# MSP4LEC

## Microgrid Service Provider for Local Energy Communities

## A Joint Transformational Innovation Proposal

ABB Enervalis 'Creating more value with energy' EnergyVille eandis KBC flux50 ENERGISING THE FUTURE

# Executive Summary

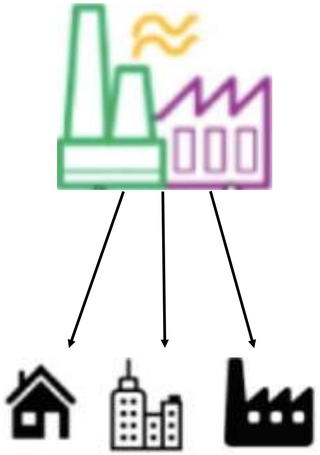
# Microgrid Service Provider for Local Energy Communities

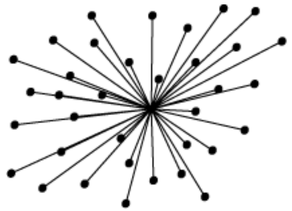
| | |
|---|---|
| **Our target group** | The developers of major urban renewal projects and in second order their buyers |
| **What problem are we solving for them?** | Building a forward-looking energy system for new projects increases the cost price, with the effect th in 2018 sub-optimal solutions will still be chosen. As a result, costly measures will become necessar in the relatively short term to bring CO2 emissions up to standard and to maintain the value of the property. |
| **Main advantages** | **We ensure that the costs and benefits of a future-oriented energy system are synchronized**. I using a lease formula, we make it possible for an optimally dimensioned solution to be placed on the market at a lower price than a solution that is supposedly cheaper but, from a sustainability point of view, less valuable. |
| **What is the promise we make?** | We ensure that the members of a local energy community (LEC) will be able to obtain their energy comfort at the LEC with a minimal impact on the environment **at a price no higher than the usual alternatives**. We do this with tried and tested financial concepts that closely match our core competencies. **For the customer everything is E2E in a one-stop shop formula.** |

# Context

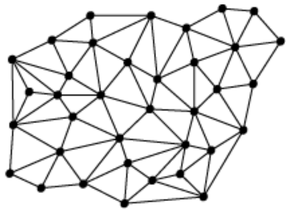
# Shift in Power Generation and Consumption

# From a centralized to a distributed integrated energy system










**Centralized Energy System**
- large, centrally located generation facilities
- one way energy flow
- utility controlled
- inflexible technology
- small numbers of players
- closed system, huge entry barriers
- high project costs (100m+)
- adds capacity in large chunks
- long project approval time (10+ years)
- heavy carbon impact

**Need for investments**

**Distributed Energy System or Energy Cloud**
- multi-way cooperation on common energy grid
- multi-way energy flow
- utility coordinated
- flexible, dynamic, resilient
- large numbers of players
- open system allowing anyone to participate
- lower project costs (20k+)
- easy to add capacity incrementally
- relatively short project approval time (1 year)
- cleaner: **local and renewable production and consumption**

# Converging factors stir up change: time to act

**Combine Climate Change and Economic Growth**

**EU Winter Package** launches a vast legal set of directives and regulations

4th major energy market reform

New targets for carbon reduction

New market roles

Legislation to be in place from 2020 on – Anticipation needed

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- Competition
- Innovation
- End user centric
- Reduction of dependency energy import

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## Generation Economics

Solar: from heavily subsidized to a key component of the generation mix (zero subsidized)

Offshore wind: EU leads the world, particularly in the North Sea

Thermal generation is forced into the role of cycling instead of stable base load provider.

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## Decentralization of Generation

The rise of the prosumer in search of valorization of his flexibility

- Rooftop solar
- Battery storage
- Biomass boiler in commercial buildings
- Building techniques e.g. concrete core activation, borehole energy storage

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Public support for action to curb climate changes grows steadily *E.g. nuclear shutdowns in Germany*

EU and EU companies want to obtain an important share of wallet in this transition

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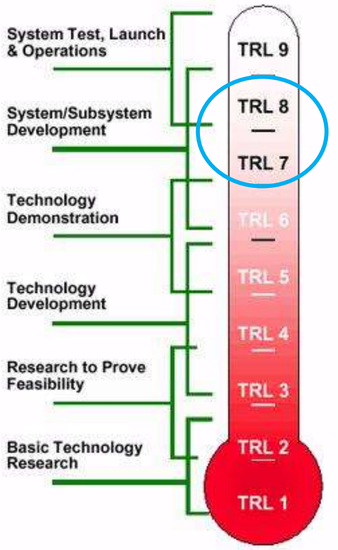
## Electricity demand growth

Heatpumps
Mobility and electrification
Digitization (data centers)

