+CityxChange – Innovation and Integrated Measures for Positive Energy Districts

Smart Otaniemi Energy Solutions for the Block Level,
Oulu | 12.09.2019
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http://cityxchange.eu/

+CxC at a glance

- EU Horizon2020 - Smart Cities and Communities Lighthouse Projects (SCC-1)
- 32 partners in 10 countries (Trondheim - NO, and Limerick - IE: 2 Lighthouse Cities; 5 Follower Cities, 2 universities, 25 industry partners covering SMEs, non-profit, large enterprises)
- Main coordinator: NTNU
- November 2018 - October 2023
- €20 million in EU funding, €10.4 million in-kind funding
- 11 Concrete demonstrators at TRL7 - less research, more deployment-focus
- Limerick first Lighthouse city in Ireland; Trondheim the second in Norway (after Stavanger)
- Co-creation and open innovation as a main principle: Citizen participation, outreach, open data and systems - "Open by Default"
  - First ever SCC-1 projects with 5% of budget (€1 million) for inter- and extra-project collaboration
  - 86% of 148 deliverables are open, only 20 confidential
  - Shared IP and open data
  - Participation in Open Research Data Pilot; funding for Open Access
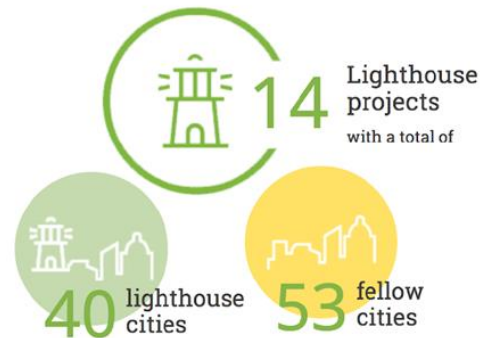
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EU H2020 SCC-01 Lighthouse Projects

[http://smartcities-infosystem.eu/]

Background

Co-creating the project

Consortium building and preparation with 32 partners

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Cities

Lighthouse Countries

Follower Countries

Other Partners

Norway

Estonia

Rep of Ireland

Netherlands

Germany

Czech Rep.

