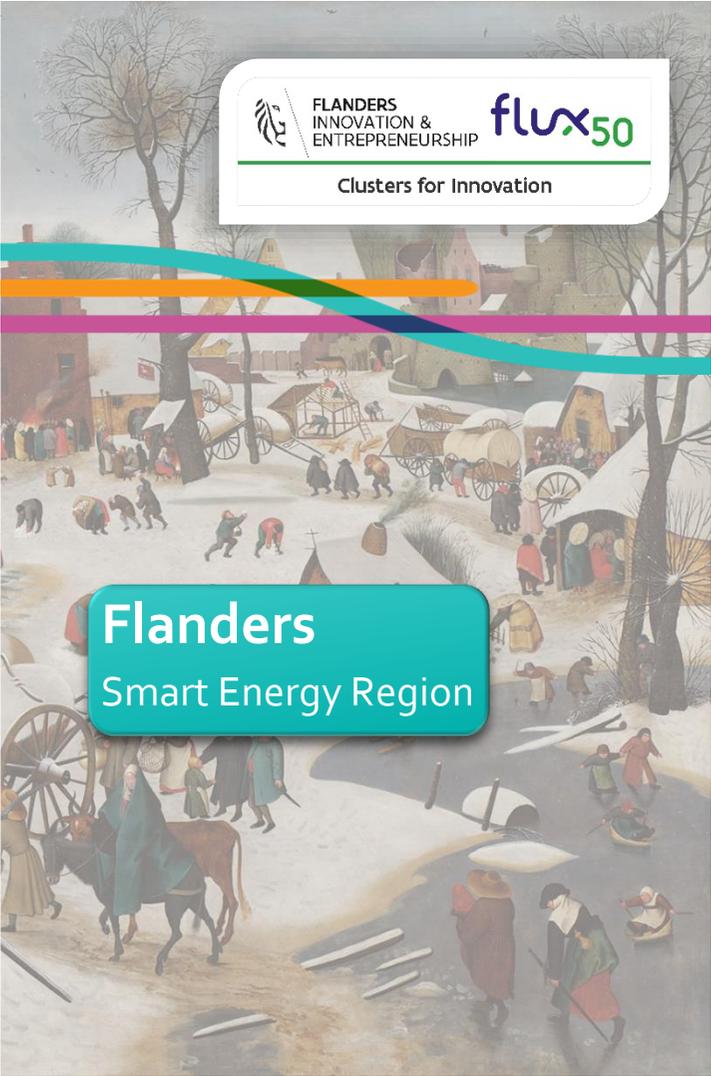




FLANDERS
INNOVATION &
ENTREPRENEURSHIP

flux50

Clusters for Innovation



Flanders
Smart Energy Region

INNOVATION LEADER FLANDERS

The Flemish region in Belgium is one of the leaders in innovation in Europe. Especially cooperation and co-creation between SMEs and the strong knowledge and research institutes are striking. Even at global level Belgium and Flanders are frontrunners.

CO-CREATION FOR THE ENERGY TRANSITION

Cooperation is one of our assets for the energy transition in Flanders.

- This aim for cooperation created Flux50 - the spearhead cluster for energy in Flanders - in 2017.
- Between 2017 and 2019 more than 150 companies and research & knowledge institutes collaborate(d) in circa 50 projects, receiving financial support from the Flemish Agency for Innovation and Entrepreneurship (VLAIO).
- The shared ambition of 'Flanders, Smart Energy Region' sustains and feeds into this cooperation.

STRONG RESEARCH INSTITUTES & UNIVERSITIES

Apart from the Flemish universities KU Leuven, University of Ghent, University of Brussels (VUB), University of Antwerp, and University of Hasselt (UHasselt), also the knowledge institutes BBRI, VITO, IMEC & EnergyVille have a strong international reputation.

TRIPLE HELIX

Industry and research players are closely linked in Flanders. Also policymakers focus on innovation. Early 2019 Flanders agreed upon an investment plan of 60 million euro for innovative energy solutions: 30 million from the private sector and 30 million from the government.

