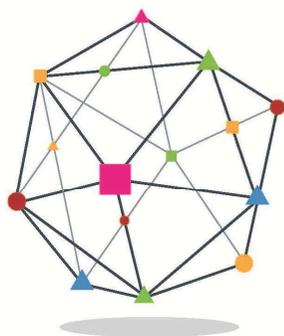




Indoor Farming en RBC

Report Novembre 2013



**LATERAL
THINKING
FACTORY.**

contributes to better human habitat



Indoor Farming: IBGE, Région Bruxelles-Capitale

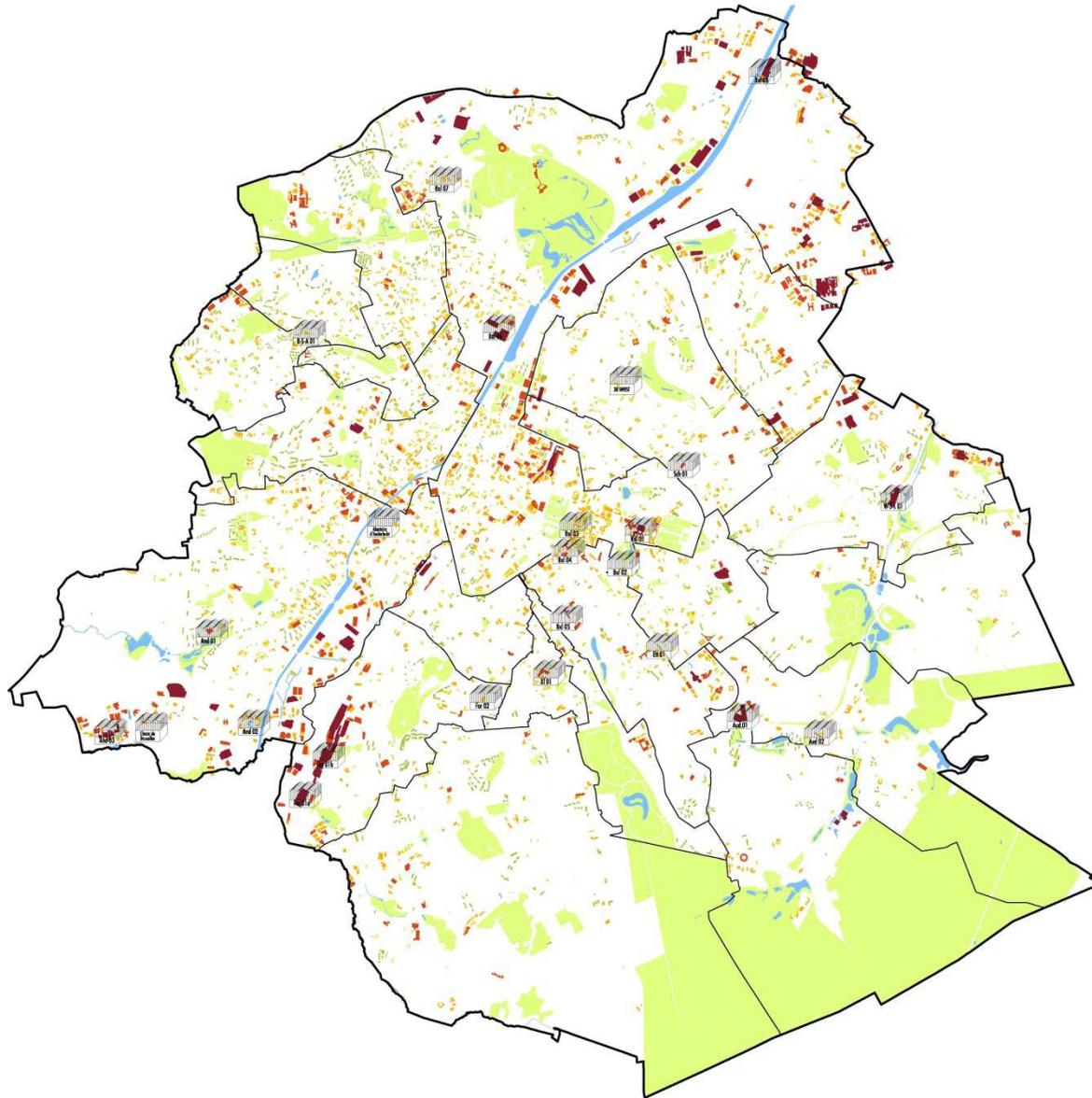
Scopes of the Mission

Produce a feasibility study to validate Indoor Farming as a business option to be promoted by IBGE in RBC and documents/tools to help IBGE assisting promoters interested in Indoor Farming.

The deliverables are:

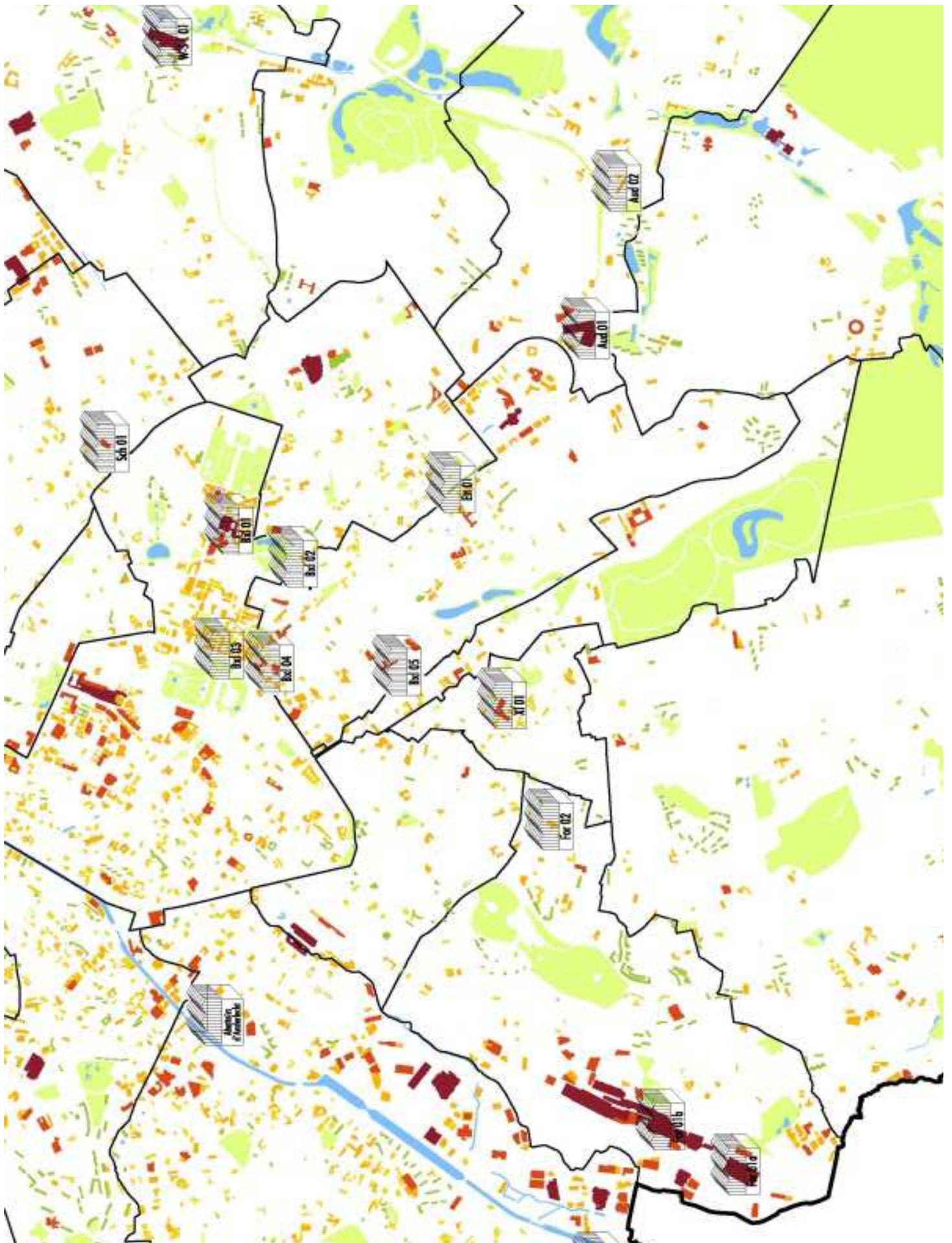
- The toolbox adapted to the RBC
Purpose: guide to start a greenhouse activity based on the Business Model
- The Map of rooftop availability in RBC (space availability, accesses, sunlight, etc)
Purpose: guide to select best spots in RBC depending on the location
- The potential spatial configurations + BM related (categories of buildings, scenarios of mixed areas and options, private and public buildings, etc)
Purpose: 20 charts selection with specific BM related to spatial configuration, raw materials access and consumers density.

MAPS: Indoor Farming: IBGE, Région Bruxelles-Capitale

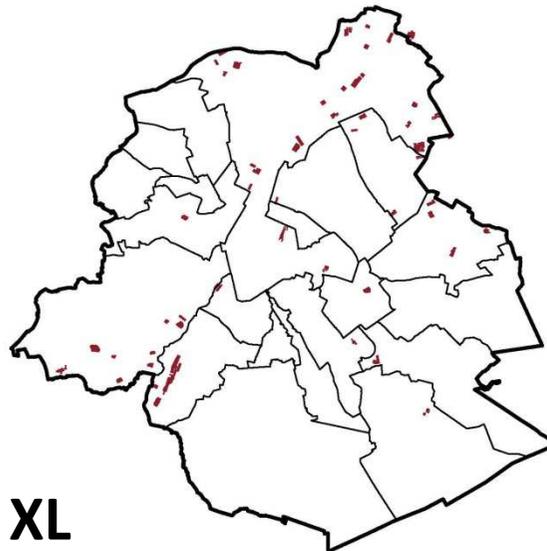
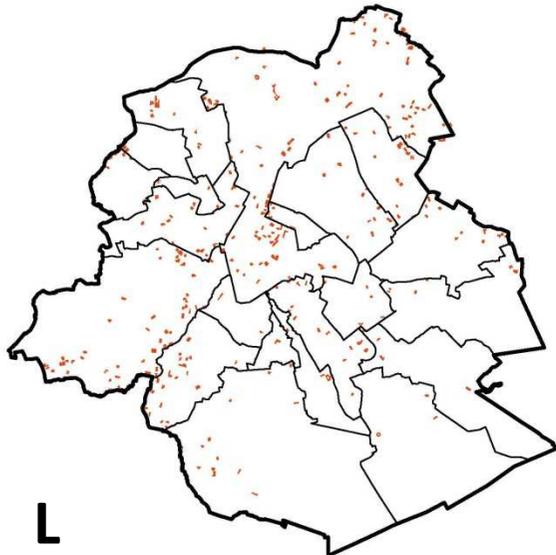
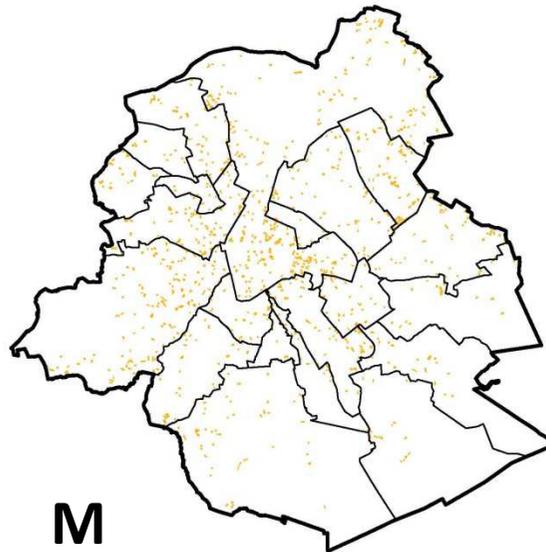


RBC Territory= 162.447.439m²

Office, Industry, parkings,
school, hospital, other
programs (without housing)
= 4377 toits plats 5.906.888m²



MAPS: Indoor Farming: IBGE, Région Bruxelles-Capitale



RBC Territory= 162.447.439m²

61 roofs > 10.000m²

1.288.124m²

342 roofs > 3.000m²

1.569.870m²

1.145 roofs > 1.000m²

1.802.794m²

2.829 roofs < 1.000m²

1.246.100m²

TOOLBOX: Indoor Farming: IBGE, Région Bruxelles-Capitale

Building-Integrated Greenhouses (BIG) range from industrial farming facilities to multifunctional living and working places to back-yard sheds.

For centuries they were integrated as winter gardens and atria in buildings to extend growing seasons with light and heat in winter and cooling in summer. Today they are part of the trend towards urban agriculture.

BIG applications are expanding due to new technologies which let them clean indoor air, purify particulate and gas emissions, use waste heat, and provide green space.

PURPOSE AND AUDIENCE

The BIG Toolbox is for experts to support partners & customers in planning value-propositions, ownership & operations for BIG. It focuses on the planning stage, with some applications for procurement and operations.

The audience for the Toolbox is experts advising customers, but well-informed individuals who want to do it themselves can also use it.

CONTEXT IN BUILDINGS

BIG can be applied to diverse building types including schools, factories, office buildings, hospitals and large area developments.

BIG are one component of healthy buildings. It is important to consider goals for the overall building when deciding how to use BIG. Users are encouraged to integrate BIG with other systems for healthy buildings. For that please refer to the publication *How to Plan a Big Beneficial Footprint*.

Value propositions for BIG are location-dependent as well as stakeholder dependent, so an important step is to inventory local conditions and stakeholder goals. Design considerations also depend on the local climate. For example in tropical climates, BIG might have no solid walls.

INTEGRATED INDOOR FARMING PLANNING TOOLBOX



A JOINT PUBLICATION OF EPEA, LATERAL THINKING FACTORY AND INSPIRED AMBITIONS

OCTOBER 15, 2013

TABLE 1 WHERE TO USE BIG PLANNING TOOLS IN THE BUILDING DEVELOPMENT PROCESS

BIG TOOL	IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE See p. 4	QUICKSCAN FINANCIAL RESOURCES See Table 2	IDENTIFY POTENTIAL VALUE-ADDED SERVICES See Table 3	COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS	IDENTIFY GROWING METHODS, PARTNERS, STRUCTURE See Table 3	IDENTIFY POTENTIAL QUICK WINS See p. 19	ALIGN EXPECTATIONS WITH REALITY See p. 19	FINALISE BIG FEATURES Highlight preferred features in Table 3	ROADMAP TIMETABLE Use priorities from Table 3
BUILDING STAGE									
CONCEPTUAL & FINANCIAL PLANNING	✓	✓	✓	✓	✓	✓	✓		
SITE DEFINITION & CONCEPTUAL DESIGN	✓	✓			✓	✓	✓		✓
MUNICIPAL & REGULATORY APPROVALS	Municipalities are often stakeholders to be consulted				Municipal conditions influence technical choices		✓	✓	
TECHNICAL DESIGN								✓	✓
PROCUREMENT					Use for specifications	Re-evaluate after tenders received		Re-evaluate after tenders received	
CONSTRUCTION									
OPERATIONS								Evaluate during operations	✓

TABLE 2 INTEGRATED INDOOR FARMING FINANCIAL INVENTORY

FINANCIAL MECHANISM	INFORMATION TO INVENTORY	VALUE-ADDED POTENTIAL
IDENTIFY ECONOMIC GOALS OF STAKEHOLDERS	Economic stake of each Stakeholder. Include greenhouse operator and the municipality who give zoning approvals.	Use to determine how value propositions might support financial Goals of Stakeholders.
IDENTIFY ZONING INCENTIVES & RESTRICTIONS	Incentives or restrictions by local zoning for different types of BIG e.g. rooftops or ground level.	Identify economic incentives or restrictions.
FEASIBILITY OF INTEGRATING CAPITAL COSTS & OPERATING COSTS	Is <i>Total Cost of Ownership financing</i> (TCO) possible? Identify if the Design-Build-Finance-Maintain-Operate framework (DBFMO) will be used. Identify which stakeholders benefit from TCO and which might not.	Determine if TCO can be used to optimize operating costs & capital costs together, e.g. investing in BIG features that generate operational savings. Try defining common financial optimization goals.
OWNER OCCUPANCY POTENTIAL	Will owners be users or operators, or just rent the facility to operators ?	Identify if owner as occupant has a self-interest in using BIG to make the building healthier.
IDENTIFY OWNER INTENTIONS FOR KEEPING THE BUILDING	Do the owners plan to keep the building where the BIG is located for a long time or sell it quickly?	(a) Recovering materials from demolishing can be part of the value proposition. (b) Integrating capital and operating costs.
POTENTIAL LIGHTING MODEL	Lighting is a big cost in many greenhouses. Can natural lighting be integrated with artificial lighting? Can lighting be leased from providers?	Operating savings from light leasing & integrating natural and artificial light. Identify opportunities for computerized modulation of natural & artificial light.

FINANCIAL MECHANISM	INFORMATION TO INVENTORY	VALUE-ADDED POTENTIAL
RENEWABLE ENERGY TECHNOLOGIES FOR HEATING AND/OR COOLING	Are PV, Geothermal, Co-generation considered in the building and can they be integrated with BIG?	Integrating renewable systems with BIG e.g. PV-integrated glass to improve payback times.
CAPITAL & OPERATING COSTS FOR ENERGY PURCHASE AND GENERATION	Are energy Power Purchase Agreements (PPA) used in the region? If not, why not? Are third party PPA's used? Are cladding substitutions or residual value of materials included in payback calculations?	Determine if PPA can be used to save capital costs or generate revenues from BIG, and if third party PPA partners might be available.
BUILDING LEASE STRUCTURE	Who holds the lease on the building and for how long? Is the lease on the building separate from the lease on the greenhouse ?	Determine if the building payback time is integrated with or separated from the BIG. Important for BIG operator.
WHO PAYS UTILITY COSTS	Do the occupants pay for energy and water?	Determine who benefits from water and energy recycling, savings & revenues.
DESCRIBE WATER INFRASTRUCTURE	Which authority is responsible for irrigation, drinking water, and wastewater infrastructure?	Determine who can gain from recycling water, e.g. local water agency, owner, occupants?
INNOVATION FINANCE	Are grant funds or subsidies available for innovation to let you focus on innovations?	Accelerate innovation while cutting development costs.

TABLE 3 SELECTING FEATURES FOR BUILDING-INTEGRATED GREENHOUSES		PRIORITY 0, 1, 2, 3 or check
CATEGORY	FEATURE OPTIONS	
	CROPS FOR FOOD OR FEED Are the crops intended to feed building occupants, other customers, or be sold on the market? Is there added value to having the production source close to consumption so consumers of the food see added value from knowing where their food comes from? First learn your intended markets, then investigate which types of crops to grow. Timeframe: Begin planning immediately for start of operations. Focus on finding a greenhouse management company with experience integrating the players.	2
	CROPS FOR FEEDSTOCK FOR PRODUCTS If producing feedstock is being considered, identify a potential customer and bring them into the process early. Timeframe: Consider one year after start of operations.	0
	SEEDLING PRODUCTION Growing seedlings or preserving certain species of seeds might be a value proposition. Timeframe: Begin investigations immediately for potential start of operations.	1
	MAXIMISE EARNINGS FROM CROPS, E.G. HIGHEST TURNOVER AT LOWEST COSTS The challenge is to identify a greenhouse in management company with experience to make this type of high productivity production cost-effective.	3
	SAVINGS ON SPOILAGE & LOGISTICS COSTS BEING CLOSE TO PROCESSING OR MARKETS If your consumption market is right next to the BIG then your spoilage losses from transport will be minimal and this can improve profits.	3
	AGRICULTURAL PRODUCTS QUALITY IMPROVEMENT COMPARED TO OPEN FIELD. Crops are less prone to damage than in open fields, adding to productivity.	1
	TOPSOIL MANUFACTURING VIA E.G. COMPOSTING, OR TOPSOIL PRESERVATION VIA SOIL-LESS AGRICULTURE. Investigate if organic residue sources nearby can be used to generate topsoil for the BIG.	0
	NUTRIENT RECYCLING VIA PHOSPHATE & FERTILISER RECOVERY Recycling of nutrients from food residues will be done via composting? On site vs. offsite composting has to be decided. Recycling of nutrients from effluent from irrigation is desirable. Timeframe: research into optimal composting & irrigation effluent options to begin immediately. Probably does not affect structural design although piping retrofit might be more expensive later.	0

TABLE 3 SELECTING FEATURES FOR BUILDING-INTEGRATED GREENHOUSES		PRIORITY 0, 1, 2, 3 or check
CATEGORY	FEATURE OPTIONS	
	RE-USE EMISSIONS AS NUTRIENTS (E.G. CO₂ FOR PLANTS) Added Value BIG can probably use building emissions like CO ₂ & water to supply safe fresh food and flowers for cafes/bars, restaurants and shops, and save transport costs and emissions. They can provide valuable biodiverse habitat, e.g. for pollinating insects. Challenge: Check local regulations for reusing emissions from buildings Timeframe: Investigations can start immediately.	3
	WATER QUALITY IMPROVEMENT OR REUSE Added Value BIG can capture and reuse rainwater and greywater to save water costs and reduce stress on storm water systems. In some cases this can generate financial savings for stakeholders such as building owners by reducing water fees and for sewage system operators by reducing inputs. Challenges Operations personnel might see biounit systems as a wildcard. It is important to show working examples of systems. If a facility generates a constant flow of greywater, the potential for reuse is good. If only occasional events are held at the facility it will require a buffering capacity. Timeframe: Immediate investigation	3
	DESIGNING FOR RECOVERY OF COMPONENTS & MATERIALS It is a priority to do a financial assessment of the potential added value to the owner of designing for recovery of materials. Greenhouses traditionally are designed for deconstruction. Components to be considered for disassembly and recovery are the frame, the glass, and the mechanical/electrical systems including e.g. lighting. Light leasing might be an important component of the approach to save capital costs. Timeframe: It is recommended a full analysis be done as soon as possible on potential DfD advantages and risks.	2
	PROTECTION FROM PESTS Greenhouses provide a protected environment which is less vulnerable to invasive species as well as from harmful insects, animals and biological damage. Check your local area to see which pests are problematic and how BIG can protect against them.	2
	BIODIVERSITY ENHANCEMENT, BIOTIC BALANCING Organic urban farming will enhance local diversity and is a priority advantage of BIG. Timeframe: Start investigations now and implement in first phase of operations.	2
	IMPROVED AIR QUALITY INCLUDING CONDITIONING, PARTICULATE REMOVAL, HUMIDIFICATION CONTROL	2

TABLE 3 SELECTING FEATURES FOR BUILDING-INTEGRATED GREENHOUSES		PRIORITY ¹ 0, 1, 2, 3 or check
CATEGORY	FEATURE OPTIONS	
	Certain species of plants such as moss are custom-designed for air cleaning and the question is if e.g. Xeroflor C2C certified moss products which metabolise pollutants can be used for purifying the air during events. Air-cleaning plants might be grown in a separate section of the BIG from other plants. E.g. at the inlet and outlets. Timeframe: Early priority to determine the impacts on air-handling system designs	
	POLLUTION BUFFER (INCL. FROM ACID RAIN, PARTICULATES AND AIR POLLUTANTS) The greenhouse structure protects crops and occupants from particulate pollution which is moderate to serious in many urban regions. It is a major benefit for occupants suffering from allergies or asthma. Protection from pests is also a standard benefit of most greenhouses. Timeframe: Start early to determine importance of noise buffering to the main stakeholder before designing for noise buffering.	2
	NOISE BUFFER (INSIDE-OUT AND OUTSIDE-IN) BIG provide an effective noise buffer inwards and outwards. The main question to answer is the importance of noise buffering on each site? Timeframe: Start early to determine importance of noise buffering to the main stakeholder before designing for noise buffering.	2
	IMPROVE PRODUCTIVITY OR WELL-BEING OF OCCUPANTS Added value CO ₂ and other interior emissions as well as exterior pollutants have negative effects on performance of occupants. BIG can counteract these effects by using emissions as nutrients for plants. BIG can also improve performance by establishing a buffer zone that reduces chronic noise and pollution from the exterior. Challenges (a) Stakeholders are often not aware their own CO ₂ and other emissions are poisoning them and instead attribute tiredness in meetings to other factors. Solution: Educate the customer with data and examples like the Desso clean air school in Waalwijk, The Netherlands. (b) CO ₂ reuse might be a regulatory problem in some regions. Check! (c) Capture might be impractical because concentrations are not high enough to capture effectively or the building systems cannot feed it into the BIG. Solution: Careful technical assessment. SUPPORTING WELL-BEING Added Value BIG are inspirational, enjoyable and comfortable places to learn and work! Healthy buildings prevent, capture and metabolize polluting particulates that cause lung and	1

TABLE 3 SELECTING FEATURES FOR BUILDING-INTEGRATED GREENHOUSES		PRIORITY ¹ 0, 1, 2, 3 or check
CATEGORY	FEATURE OPTIONS	
	heart disease, as well as providing skin-safe and lung-safe materials for occupants. BIG can also protect occupants from chronic external noise. Challenges Stakeholders are often not aware of particulates risks. (See also further reading "Years of life lost in EEA countries due to PM2.5 pollution, 2008"). Solution: Educate the customer with convincing examples like the Desso clean air school in Waalwijk, The Netherlands. ENHANCE AESTHETICS & IMPROVE CUSTOMER EXPERIENCE Added Value In customer-intensive operations like stores, a competitive edge is often gained by improving customer experience in the store. BIG can achieve this e.g. improve natural light & aesthetics, provide a place to relax or leave the kids, and improve air quality. Challenges Operations personnel are used to narrowly defined operating conditions and might view BIG as a wildcard and risk. These concerns can be overcome by pointing out examples like Ferrari who use plants to "fine tune" the air in their factories which are seen as some of the cleanest and most closely controlled anywhere. Important to resolve two potentially conflicting goals. One is to enhance the aesthetics and experience of occupants. The other is to separate the greenhouse from occupants to avoid contaminating some types of plants. It is important to determine if contamination is an issue with the plants used, and if yes how to achieve those things together. Occupants can be separated from the plants but still see and enjoy them. As well, not all plants have to be separated from the event-goers. Timeframe: As soon as possible it is important to develop an approach to accommodate those potentially conflicting goals.	1
	USE UNDER-UTILIZED SPACE (E.G. ROOFSPACE, WALL SPACE) Added Value BIG can use underutilized space in and around buildings e.g. rooftops, facades and common spaces. BIG can join multiple buildings to create valuable new space. This can provide added recreational and meeting space for occupants. They can be constructed on parking lots where the support structure is already financed. Challenges ✓ Zoning might restrict use of rooftop or building-added space. Solution: Find another part of the building where BIG can be used in the zoning limit. ✓ Operations personnel might perceive risk from BIG as presenting undefined conditions. Solution: Pointing out examples like Ferrari who use plants to fine tune the air in their factories ✓ Sometimes owners don't want their buildings to be visible targets! Solution: BIG can be virtually invisible to the outside if they are positioned properly. ✓ Perception greenhouses compete for PV space. Solution: PV-integrated glass.	2

TABLE 3 SELECTING FEATURES FOR BUILDING-INTEGRATED GREENHOUSES		PRIORITY ¹ 0, 1, 2, 3 or check
CATEGORY	FEATURE OPTIONS	
	TEMPORARY USE OF LAND PLANNED FOR DEVELOPMENT Because some types of greenhouses are easy to assemble and disassemble they make good temporary structures for site promotion, food production for worker canteens, and noise buffers for construction.	0
	NATURAL LIGHTING/SAVINGS ON ARTIFICIAL LIGHTING COSTS It is accepted practice in many buildings to use software to save energy and keep constant light levels by balancing sky lighting with indoor lighting.	2
	HEATING, COOLING, ENERGY GENERATION OR STORAGE (SPECIFY) <ul style="list-style-type: none"> ✓ Capture and reuse heat generated by heating or manufacturing systems. ✓ Use solar energy to generate heat and grow plants profitably. Every greenhouse uses solar energy, but Solar Greenhouses are a specific technical type consisting of one side of the greenhouse as a heat-gathering and storage wall to extend growing seasons, and comfort levels as well as insulating from over-heating. Solar greenhouses are used extensively in northern China for example. ✓ Store energy. The important feature for using renewable energy when it is required. ✓ Save air conditioning costs by deflecting heat-creating energy to the outside. ✓ Integrate with other renewable energy systems e.g. photovoltaics, geothermal sources, solar thermal & storage. 	2
	URBAN HEAT ISLAND MITIGATION There is a misconception that greenhouses create urban heat islands when actually new studies show they improve the heat island effect by absorbing thermal energy or deflecting solar energy away before it creates heat or by evaporative cooling with aquacultures.	3
	RESEARCH & DEVELOPMENT <p>Added Value BIG support a range of R&D activities by companies including testing employee and customer satisfaction levels, expanding the use of monitoring systems which might be manufactured by the business. Other R&D applications.</p> <ul style="list-style-type: none"> ✓ Seedling development. ✓ Preserving endangered crop species ✓ Improving plant productivity ✓ Improving air quality ✓ Improving occupant experience <p>Challenge Fitting BIG into existing R&D, either physically or business wise like using a BIG as an interesting demo/exhibition center.</p>	1

TABLE 3 SELECTING FEATURES FOR BUILDING-INTEGRATED GREENHOUSES		PRIORITY ¹ 0, 1, 2, 3 or check
CATEGORY	FEATURE OPTIONS	
	EDUCATION & TRAINING <p>Added Value BIG are effective tools to educate students, teachers and office occupants how to improve their health and performance as well as how biodiverse systems work. It is also instrumental in the education of children about vegetable and fruit production.</p> <p>Challenge Getting them accepted by the operations department in educational institutions.</p>	2
	CORPORATE SOCIAL RESPONSIBILITY (CSR) / GLOBAL REPORTING INITIATIVE (GRI) CLAIM How important is a CSR claim to the owner? Does the owner use GRI?	3
OWNER TYPE	BUILDING OWNER OWNS THE FACILITY	✓
	COMMERCIAL URBAN FARMER	
	AMATEUR GARDENERS	
	COMMUNITY ASSOCIATION	
	3rd PARTY (SPECIFY)	
OPERATOR TYPE	COMMERCIAL URBAN FARMER	✓
	BUILDING OWNER Do the owners want to operate the greenhouse themselves or do they want to partner with a third party operator? One of the most important questions to answer early so the operator is involved from the start.	
	AMATEUR GARDENERS	
	GREENHOUSE SYSTEMS COMPANY	✓
	BUILDING OPERATIONS COMPANY	
	STUDENTS PROFESSIONAL RESEARCHERS	✓

TABLE 3 SELECTING FEATURES FOR BUILDING-INTEGRATED GREENHOUSES		PRIORITY 0, 1, 2, 3 or check
CATEGORY	FEATURE OPTIONS	
GREENHOUSE INTEGRATION TYPE	GREENHOUSE AS OUTER ENVELOPE CONTAINING MULTIPLE FACILITIES OR STRUCTURES	
	STAND-ALONE GREENHOUSE WITHOUT OTHER STRUCTURES INSIDE	
	GREENHOUSE AS SKIN FOR BUILDING	✓
	EVENT FACILITY INTEGRATED	✓
	RESTAURANT/CAFETERIA -INTEGRATED A good marketing tool is to be able to show customers where their food is coming from so it can be trusted and they can share the experience. Determine if there will be cafe or restaurant services or will this only occur during social events?	
	SUPERMARKET-INTEGRATED Integrated indoor farms provide fresh on-site products and enhance customer experience.	
	PENAL INSTITUTION-INTEGRATED Greenhouses have been identified as productive rehabilitation mechanisms in prisons.	
	AGRO-INDUSTRY PROCESSING FACILITY INTEGRATED Locating production next to processing facilities saves spoilage and transport costs.	
	FACTORY, LOGISTICS OR TRANSPORT FACILITY INTEGRATED Ferrari in Italy uses indoor trees and other plants to fine-tune air in its clean-room facilities.	
	HEALTHCARE INSTITUTIONS, SENIORS HOMES, PALLIATIVE CARE Greenhouse gardens have been used for many years to improve recovery rates of patients and improve quality of life in chronic care facilities.	
SCHOOLS & TRAINING CENTERS INTEGRATED Building integrated greenhouses are already used in schools, in e.g. Manhattan as curriculum-integrated teaching tools.		
OFFICES INTEGRATED Atria are common in office buildings but usually under-utilised and can be optimised.		