Romania

Bulgaria

Spain

Italy
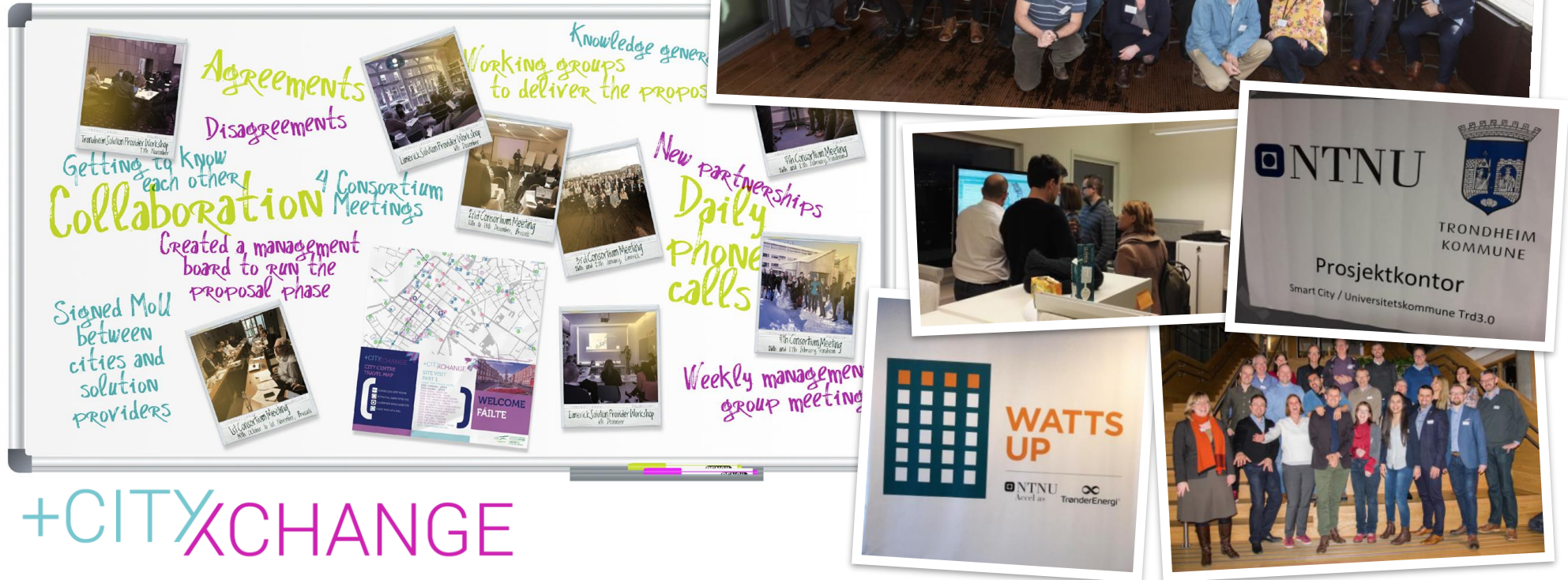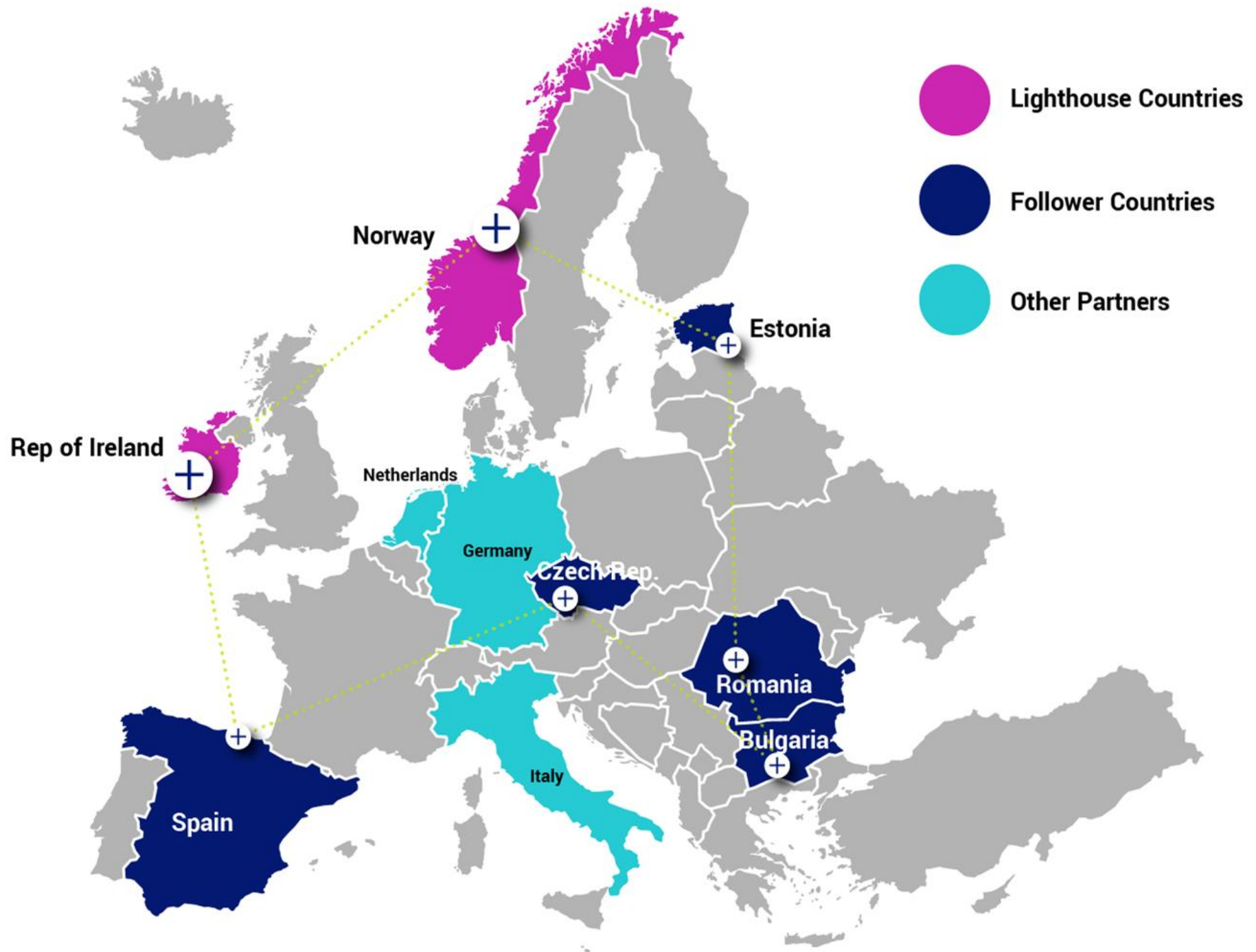
Consortium

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Approach

Project Core

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City-Driven System Transition towards PEBs/PEDs

Prototype the Future
Test solutions before we implement them. Hard modelling and with citizents through beta projects.

