INTERNATIONAL SYMPOSIUM ON ADVANCED TECHNOLOGIES AND MANAGEMENT FOR INNOVATIVE GREENHOUSES

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Interreg North-West Europe GROOF

European Regional Development Fund

PS07-03 : Greenhouses on rooftop to reduce CO2 in urban environment – the GROOF project

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CONTEXT

GROOF project is an innovative cross-sectorial approach in the construction and agricultural sectors by combining energy sharing and local food production.

COMPETENCE TEAMS

CT1 - Building & Construction: technical, urban planning rules, regulations, insurance, etc.
CT2 - Energy performance of rooftop greenhouse and connection with the building
CT3a - Socio-economic aspects: business and social models
CT3b - Plant production (vegetable and herbs but also fruits, plantlets, micro greens, medicinal or edible flowers

CONSORTIUM

- **Luxemburg**
  - **CDEC** *leader* (www.cdec.lu) => Finance, Training, Engineering, Innovation, Promotion
  - **IFSB** (www.ifsb.lu) => structural aspects, building & construction, Training (**+pilot I2**)
- **Belgium**
  - **Ulg** (www.bembloux.ulg.ac.be) => urban agriculture, trainings, economic and trade development (**+pilot I1**)
  - **Groupe One** (www.groupeone.be) => Awareness ,Training , sustainable business models, Green Economy Networking
  - **CEC** (www.ecoconstruction.be) => network of companies, sharing competences, exchange experiences & acquisition of knowledge
- **Germany**
  - **HS Trier / IfaS** (www.umwelt-campus.de/ucb/index.php?id=home&L=1) => technical energy concepts, CO2 emission and energy balancing, economic
  - **EBF** (www.ebf-gmbh.de) => consultancy for energy management, energy efficiency and renewable energy (**+pilot I4**)
- **France**
  - **CSTB** (www.cstb.fr) => regulations, safety, climate, energy, Carbone footprint, water management, acoustics, BIM
  - **ASTREDHOR** (www.astredhor.fr) => production costs & techniques, horticultural product range, plant's innovation
  - **GALLY** (www.gally.com) => Farming activities, educational farms, design, engineering, urban agriculture, technical feasibility (**+pilot I3**)
- **Spain**
  - **UAB** (www.sostenipra.cat) => Food Technology and Safety, Environmental Sciences and Technology, Material Science and Engineering, Social Sciences & Humanities

ORGANIZATION

CT1 Building & Construction — *Leader CSTB*
CT2 Energy — *Leader EBF*
CT3 Socio-Economy & Plants Production — *Leader Groupe One*

- **WP C** Communication — *Leader CDEC*
- **WP M** Management — *Leader CDEC*
- **WP LT** Long Term — *Leader ASTREDHOR*
- **WP T1** Learning and sharing about context to foster technology implementation — *Leader CSTB*
- **WP T2** Coaching to accelerate the implementation of Rooftop Greenhouses using GROOF technology — *Leader ULg*
- **WP T3** Technical assessment and public demonstration of running models — *Leader HS Trier IfaS*

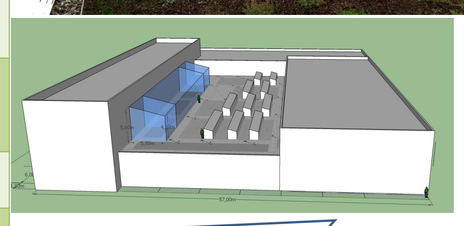
- **I1** (Ulg) CO2 reduction and energy savings on a new public building
- **I2** (IFSB) CO2 reduction and energy savings on an existing industrial private building
- **I3** (Gally) CO2 reduction and energy savings on an refurbished residential building
- **I4** (EBF GmbH) CO2 reduction and energy savings on an office-type building from 1950s

4 PILOTS

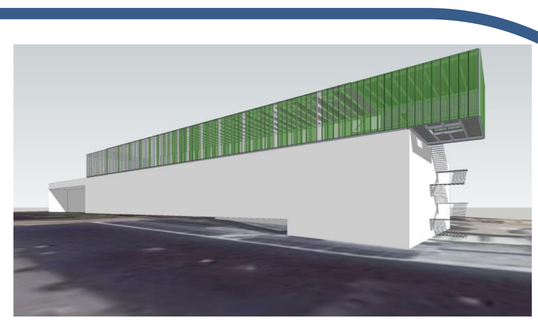
I1/Gembloux-University of Liege (Belgium);
I2/Bettembourg-IFSB (Luxembourg);
I3/Paris-Gally (France);
I4/Bürstadt-EBF (Germany)

WHAT ?