## Technology Readiness Level



# EU Winter Package

## New role: the Local Energy Community (LEC)

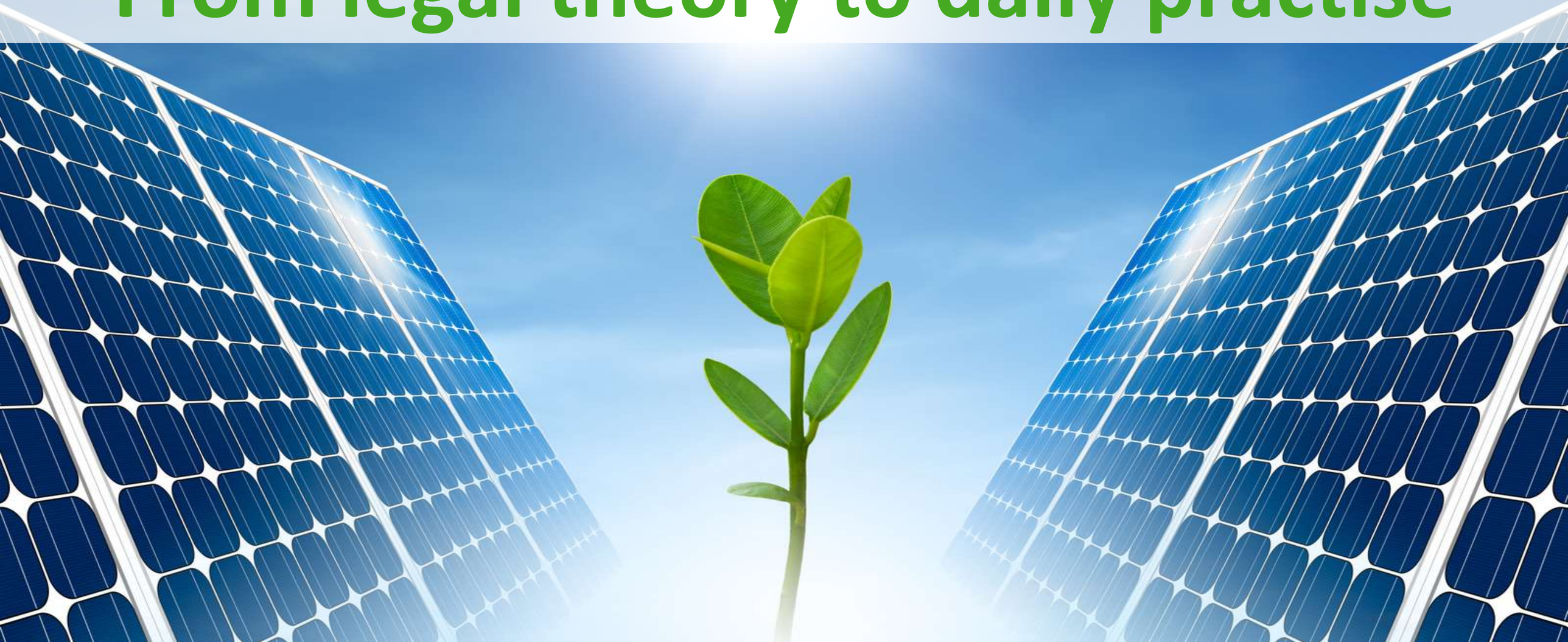
**Member States shall ensure that Local Energy Communities:**

- are entitled to own, establish, or lease community networks and to autonomously manage them;
- can access all organised markets either directly or through aggregators or suppliers in a non-discriminatory manner;
- benefit from a non-discriminatory treatment with regard to their activities, rights and obligations as final customers, generators, distribution system operators or aggregators;
- are subject to fair, proportionate and transparent procedures and cost reflective charges;
- where relevant, may conclude agreements with the distribution system operator to which their network is connected on the operation of the community network.

**Member States shall provide an enabling regulatory framework that ensures that:**

- participation in a Local Energy Community is voluntary;
- shareholders or members of a Local Energy Community shall not lose their rights as household customers or active customers;
- shareholders or members are allowed to leave a Local Energy Community;
- Article 8 paragraph 3 applies to generating capacity installed by Local Energy Communities as long as such capacity can be considered small decentralised or distributed generation;
- provisions of Chapter IV apply to Local Energy Communities that perform activities of a distribution system operator;
- where relevant, a Local Energy Community may conclude an agreement with a distribution system operator to which their network is connected on the operation of the Local Energy Community's network;
- where relevant system users that are not shareholders or members of the Local Energy Community connected to the distribution network operated by a Local Energy Community shall be subject to fair and cost-reflective network charges. If such system users and Local Energy Communities cannot reach an agreement on network charges, both parties may request the regulatory authority to determine the level of network charges in a relevant decision;
- where relevant Local Energy Communities are subject to appropriate network charges at the connection points between the community network and the distribution network outside the energy community. Such network charges shall account separately for the electricity fed into distribution network and the electricity consumed from the distribution network outside the Local Energy Community in line.