Integrated Planning and Design
3D modelling and Decision Support Tools (DST).

Enable the Future
Create new innovations, tools, technologies, services etc. to enable the creation of positive energy blocks and districts.

Common Energy Market
Include RES, storage, energy management, blockchain, P2P energy trading, community grid, electric-vehicles, energy grid infrastructure.

CommunityxChange
Innovation Playground, Platfor(u)ms, Next Generation of Smart Citizen, PEB Champions etc.

Accelerate the Future
Create new top-down approaches from urban authorities and bottom up approaches through citizen engagement which, accelerates the adoption of positive energy blocks and districts.

Co-creating the future we want to live in

PEB
Positive Energy Block/Distirct

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EU driving the green energy transition

- [Winter Package](): Transition to a renewable energy economy - "Clean Energy for all Europeans"
- [EU 3. Energy Market Package](): Inner market for EL and gas
- [SET Plan](): Accelerate deployment of low-C technologies
- Positive Energy Buildings ➜ *Blocks* ➜ *[Districts]()* ➜ Cities
- Revised [Renewable Energy Directive]() (December 2018)
- FP5 ➜ FP7 ➜ Horizon2020 ➜ Horizon Europe

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Demo Projects:
Technology

ENVIRONMENTAL

Model (DP01)
Record data and provide integrated decision support to cities

SPATIAL

DPEB (DP06)
Create DPEBs through improved energy performance and integration with the energy system

TECHNICAL

Microgrids (DP07)
Balance and optimise energy in the PEB through Microgrids

TECHNICAL

EMaaS (DP08)
Integrate seamless e-mobility within the PEB

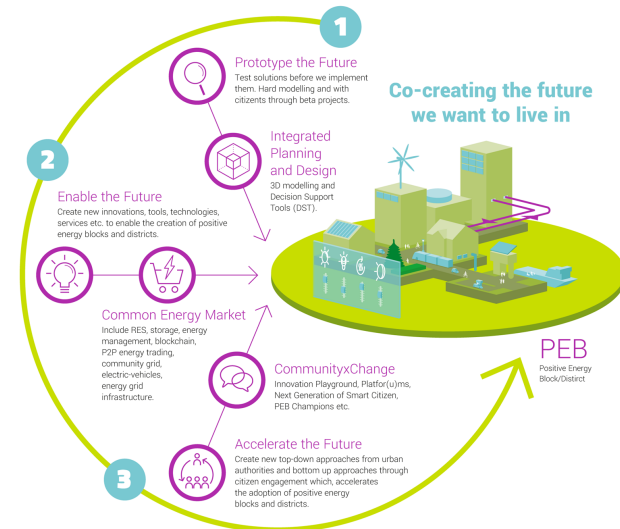**TECHNICAL**

Local trading (DP09)
Enable Peer-to-Peer trading within the PEB
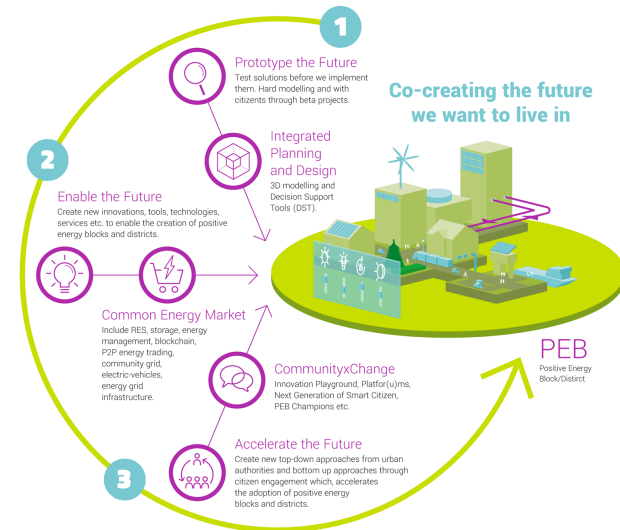
TECHNICAL

Flexibility market (DP10)
Enable a fair deal to all consumers through a flexibility market

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Demo Projects:
Community Engagement and Scaling

Co-creating the future we want to live in

1 Prototype the Future
Test solutions before we implement them. Hard modelling and with citizens through beta projects.

Integrated Planning and Design
3D modelling and Decision Support Tools (DST).