TABLE 3 SELECTING FEATURES FOR BUILDING-INTEGRATED GREENHOUSES		PRIORITY 0, 1, 2, 3 or check
CATEGORY	FEATURE OPTIONS	
GREENHOUSE PLACEMENT RELATIVE TO BUILDING	RECREATION FACILITY INTEGRATED Spas and sport facilities often have atrium areas which can be optimised for integrated indoor farming especially to grow speciality herbs and other healthy foods for caterfeterias.	
	SITED AT ONE BUILDING BUT WITH PRODUCT SALES AGREEMENT TO ADJACENT BUILDINGS Integrated indoor farms in the U.S. have production agreements with supermarkets.	
	APARTMENT CLUSTER INTEGRATED Community gardening is a well-established practice and especially well-suited to multi-unit apartment complexes where rooftop or landscape space often goes under-used.	
	SINGLE-FAMILY DWELLINGS INTEGRATED Referred to as 'winter gardens', integrated indoor farming is a welcome addition to homes and can be optimised using planning steps described in this toolbox.	
	FLOATING ON WATER One of the first indoor farms in New York city was built in a river barge to save space.	
	BUILDING INSIDE THE GREENHOUSE	
	STAND-ALONE, NOT INTEGRATED WITH BUILDING	
	ROOFTOP INTEGRATED	✓
	GROUND FLOOR ATTACHED TO EXTERIOR	
	MULTI-STORY ATRIUM INTEGRATED WITH BUILDING	
SINGLE STORY INTEGRATED WITH INTERIOR USING DAYLIGHT		
INTERIOR OF BUILDING ABOVE GROUND NOT USING DAYLIGHT		
VERTICAL WALL/ENCLOSED BALCONIES		
BELOW GROUND LEVEL WITH OR WITHOUT DAYLIGHT		

TABLE 3 SELECTING FEATURES FOR BUILDING-INTEGRATED GREENHOUSES		
CATEGORY	FEATURE OPTIONS	
	<p>PRIORITY 0, 1, 2, 3 or check</p>	
GREENHOUSE CONSTRUCTION	OPEN-TYPE	
	CLOSED-TYPE (EG WATER OR ENERGY RE-USE)	✓
	GLASS (GH, WHITE, AR, SINGLE, DOUBLE)	✓
	PLASTIC (PMMA, PE, PC, ETFE, TFE, SINGLE, DOUBLE)	✓
	NORMAL WEIGHT CONSTRUCTION	
	LIGHT WEIGHT CONSTRUCTION	✓
	ULTRA-LIGHT WEIGHT (EG BAMBOO+FOIL)	
	HIGH TECH (HVAC, LIGHT, COMPUTER CONTROLLED)	
	MEDIUM TECH (CONTROLLED ENVIRONMENT)	✓
	LOW TECH (PASSIVE CATCH OF SOLAR HEAT)	
NEWLY BUILT / RENOVATION		

RESULTS OF FEATURE SELECTION USING EVENT FACILITY EXAMPLE

The results of the process from Table 3 identify priority characteristics and questions to solve.

For example the question marks next to priorities in Table 3a indicate;

- How will operations be divided between the commercial operator, the greenhouse systems company and the researchers who are growing seedlings ?
- Which materials to use for the building skin?

After those questions are resolved the resulting table can be shown to the prospective greenhouse operator, contract, municipal permitting authorities and other stakeholders to give them clarity on priorities for the facility. It will be a guide throughout planning, construction and operations.

Table 3a Priority features resulting from Table 3 category selections using the example of an event facility integrated with a greenhouse.

VALUE-ADDED SERVICES SEEDLING PRODUCTION RESEARCH & DEVELOPMENT AGRICULTURAL PRODUCTS QUALITY IMPROVEMENT COMPARED TO OPEN FIELD. IMPROVED AIR QUALITY IMPROVE PRODUCTIVITY OR WELL-BEING OF OCCUPANTS ENHANCE AESTHETICS & IMPROVE CUSTOMER EXPERIENCE
OWNER TYPE BUILDING OWNER
OPERATOR TYPE ?? COMMERCIAL URBAN FARMER ?? PROFESSIONAL RESEARCHERS ?? GREENHOUSE SYSTEMS COMPANY
GREENHOUSE INTEGRATION TYPE GREENHOUSE AS SKIN FOR BUILDING EVENT FACILITY INTEGRATED
GREENHOUSE PLACEMENT RELATIVE TO BUILDING ROOFTOP INTEGRATED GREENHOUSE AS SKIN FOR BUILDING
GREENHOUSE CONSTRUCTION NEWLY BUILT CLOSED-TYPE (EG WATER OR ENERGY RE-USE) ?? GLASS (GH, WHITE, AR, SINGLE, DOUBLE) ?? PLASTIC (PMMA, PE, PC, ETFE, PTFE, SINGLE, DOUBLE) LIGHT WEIGHT CONSTRUCTION

SPATIAL CONFIGURATION

Indoor Farming: 20 localizations + 3 pilot projects



Matrix of configurations, Indoor Farming: 20 localizations + 3 pilot projects



Indoor Farming: 20 Charts > Toolbox



INDOOR FARMING IN RBC // 2014

AND01

Avenue Marius Renard
1070 Anderlecht

Carrefour Anderlecht

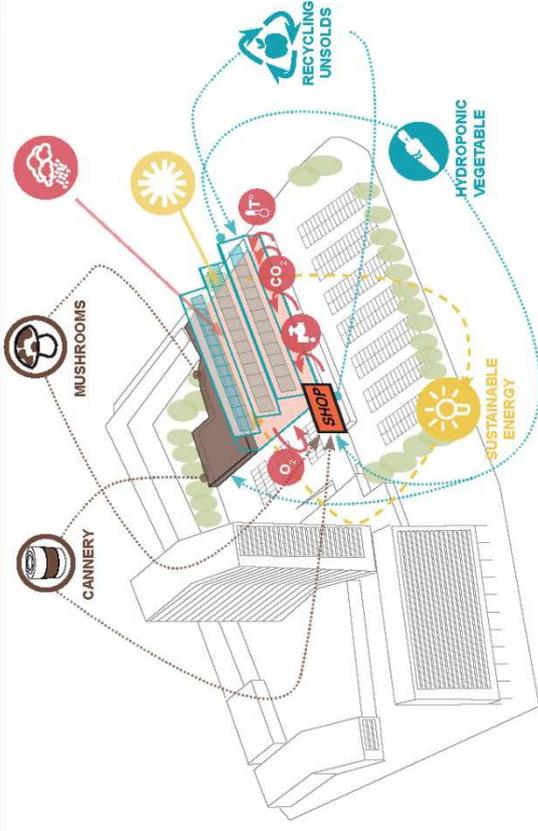


ResilientWeb
Innovate for a sustainable business



PROJECT

SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area L > 3.000m ² 49m, 31m, 42m, 57m	Use SHOP Nutrients availability HEAT CO ₂	Host CARREFOUR	Accessibility EASY	Context PRIVATE UNSOLD VEG. H ₂ O
--	--	---	--------------------------	------------------------------	--

Available area 5.550 m² (0.56Ha), deduced existing parking. Take account of the shadow of the tower of residences at the end of the day.

Building use and structure The project is on the roof of a supermarket of the ensign Carrefour Belgium. The access is easy, slope for vehicles in place.

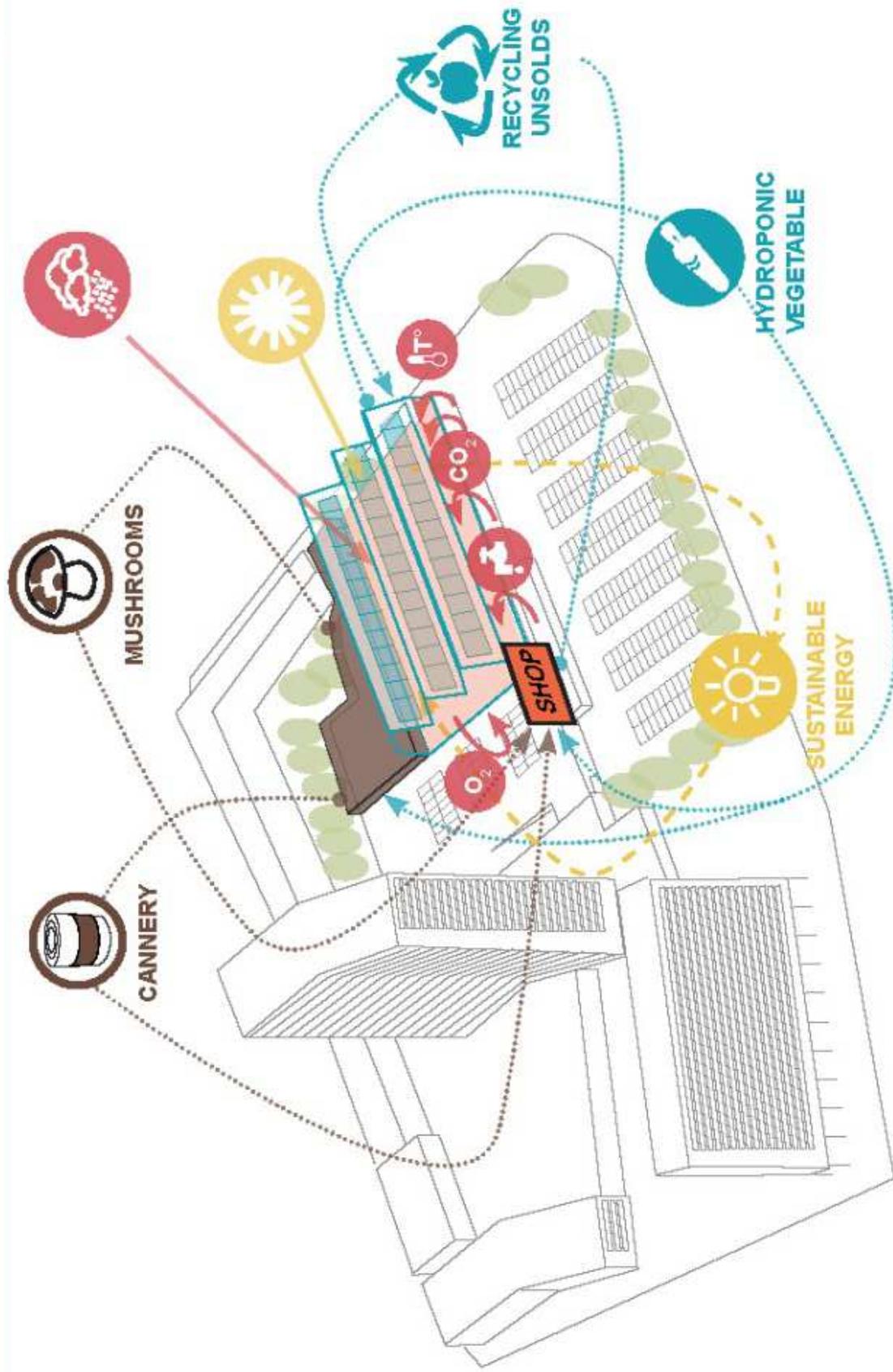
Context Accessibility RRU in zone C - Tramway STIB 31 and 81. Primary schools and secondary near (less 500m). Mainly residential district with some great surfaces and proximity shops.

Nutrients availability XXX

KNOW WHAT YOU WANT

Reduce the price you pay for your food is our greater concern. What could be more normal than bringing back part of the production closest to the consumer without losing quality. The greenhouse on the roof of our Carrefour Anderlecht shop allows us to reach this objective; more over the local cannery that we set up also helps us possible offering you varied products throughout the year. In short, a true WIN-WIN solution.

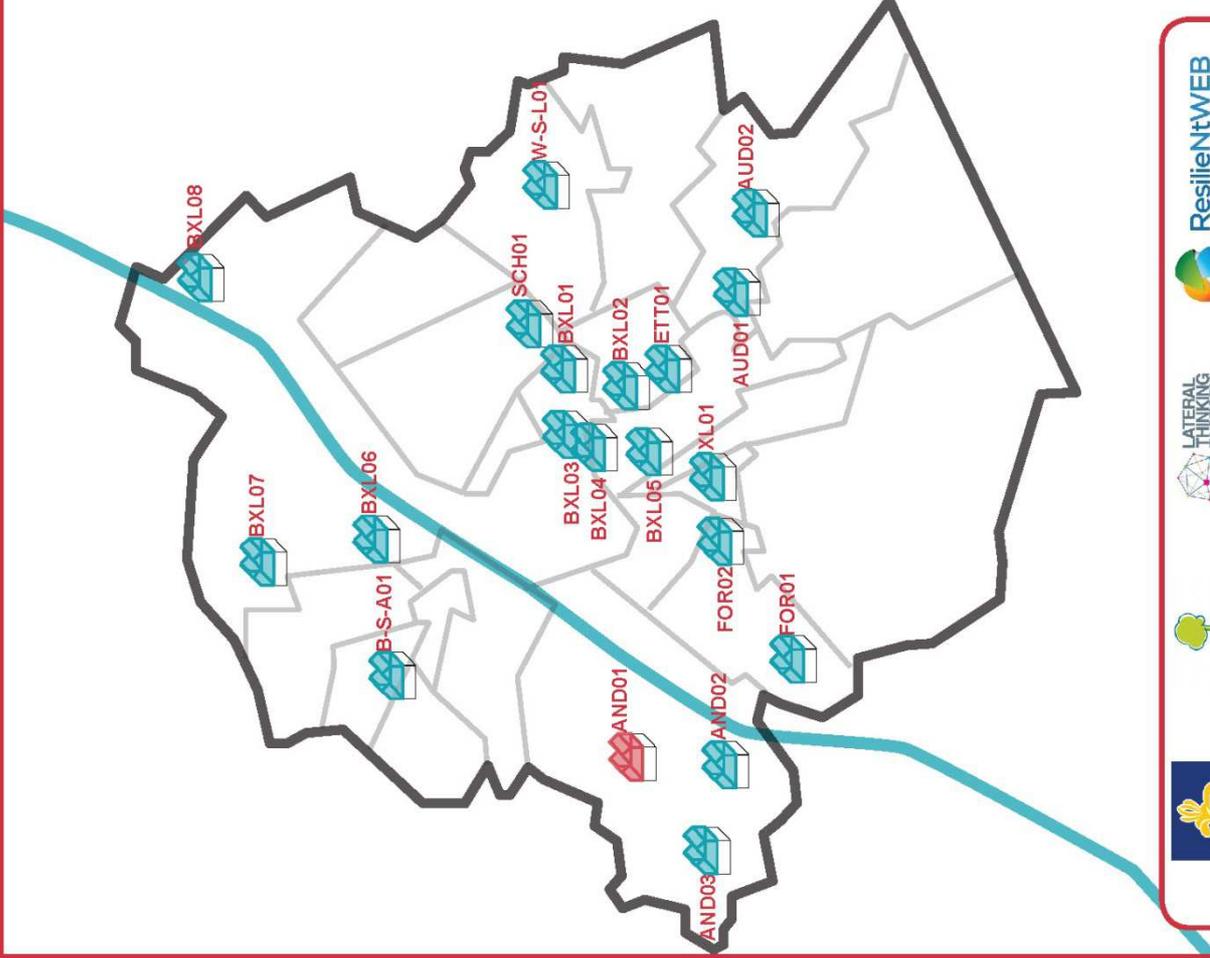
WHY DO IT? ++ € PRODUCT NEW BUSINESS OPPORTUNITIES VEG. UNDERUSED SPACE ???	STAKEHOLDERS CARREFOUR ECO IRIS	FTE 15-30
ENJOY THE HEAT RECYCLING AIR LESS LOGISTIC SUSTAINABLE ENERGY COMPOST UNSOLDS	ADDED VALUE CANNERY	
VEGETABLES CANNED FOOD MUSHROOMS	PRODUCTION SYSTEM GLASS + PV HYDROPONIC	



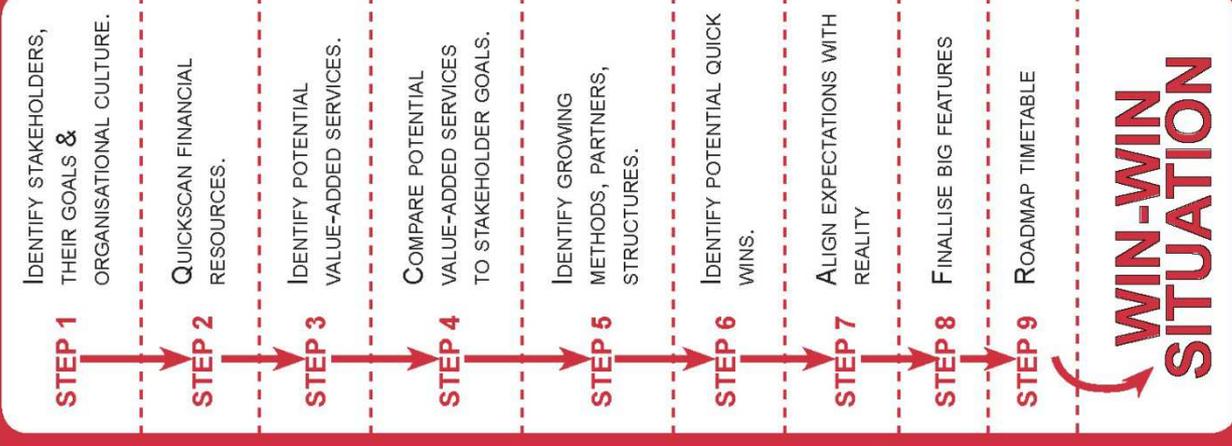
INTEGRATED INDOOR FARMING PLANNING TOOLBOX

01		2		1
02		3		2
03		0		0
04		3		1
05		3		1
06		1		2
07		1		0
08		3		0
09		2		3
10		3		2
11		0		0
12		2		0
13		0		3

QUICK WINS



START TO PLAN



INDOOR FARMING IN RBC // 2014

AND02

CERIA



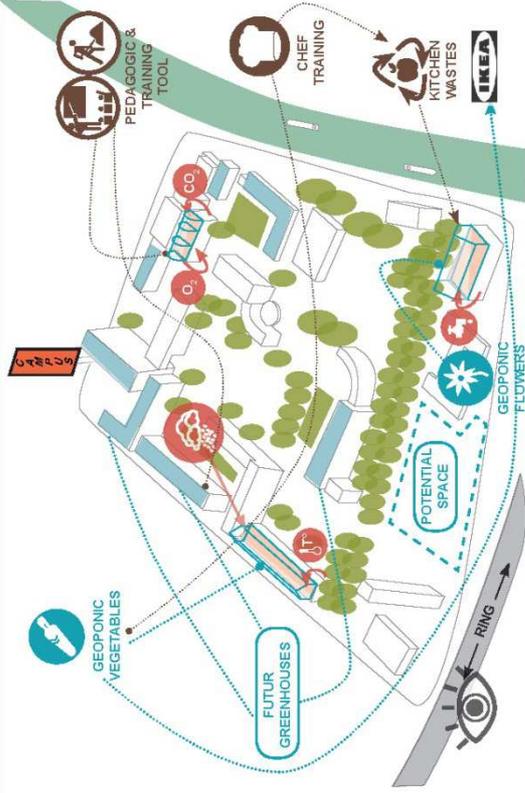
Innovate for a sustainable business



RUE EMILE GRAYSON
1070 ANDERLECHT

PROJECT

SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area L > 3.000m² 200m 60m	Use EDUCATION & TRAINING HEAT CO ₂	Host CERIA	Accessibility HARD	Context PUBLIC KITCHEN WASTE H ₂ O
--	---	--	---------------	-----------------------	--

Available area Approximately 9.000 m² (0,9Ha) of flat roofs distributed on several buildings.

Building use and structure The project is located on the roofs of the buildings of the Campus of the CERIA. Synergies should be possible with institutes present on the campus. Of which in particular: - The Meurice Institute, industrial Engineer in Biochemistry and Chemistry - the Hautot Institute, Architecture of gardens and landscapes, Dietetics, Management of the urban environment, Hotel management.

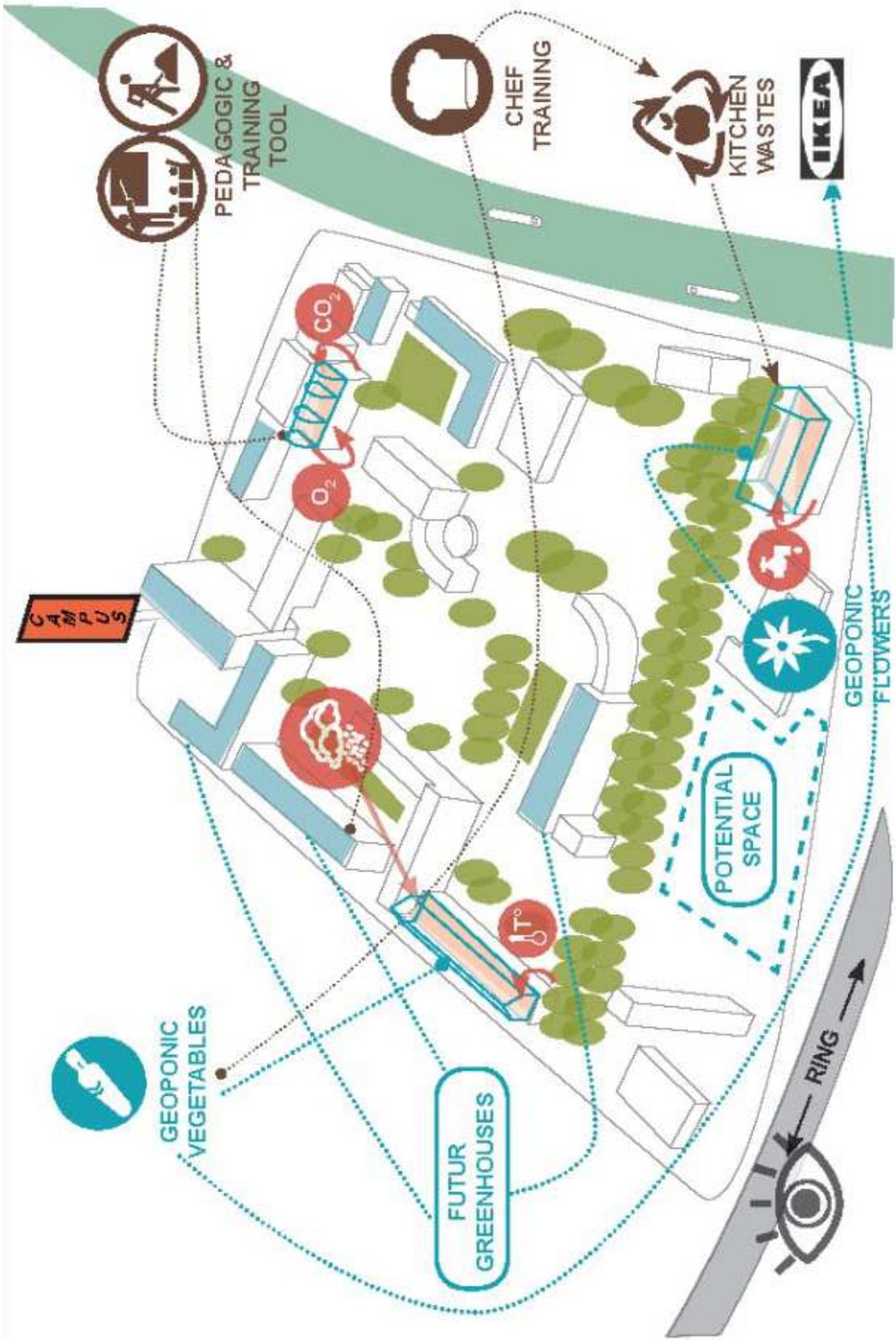
Context Accessibility RRU in zone C - Bus the STIB 75
Located in edge of speedway and along the canal, the zone is mainly intended for the equipment of collective interest or public utility.
University cafeteria on the campus.

Nutrients availability XXX

KNOW WHAT YOU WANT

Ceria is an active campus of several highschools (landscape architecture, horticulture, hotel and catering, ...), so the goal of our greenhouses on the roofs of the institutes, is proposing to our students, an *in situ* training place. For some, it will be the fresh and local products which will be interesting, for others, it will be the fact of growing and of taking care of it. In all the cases, that will be true teaching aids natural size. An other positive point? The rest of the production goes directly to the restaurant of a famous Swedish builder of furniture.

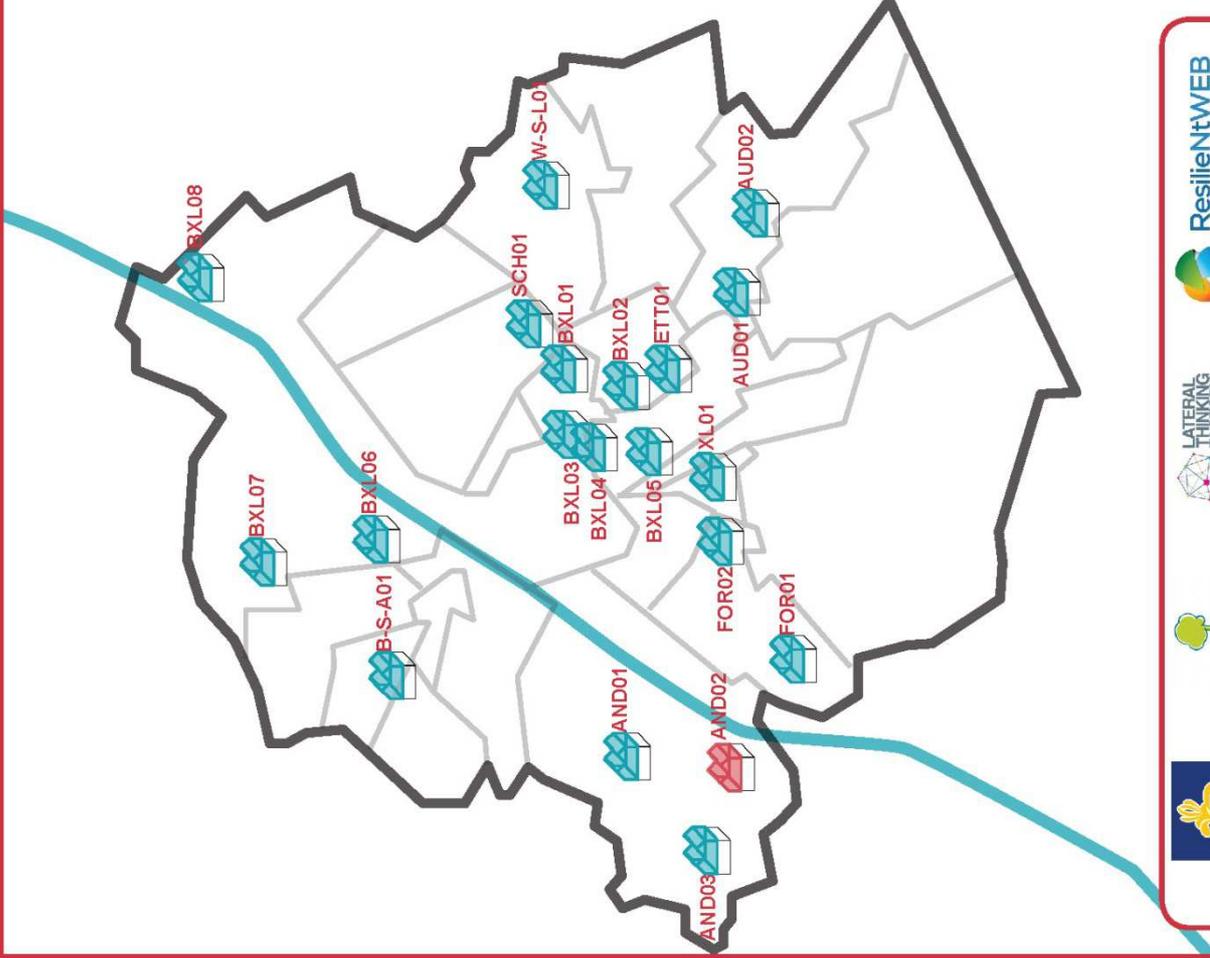
WHY YOU DO THAT PEDAGOGIC TOOL TRAINING TOOL PRODUCT VEG. RECYCLING AIR ENJOY THE HEAT	STAKEHOLDERS CERIA IKEA	FTE 15-30
PRODUCTS VEGETABLES FLOWERS	ADDED VALUE HIGH VISIBILITY FIT SMALL GROWUP	PRODUCTION SYSTEM PLASTIC GREENHOUSE GLASS GEOPONIC
UNDER-USED SPACE COMPOST WASTE NEW JOBS RESEARCH & DEVELOP.	AVAILABLE SPACE AVAILABLE SPACE GROUND FLOOR	



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		2		1
02		1		1
03		0		1
04		1		3
05		1		2
06		1		3
07		2		0
08		2		0
09		3		3
10		2		1
11		0		3
12		3		3
13		3		2

QUICK WINS



Logos for ResilientWEB (Innovate for a sustainable business), Lateral Thinking Factory, and other partners.

