging points**
- **ICT:** Implementation of a data platform
→ to achieve behavioral changes for increased energy efficiency in housing and mobility
→ to enable the development of new services

2.) Eckart-Vaartbroek: residential district

- **Retrofitting** of 25.000m²
- Energy: PV contribution, use of wind power, smart meters, renewable biomass energy system for heat network



Figure: Strijp-S lighthouse district

Lighthouse City Stavanger

- Radical reduction of CO₂ emissions through **integrated e-mobility-solutions**
- rollout of “**super-charging hubs**”
- **Energy:** Installation of a CHP for three large buildings
- Implementation of **Smart generic gateways** in 100 homes and two large public buildings
- Advanced fiber optic infrastructure for new public services e.g. video solutions
- Focus on **civic engagement**



Cross-cutting elements - 1

Impact Assessment and Monitoring

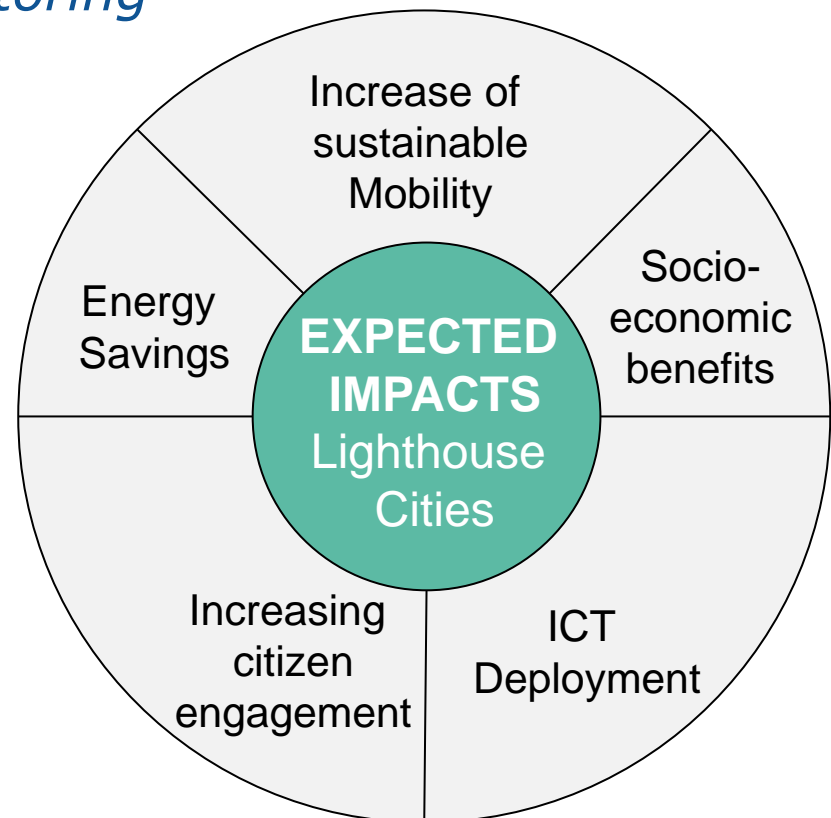
- **common monitoring and assessment framework**

→ real-time support for the Lighthouse Cities

→ **enable comparisons** between cities and sectors

- Framework is based on **specific indicators /expected impacts**

Lead: University of Manchester
Partner: Local Universities



Cross-cutting element - 2

Smart City Framework

Development of a Smart City Framework as a **guideline and decision making tool for smart city development**

- To help **Follower Cities** to replicate smart city implementation projects upon local factors and **develop their own smart city implementation plans**
- To transfer successful project implementation in the Lighthouse Cities to **replication** beyond the Follower Cities