2 Enable the Future
Create new innovations, tools, technologies, services etc. to enable the creation of positive energy blocks and districts.

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Include RES, storage, energy management, blockchain, P2P energy trading, community grid, electric-vehicles, energy grid infrastructure.

CommunityxChange
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3 Accelerate the Future
Create new top-down approaches from urban authorities and bottom up approaches through citizen engagement which, accelerates the adoption of positive energy blocks and districts.

PEB
Positive Energy Block/District

SOCIAL
Engage (DP03)
Co-create Positive Energy Blocks

SOCIAL
Vision (DP02)
Co-create a Bold City Vision, to Plan, Implement, Replicate and Scale-up to Positive Energy Districts and Cities

LEGAL
Regulatory zone (DP04)
Enable innovation through regulation mechanisms

ECONOMIC
Invest (DP11)
Enable consumers to invest in their buildings, which is critical to the creation of a PEB

SOCIAL
Playground (DP05)
Accelerate change and disruptive solutions through innovation playgrounds

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Key innovations

Energy

- Reconstruct energy ecosystem: Divide energy concession areas into Community Grids; "rebuild from below"
- Establish Community System Operator - CSO - below DSO level
- P2P trade of energy (60 min.), capacity/effect (10 min.), and frequency alignment (1 min.)
- Local Flexibility Market with no/low limit for trading flexibility
- Special regulatory districts that enable open P2P trading
- Energy Trading Platform utilizing [blockless blockchain](#) with no/low transaction fees
- Energy Systems Integration with mainly software-based systems
- New TRL7 heat pumps - "packaging" - mobile container solutions

Mobility

- Highly flexible and scalable mobility platform; adaptable to "any" city at low costs
- Frontend acting as market place/one-stop-shop for public/shared, green mobility including micropayment solution
- EVs fully integrated with the Community Grid; EV batteries as energy asset/market player

Community

- Co-creation: cities + universities + solution providers + citizens; new framework and methodology
- Open Innovation
- "Next Generation Smart Citizen"
- Creating Innovation Spaces (SCC project office + Smart City + UniversityCity + Citizen Observatory)