START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

STEP 2 QUICKSCAN FINANCIAL RESOURCES.

STEP 3 IDENTIFY POTENTIAL VALUE-ADDED SERVICES.

STEP 4 COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.

STEP 5 IDENTIFY GROWING METHODS, PARTNERS, STRUCTURES.

STEP 6 IDENTIFY POTENTIAL QUICK WINS.

STEP 7 ALIGN EXPECTATIONS WITH REALITY

STEP 8 FINALISE BIG FEATURES

STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

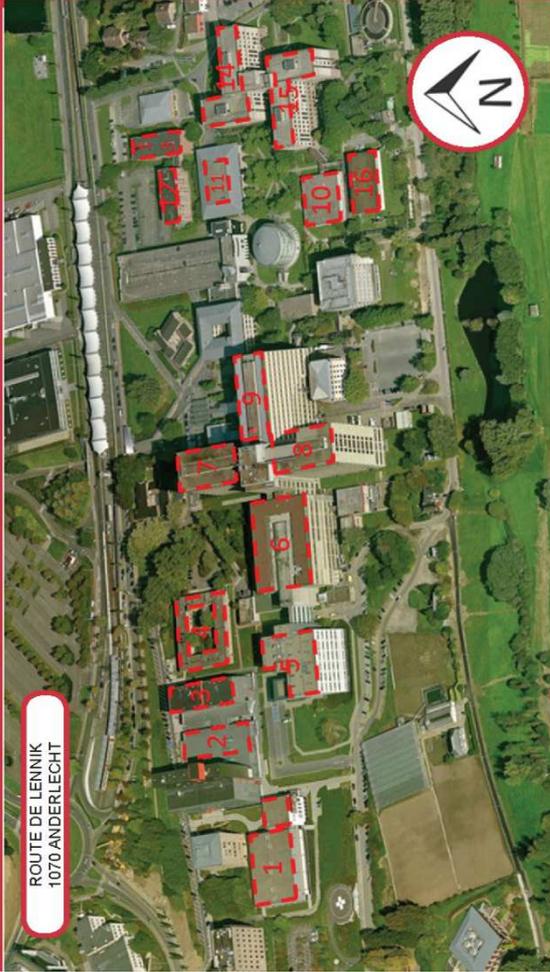
INDOOR FARMING IN RBC // 2014

AND03

Campus Erasme



ResilientWEB
Innovate for a sustainable business



ROUTE DE LENNIK
1070 ANDERLECHT

KNOW WHAT YOU HAVE

	Available area XL > 10.000m ² 730m 60m	Use HOSPITAL & UNIVERSITY	Host ULB & HOSP ERASME	Accessibility HARD	PRIVATE
		Nutrients availability HEAT CO ₂	H₂O	Context WWTP	

Available area

Approximately 32.000 m² (3,2Ha) of flat roofs distributed on several buildings.

Building use and structure

The project is located on the roofs of the buildings of the campus Erasme (Université libre de Bruxelles), more particularly on the Erasme Hospital - University Clinics of Brussels.

Context

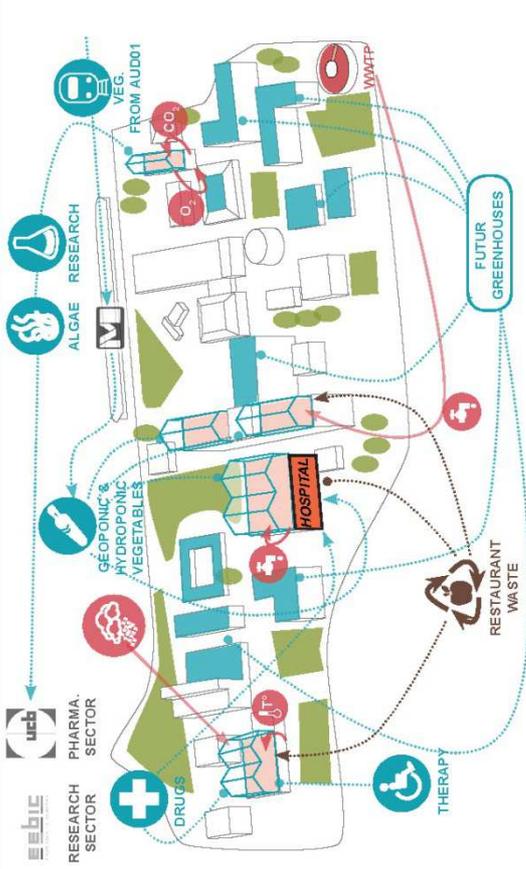
Accessibility RRU in zone B - Subway STIB 5, Bus DELIJN 141, 142, 620
Located in periphery, the zone is dedicated to the offices and the university campus, university cafeteria and probably some cafeteria of offices. Presence also of a nursery and a convalescent home.

Nutrients availability

XXX

PROJECT

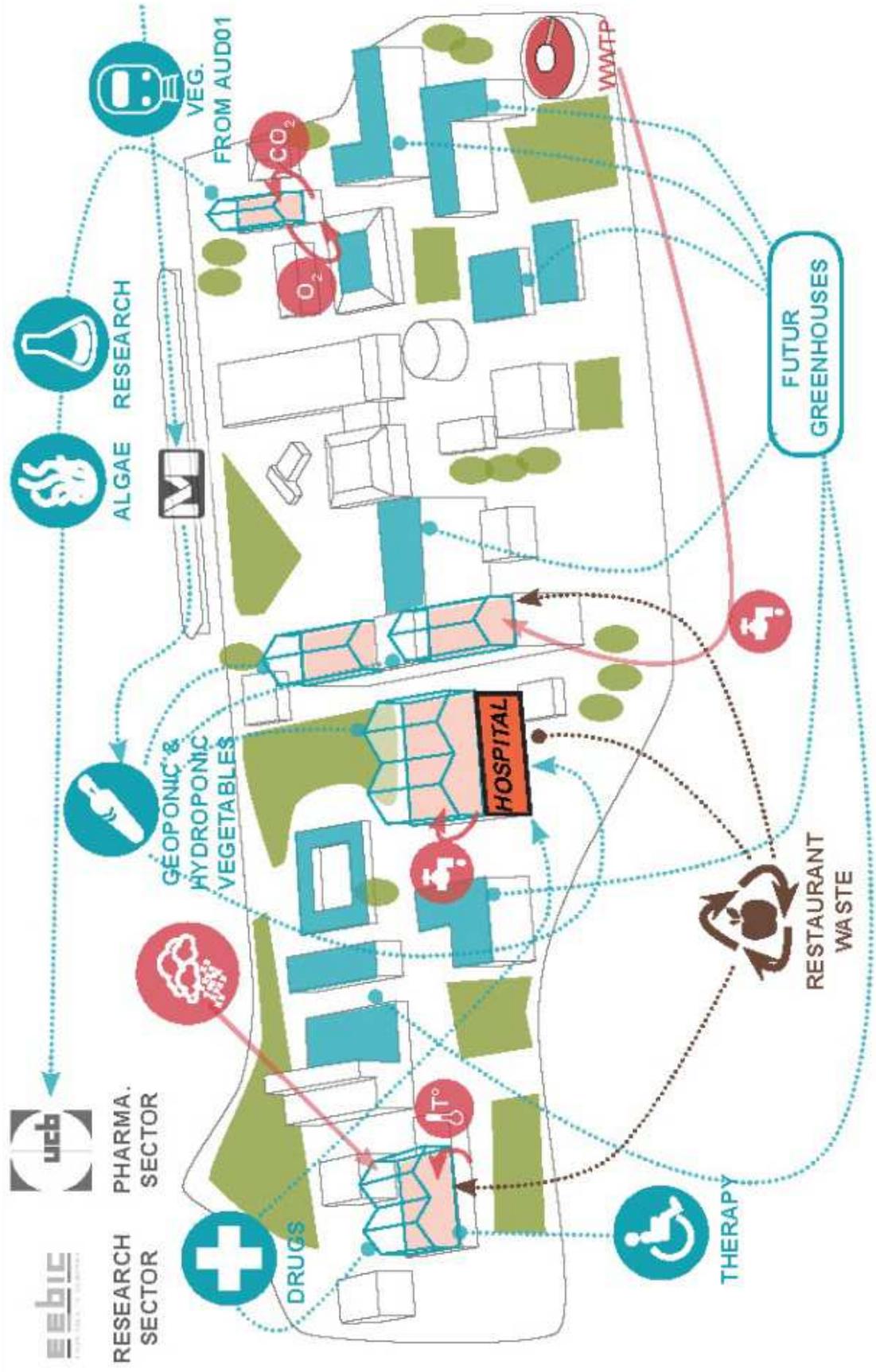
SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU WANT

Nature, a timeless source of inspiration and of all medicines. Our greenhouses on the roofs are useful to us for the production of food of quality for our patients and our employees but also as great spaces of research, of therapy for disabled people, production of medicines (apitherapy, medicinal plants) and of algae for the pharmaceutical and cosmetic sector. In short, a true complementary tool to our activities

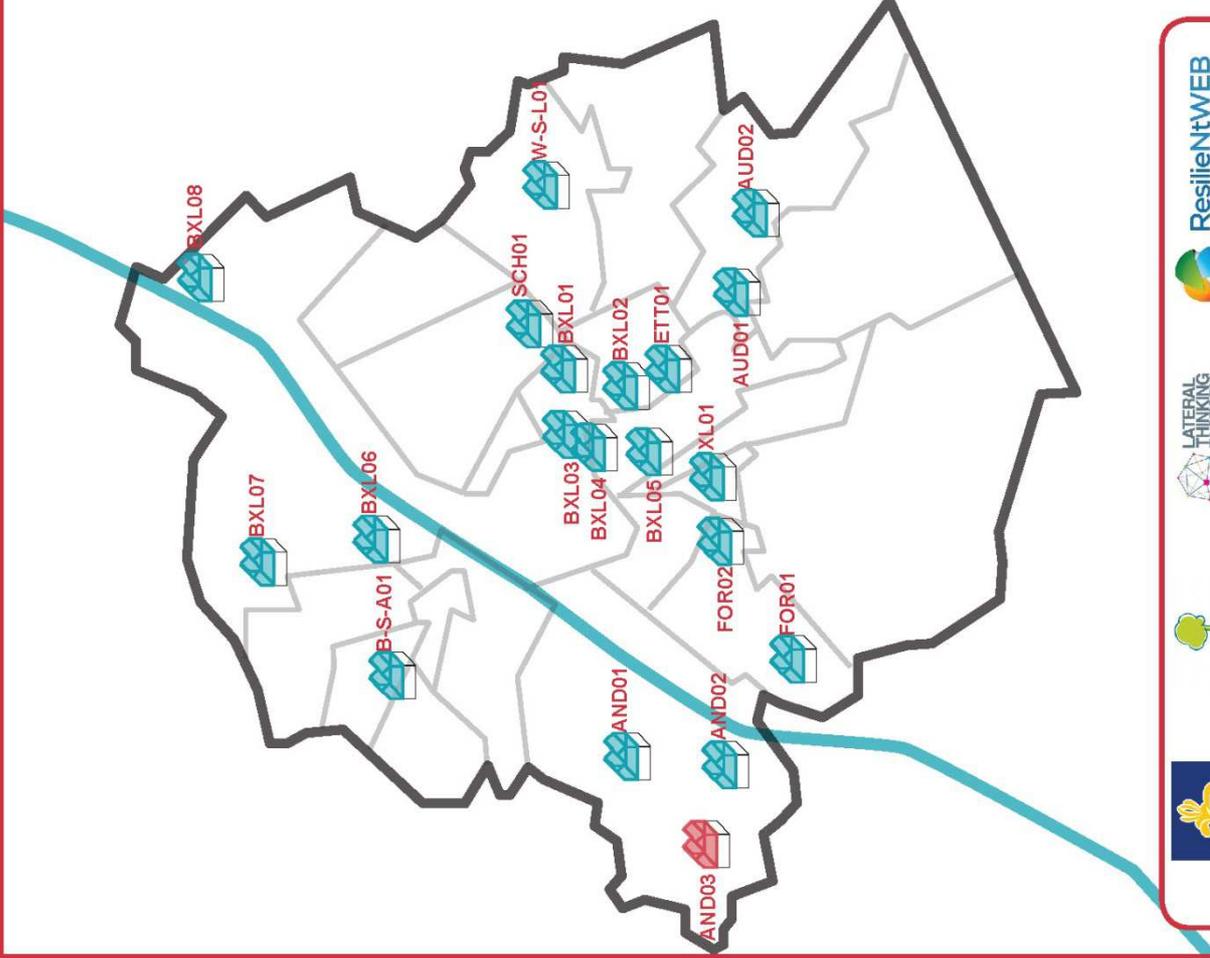
WHY DO IT?	STAKEHOLDERS	FTE
<ul style="list-style-type: none"> PRODUCT MED. RESEARCH & DEVELOP. THERAPY WELL-BEING. PRODUCT VEG. 	<ul style="list-style-type: none"> ULB HOSPITAL EBIE 	75-100
<ul style="list-style-type: none"> UNDER-USED SPACE RECYCLING AIR ENJOY THE HEAT 	ADDED VALUE	
	<ul style="list-style-type: none"> RESTAURANT WASTE FIT SMALL GROWUP METRO LINK WITH AUD01 	
PRODUCTS	PRODUCTION SYSTEM	
<ul style="list-style-type: none"> VEGETABLE DRUGS ALGAE 	<ul style="list-style-type: none"> GLASS GEOPONIC HYDROPONIC 	



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		3
02		0
03		0
04		2
05		1
06		2
07		0
08		2
09		3
10		3
11		1
12		3
13		1
14		3
15		3
16		1
17		3
18		2
19		3
20		1
21		0
22		2
23		1
24		3
24		1
26		2

QUICK WINS



ResilientWEB
Innovate for a sustainable business

LATERAL THINKING FACTORY

RESILIENT PERFORMANCE

EUROPEAN UNION

START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

STEP 2 QUICKSCAN FINANCIAL RESOURCES.

STEP 3 IDENTIFY POTENTIAL VALUE-ADDED SERVICES.

STEP 4 COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.

STEP 5 IDENTIFY GROWING METHODS, PARTNERS, STRUCTURES.

STEP 6 IDENTIFY POTENTIAL QUICK WINS.

STEP 7 ALIGN EXPECTATIONS WITH REALITY

STEP 8 FINALISE BIG FEATURES

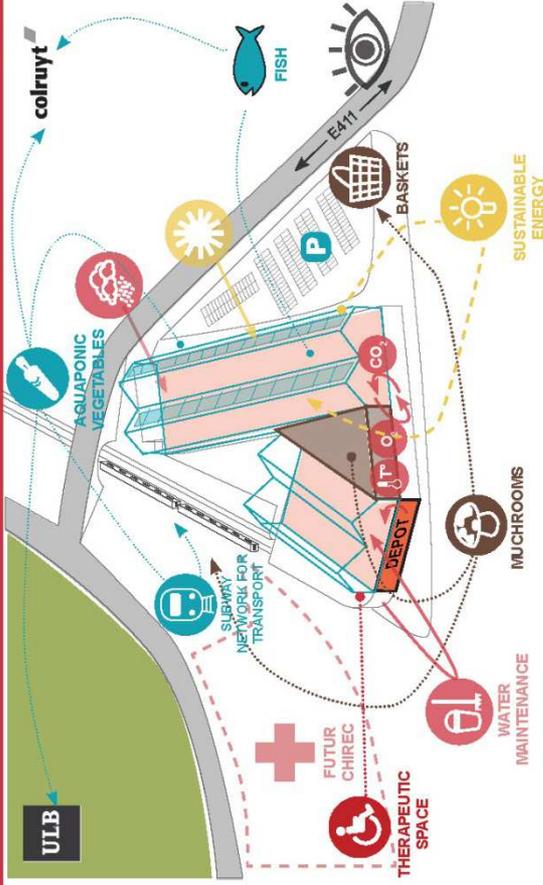
STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

DELTA
1160 AUDERGHEM



PROJECT SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area XL > 10.000m ² 70m, 165m, 250m, 100m, 100m, 88m, 135m	Use DEPOT Nutrients availability HEAT, CO ₂ , H ₂ O, WATER MAINTENANCE	Host STIB MIVP	Accessibility EASY	Context PUBLIC
--	--	--	-----------------------------	------------------------------	--------------------------

Available area 3,4 Ha (34.000 sqm2) the whole roof area is available. Not currently accessible.

Building use and structure STIB bus depot, maintenance and cleaning. The rooftop is accessible from adjacent space and new access seems easy to create. Structure has not been studied and needs an in depth technical survey.

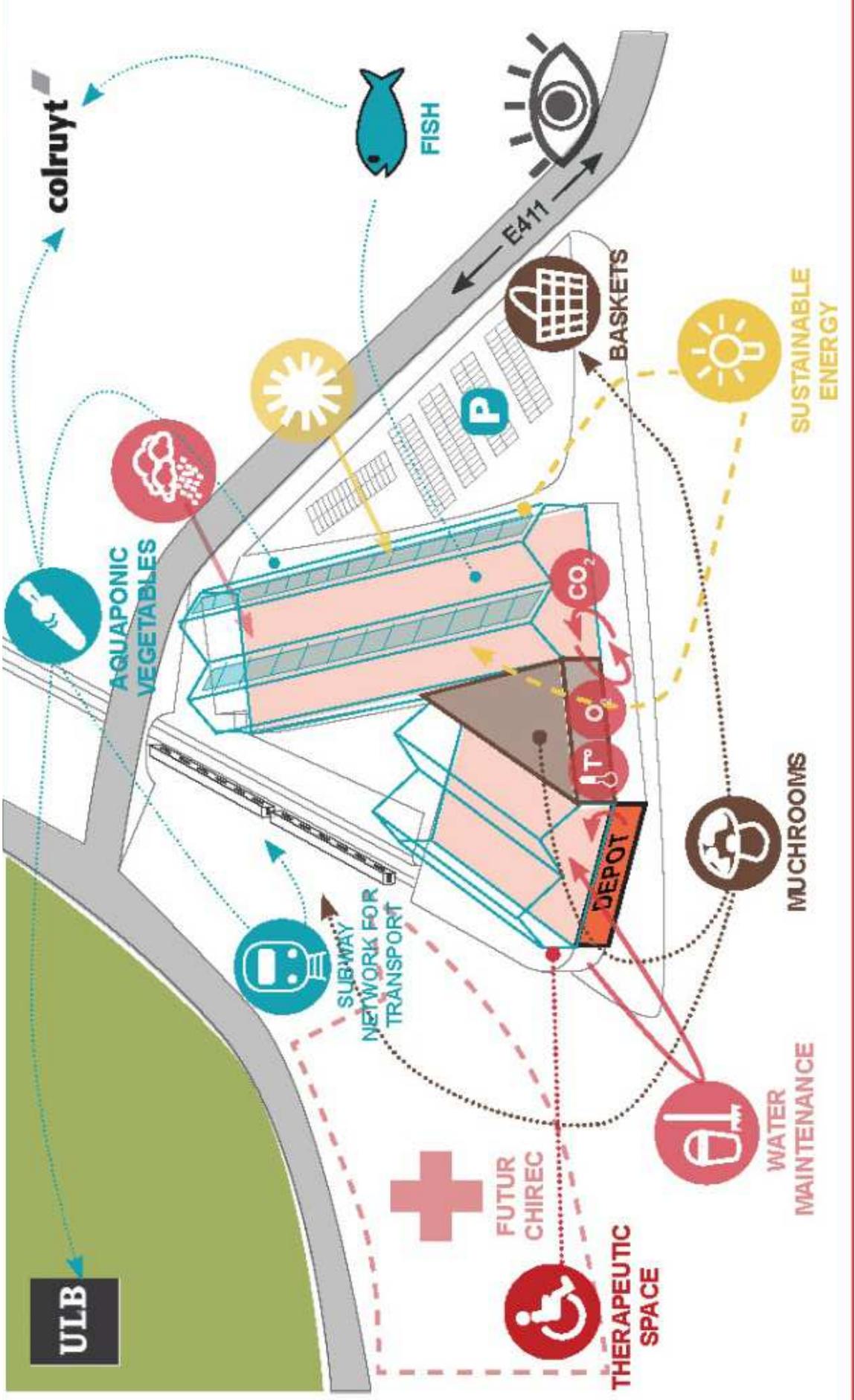
Context Located in a mixed use neighborhood with offices, housing and production activities. Some restaurants, no retail. High visibility from the E411 Highway Close to the ULB and VUB sites, European School and the new CHIREC Hospital (in construction).

Nutrients availability Potential use of Heat and water coming from the building behind, explore potential use of the Subway Network for night goods transport, potential to use nutrients coming from the future hospital (to be defined). Check heat production from electrical transformer.

KNOW WHAT YOU WANT

The Delta bus depot being one of the large of the city with a beautiful rooftop, STIB wants to start growing vegetables to use all the resources from its facility (water, heat and CO2) and improve building's performances by generating added value from waste management. Well located near the E411 highway and the subway, STIB will have different possibilities to move production, by trucks, light transport or subway, depending of where we will deliver. Another nice goal will be to create a therapeutic area with CHIREC to help health recovery through gardening.

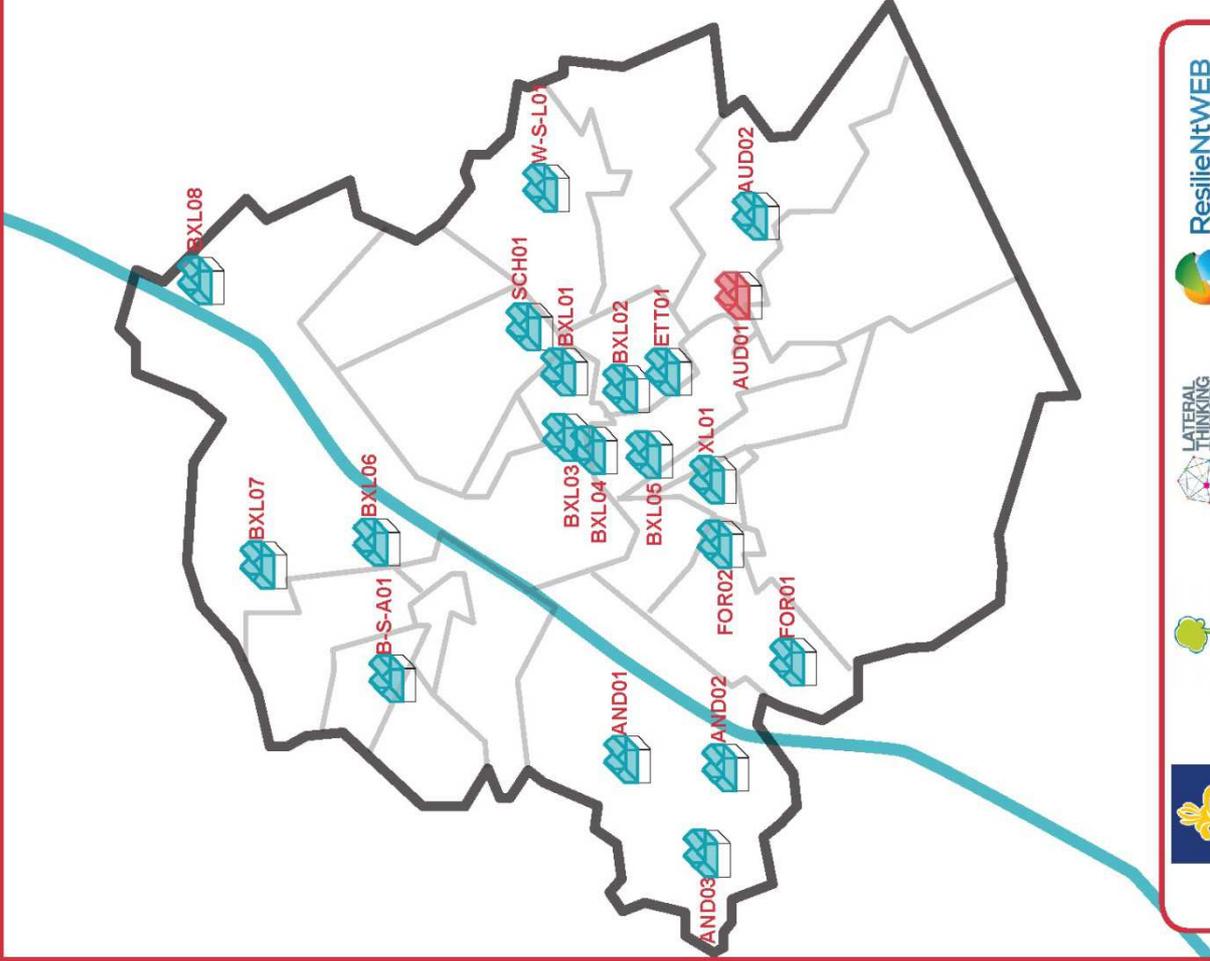
WHY DO IT? €+ PRODUCT NEW BUSINESS OPPORTUNITIES VEG. LESS LOGISTIC SUSTAINABLE ENERGY UNDER-USED SPACE NATURAL LIGHTING	STAKEHOLDERS STIB ULB colruyt CHIREC	FTE 100-150 PIT SMALL GROW/UP
ADDED VALUE USE SUBWAY FOR TRANSP. HIGH VISIBILITY THERAPY SPACE BASKETS	PRODUCTION SYSTEM GLASS + P.V. HYDROPONIC AQUAPONIC	PRODUCTS VEGETABLES MUSHROOMS FISH ENERGY



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		1
02		3
03		0
04		3
05		3
06		3
07		0
08		0
09		1
10		3
11		2
12		1
13		1
14		1
15		1
16		2
17		1
18		3
19		3
20		1
21		3
22		2
23		3
24		1
24		0
26		2

QUICK WINS



START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

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STEP 7 ALIGN EXPECTATIONS WITH REALITY

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STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

INDOOR FARMING IN RBC // 2014

AUD02

Subway Station Demey



ResilientWeb
Innovate for a sustainable business

AVENUE LOUIS DEHOUX
1160 AUDERGHEM



KNOW WHAT YOU HAVE

	Available area M > 1.000m ² 145m x 18m	Use SUBWAY-STATION Nutrients availability HEAT H ₂ O	Host STIB	Accessibility HARD Context PUBLIC
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Available area 2.600 m² (0.26Ha) de toiture parfaitement rectangulaire.

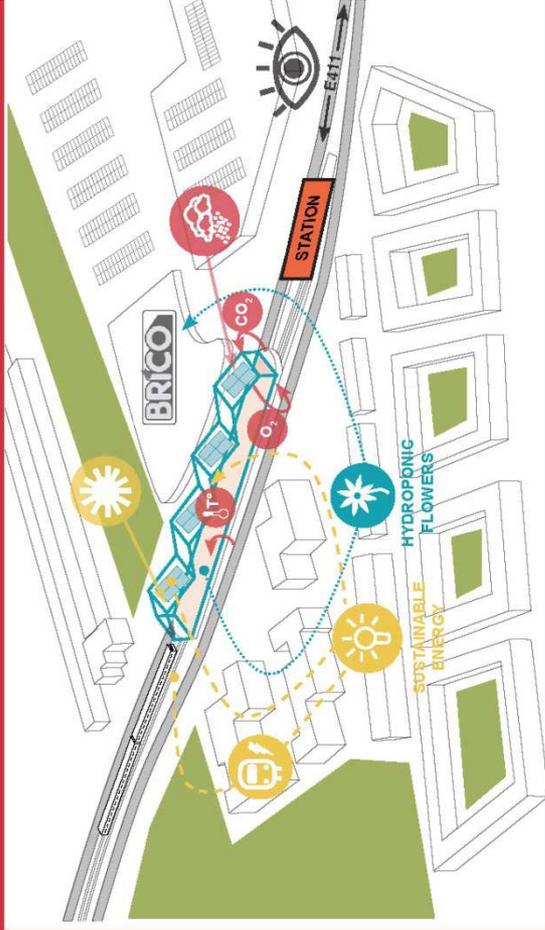
Building use and structure Station de métro Demey de la STIB. Le fait que la station soit entourée par la route rend l'accès difficile. Une configuration similaire existe à la station de métro Parnthenhuis avec un accès plus aisé.