(1) recovering heat generated by the building supports of greenhouse, both actively (ventilation system) and passively (30% heat lost through the roofs) in plant production,
(2) collecting CO2 by human activity and building activities to "feed" the plants,
(3) reduce transport-generated CO2 emissions by producing locally

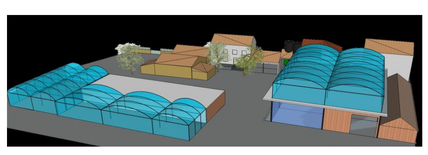


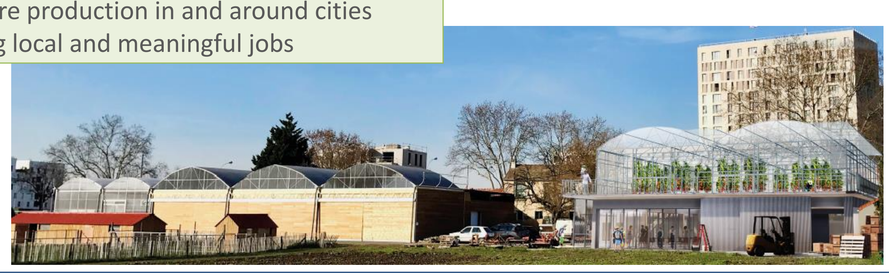
Location/size	Gembloux, Belgium – 200m²
Support	newly constructed public building
Products	model species like lettuce and tomato
Services	research, training, demonstration
Technological	Hydroponics, aquaponics, bioponics
Environmental	Energy savings (Heat, CO2, transport)
Energy	heat exchanger on building cooling system and innovative covering and shape of the greenhouse
Aims	Innovation at university level Development of research and teaching facilities Accumulation of scientific knowledge Work with innovative people

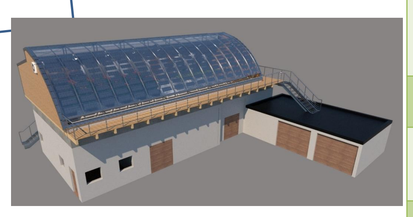


Location/size	Bettembourg, Luxembourg – 600m²
Support	On existing tertiaire and industrial private building
Products	Tomatoes
Services	Training and visits
Technological	Hydropony, high/advandced technology
Environmental	Energy savings (Heat, CO2, transport)
Energy	Pellets / solar panels / …
Aims	. Test : building on a roof not designed for this . Follows construction prototype in 2014 . Future and viable professional installation

Location/size	Saint-Denis, France – 360m²
Support	On new building
Products	Tomatoes, herbs and leafy greens
Services	Training sessions, Professional visits, Consultancy, Private and corporate events, Public fairs and events
Technological	Hydroponics, high/advanced technology and culture on growing media
Environmental	Energy savings (Heat, CO2, transport)
Energy	Pellets / solar panels / …
Aims	. Bringing high quality local food to urban people . Creating (and maintaining) a rich and diverse agriculture production in and around cities . Creating local and meaningful jobs







Location/size	Bürstadt, Germany – 180m²
Support	On existing social building/warehouse
Products	Fruit vegetables (different varieties), Leavy greens, Herbs, Cannabis
Services	Public and private tours, training, Hub for learning and sharing experiences, Hosting fairs and festivals, Rentable space for marriages and parties
Technological	passive, solar and aquaponic
Environmental	Energy savings (Heat, CO2, transport)
Energy	
Aims	.Show the several possible applications of the Sunlight Greenhouse .Helping to establish farming in urban context

Next steps

Preparing guidelines (WPT1), Selecting 10 candidates of the Open CALL (WPT2) and coaching them for one year, Calculating the LCA of each pilot and the Carbone budget (WPT3), building the pilots and install the equipment's of sensors to follow the performances of energy, water supply, electricity, plant productions (I1, I2, I3, I4)