"New business concepts, -models, and -products/services will emerge, enabling increased ROI and reduced payback times"
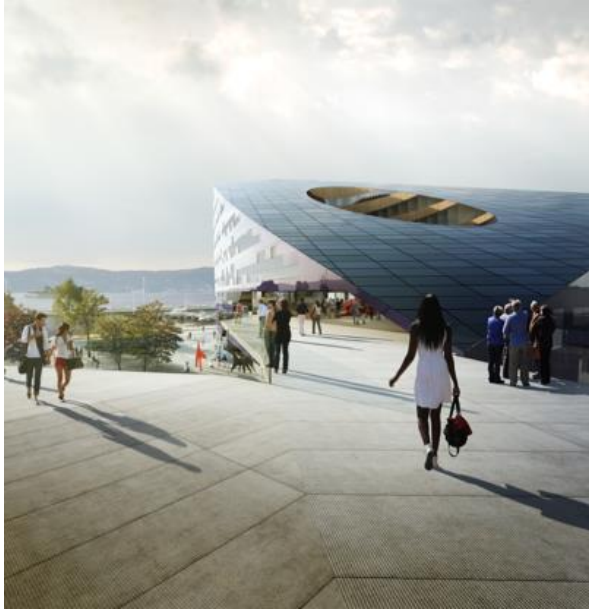
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The new energy market
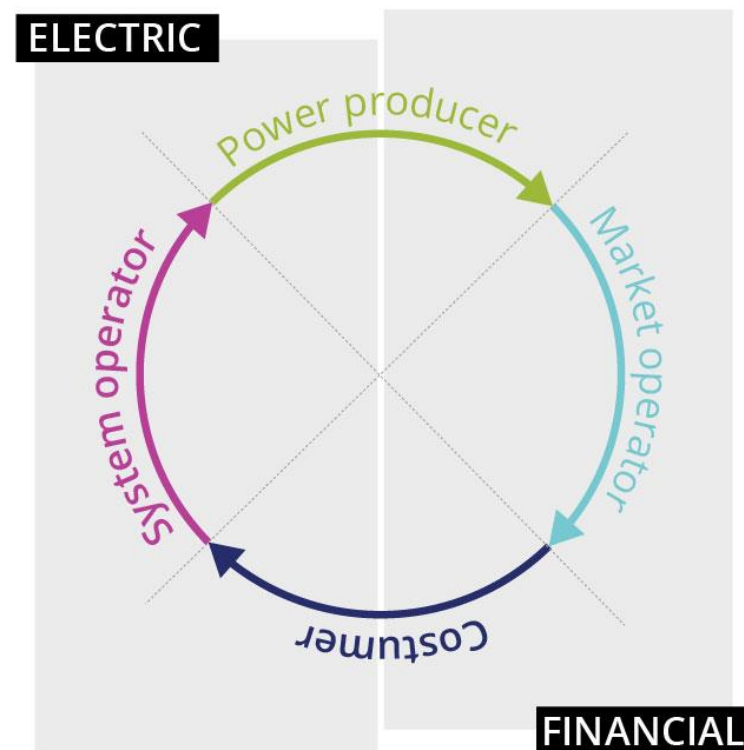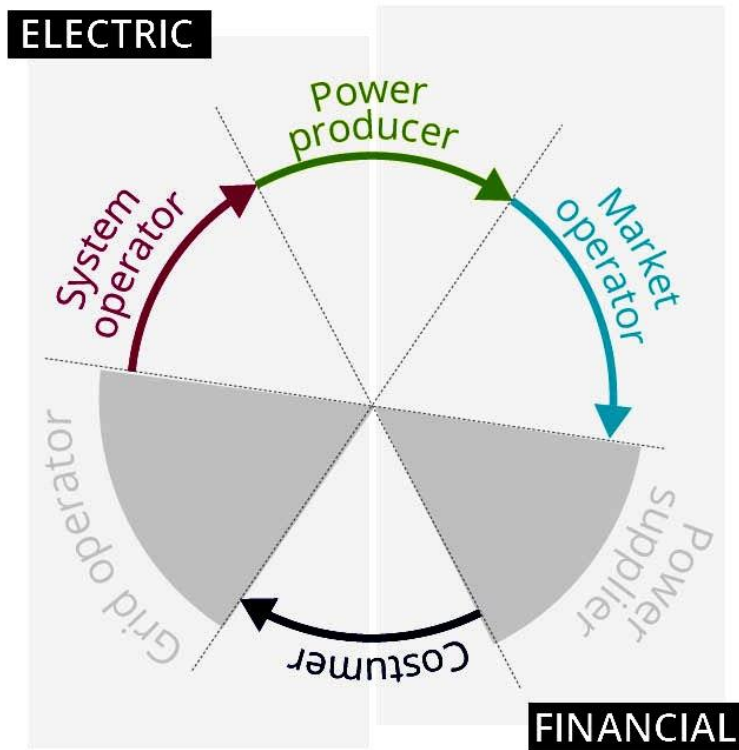
Source:
+CxC D2.1 *Report on Regulatory Mechanism to Trial Innovation in Cities*
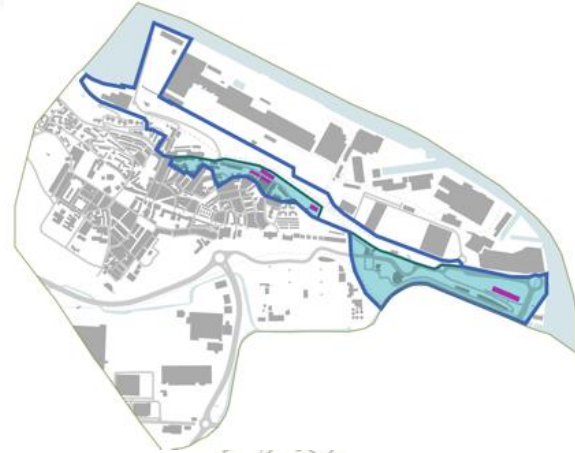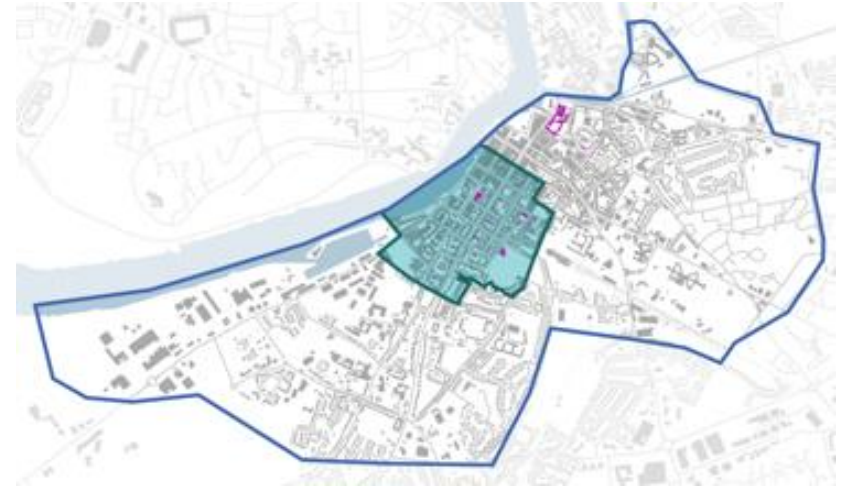
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Starting from hubs