Context Accessibilité RRU en zone B – Métro STIB 5, BUS STIB 41,72. Présence directe d'un ensemble de supermarchés alimentaires et de jardinage. Notons également la présence de quelques grands ensembles de bureaux et de logements. Situé, visible par les automobilistes entre autre aux heures de pointe, sur un des principaux axes autoroutiers à la ville, le projet peut revêtir un caractère symbolique

XXX

Nutrients availability

PROJECT SYSTEM-HOLISTIC DIAGRAM

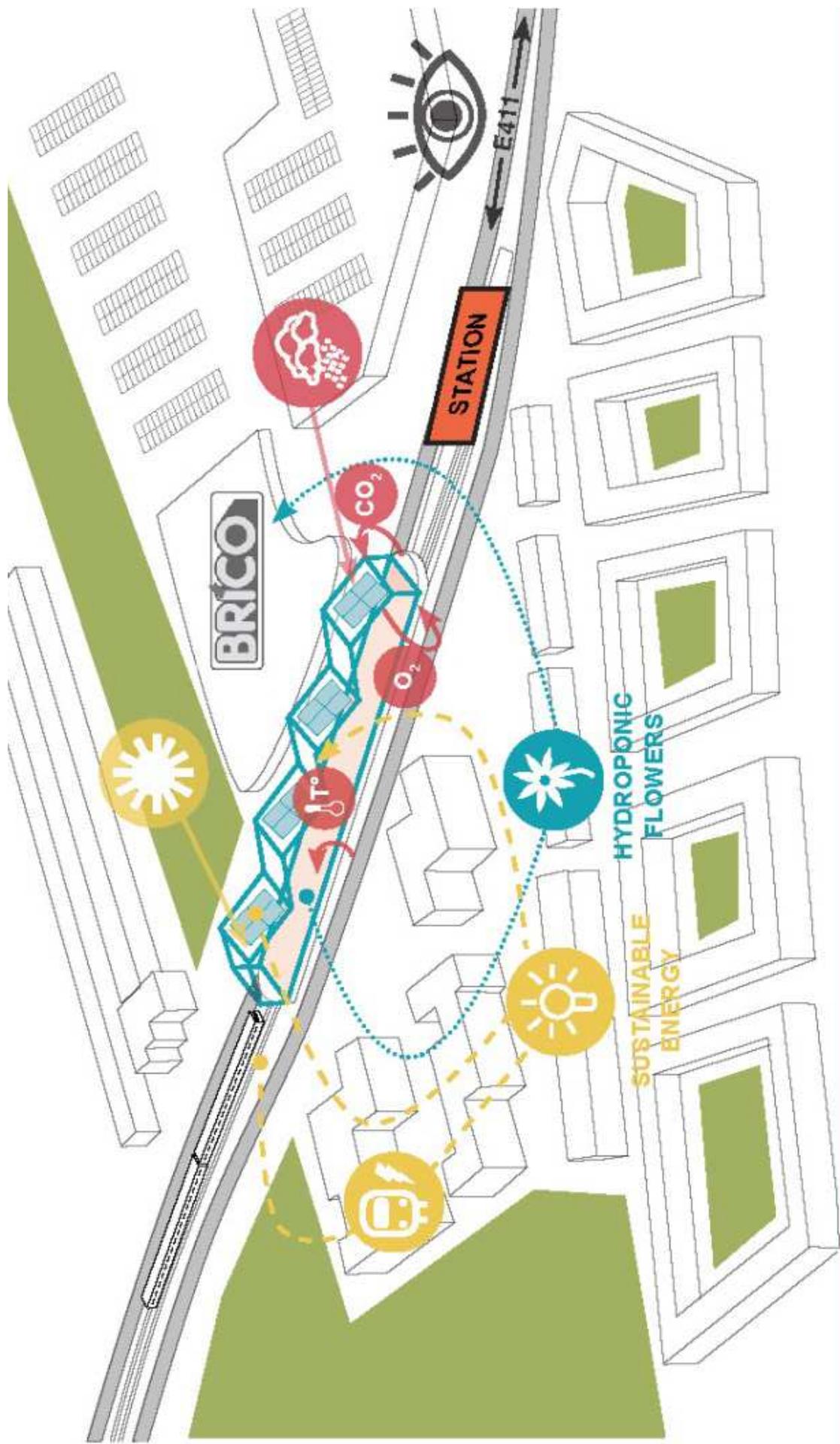


KNOW WHAT YOU WANT

L'objectif principal? Montrer à une des portes de la ville que l'agriculture urbaine est possible sur n'importe quelle toiture plate et surtout qu'avec ce genre de projet, Bruxelles possède encore un atout de plus pour devenir LA capitale la plus durable et la plus verte, même dans les lieux les moins probables!

De plus, ce projet est un espace pilote en recherche et en développement de récupération et de production d'énergie, entre autre grâce à un système qui récupère l'énergie des metros qui freinent.

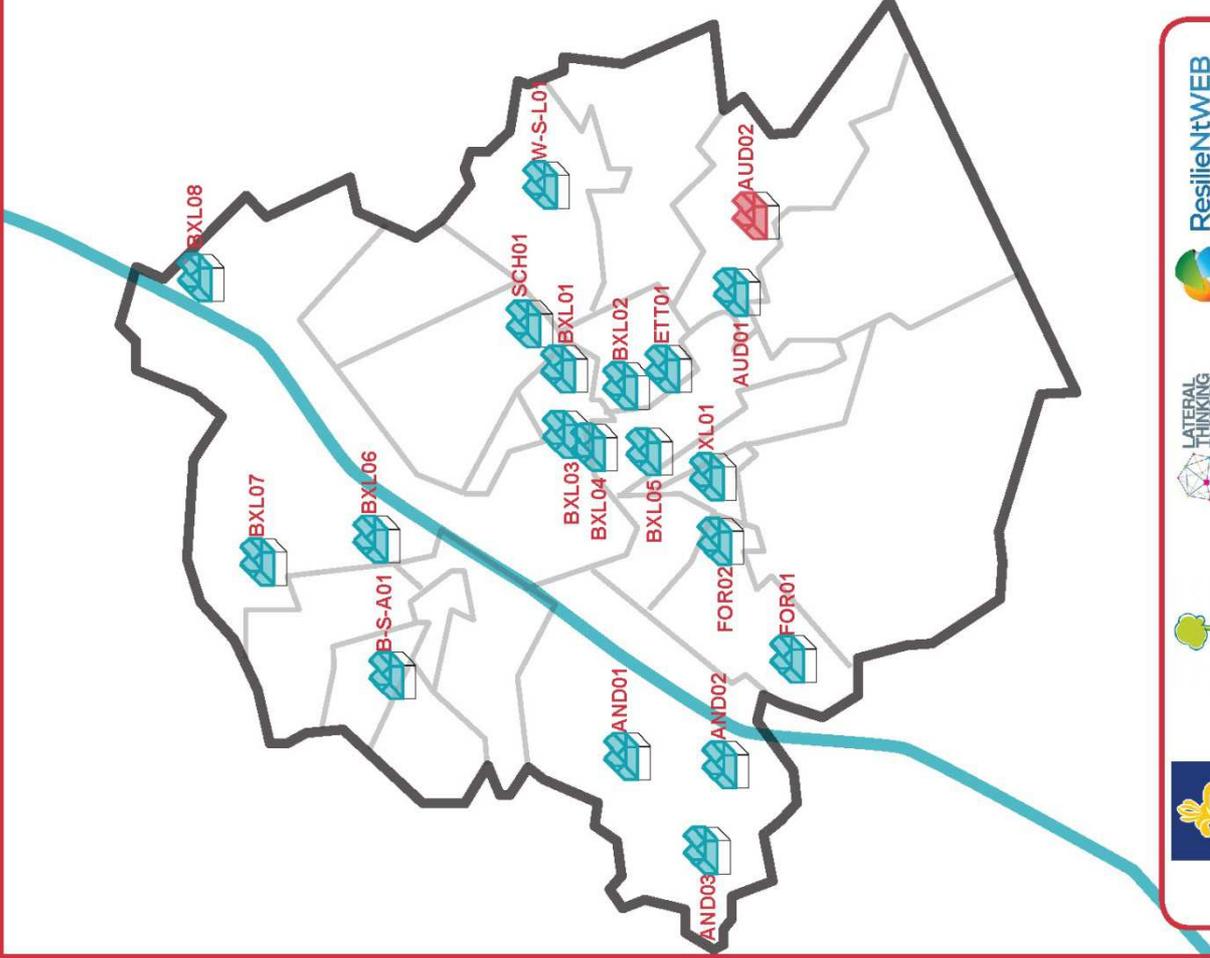
WHY DO IT? HIGH VISIBILITY OPPORTUNITIES & DEVELOP. NETWORK NEW RESEARCH COMPANIES TO BRICO UNDER-USED SPACE SUSTAINABLE ENERGY	STAKEHOLDERS STIB BXL BRICO	FTE 5-15
ADDED VALUE NEW KIND OF ENERGY RECYCLING AIR ENJOY THE HEAT	PRODUCTION SYSTEM GLASS + P.V. HYDROPONIC	
PRODUCTS FLOWERS ENERGY		



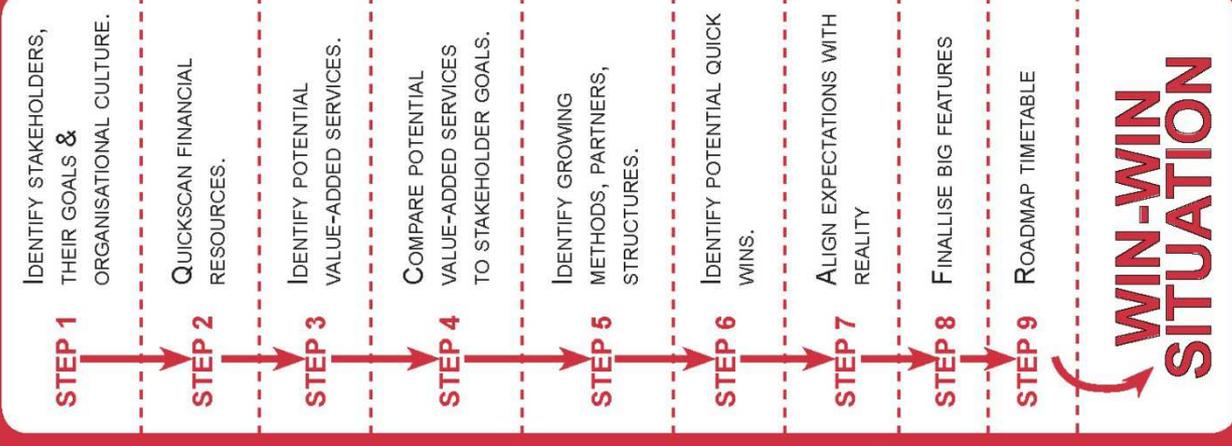
INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		0
02		2
03		0
04		1
05		2
06		2
07		0
08		0
09		2
10		2
11		3
12		1
13		1
14		0
15		2
16		3
17		1
18		3
19		1
20		0
21		3
22		1
23		1
24		3
24		0
26		2

QUICK WINS



START TO PLAN



INDOOR FARMING IN RBC // 2014

B-S-A01

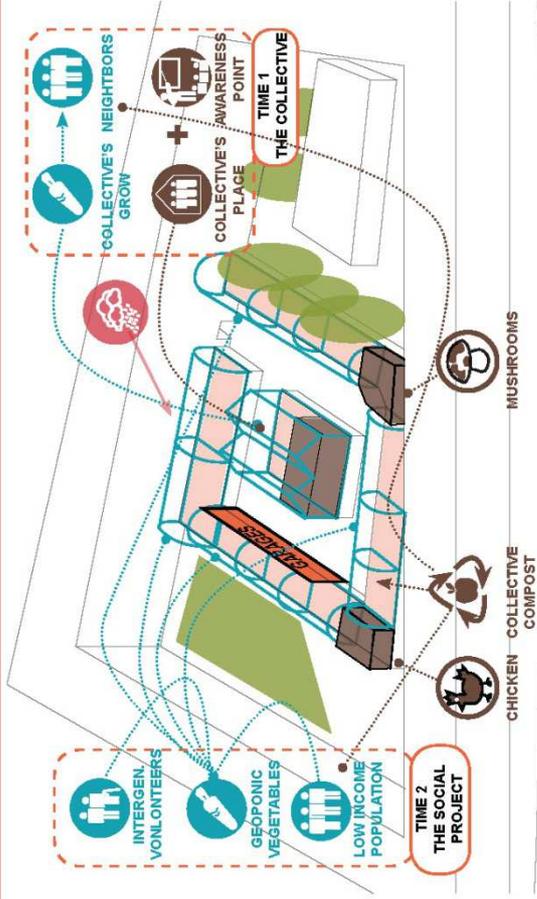
Garages

AVENUE CHARLES-QUINT
1082 BERCHEM-SAINTE-AGATHE



PROJECT

SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area S < 1.000m ² 52m, 26m, 42m, 44.3m	Use GARAGES Nutrients availability NEIGHBOR'S KITCHEN WASTES H ₂ O	Host NEIGHBORS	Accessibility EASY	Context PRIVATE
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Available area 230m² (0,026Ha) pour la toiture rectangulaire au centre du parking collectif et 853m² (0,083Ha) pour les toitures périphériques.

Building use and structure Ensemble de boîtes de garages en intérieur d'îlot résidentiel avec des toits plats sous roofing. Une configuration récurrente en RBC. Compte tenu de la taille de la serre, de sa fonction principalement sociale et de la très faible hauteur des garages, l'accès est considéré facile.

Context Accessibilité RRU en zone B – BUS STIB 87, BUS DELIJN 213.214 Dans un quartier résidentiel. Quelques commerces de proximité. Ce projet est avant tout social pour les habitants de l'îlot. Il permettrait également d'améliorer la qualité de l'intérieur d'îlot en remplaçant une toiture noir roofing par une serre vivante.

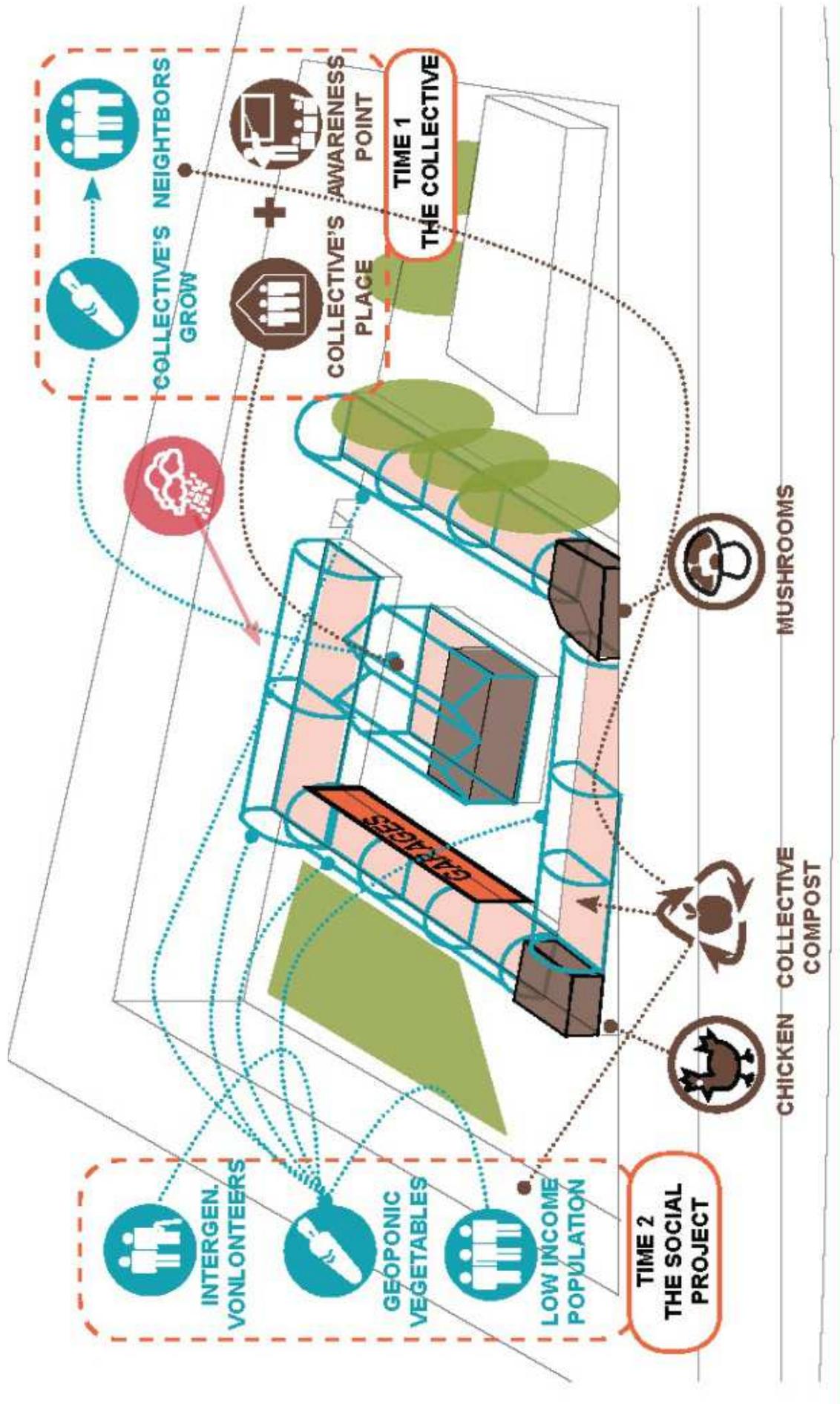
XXX

Nutrients availability

KNOW WHAT YOU WANT

Projet en deux temps, il commence d'abord sur la parcelle centrale, par la création d'un espace éco-socio-culturel de quartier lancé par les riverains et soutenu par la commune. Il est à la fois un potager collectif et lieu de rassemblement, le tout sous une serre en verre. Ensuite, l'espace périphérique est investi par un bénévole retraité et un jeune volontaire européen pour la culture de légumes destinés à des familles en situation précaire (CPAS,...)

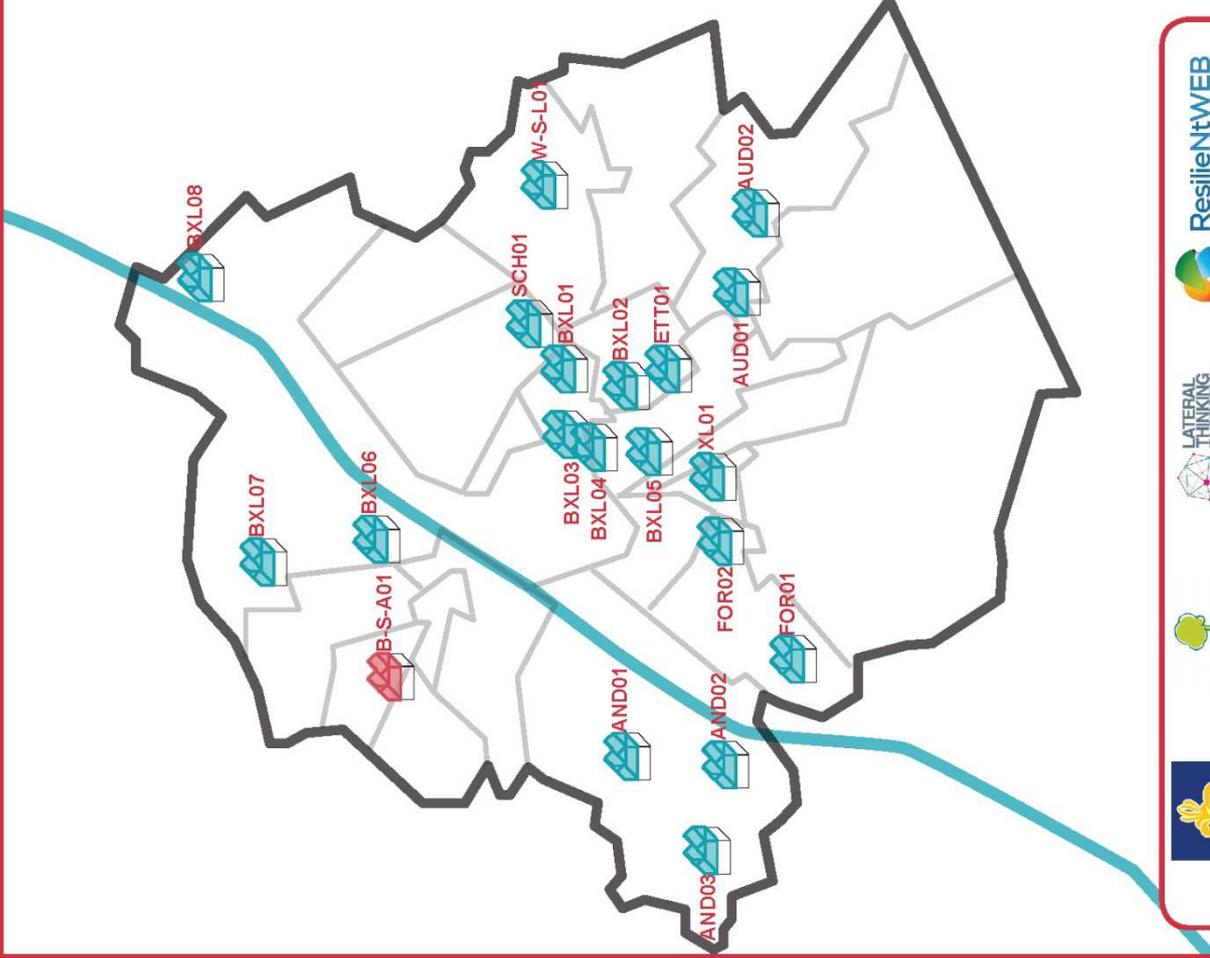
WHY DO IT? PRODUCT VEG. SOCIAL AWARENESS URBAN HEAT ISLAND VIEW ENHANCEMENT UNDER-USED SPACE RAIN WATER USE	STAKEHOLDERS NEIGHBORS TOWN CPAS ADDED VALUE COLLECTIVE COMPOST INTERGENERATIONAL VOLUNTEERS	FTE 0-5
PRODUCTS VEGETABLES MUSHROOMS CHICKEN COMPOST	PRODUCTION SYSTEM PLASTIC GREENHOUSE GLASS GEOPONIC	



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		3		1
02		1		1
03		2		2
04		0		3
05		3		3
06		3		3
07		3		1
08		3		0
09		0		1
10		0		3
11		2		2
12		3		2
13		3		1

QUICK WINS



Logos for ResilientWEB (Innovate for a sustainable business), Lateral Thinking Factory, and other partners.

START TO PLAN

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STEP 6 IDENTIFY POTENTIAL QUICK WINS.

STEP 7 ALIGN EXPECTATIONS WITH REALITY

STEP 8 FINALLISE BIG FEATURES

STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

INDOOR FARMING IN RBC // 2014

BXL01

Council of the EU

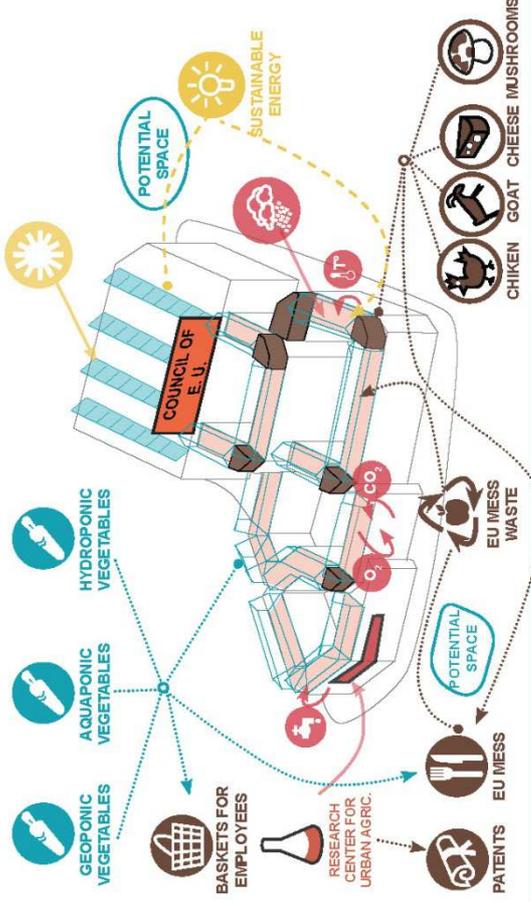


ResilientWeb
Innovate for a sustainable business



RUE FROISSART
1000 BRUXELLES

PROJECT
SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	 Available area L > 3.000m ² 215m	 Use OFFICE Nutrients availability HEAT CO ₂	 Host COUNCIL OF THE E.U.	 Accessibility HARD	 Context PUBLIC
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Available area

8.800 m² (0.88 Ha) de toiture répartis sur plusieurs bâtiments contigus et de niveaux différents. Surface occupée par les panneaux solaires déduite.

Building use and structure

C'est le bâtiment du Conseil Européen à Bruxelles. Grand complexe de bureau. Une attention particulière doit être portée à la sécurité.

Context

Accessibilité RRU en zone A – Métro STIB 1.5 BUS STIB 21.22.27. 36. 60
Dans un quartier de bureau, quelques commerces de proximité. A deux pas du rond-point Schuman, véritable centre des Institutions Européennes, ce projet a une grande valeur symbolique.

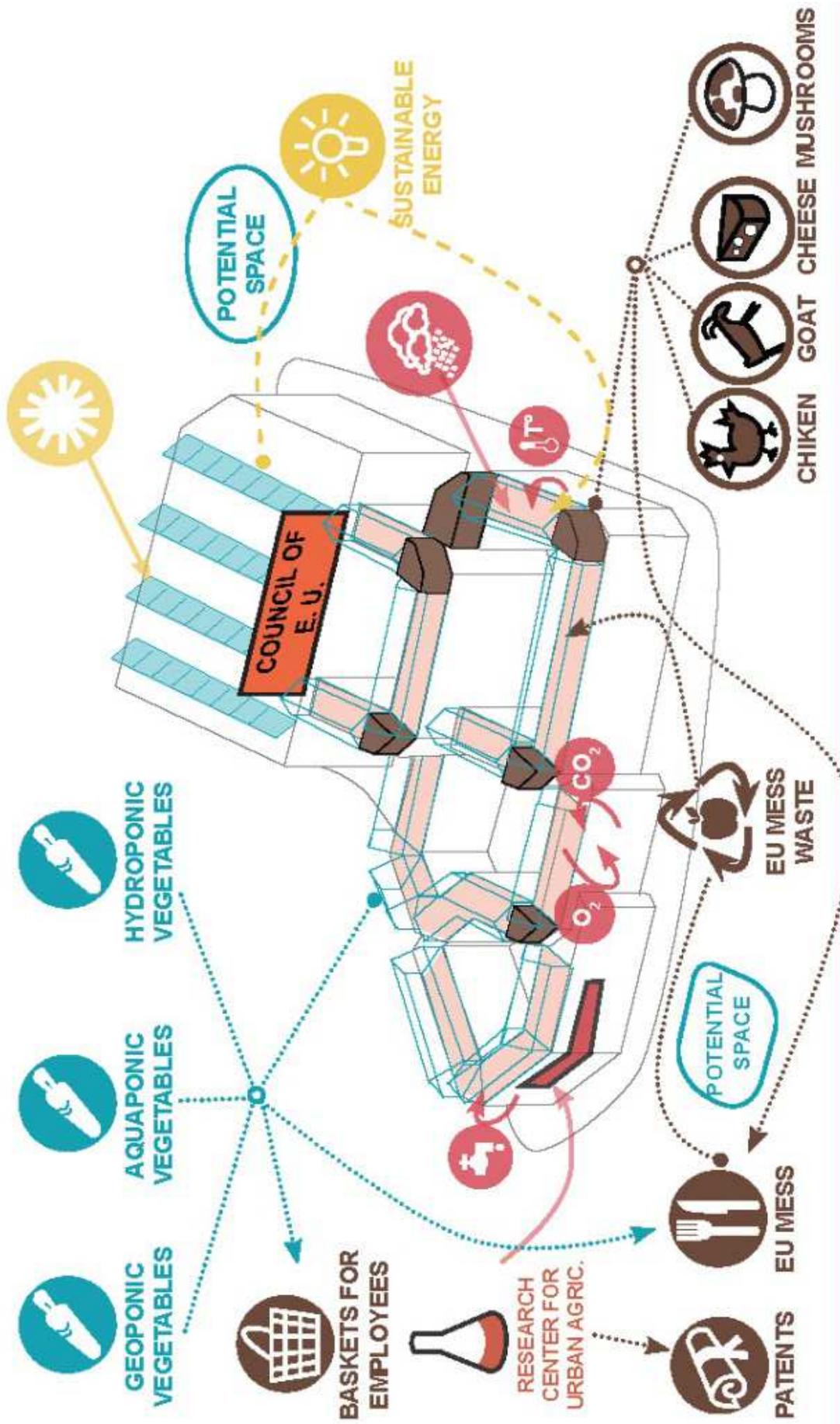
Nutrients availability

XXX

KNOW WHAT YOU WANT

Projet emblématique et pilote pour l'Union Européenne, notre objectif est de montrer le potentiel environnemental et de réemploi, et les opportunités créatives et productives que représente l'agriculture urbaine sur les toits (avec et sans serres).
Vitrine innovante pour le "vieux continent" et pour le reste du monde, c'est ici une porte ouverte vers les villes durables du futur. Après production, nos produits sont utilisés dans nos restaurants et dans les restaurants du quartier ou vendu à nos employés une fois par semaine sous forme de paniers.