The ambition of 'Flanders, Smart Energy Region' is definitely carried out by our triple helix model.

FROM CO-CREATION TO INTEGRATION

One of the assets of the energy innovation in Flanders is the unique integration of proven and new technologies.

The new decentralized energy ecosystem will consist of local production of renewables, storage, efficiency of consumption and the interconnection of these systems at different levels. For each individual case, connecting production, storage, and consumption is a first step; the smart control and management of the system on different scale levels a second.

IoT, AI AND LIVING LABS

Data is the basis for control, system management and monitoring where Internet of Things plays an important role in the exchange of data and the communication between systems. Every component in the energy system is connected.

Via artificial intelligence and machine learning are central controls turned into dynamic, self-adjusting systems.

Since Flemish innovation is strongly focused on the integration of systems, the data and IoT-aspects are closely linked to the energy research. Therefore real-life testing is indispensable. The development of 10 living labs by 2023 is one of the top priorities in 'Flanders, Smart Energy Region'.

FLANDERS SMART ENERGY REGION POWERED BY FLUX50

In May 2017 the triple helix cooperation of the Flemish ecosystem created Flux50 - the spearhead cluster for energy in Flanders. Our mission is to realise the 'Flanders, Smart Energy Region'.

Three pillars: Inform - Innovate – Internationalise

By **informing** the energy community in Flanders Flux50 upgrades knowledge and expertise in order to let the stakeholders cooperate to **innovate**. These unique innovations can fully flourish by playing a role on the **international market**.

INTEGRATION OF THE ENERGY TRANSITION IN SOCIETY

Technology as enabler for new energy ecosystems resulting in a successful market adoption when it goes hand in hand with a socio-economic viable model. That is why all projects also focus on the broader socio-economic aspects of viable business models, supporting legislation and customer engagement.

PROJECTS

ALL PROJECTS ARE FINANCED BY FLANDERS INNOVATION & ENTREPRENEURSHIP (VLAIO) AND THE PRIVATE PARTNERS

CONNECTED BUILDINGS

Living Lab

The project aims at offering digital energy services in a 100% vertical integrated approach. A digital tailored combination of products and innovative services will lead to higher comfort, unburdening, higher energy and cost savings via connectivity in newly installed buildings.

Monitoring and steering could deliver superior service to users of buildings that envelope renewable energy components, systems or control.

Hundred buildings of individual households are connected as one large living lab. A digital energy audit will result from this real life data collection. Afterwards the real world results will be measured and compared to the predicted results from the digital audit.

Partners: June Energy, Bagaar and Insaver

Budget: 1,4M EUR

XMPL *Living Lab*

The new commercial site within the Evolis Business Park in Kortrijk serves as a state-of-the-art cleantech Hub where several cleantech scale-ups will be hosted & relevant activities will be organised.

Several renewable energy sources (wind & solar) and energy storage facilities (batteries, ice buffer, hydrogen storage and vehicle-to-grid system) will be integrated. They will configure the power system to allow communication between the energy sources and energy consumption.

The XMPL project will collect data from the site for the energy traffic control model, in which supply and demand is forecast based on multiple parameters (load, weather, IoT sensors, market data,...& historical reference data).

This feature will be added to an energy traffic control system with automated triggers, and will be optimised to an economically viable product for buildings, houses, micro-grids and EVs without loss of comfort & with limited maintenance.

Partners: Xvent, Amplifino, and Yuso

Budget: 2,9M EUR

MACHINE LEARNING FOR REAL-TIME ADVANCED MULTI-ENERGY TRADING

Interdisciplinary and cooperative research project

MAMÔET

In the future local energy community of the Green Energy Park (Zellik - Brussels) one of the challenges is to correctly energetically balance and financially optimize a complex system of multiple connected, decentral devices to guarantee the overall quality and safety.

MAMÔET aims at developing an artificial brain as a backbone for the optimal functioning of a stand-alone multi-energy ecosystem. The 'Green Energy Park' will be the living lab to test the backbone and refine it into a marketable product.