Powerhouse Brattøra,
Trondheim
[www.powerhouse.no]

Lysgården, Sluppen,
Trondheim
[www.lysgarden.no]

Calle Txabarri, Sestao
[www.sestaoberri.eus]

Gardens International, Limerick
[www.limerick.ie]

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+CityxChange replication/upscaling Plan

- Replication integrated into the project, flow from Lighthouse Cities to Follower Cities
- Ambition to build replicable solutions that work in all 7 cities and beyond
- Roadmap to scale up the PEB pilots
- Detailed feasibility studies and replication project pipelines for Follower Cities
- Investment and business models to build & scale PEBs

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City perspective and impact

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Why the City of Trondheim engages

- Citizen at the centre, open innovation
- Urban prototyping, experimenting, testing for new ways of working
- New jobs, businesses and business models; attract more investments
- Climate, energy, and local air quality
- New ICT-based services to improve urban quality
- Benchmarking and strengthen city position
- Competence/Experience for sustainable urban development
- Solutions and cooperation processes adapted to city's identity
- Strategic municipal vision for 2050, co-created with local actors

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Key points from a city perspective

- Cities at the core - city driven projects
- Anchoring at CEO level (project owner) + strong political anchoring
- City as a lab + strong R&D connection
- Work across silos

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25+5
SDG Cities
Leadership Platform