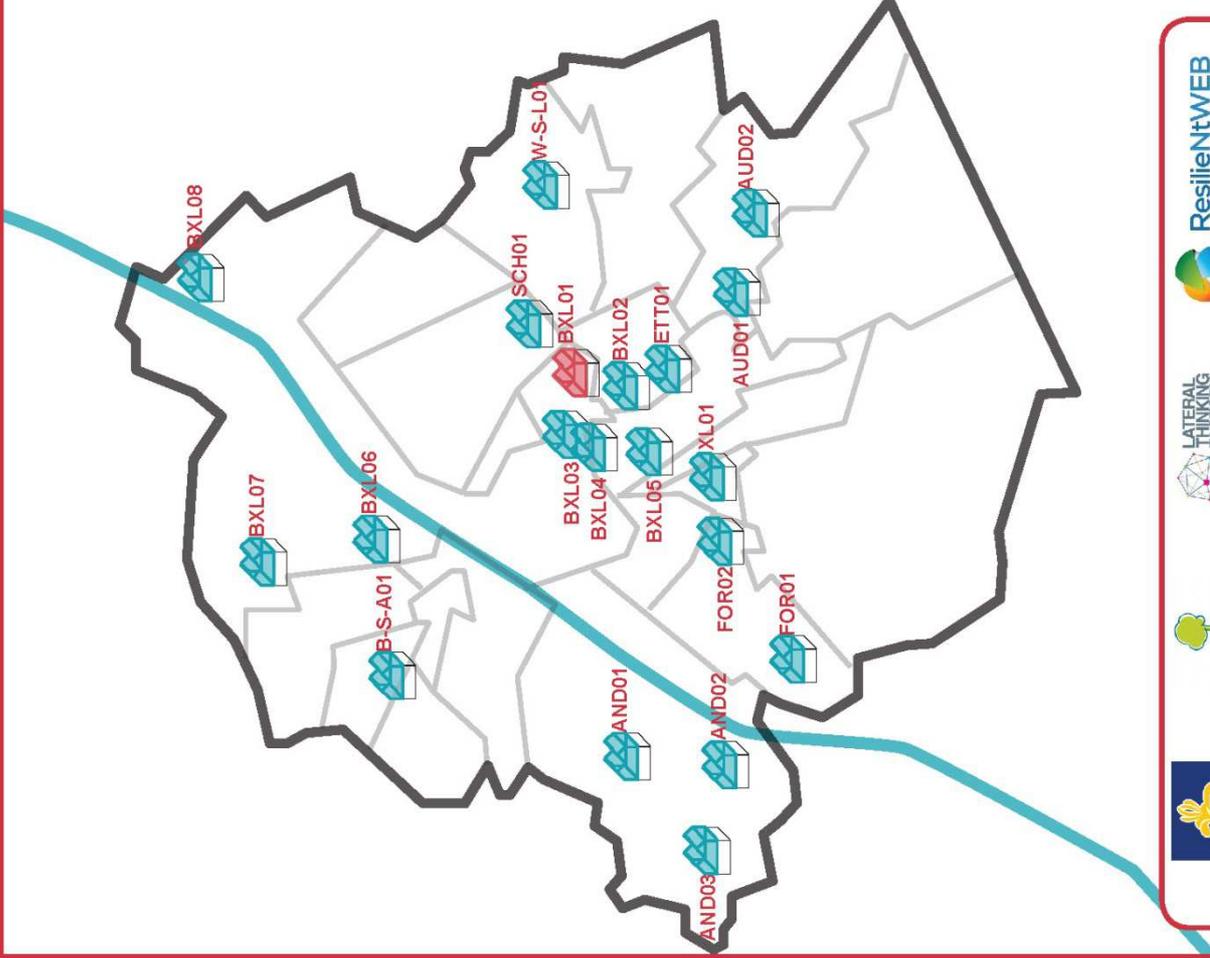
 WHY DO IT? HIGH VISIBILITY OPPORTUNITIES NEW BIODIVERSITY SUSTAINABLE ENERGY UNDER-USED SPACE	 ENJOY THE HEAT RECYCLING AIR LESS LOGISTIC	 STAKEHOLDERS EU MESS RESEARCH & DEVELOP BANK OF SEEDS	 FTE 30-50 GROUND FLOOR AVAILABLE SPACE
 PRODUCTS VEGETABLES ENERGY MUSHROOMS FISH MANY MORE	 GLASS + P.V. BASKETS	 PRODUCTION SYSTEM GEOPONIC HYDROPONIC AQUAPONIC	 AQUAPONIC



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		3		2
02		1		2
03		3		0
04		2		2
05		2		3
06		1		2
07		1		0
08		3		1
09		3		2
10		3		2
11		3		3
12		2		3
13		3		2

QUICK WINS



START TO PLAN

STEP 1	IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.
STEP 2	QUICKSCAN FINANCIAL RESOURCES.
STEP 3	IDENTIFY POTENTIAL VALUE-ADDED SERVICES.
STEP 4	COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.
STEP 5	IDENTIFY GROWING METHODS, PARTNERS, STRUCTURES.
STEP 6	IDENTIFY POTENTIAL QUICK WINS.
STEP 7	ALIGN EXPECTATIONS WITH REALITY
STEP 8	FINALISE BIG FEATURES
STEP 9	ROADMAP TIMETABLE

WIN-WIN SITUATION

INDOOR FARMING IN RBC // 2014

BXL02

Natural Sciences Museum

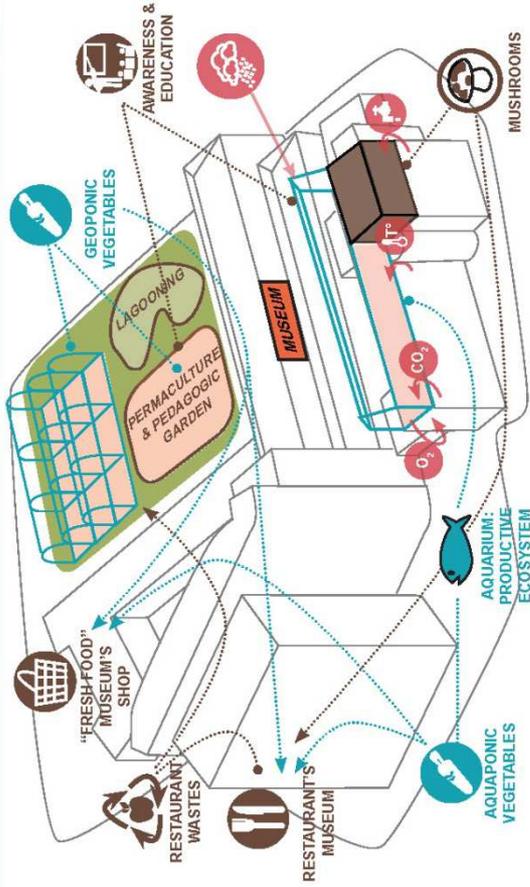


Innovate for a sustainable business



RUE VAUTIER
1000 BRUXELLES

PROJECT
SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area L > 3.000m ² 45m x 86m x 17m x 75m	Use MUSEUM OFFICE	Host MUSEE DES SCIENCES NAT.	Accessibility EASY	Context PUBLIC
		Nutrients availability HEAT CO ₂ H ₂ O KITCHEN WASTES			

Available area

5.270 m² (0.52Ha) sur le toit du bâtiment administratif du Musée des Sciences Naturelles de Belgique

Building use and structure

Le bâtiment accueille les services administratifs du Musée des Sciences Naturelles de Belgique auquel il est accolé. L'accès est considéré comme facile vu la proximité d'un noyau de communication capable de desservir la toiture.

Context

Accessibilité RRU en zone A - Gare SNCB Bruxelles-Luxembourg, BUS STIB: 34, 80 A cheval entre un quartier de bureau et résidentiel. Peu de commerces de proximité. Déjà quelques initiatives présentes pour la biodiversité dans le parc Léopold contigu. L'intérêt principal de ce projet est éducatif. Un concept d'expérience - découverte alimentaire peut se développer en partenariat avec la cafétéria du Musée des Sciences Naturelles de Belgique et ses 280.000 visiteurs par an. Voir devenir une galerie d'exposition à part entière.

Nutrients availability

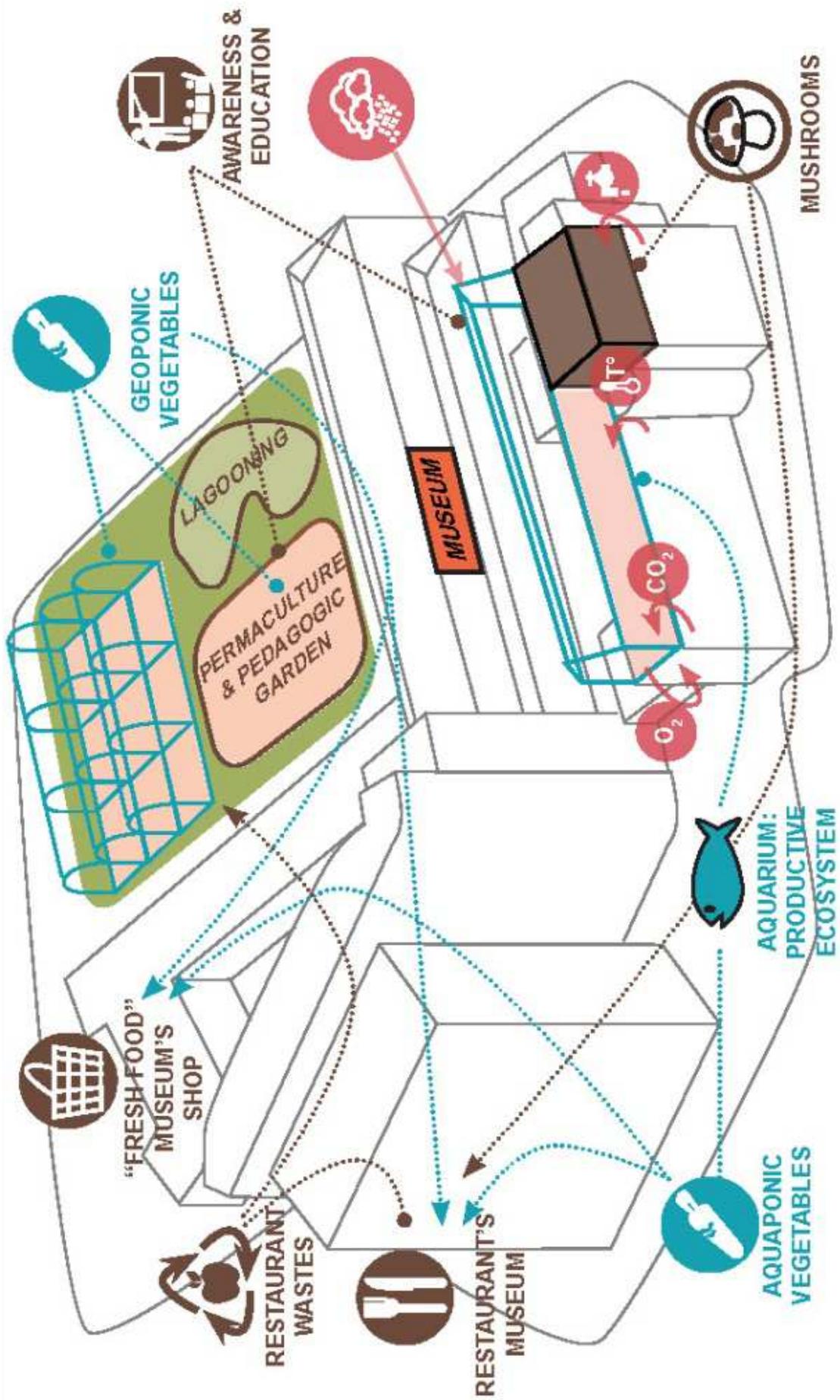
XXX

KNOW WHAT YOU WANT

Voici notre toute nouvelle galerie consacrée à l'alimentation et les écosystèmes productifs, en lien directe avec l'exposition permanente Biodiversity. Elle présente de façon interactive les différentes possibilités de production d'aliments en plein centre ville.

Elle comprend une serre sur les toits du musée où les végétaux poussent dans l'eau de notre aquarium (véritable écosystème aquatique productif), et au sol, un espace potager en permaculture et bien d'autres systèmes de résilience urbaine (lagunage pour les eaux grises, toilettes sèches, récupérations des eaux de pluies...). Toute notre production est bien sur en vente dans notre nouveaux Fresh Food Shop et utilisés dans la cuisine de notre caténeria.

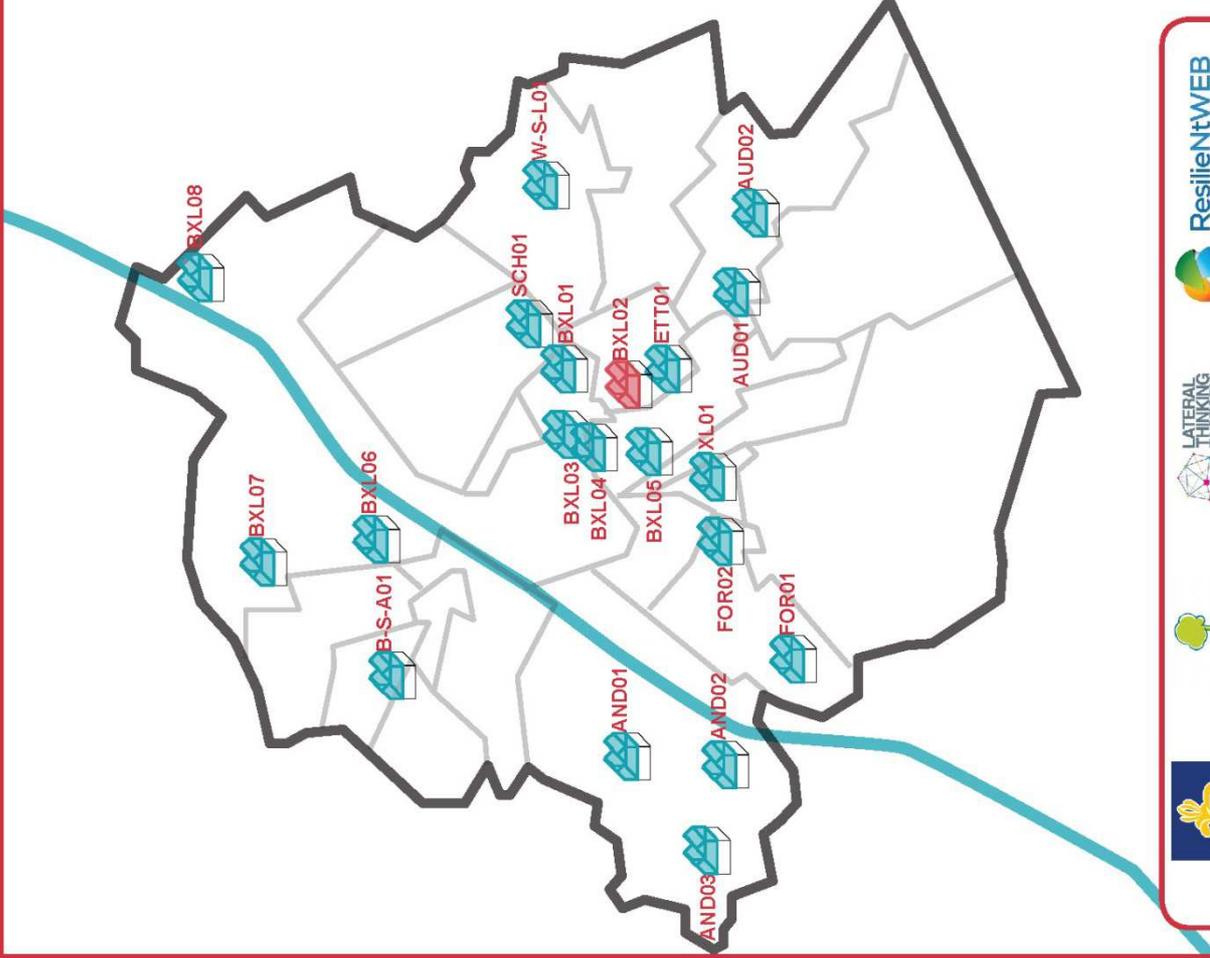
WHY DO IT?	STAKEHOLDERS	FTE
<ul style="list-style-type: none"> PRODUCT VEG. AWARENESS & EDUCATION HIGH VISIBILITY RECYCLING AIR ENJOY THE HEAT 	<ul style="list-style-type: none"> ECO IRIS LINK WITH OTHER MUSEUM AREA LIVING MUSEUM LINK WITH UNIVERSITIES 	15-30
PRODUCTS	ADDED VALUE	
<ul style="list-style-type: none"> UNDER-USED PERMACULTURE SPACE RESEARCH BIODIVERSITY 	<ul style="list-style-type: none"> GEOPONIC HYDROPONIC AQUAPONIC 	
PRODUCTION SYSTEM		
<ul style="list-style-type: none"> VEGETABLES MUSHROOMS FISH PLASTIC GREENHOUSE GLASS 		



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		2		2
02		0		2
03		3		0
04		2		2
05		1		2
06		1		3
07		2		0
08		3		0
09		3		2
10		3		2
11		3		3
12		3		3
13		3		1

QUICK WINS



START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

STEP 2 QUICKSCAN FINANCIAL RESOURCES.

STEP 3 IDENTIFY POTENTIAL VALUE-ADDED SERVICES.

STEP 4 COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.

STEP 5 IDENTIFY GROWING METHODS, PARTNERS, STRUCTURES.

STEP 6 IDENTIFY POTENTIAL QUICK WINS.

STEP 7 ALIGN EXPECTATIONS WITH REALITY

STEP 8 FINALLISE BIG FEATURES

STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

INDOOR FARMING IN RBC // 2014

BXL03

Offices - Trône

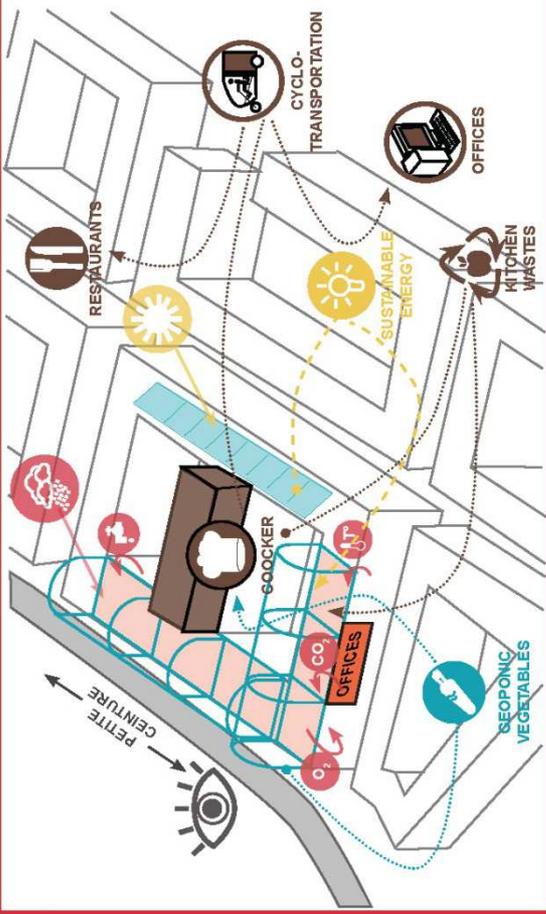


ResilientWEB
Innovate for a sustainable business



AVENUE DES ARTS
1000 BRUXELLES

PROJECT
SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area L > 3.000m ² 122m / 50m / 35m / 85m / 15m / 15m	Use OFFICE Nutrients availability HEAT CO ₂	Host MULTI OWNERS H ₂ O KITCHEN WASTE	Accessibility HARD	Context PRIVATE OFFICES KITCHEN WASTE
--	--	---	--	------------------------------	---

Available area

4.800 m² (0.48Ha) de toitures de plein pied mais réparties sur plusieurs bâtiments

Building use and structure

La situation est rendue complexe par la présence de différents propriétaires. Cette configuration est récurrente à Bruxelles et ce projet pourrait être un projet pilote. Les bâtiments sont relativement hauts et l'accès peut s'avérer difficile. La situation exacte est à étudier sur place.

Context

Accessibilité RRU en zone A - Métro STIB 2,6 BUS STIB 27, 34, 38, 64, 80, 95
Dans un quartier exclusivement dédié au bureau. Présence de nombreux restaurants d'entreprise.
Présence également de restaurants dédiés au temps de midi des employés.

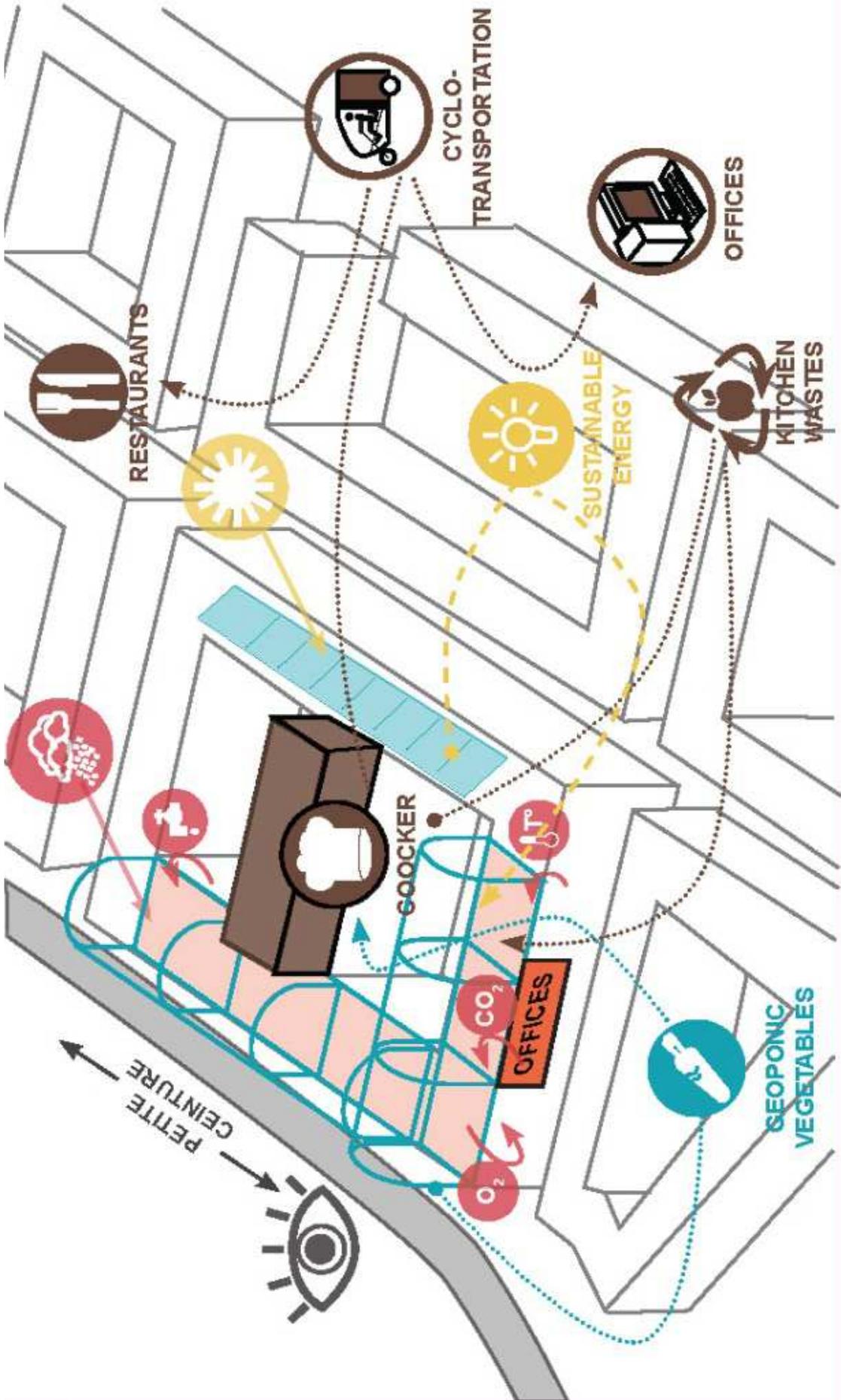
Nutrients availability

XXX

KNOW WHAT YOU WANT

Une des plus grandes nuisances en centre ville? La distribution alimentaire dans les magasins et restaurants. En produisant dans les serres sur les toits de nos bureaux au centre ville, nous réduisons considérablement ces problèmes. De plus, en transformant notre production en lunchs de qualité (salades, stoerms, woks,...) et en les distribuant avec notre cyclo-livreur, c'est toute une micro-économie qui est recréée sur une surface autre fois stérile.

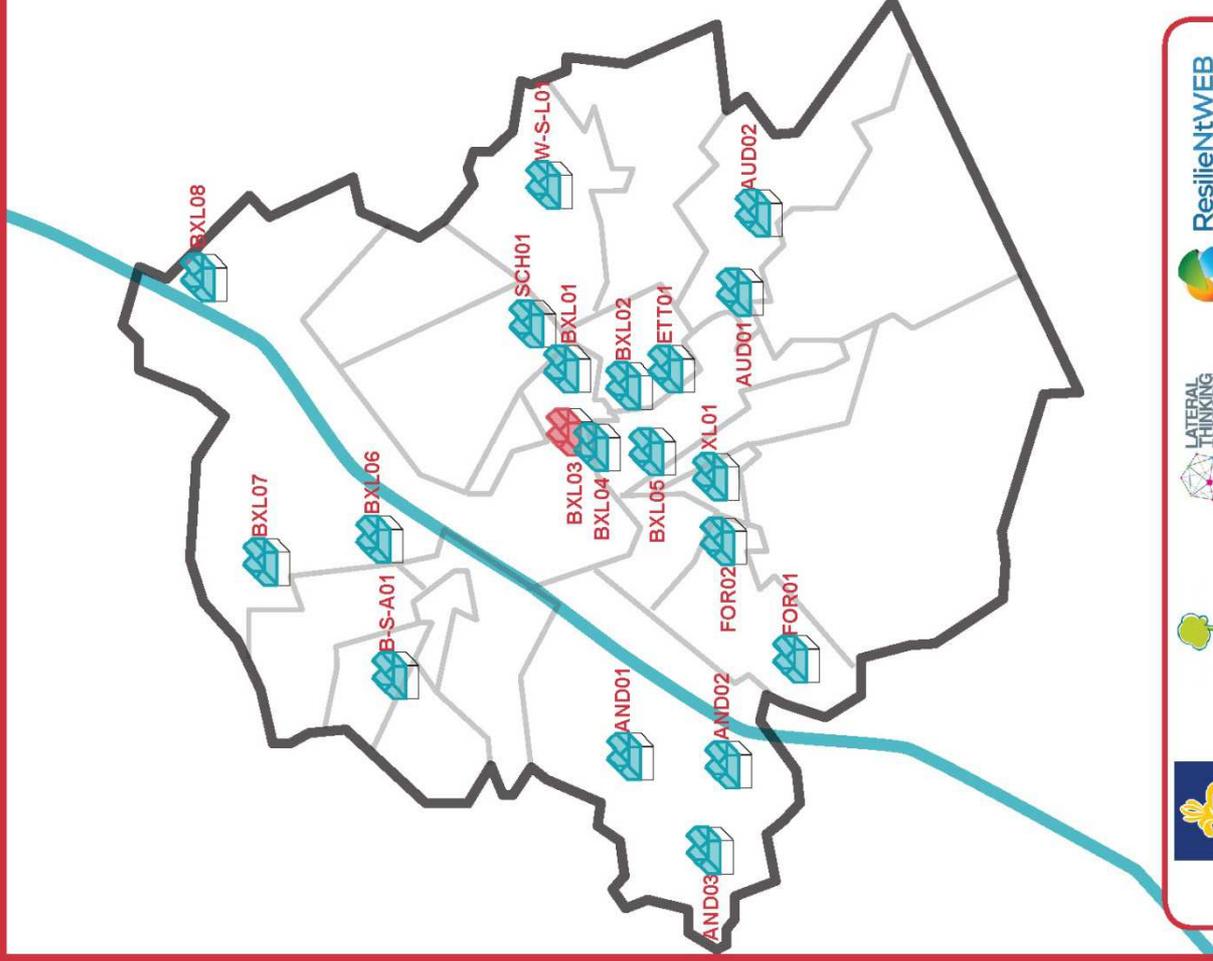
WHY DO IT? ++ € PRODUCT NEW BUSINESS VEG. NEW OPPORTUNITIES LOGISTIC UNDER-USED SPACE FOOD TRANSFORMATION	STAKEHOLDERS OFFICES PRIVATE INVESTOR	FTE • 0-5
ENJOY THE HEAT RECYCLING AIR LESS LOGISTIC SUSTAINABLE ENERGY	ADDED VALUE CYCLO-TRANSPORTATION	PRODUCTION SYSTEM PLASTIC GREENHOUSE GEOPONIC
PRODUCTS COOKED FOOD VEGETABLES ENERGY	PRODUCTION SYSTEM PLASTIC GREENHOUSE GEOPONIC	



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		3		1
02		0		2
03		0		1
04		3		2
05		3		2
06		1		2
07		0		0
08		2		0
09		3		3
10		2		2
11		1		0
12		2		0
13		0		1

QUICK WINS



Logos for ResilientWEB (Innovate for a sustainable business), Lateral Thinking Factory, and other partners.

START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

STEP 2 QUICKSCAN FINANCIAL RESOURCES.

STEP 3 IDENTIFY POTENTIAL VALUE-ADDED SERVICES.

STEP 4 COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.

STEP 5 IDENTIFY GROWING METHODS, PARTNERS, STRUCTURES.

STEP 6 IDENTIFY POTENTIAL QUICK WINS.

STEP 7 ALIGN EXPECTATIONS WITH REALITY

STEP 8 FINALISE BIG FEATURES

STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

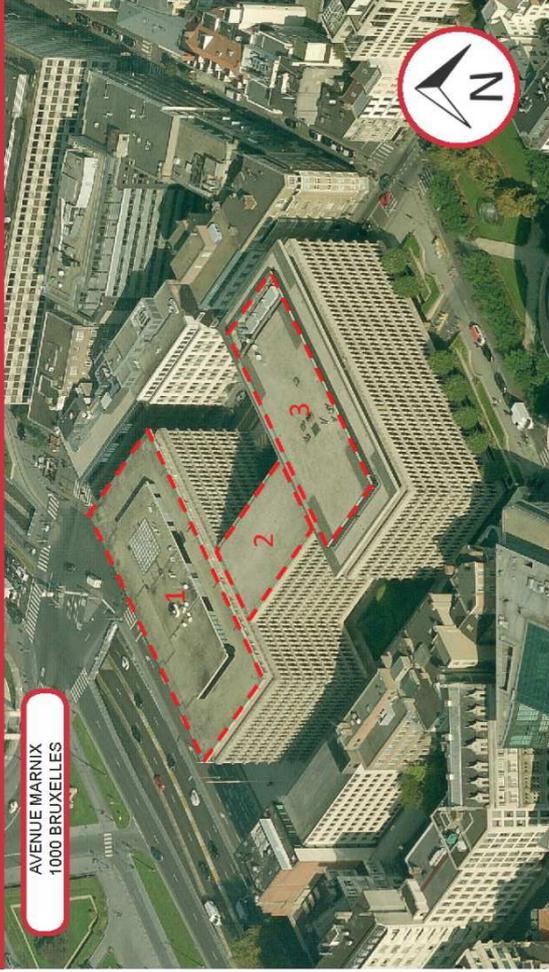
INDOOR FARMING IN RBC // 2014

BXL04

ING Bank

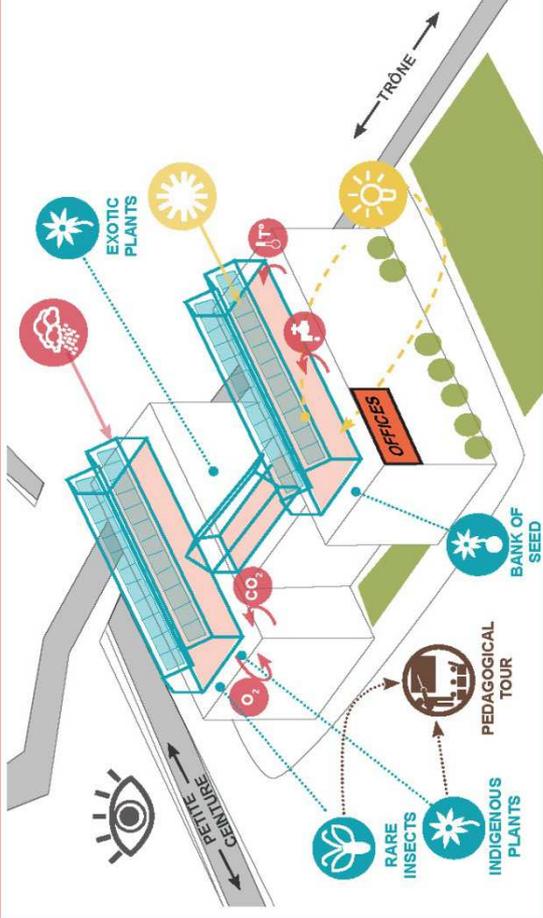


ResilientWeb
Innovate for a sustainable business



AVENUE MARNIX
1000 BRUXELLES

PROJECT
SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area L > 3.000m ² 75m, 22m, 30m, 22m, 35m, 63m	Use OFFICE Nutrients availability HEAT, CO ₂ , H ₂ O	Host ING ING BANK	Accessibility HARD	Context PRIVATE
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Available area 3.800 m² (0,38 Ha) de toitures. Une attention particulière doit être portée aux étages techniques en toiture.