Partners: SDM, PowerPulse, Priva, ABB, and VUB-MOBI

Budget: 5,0M EUR

REALIZING SAFE AND STABLE BIPOLAR LOW-VOLTAGE DC POWER AND DATA BACKBONES

Interdisciplinary and cooperative research project BIDC

An increasing number of grid components run on direct current (DC) opposite of the current distribution grid which runs on alternating current (AC). DC applies to most sources of renewable energy (PV, battery ...) and also to consumer goods such as household appliances, heating and ventilation systems, and charging equipment for electric vehicles.

DC will thus be a key technology in providing cost-effective, modular and reliable microgrids. Low-voltage DC microgrids are forecasted to represent a 5.1 billion EUR market by 2025.

The listed advantages, potential and trends have convinced four early adopters in Flanders to deploy low-voltage DC (LVDC) microgrids (100 kW-1 MW) in the upcoming years.

This cooperation project aims at filling a number of market gaps for

- Hardware components
- An overall system protection strategy
- A grid code with LVDC microgrids.

Partners: KU Leuven, VITO, ABB, Imtech, Th!nk E & TDR

Budget: 3,8M EUR

OPTIMIZED BI-DIRECTIONAL & SMART VEHICLE CHARGING IN LOCAL ENERGY SYSTEMS

Interdisciplinary and cooperative research project OPTIBIDS

The electrification of our fleet is an essential part in the transition. It, however, brings along its own challenges and opportunities. On the one hand the e-fleet will increase the electricity demand, while on the other hand EV's are moving energy storage units. The key to level the demand and storage lies in new local ecosystems with local renewable energy production.

The OPTIBIDS project aims at acquiring the required knowledge and technology to integrate the charging-demand and storage-asset of electric vehicles into a local energy system (LES). By doing so, it wants to support the creation of local sustainable energy systems.

To accustom both the e-mobility demand and storage feature in the LES, vehicles and chargers must be capable of variable and bi-directional power transmission (charge and discharge). E-mobility can be used for balancing the local energy system (LES) or the main electricity grid in, potentially, an economically viable manner.

Partners: VUB, Powerdale, Bluways, Imtech, VDL Bus, and Scholt Energy Control

Budget: 4,5M EUR

ROLL-OUT OF LOCAL ENERGY COMMUNITIES

Interdisciplinary and cooperative research project ROLECS

Within ROLECS, a total of 25 companies and 5 research institutes kick-off an ambitious, interdisciplinary cooperative research project aiming to gain understanding and to maximize the potential of Energy Communities (ECs). The Energy Communities are a novel concept in the 4th Energy Package / Clean Energy Package of the European Commission and refer to cooperation among consumers (or prosumers) in order to accomplish the satisfaction of their communities energy needs using locally produced energy sources.

Within an EC, energy can be exchanged to maximize the balance between local consumption and production, and organizes this exchange at community level. Assets such as solar panels batteries, charging stations for electrical vehicles and even grid operation could be part of the new community approach.

The local production and storage of energy triggers demand-side response of the consumers to contribute to reducing losses and inefficiencies of the system. At the same time the control and storage of renewable energy can unburden the distribution grid operators and could open doors for energy communities to become more active participants of the balancing markets (flexibility).

The 30 partners of ROLECS have set out clear goals to make LECs a success technically, financially, socially and legally. Making LECs a relevant part of our energy system is a clear target to enable more local renewables and providing new business opportunities without increasing societal cost of public infrastructure. 10 complementary demonstration sites form a sound basis to represent the most potential future LEC concepts, from small residential cooperative to large industrial private set-ups.

Partners: Th!nk E, ABB, Wattson, ThermoVault, Enervalis, Energent, 3E, Ducoop, Farys Solar, Ingenium, Engie Electrabel, Engie Laborelec, KBC, Quares, OpenMotics, Metha advocaten, Blixt, Magenta Tree, Fieldfisher, Powerdale, Antea, Aspiravi, 70GigaWatt, C-Valley Leuven, Fluvius System Operator, IMEC, VITO, KU Leuven, UGent, and VUB

Budget: 7,7M EUR

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