TRD3.0

SMARTCITYTRONDHEIM

Sentralen
for Co-Creation and Relational Welfare

Societal learning and
UniversityCity -
Trd3.0

"Smart" sustainable
urban development &
democracy

Relational welfare,
co-creation, and
Municipality 3.0

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Achievements so far

First 10 months

- Started one of the first large-scale projects on Positive Energy Districts
- Deeper planning and linking of project and demos in all cities
- Core Framework and Methodology done/developing
  - Regulatory issues on trading
  - Bold City Vision
  - KPI Framework
  - Market models
  - eMaaS
- Collaboration, interaction, replication
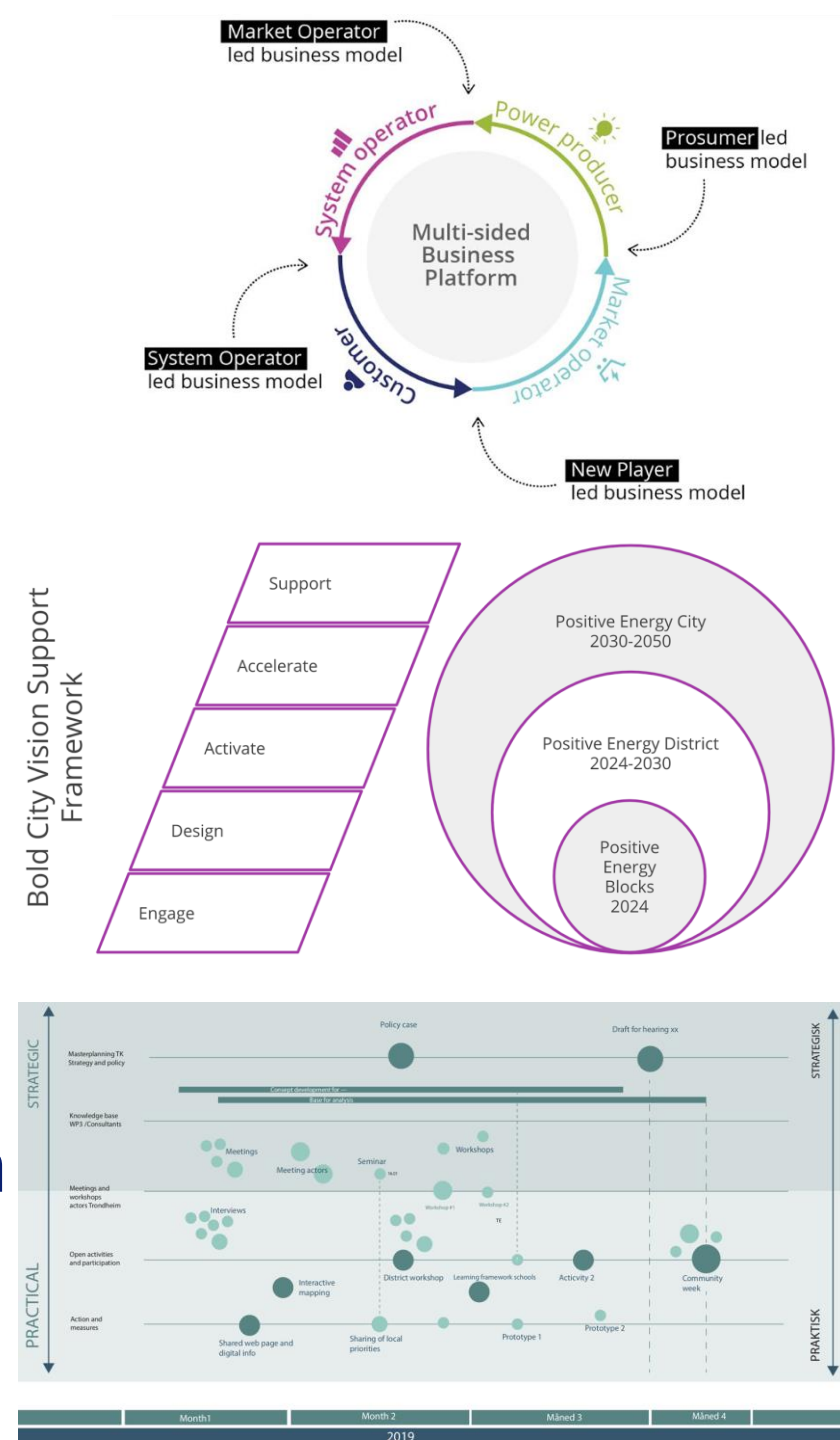
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More Answers

Knowledge Base

This database will grow to one of the central elements of the website and will include all public deliverables and other kinds of downloadable information. It is structured in different categories (deliverables, articles, news updates, presentations, technical papers, …) and is further organised through the use of content-based and geographical tags.

Search the Knowledge Base | Search

Project Glossary (1 Article)

Positive Energy Districts (PED)

⊕ View all

Research Outcomes (1 Article)

A Smart City Ecosystem Enabling Open Innovation

⊕ View all

Public Deliverables (14 Articles)

D2.1 Report on Enabling Regulatory Mechanism to Trial Innovation in Cities «pending approval»

D3.1 Framework for Bold City Vision, Guidelines, and Incentive Schemes «pending approval»

D7.1 Approach and Methodology for Monitoring and Evaluation «pending approval»

D7.2 Reporting to the SCIS system «pending approval»

D9.1 Framework for intra-project collaboration «pending approval»

⊕ View all

Info Materials (3 Articles)

General project leaflet

City-specific project leaflet (English)

City-specific project leaflet (local languages)

⊕ View all

https://cityxchange.eu/knowledge-base/

https://cityxchange.eu/

Q&A

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