Building use and structure Cette immeuble accueille les bureaux de la banque de la banque ING. Les problèmes liés à la sécurité doivent être observés du point de vue de l'accès. Le bâtiment est relativement haut.

Context Accessibilité RRU en zone A – Métro STIB 2.6 BUS STIB 27, 34, 38, 64, 80, 95
Dans un quartier exclusivement dédié au bureau. Présence de nombreux restaurants d'entreprise. Présence également de restaurants dédiés au temps de midi des employés.

Nutrients availability 5.550m³

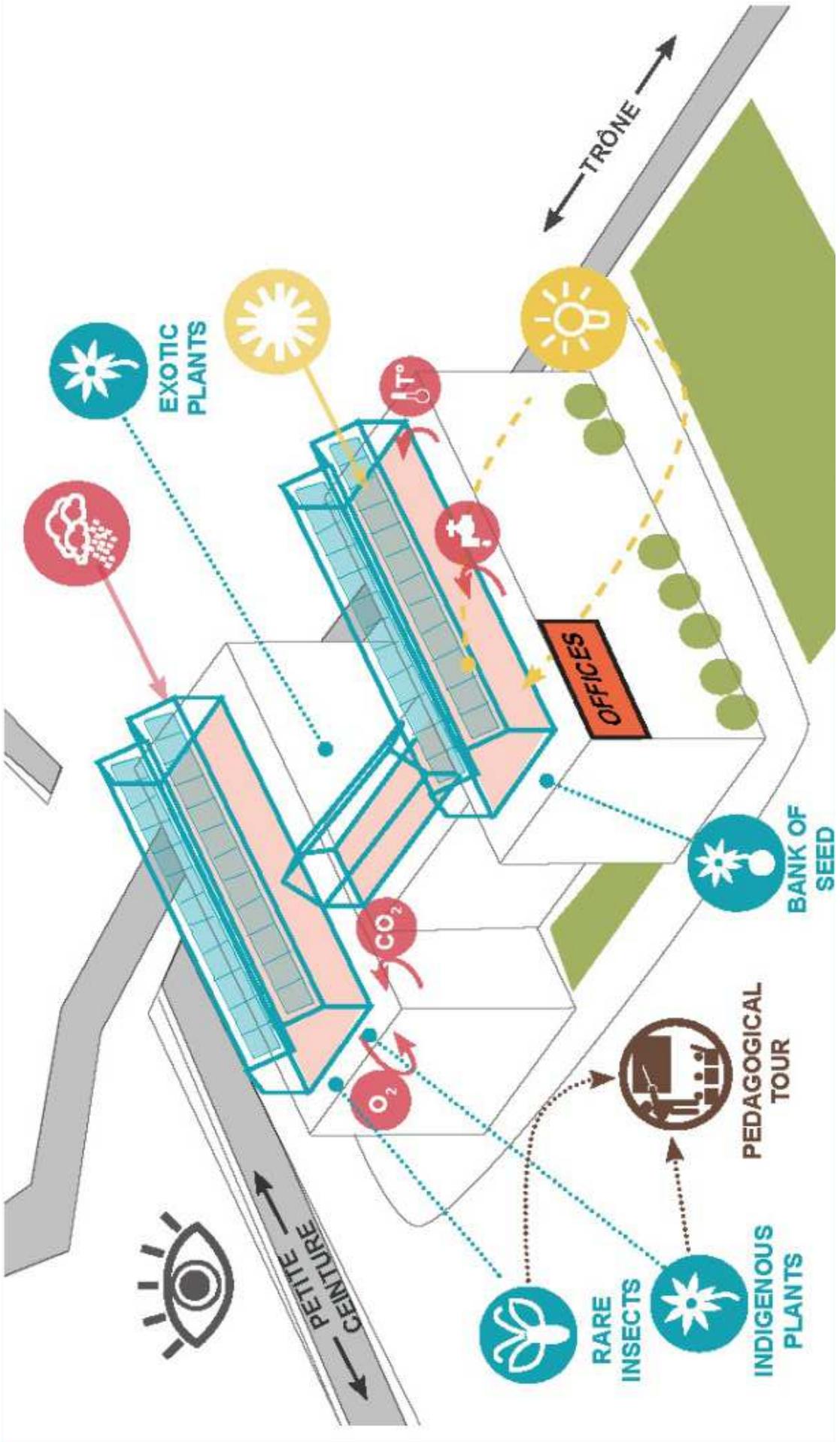
KNOW WHAT YOU WANT

Depuis plus de 20 ans, nous sommes les gardiens de vos intérêts présents et futurs. C'est pourquoi nous faisons un pas plus loin en créant sur les toits de notre siège, une banque de la biodiversité et des espèces en danger.

Ce nouvel espace sous serre permettra la reproduction et la sauvegarde de semences, de plantes, d'animaux et d'insectes (abeilles, papillons,...) en voie d'extinction.

Ce projet est aussi une façon de préserver et utiliser au mieux notre bâtiment classé, en protégeant son toit, en récupérant la chaleur perdue des locaux et en utilisant ces plantes pour purifier l'air intérieur.

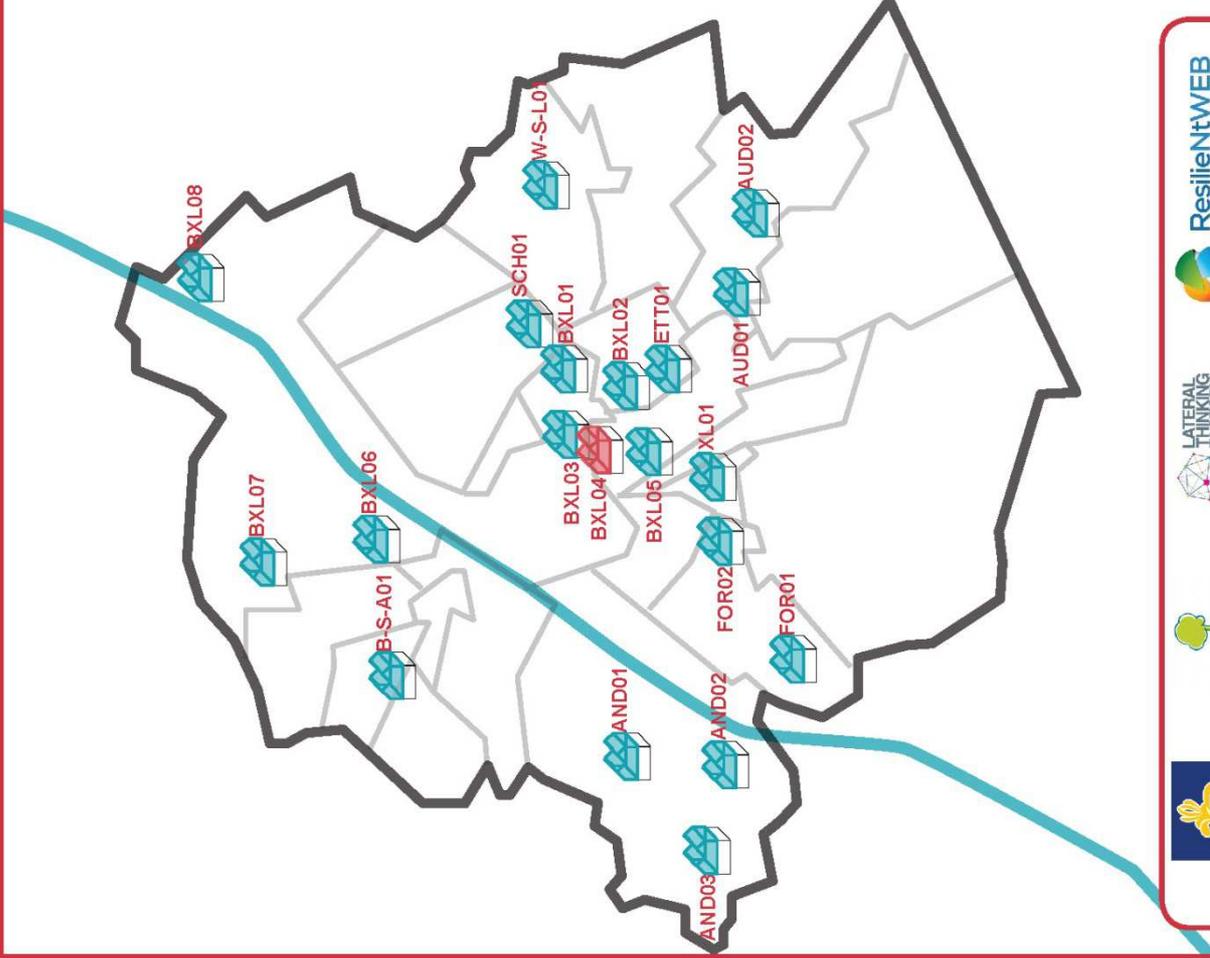
WHY DO IT? HIGH VISIBILITY AWARENESS CSR RECYCLING AIR ENJOY THE HEAT ENRICH THE SPACE	STAKEHOLDERS ING EUROPEAN UNION	FTE 0-5
PRODUCTS SEEDS BIODIVERSITY ENERGY	ADDED VALUE cradle2cradle C2C MATERIALS	PRODUCTION SYSTEM GLASS + P.V. GEO-PONIC



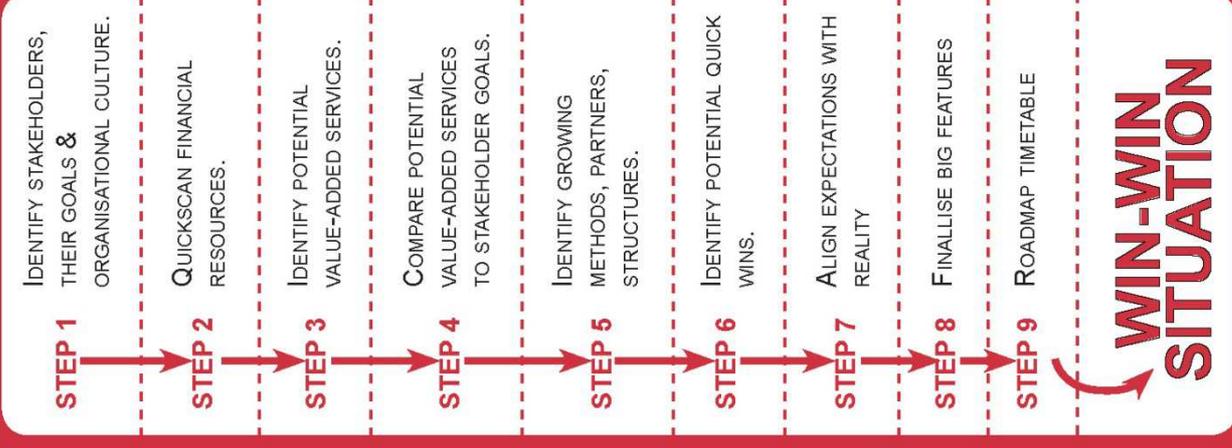
INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		0		2
02		0		2
03		3		1
04		0		3
05		0		3
06		2		2
07		0		0
08		0		0
09		3		2
10		3		1
11		3		1
12		3		2
13		3		3

QUICK WINS



START TO PLAN



INDOOR FARMING IN RBC // 2014

BXL05

Water tank - Vivaqua



ResilientWEB
Innovate for a sustainable business

RUE DE LA VANNE
1000 BRUXELLES



KNOW WHAT YOU HAVE

	Available area L > 3.000m ² 84m x 125m	Use WATER TANK Nutrients availability NEIGHBORS'S KITCHEN WASTE	Host VIVAQUA VIVAQUA	Accessibility EASY PUBLIC	Context
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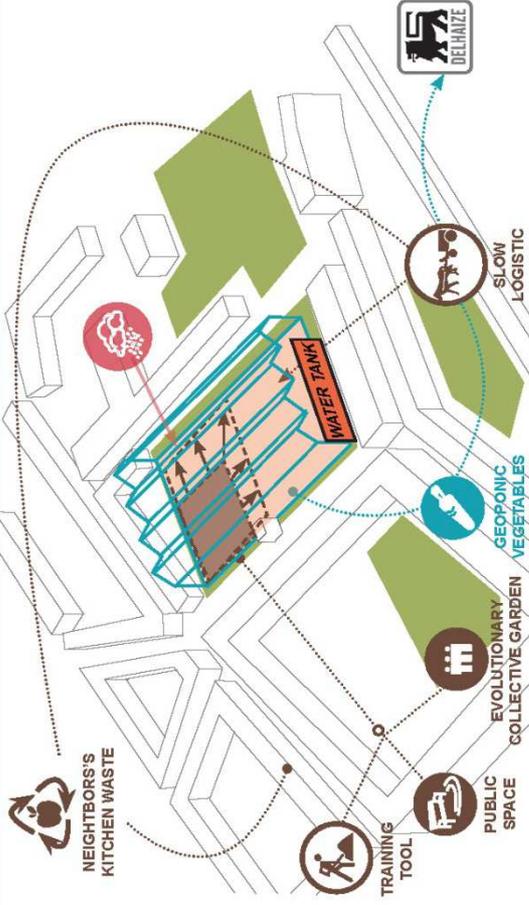
Available area 8.800 m² de pelouse au-dessus d'un réservoir d'eau potable.

Building use and structure Cette surface singulière recouvre un des réservoirs d'alimentation en eau potable de la RBC. L'accès est quasiment de plein pied avec la voirie. Il est à noter que le gazon existant n'est pas considéré dans le PRAS comme zone de parc ou comme zone verte.

Context Accessibilité RRU en zone B – Tram STIB 81.83 BUS STIB 54
Dans un quartier principalement résidentiel, avec quelques bureaux vers l'avenue Louise. Ecole toute proche. Supermarché à 200m

Nutrients availability XXX

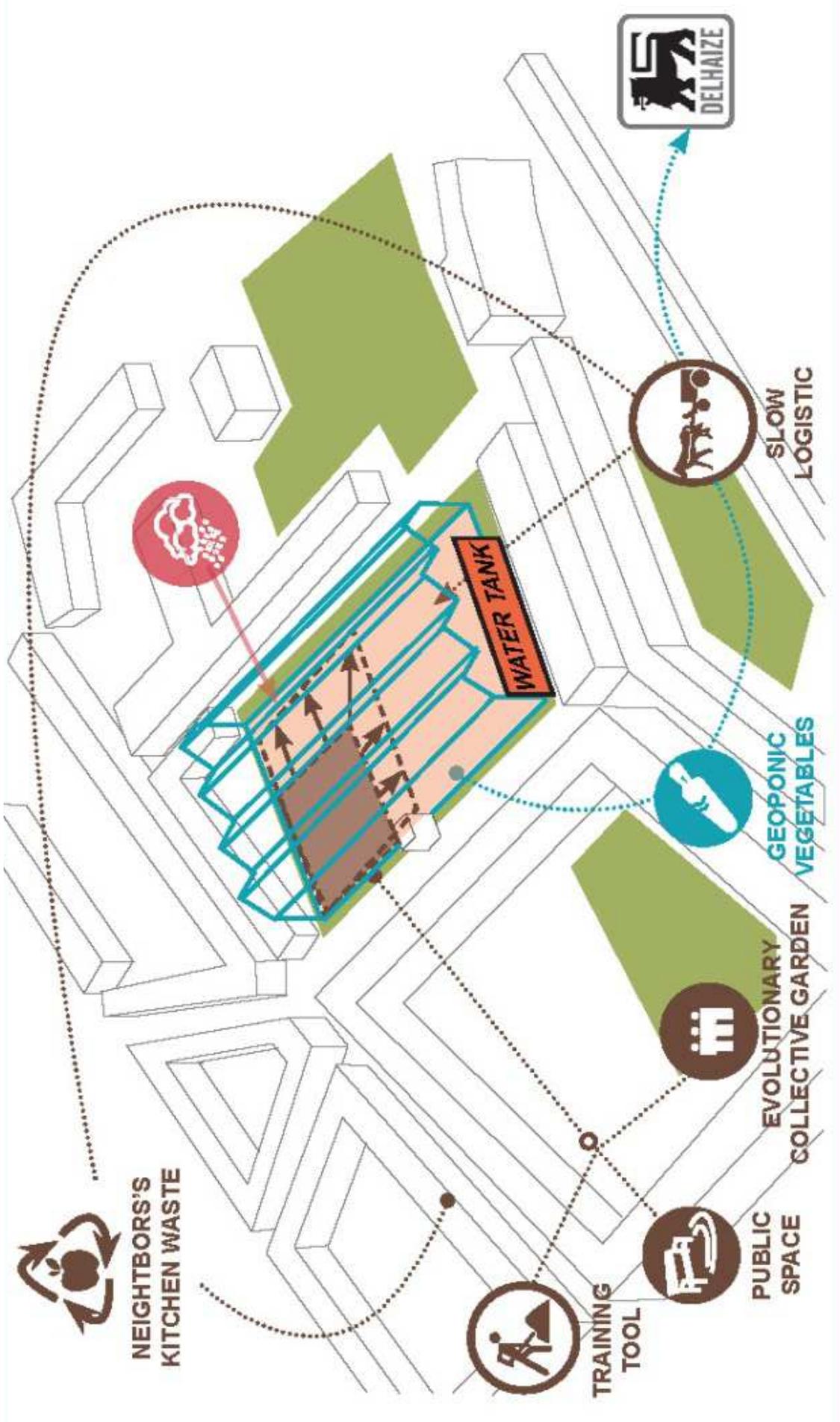
PROJECT
SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU WANT

Nous voulons profiter de cette grande surface urbaine non-utilisée pour créer un espace productif évolutif. Pourquoi évolutif? Car dans un premier temps, 80% de la surface est utilisée pour la culture (vente directe en circuit court au magasin Delhaize Flagey) et 20% pour des potager collectifs. Avec le temps, cette proportion peu évoluer en fonction de l'engouement ou non des riverains de rejoindre le projet.
En plus, la commune d'Ixelles lance un concept innovant, le ramassage des déchets alimentaires ménager avec des moyens lents (cheval et charrette) pour amener au projet des nutriments sans chimie. Bonus: le croton de cheval peut également être utilisé!

WHY DO IT? PRODUCT VEG. TRAINING TOOL LESS LOGISTIC PUBLIC SPACE UNDER-USED SPACE SOCIAL SPACE COLLECTIVE COMPOST EVOLUTIVE PROJECT	STAKEHOLDERS DELHAIZE VIVAQUA IXELLES	FTE 5-15 NO PESTICIDES
PRODUCTS VEGETABLES	ADDED VALUE EVOLUTIVE PROJECT SLOW LOGISTIC	PRODUCTION SYSTEM GLASS GEOPONIC



NEIGHBORS'S
KITCHEN WASTE



TRAINING
TOOL



PUBLIC
SPACE



EVOLUTIONARY
COLLECTIVE GARDEN



GEOPONIC
VEGETABLES



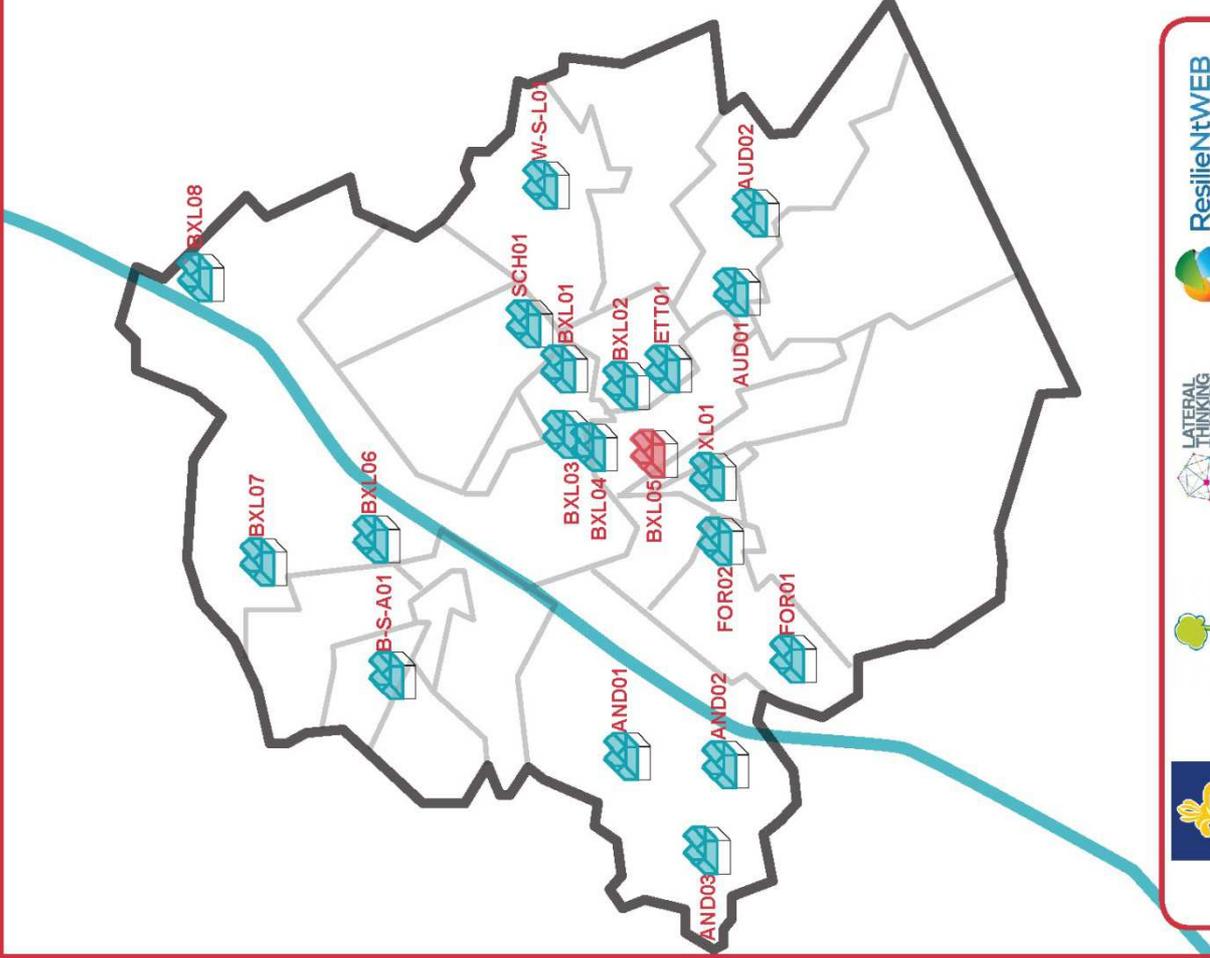
SLOW
LOGISTIC



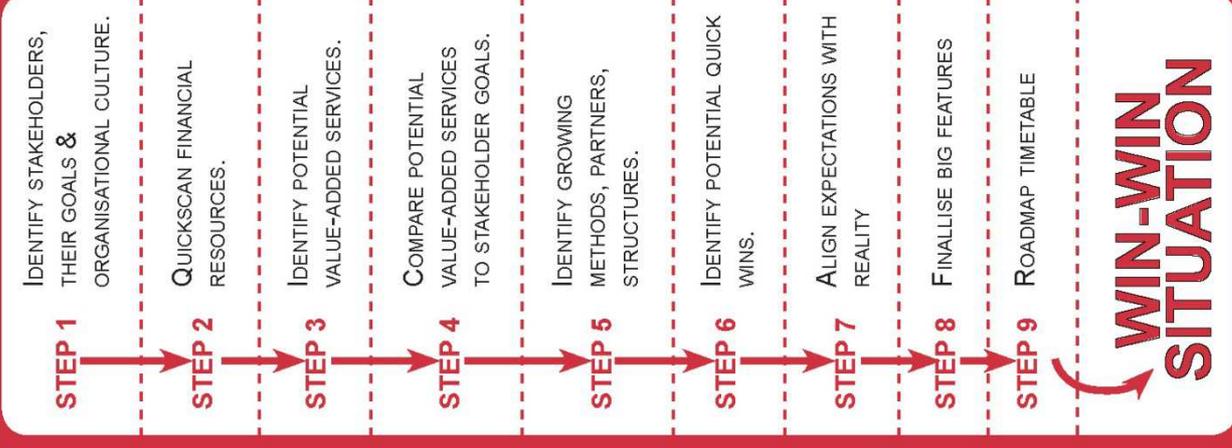
INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		3		0
02		3		0
03		1		0
04		2		1
05		3		2
06		1		3
07		3		0
08		3		0
09		0		0
10		2		0
11		1		1
12		3		2
13		2		1

QUICK WINS



START TO PLAN



INDOOR FARMING IN RBC // 2014

BXL06 TIR

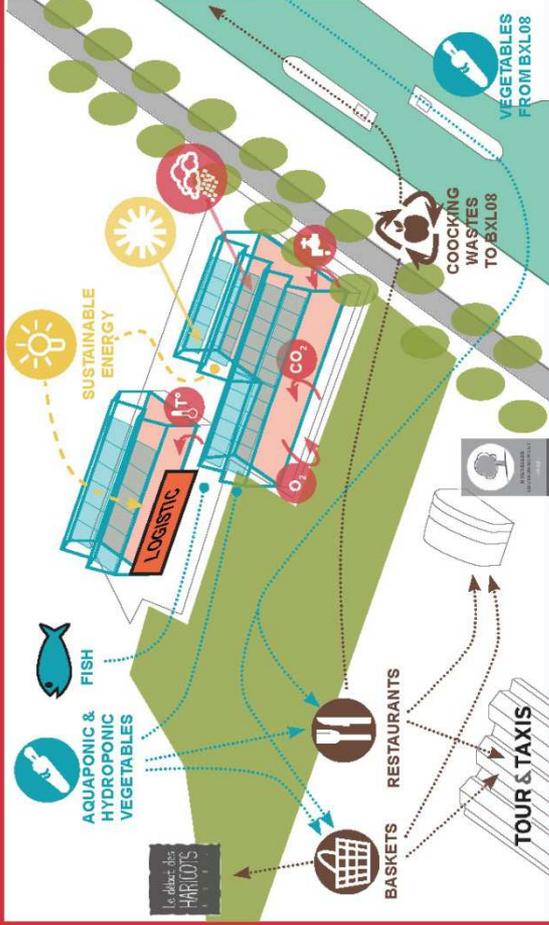


ResilientWEB
Innovate for a sustainable business



AVENUE DU PORT
1020 BRUXELLES

PROJECT
SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area X1 > 10.000m² 75m, 155m, 125m, 200m	Use LOGISTIC Nutrients availability HEAT CO ₂ H ₂ O	Host sertrans SERTRANS	Accessibility EASY	Context PRIVATE
--	--	--	-------------------------------------	-----------------------	--------------------

Available area

39.000 m² de toiture répartis sur deux bâtiments distincts. La présence de panneaux photovoltaïques sur l'ensemble de la toiture (non visible sur les photos précédentes) est à intégrer dans la problématique de compatibilité des panneaux solaires avec les indoor farming.

Building use and structure

Situé au-dessus d'un centre de logistique du port de Bruxelles. L'existence de rampe d'accès pour camion au niveau inférieur permet d'envisager des rampes d'accès plus légères à installer pour la toiture.

Context

Accessibilité RRU en zone C -BUS STIB 57, 88
Dans un quartier industriel. Pas de commerce de proximité ou de restaurant existant. Le site de Tour et Taxis est en cours de revitalisation. Une synergie devrait être possible avec les nouvelles fonctions à venir, notamment avec l'installation des futures bureaux de l'Institut Bruxellois de la Gestion de l'Environnement IBGE-BIM. Notons également la proximité du projet de quartier durable Tivoli.