Lead: Fraunhofer IAO

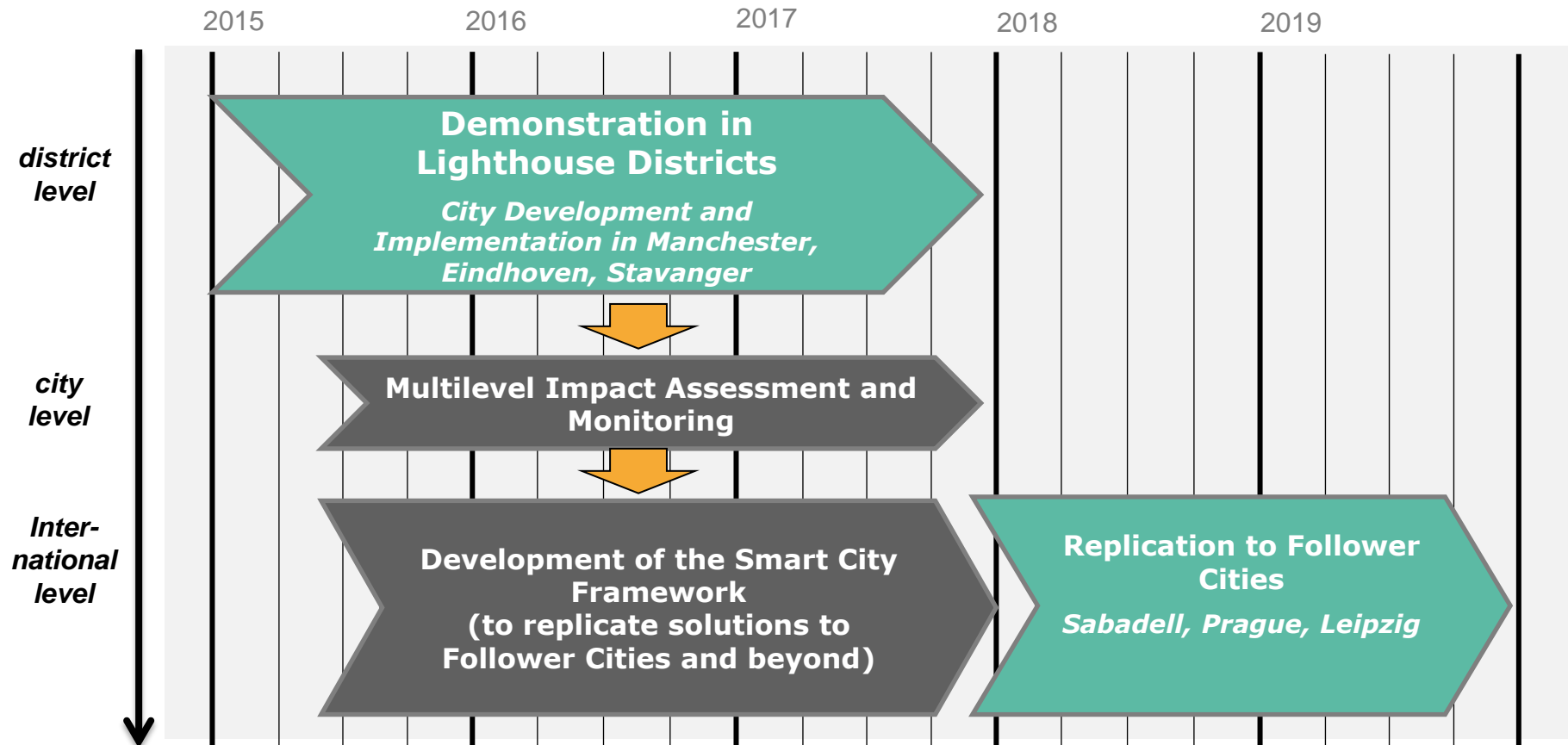
Cross-cutting elements - 3

ICT Reference Architecture

- Design and implementation of a joint **ICT reference architecture**
- Blueprint for the implementation of **local ICT solutions** for smart city integration
- **Common components, interfaces and formats** as the basis for city specific solutions
- Cities will develop their **individual ICT strategy plans**

Lead: Fraunhofer Focus with local universities

Impact assessment and replication



Important aspects & Lessons Learned

- Energy efficiency and/or RES in **existing** buildings
- Link energy & mobility system with **intelligent ICT infrastructure**
- District of Lighthouse Cities must have a **clear defined smart city implementation plan**
- Special unit costs **only** when exceeding standard for new houses
- Have **your Unique selling points!** Create **your story**
- Prove your strong sense of collaboration through content in technology and process
- Put a strong focus on **business model**
- **Ideal project size**

Contact

Damian Wagner

Project coordinator Triangulum

Damian.wagner@iao.fraunhofer.de

Alanus von Radecki

Office: +49 (0)711 970-2169

alanus.radecki@iao.fraunhofer.de



Nora Fanderl

Office: +49 (0)711 970-2301

Nora.fanderl@iao.fraunhofer.de

www.iao.fraunhofer.de

Thank you for your attention

Valerie Bahr
Steinbeis-Europa-Zentrum



Haus der Wirtschaft
Willi-Bleicher-Str. 19
70174 Stuttgart
Tel.: +49-711-123 4021
Fax: +49-711-123 4011



DEMONSTRATE • DISSEMINATE • REPLICATE

bahr@steinbeis-europa.de
www.steinbeis-europa.de