# From legal theory to daily practise



# Concrete action

**Microgrid Services for Local Energy Communities** is one of 19 proposals in the first Flux50 call (May 31st 2017)

Support *Vlaams Agentschap Innoveren en Ondernemen* (VLAIO)

Execution of the *Vlaams Klimaatplan* (°2016)

## Committed parties

- ABB (Asea Brown Boveri, world leader energy systems and automation, CH/SWE)
- VITO/EnergyVille (knowledge center)
- Eandis (DSO)
- Enervalis (SaaS for distributed energy systems)
- KBC

## Duration

01/07/2017 - 31/12/2017
Deliverable: feasibility study

## Support by VLAIO and Flux50 on

- legal barriers
- data infrastructure organization
- valorization of flexibility
- end user engagement

(project overarching working groups)


# The Mechelen Eandis Project

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## Control is key for Microgrids

Conducting a feasibility study on the development of a **control system for *smart* microgrid operations**, as well as the **business and finance model** that needs to be put in place.

## Location

### Eandis site, Mechelen

The site is part of a broader **urban renewal** that will include the building of apartments and parking (Eandis site, Keerdok en Rode Kruisplein). First phase: 800 units, merely apartments.

The sites will be installed with a heat network and borehole energy storage systems. Start development: **2018**.

The Eandis parts and buildings and premises are implemented as **living lab** for development and integration of new technologies, assets, business models with strong end user interaction, where companies can implement solutions and hands-on test and demonstrate them in a safe and controlled environment.

# Concrete objectives

Main objective

Offering a **solution** for users (households and SME) that want to purchase local generated energy and users that want to generate their own energy by participating in local investments in renewable generation.

Involvement:
City of Mechelen
Bond Beter Leefmilieu

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Involvement:
City of Mechelen
BBL
End users

Track 1

- Market requirements, (openness of the interfaces)
- Data-platform specifications
- Novel needed inter-microgrid models (e.g. peer2peer trading mechanisms)

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Track 2

- Value Chain definition
- Business Model Canvas

Lead: VITO/Eandis

Track 3

- Financing options
- Risk assessment

**= Conditions for risk balanced bankability**

Lead: KBC/VITO

**2-daagse workshop**

- November 13/14th 2017, CCM
- All committed parties were present, including the City of Mechelen and Bond Beter Leefmilieu
- Interested findings on an integrated OPEX Service role

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**Outcome**

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# Microgrid Service Provider (MSP) for Local Energy Communities (LEC)

**Conditions for future proof energy management**

- Able to maximize local renewable production and consumption
- Optimized design and dimensioning through bundling of scattered capabilities
- **Flexibility** is valorized
- Optimized procurement
- Purchase power through scale
- Circularity by design

**Flexibility** of an electricity system is the capacity of the system to respond to predictable and unpredictable changes in the conditions of the electricity system. The safety, reliability and efficiency of the network must be guaranteed. Contributing to flexibility is the main value driver in the future distributed energy system.

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## MSP's proposition

- Establish an appropriate legal structure for the local energy community to participate in the energy system.
- Design, implementation and exploitation in a balanced collaboration with the best in class suppliers and other stakeholders
- Owns the hardware to produce renewable energy
- Financing: a lease formula, with the LEC as lessee
- Balancing local production and consumption
- Valorization of flexibility
- Purchase of deficit (consumption>production)
- Providing energy comfort at a price not higher than 'normal', all-in-one
- Keeps the books and takes care of settlement, billing and payments
- Maintenance and service, incl. hotline, in collaboration with parties such as DSO, preferably through a digital channel
- Take-back, reassignment and/or refurbishment of renewable assets (principles of circularity)

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## Impact analysis

- Project developer: cost energy management system is lifted out of the project. Able to present a future proof offer without prohibitive pricing issues.
- Local Energy Community: able to act as a part of the energy system, by bringing scale and expertise in their reach
- Individual owner: future proof management of patrimony. Able to obtain optimal energy comfort, infrastructure e.g. charging, microgrid ready household appliances
- Suppliers and other systemic participants (e.g. DSO): can cope with their core business and are able to collaborate so they achieve the sustainability goals
- MSP, as a lessor, uses an anchored financing model. By contracting the best in class parties to build an E2E energy service, performance risk is well controlled. The financing risk is distributed to the lowest and best spread level possible. As an aggregator, the MSP achieves purchase power, with important positive impact on the business case.