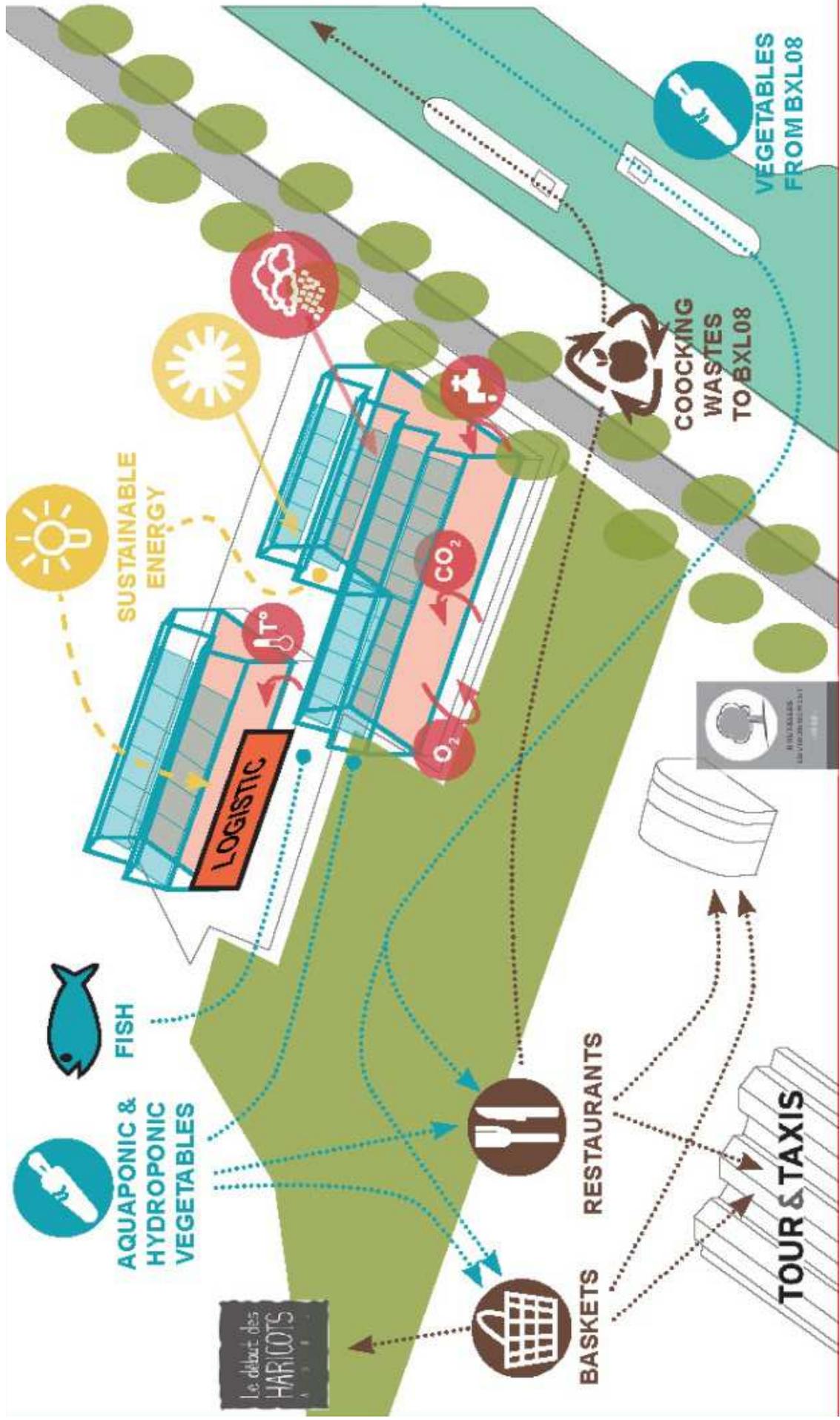
Nutrients availability

XXX

KNOW WHAT YOU WANT

Propriétaire de bâtiments avec une très grande surface de toit, nous voulons valoriser cet espace "non utilisé" pour créer de l'énergie verte (P.V) et participer à la production alimentaire en circuit court. Ce projet est une opportunité de création de réseaux solidaires et résilients avec des acteurs bruxellois engagés dans une démarche environnementale et de produits de qualités tels que Bruxelles Environnement, Tour&Taxi, l'éco quartier Tivoli, GreenBiz et Le début des haricots, ASBL. De plus, la présence du canal proche nous permet de lancer un nouveau secteur d'activité logistique, le transport de marchandises produisent en ville. Notre première navette entre notre site et BXL08 est d'ailleurs déjà en phase d'étude.

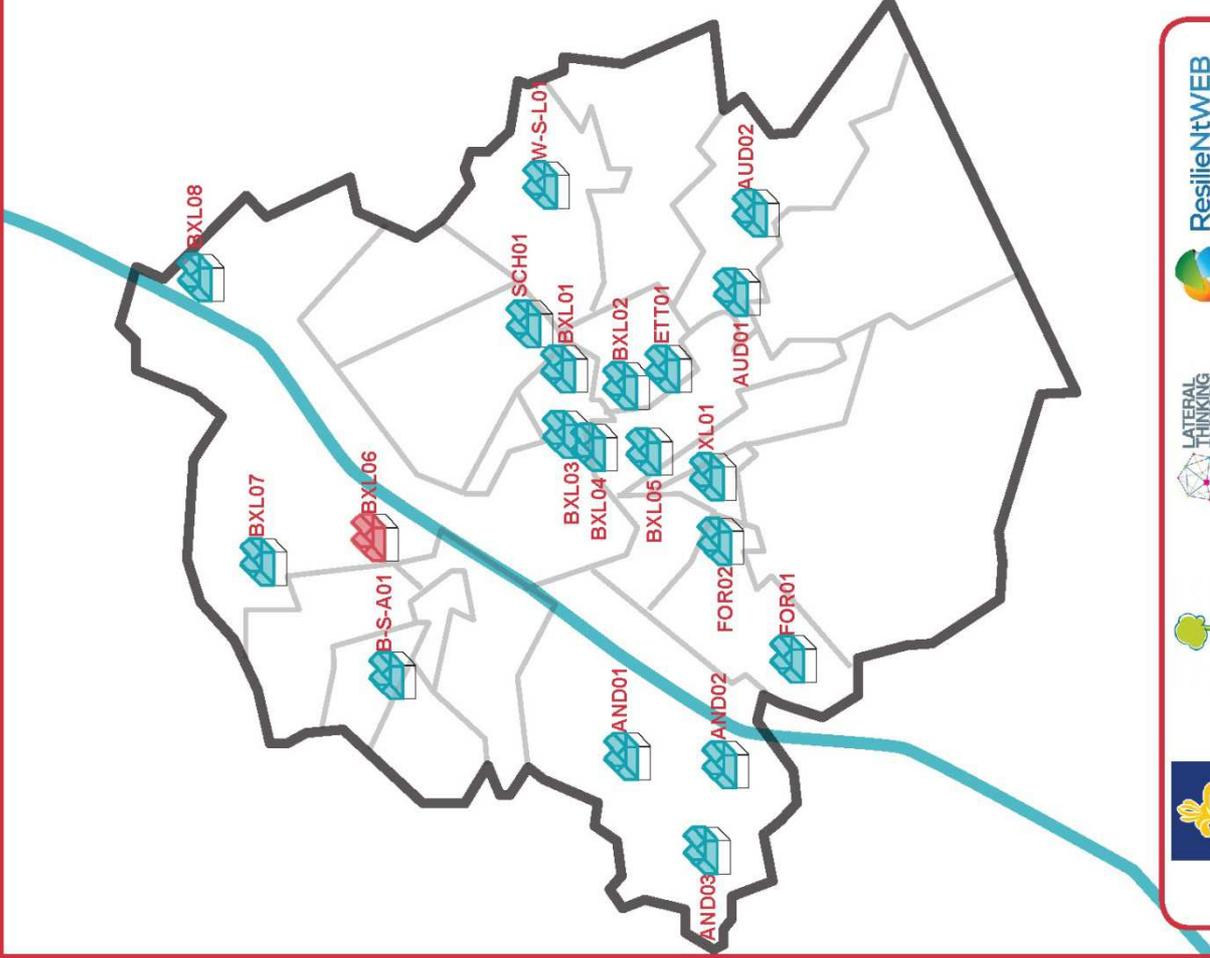
WHY DO IT? PRODUCT VEG. NEW BUSINESS OPPORTUNITIES €++ UNDER-USED SPACE ???	STAKEHOLDERS Le début des HARICOTS sertrans TOUR & TAXIS 75-100 FTE	ADDED VALUE HOUSEBOAT LOGISTIC PROJECT NETWORK RESEARCH & DEVELOP	PRODUCTION SYSTEM GLASS HYDROPONIC AQUAPONIC
ENJOY THE HEAT RECYCLING AIR ALTERNATIVE LOGISTIC COMPANY NETWORK VEGETABLES ENERGY FISH	VEGETABLES FROM BXL08 COOKING WASTES TO BXL08 RESTAURANTS BASKETS TOUR & TAXIS SUSTAINABLE ENERGY FISH AQUAPONIC & HYDROPONIC VEGETABLES LOGISTIC	GLASS HYDROPONIC AQUAPONIC	GLASS HYDROPONIC AQUAPONIC



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		2
02		3
03		0
04		3
05		3
06		2
07		0
08		2
09		3
10		3
11		2
12		2
13		1
14		2
15		2
16		2
17		1
18		1
19		3
20		0
21		0
22		2
23		2
24		2
24		0
26		2

QUICK WINS



START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

STEP 2 QUICKSCAN FINANCIAL RESOURCES.

STEP 3 IDENTIFY POTENTIAL VALUE-ADDED SERVICES.

STEP 4 COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.

STEP 5 IDENTIFY GROWING METHODS, PARTNERS, STRUCTURES.

STEP 6 IDENTIFY POTENTIAL QUICK WINS.

STEP 7 ALIGN EXPECTATIONS WITH REALITY

STEP 8 FINALLISE BIG FEATURES

STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

INDOOR FARMING IN RBC // 2014

BXL07

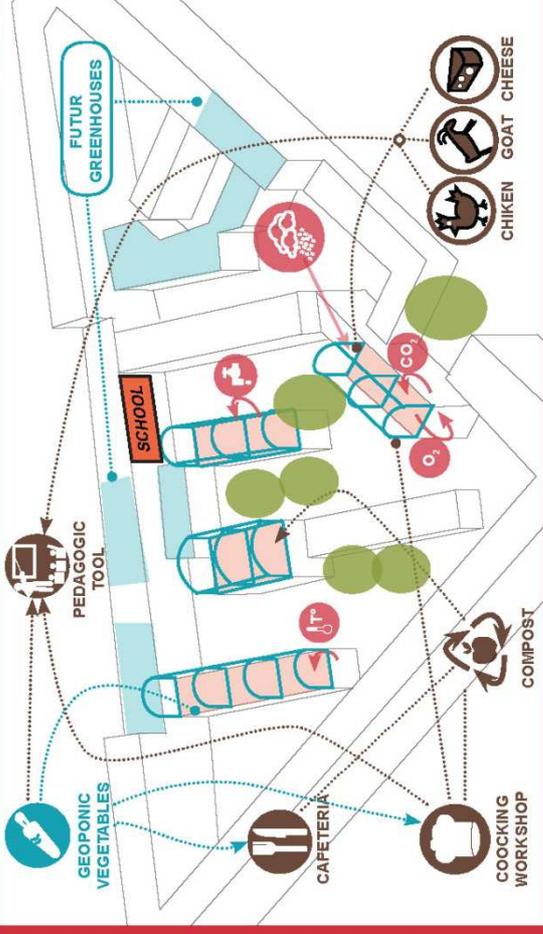
School in Laeken



Innovate for a sustainable business



RUE REPER-VREVEN
1020 BRUXELLES



KNOW WHAT YOU HAVE

	Available area L > 3.000m ² 80m x 155m	Use SCHOOLS Nutrients availability HEAT CO ₂	Host SEVERAL SCHOOLS	Accessibility HARD	Context PUBLIC CAFET. WASTES H ₂ O CO ₂
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Available area 4.500 m² répartis sur plusieurs bâtiments de différentes écoles, toutes dans le même îlot.

Building use and structure Cet ensemble d'écoles maternelle et secondaire dispose d'un réseau de toitures plates dans le même intérieur d'îlot. A noter qu'il existe beaucoup d'écoles en RBC dotées de grandes toitures plates.

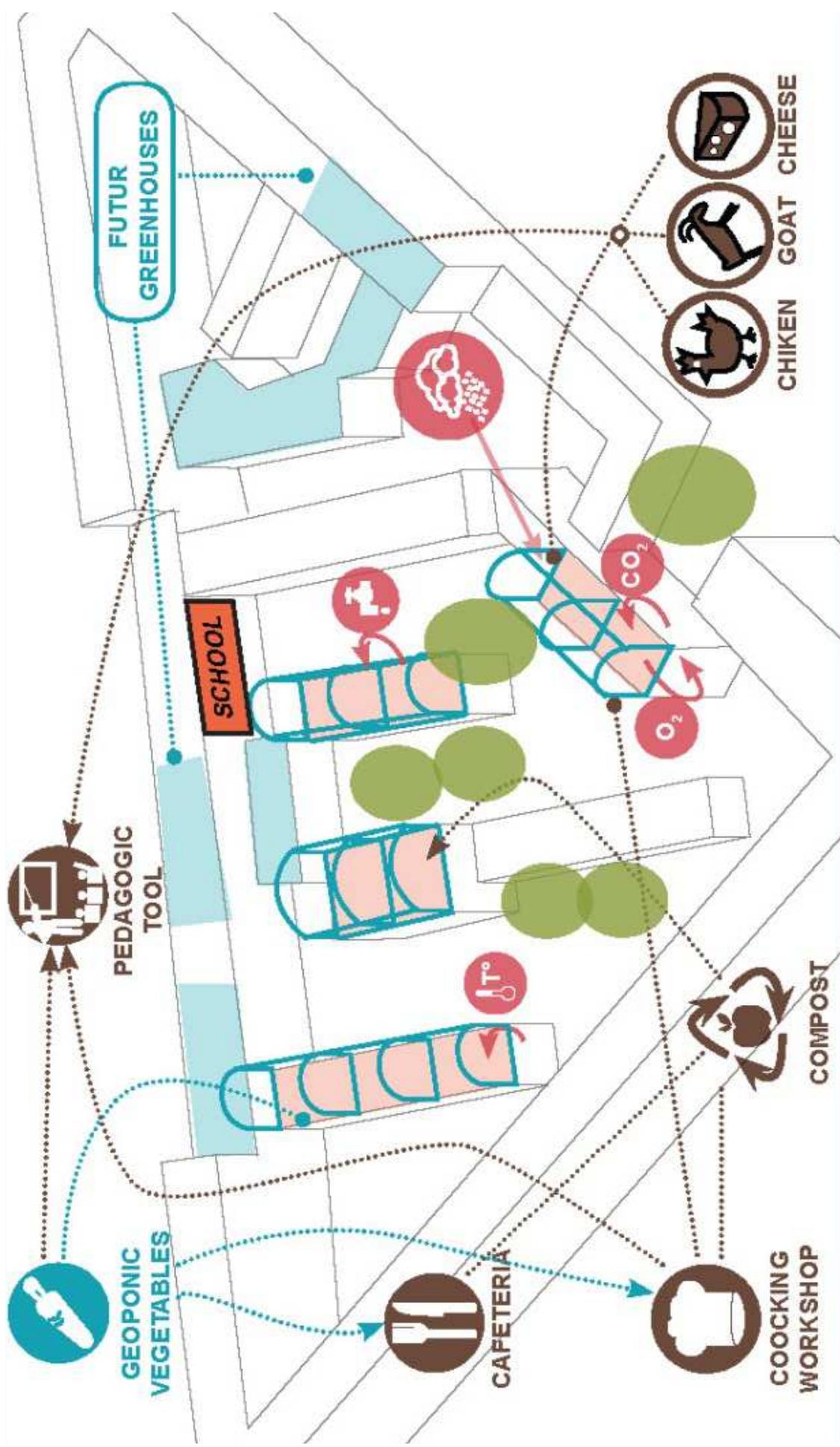
Context Accessibilité RRU en zone B – Métro STIB 6, BUS DELIJN 233, 240, 241, 242, 243, 246, 250, 251, 260 Dans un quartier principalement résidentiel. Quelques commerces de proximité. Notons également la présence à proximité du site hospitalier Brugmann.

Nutrients availability XXX

KNOW WHAT YOU WANT

Notre priorité? Un cadre d'apprentissage sain, dynamique et didactique pour nos étudiants et notre corps enseignant. Outre l'enjeu pédagogique (notre école rejoignant le réseau Bubble) et la possibilité de créer des ateliers "Culture & Cuisine" (avec des personnes âgées) les mercredi après-midi au lieu de la traditionnelle garderie, nos serres sur les toits nous permettent de créer un réel espace tampon cultivé nous permettant de faire des économies de chauffage et d'utiliser la photosynthèse des plantes pour purifier l'air qui entre dans les classes.

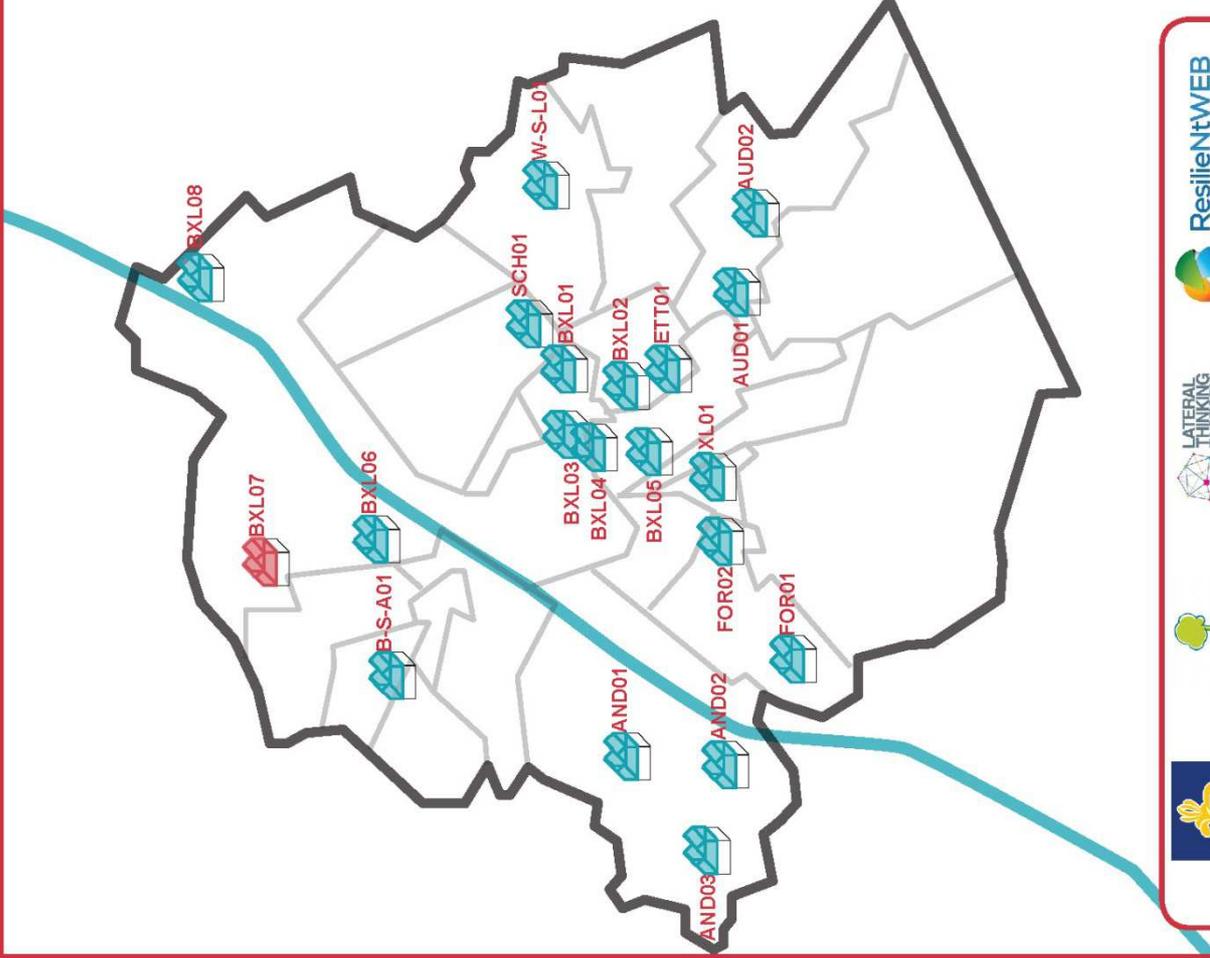
WHY DO IT? PEDAGOGIC TOOL PRODUCT VEG. NOISE REDUCTION RECYCLING AIR ENJOY THE HEAT UNDER-USED SPACE COMPOST VIEW ENHANCEMENT	STAKEHOLDERS SCHOOLS Bubble SCHOOLS	FTE 0-5
PRODUCTS VEGETABLES CHICKEN GOAT CHEESE GEOPONIC	ADDED VALUE COOKING WORKSHOP INTER-GENERATIONAL PIT SMALL GROW UP	PRODUCTION SYSTEM PLASTIC GREENHOUSE GEOPONIC



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		2
02		0
03		1
04		1
05		2
06		2
07		3
08		2
09		3
10		2
11		1
12		3
13		2
14		3
15		3
16		3
17		2
18		2
19		3
20		2
21		0
22		2
23		2
24		1
24		3
26		1

QUICK WINS



Logos for ResilientWEB (Innovate for a sustainable business), Lateral Thinking Factory, and other partners.

START TO PLAN

STEP 1	IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.
STEP 2	QUICKSCAN FINANCIAL RESOURCES.
STEP 3	IDENTIFY POTENTIAL VALUE-ADDED SERVICES.
STEP 4	COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.
STEP 5	IDENTIFY GROWING METHODS, PARTNERS, STRUCTURES.
STEP 6	IDENTIFY POTENTIAL QUICK WINS.
STEP 7	ALIGN EXPECTATIONS WITH REALITY
STEP 8	FINALISE BIG FEATURES
STEP 9	ROADMAP TIMETABLE

WIN-WIN SITUATION

INDOOR FARMING IN RBC // 2014

BXL08

Wastewater treatment BXL-Nord



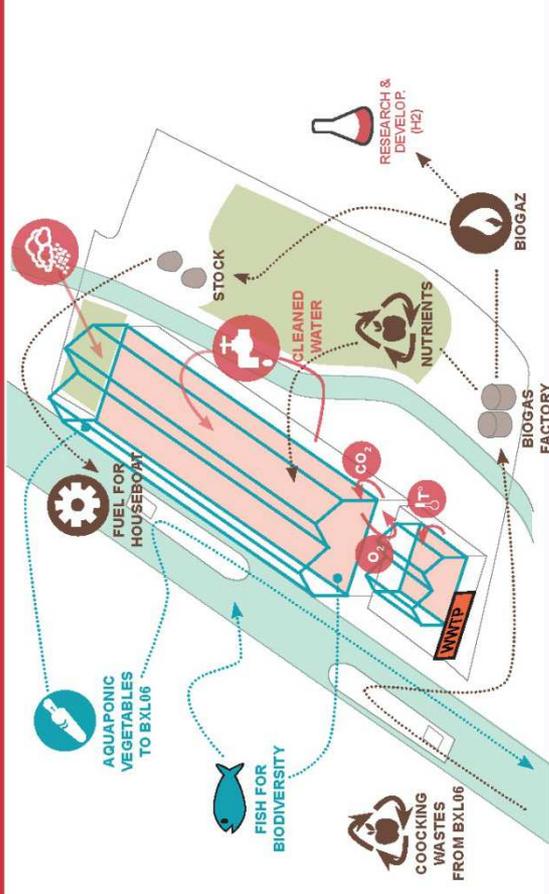
Innovate for a sustainable business



DIGUE DU CANAL
1130 BRUXELLES

PROJECT

SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area XL > 10.000m ² 82m 300m 50m 50m	Use WWTP Nutrients availability HEAT CO ₂ H ₂ O COMPOST FROM BXL06 WWTP	Host AQRIS	Accessibility EASY	Context PRIVATE
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Available area 32.000 m² de toiture d'un seul tenant. Projet existant d'installation de panneaux photovoltaïques à considérer.

Building use and structure C'est le toit de la station d'épuration des eaux usées à la sortie de la RBC. L'accès doit pouvoir être évident si l'on considère la faible hauteur du bâtiment et la place disponible autour pour y installer une infrastructure.

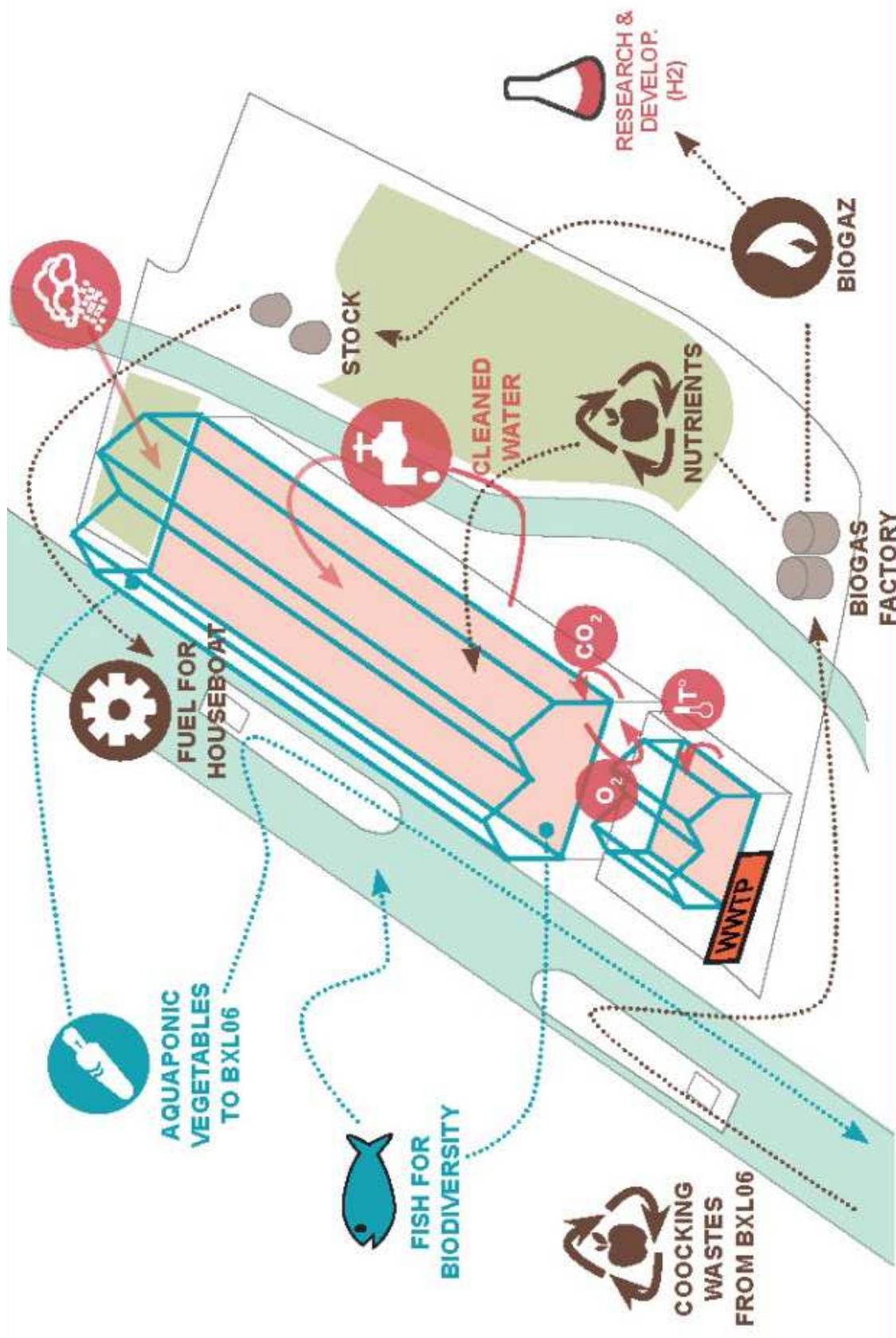
Context Accessibilité RRU en zone C – BUS STIB 58
Dans un zoning industriel en périphérie. Pas de débouché à proximité immédiate apparent. A prospecter: industries agroalimentaires

Nutrients availability XXX

KNOW WHAT YOU WANT

Depuis 7 ans, nous prenons soin de vos eaux usées. Notre engagement écologique et la qualité de nos services nous poussent maintenant à aller plus loin dans notre démarche: proposer une culture en aquaponie sur nos toits utilisant une eau directement issue de notre station. Ce projet nous permet d'offrir la possibilité aux bruxellois des produits frais et locaux et la culture en aquaponie nous sert de nurserie pour des poissons qui irons repeupler les eaux de la Senne et du canal. La présence proche du canal, nous permet de créer une coopération avec le projet BXL06 en transportant notre production avec des péniches vers ce site et en récupérant leurs déchets qui seront transformés dans notre unité de biométhanisation.

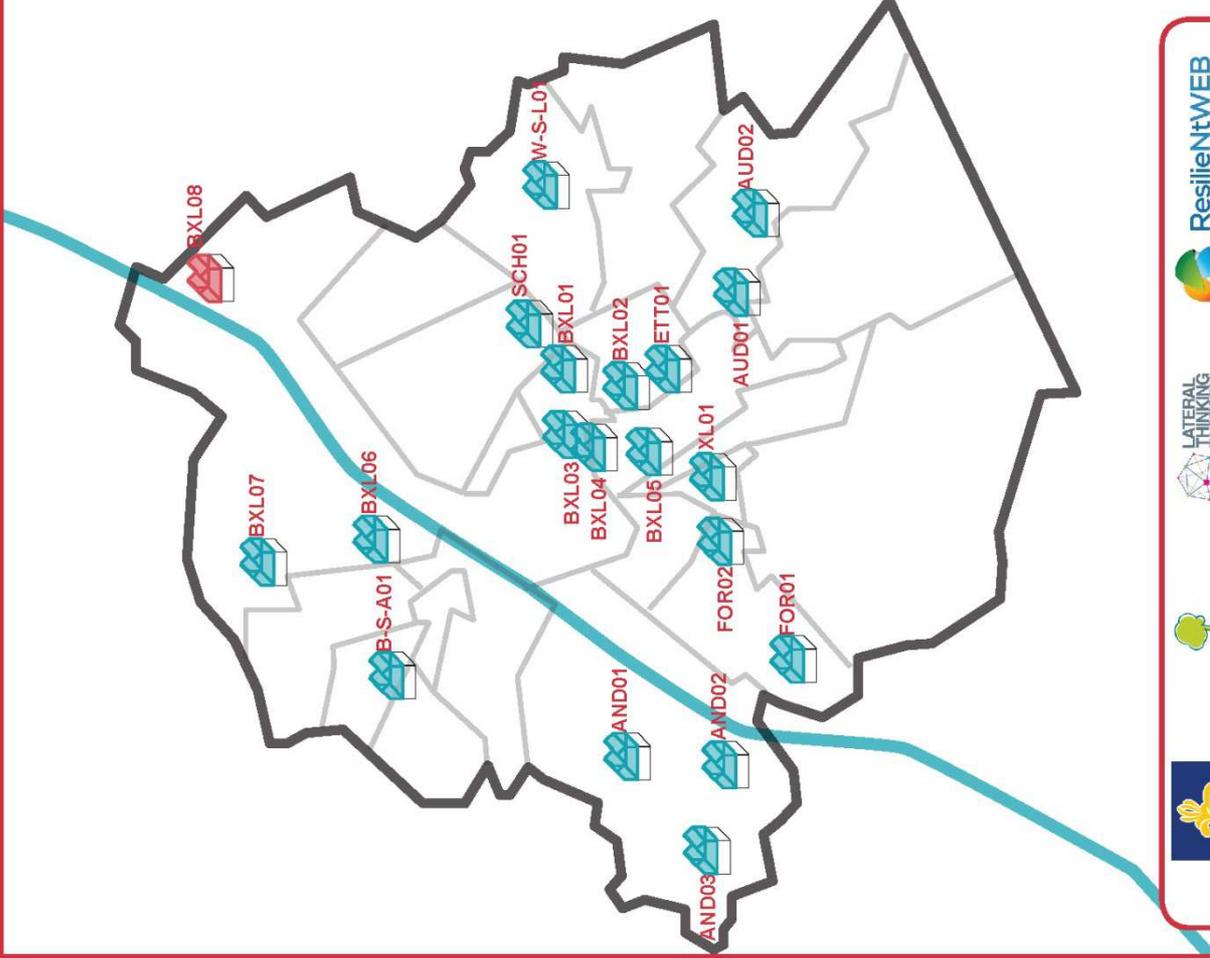
WHY DO IT? NEW OPPORTUNITIES €++ PRODUCT VEG. RESEARCH & DEVELOP.	STAKEHOLDERS AQRIS LIFE PROGRAMME EUROPEAN UNION	ADDED VALUE ENJOY THE HEAT RECYCLING AIR SHOW OUR QUALITY NURSERY HIGH VISIBILITY ALTERNATIVE LOGISTIC	FTE 100-150
PRODUCTS VEGETABLES FISH FOR THE CANAL	PRODUCTION SYSTEM GLASS AQUAPONIC	PROJECT NETWORK HOUSEBOAT LOGISTIC BXL06 BIOGAZ	



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		2		3
02		3		3
03		0		2
04		2		1
05		2		2
06		1		2
07		3		0
08		3		0
09		3		3
10		3		2
11		2		3
12		2		1
13		3		3

QUICK WINS



START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

STEP 2 QUICKSCAN FINANCIAL RESOURCES.

STEP 3 IDENTIFY POTENTIAL VALUE-ADDED SERVICES.

STEP 4 COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.

STEP 5 IDENTIFY GROWING METHODS, PARTNERS, STRUCTURES.

STEP 6 IDENTIFY POTENTIAL QUICK WINS.

STEP 7 ALIGN EXPECTATIONS WITH REALITY

STEP 8 FINALISE BIG FEATURES

STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

INDOOR FARMING IN RBC // 2014

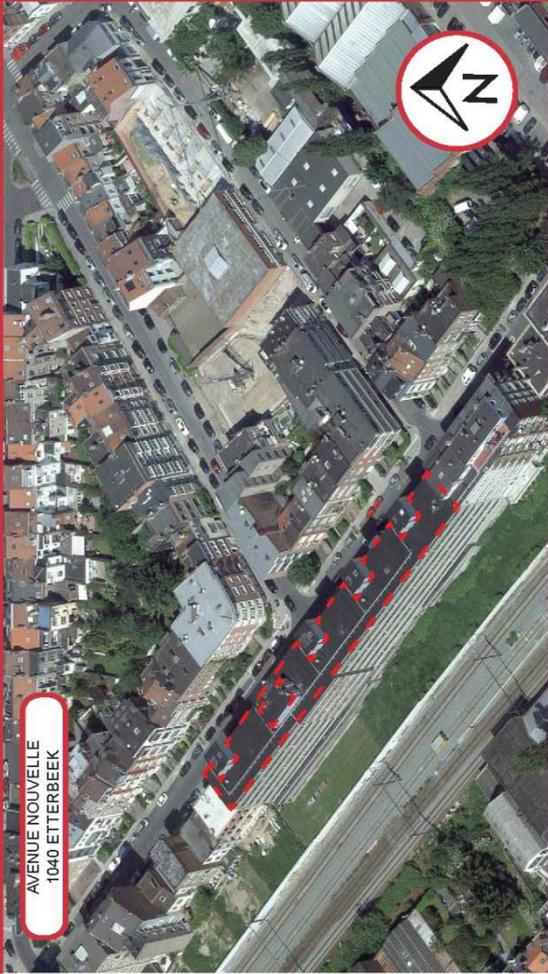
ETT01

Student Residence VUB

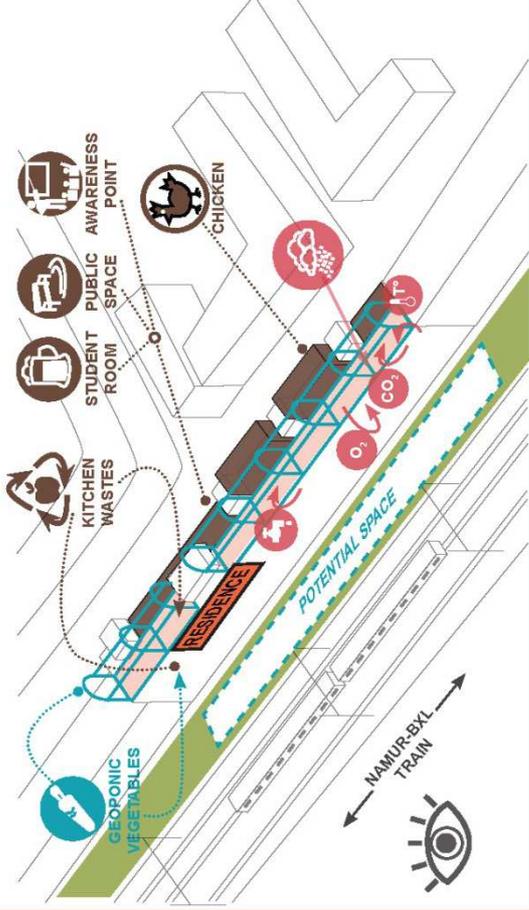


Innovate for a sustainable business

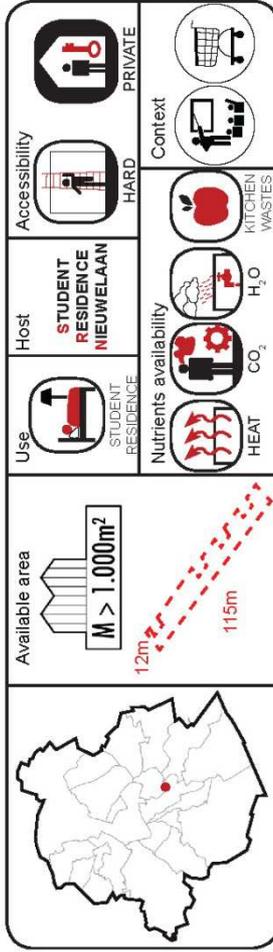
AVENUE NOUVELLE
1040 ETTERBEEK



PROJECT
SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE



Available area

1. 100 m², blocs techniques en toiture déduits.

Building use and structure

Résidence pour étudiants de la Vrije Universiteit Brussel. Environs 300 logements communautaires pour étudiants.

Context

Accessibilité RRU en zone A – Gare SNCB Etterbeek, Tram STIB 7,25, Bus DELIJN 178
Situé dans un quartier résidentiel, quelques commerces de proximité et deux écoles.

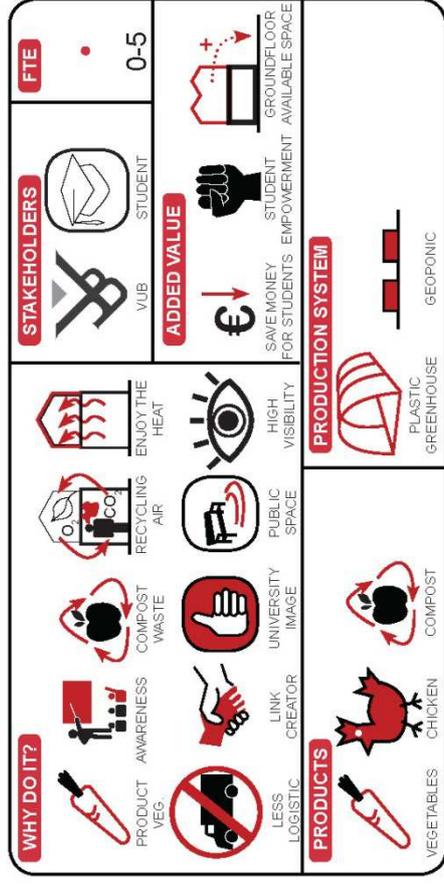
Nutrients availability

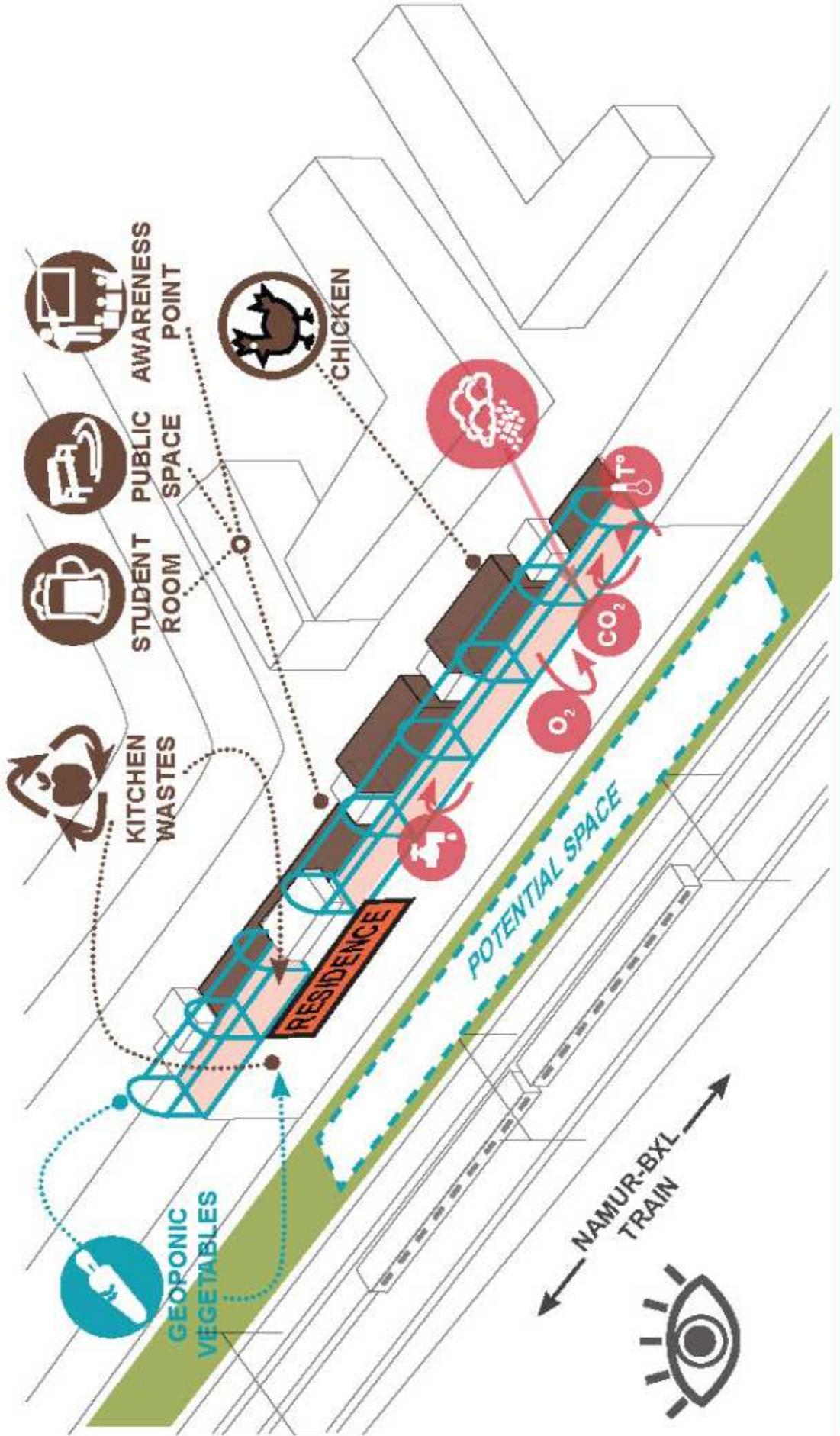
XXX

KNOW WHAT YOU WANT

Le projet a pour but de permettre au étudiants, futurs citoyens et acteurs de la société, de lancer un projet engagé: produire sur les toits de leurs logements, des aliments frais pour les autres étudiants de l'immeuble, de les sensibiliser et leur offrir un espace agréable pour se relaxer après les cours et étudier.

En échange de cela, les étudiants impliqués dans le projet reçoivent un accès à certaines facilités (réduction du minerval et des loyers,...) sous le même principe que les "Kots à projet" à l'Université Catholique de Louvain.

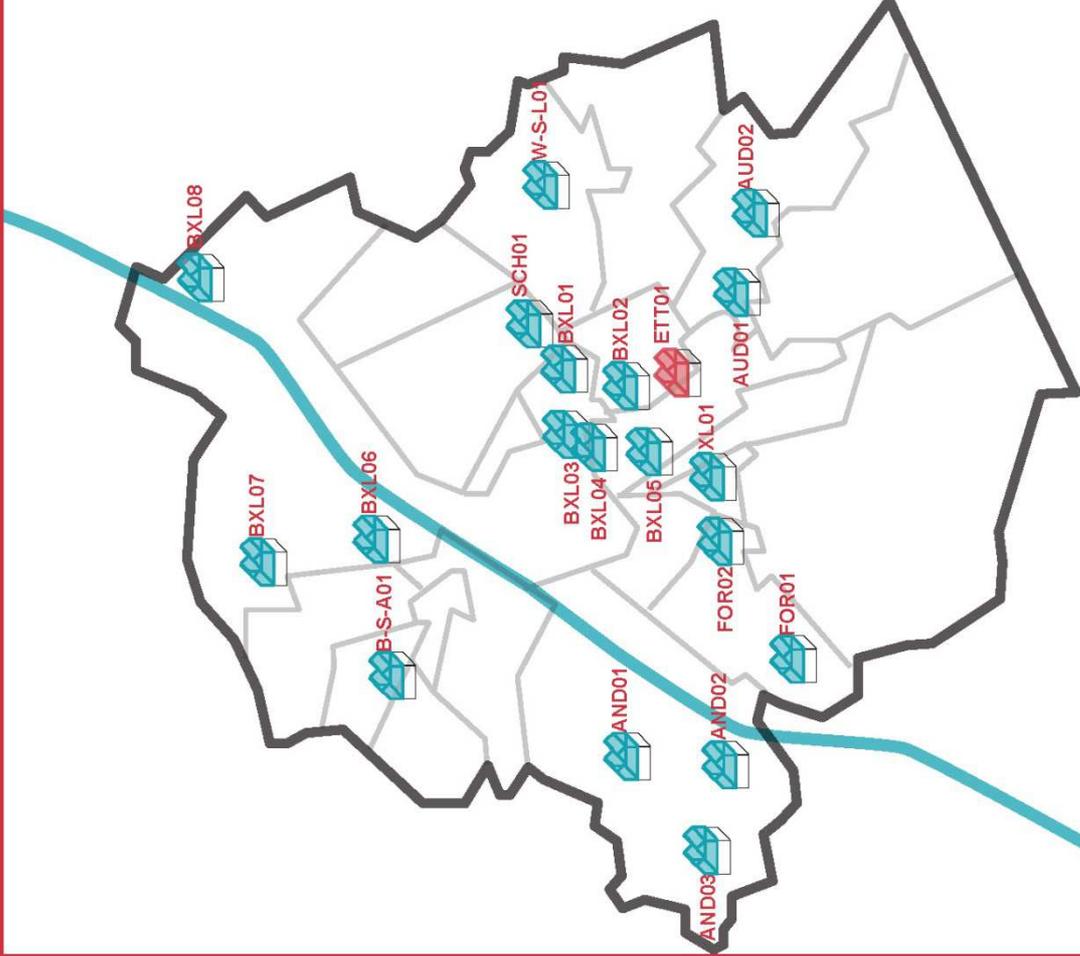




INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		3		2
02		0		2
03		2		0
04		0		2
05		3		1
06		2		3
07		3		0
08		3		0
09		3		2
10		2		2
11		1		2
12		3		2
13		2		1

QUICK WINS



Logos for ResilientWEB (Innovate for a sustainable business), Lateral Thinking Factory, and other partners.

START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

STEP 2 QUICKSCAN FINANCIAL RESOURCES.

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WIN-WIN SITUATION

INDOOR FARMING IN RBC // 2014

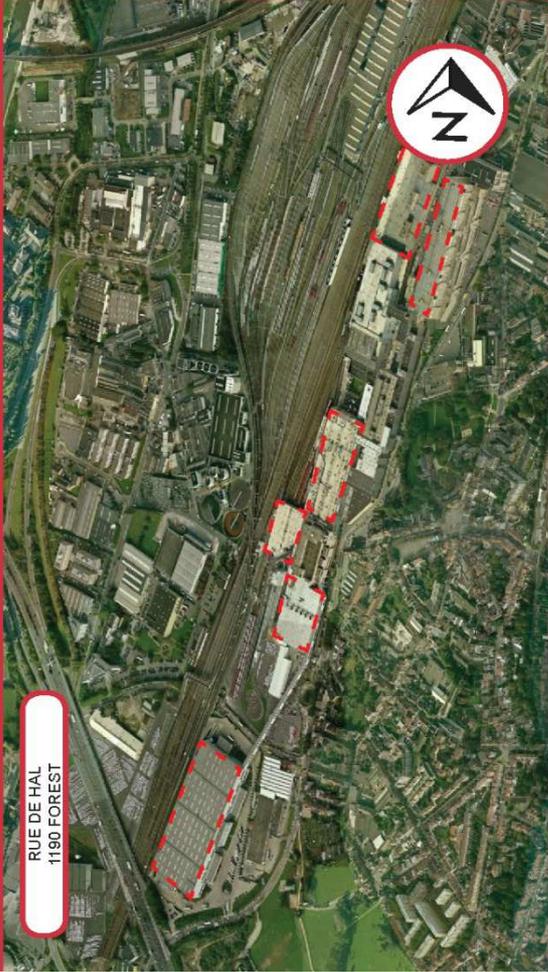
FOR01

Audi Forest



Innovate for a sustainable business

RUE DE HAL
1190 FOREST



KNOW WHAT YOU HAVE

	Available area XL > 10.000m ² 1900m	Use INDUSTRY Nutrients availability HEAT CO ₂	Host Audi AUDI FOREST	Accessibility EASY	Context PRIVATE
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Available area

La plus grande surface de toit plat en RBC avec 180.000 m² de toiture répartis sur deux bâtiments appartenant à la même usine.

Building use and structure

Le projet est situé sur le complexe de l'usine Audi Forest. Réparti sur le nouveau bâtiment (34.000 m²) et sur les anciens bâtiments contigus (146.000 m²). Une attention doit être portée aux lanternes existants. Les toitures sont relativement hautes, mais les dégagements autour des bâtiments devraient permettre un accès aisé.

Context

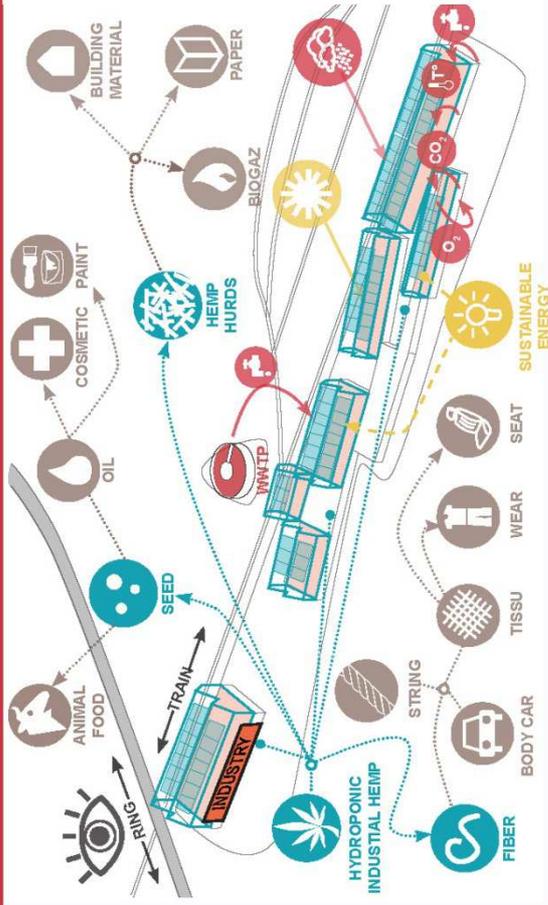
Accessibilité RRU en zone B – Tram STIB 32, 82, 97, Bus STIB 50
Etendu le long du chemin de fer le site a un énorme potentiel en terme de surface et de nutriments, mais ne dispose pas de grand débouché à proximité. Quelques zones d'habitation et peu de commerces aux alentours.

Nutrients availability

5.550m³

PROJECT

SYSTEM-HOLISTIC DIAGRAM

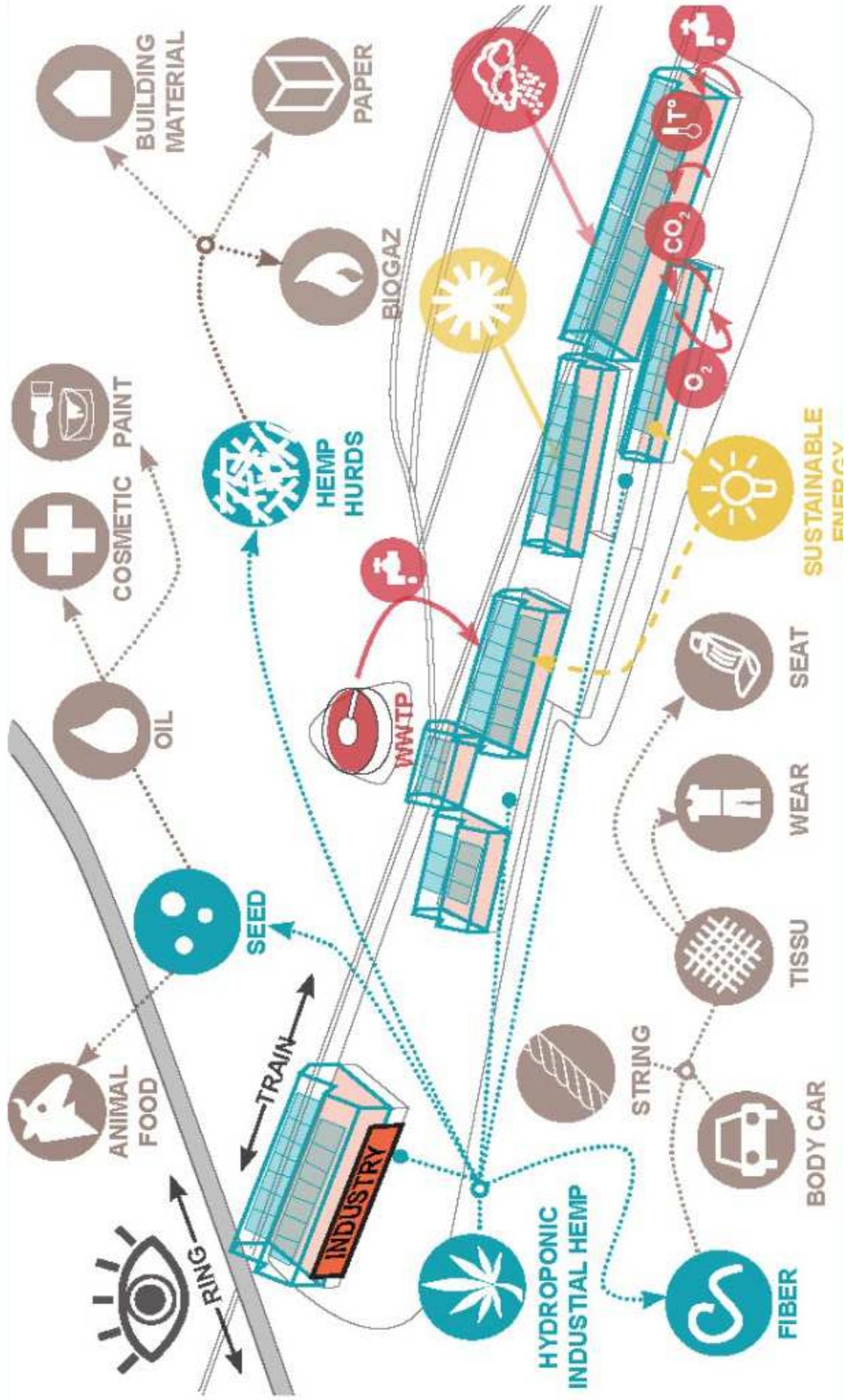


KNOW WHAT YOU WANT

Audi a toujours été à la pointe de la technologie. Soucieux de l'environnement et de continuer toujours plus loin l'innovation, nous avons choisi d'utiliser les toits de notre usine de Forest pour faire de la culture sous serre. Mais pas n'importe quel type de culture, la culture du chanvre.

Cette matière première utilisée depuis des centaines d'années nous permet d'une part de participer à la production belge qui sera utilisée pour la construction, l'industrie textile, etc. et d'autre part pour produire notre nouveau concept, l'Audi H1 (Hemp). Cette voiture roulant au biogaz (produit également par la méthanisation des déchets de la culture) aura la carrosserie, la peinture, les tissus intérieurs 100% fibres naturelles, bref une voiture en partie compostables.

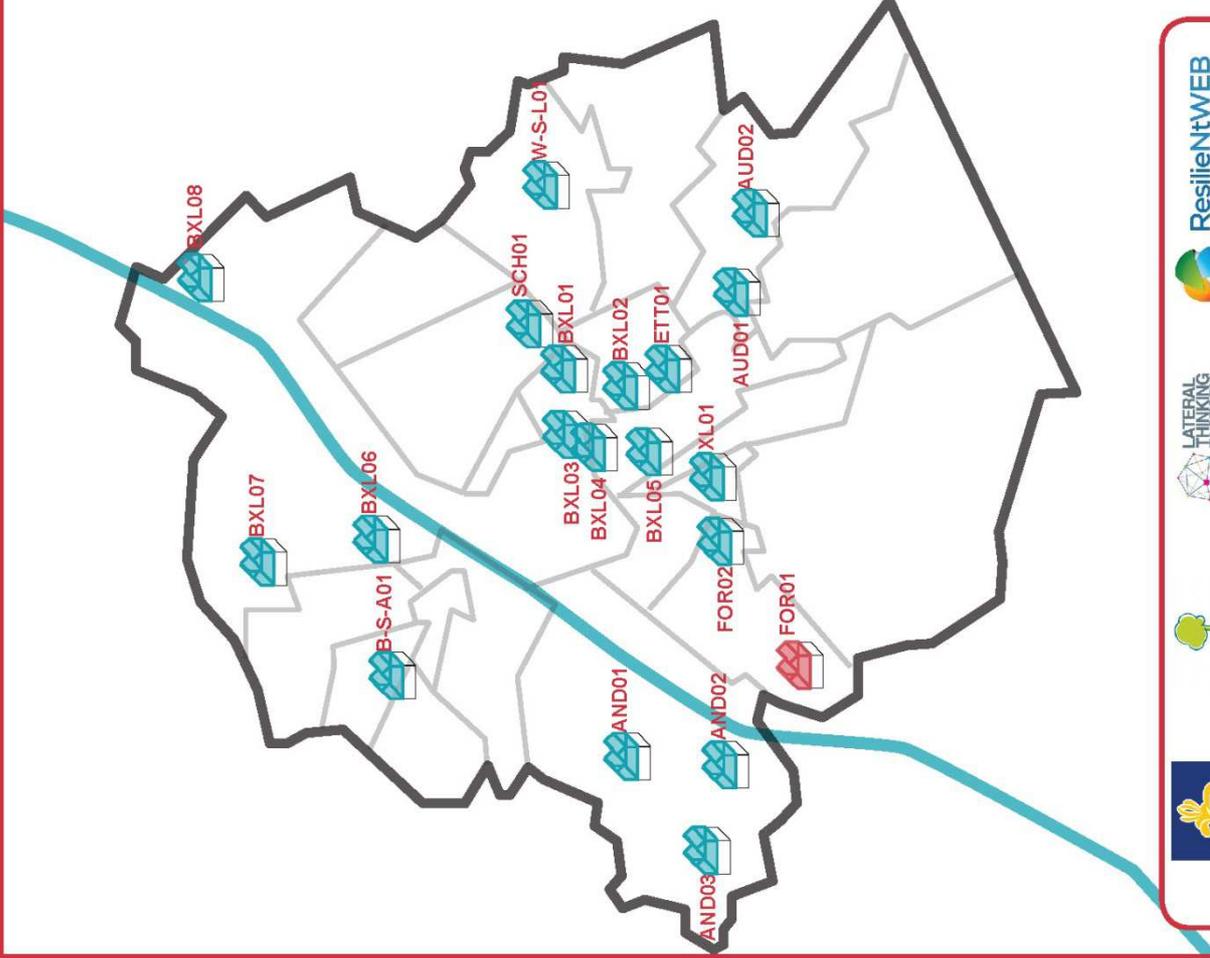
WHY DO IT?	STAKEHOLDERS	FTE
<ul style="list-style-type: none"> Product New Business Opportunities & Develop. Less Logistic Brand Image High Visibility Sustainable Energy Recycling The Air Enjoy The Heat 	<ul style="list-style-type: none"> Audi Hemp Sector WWTTP Many Sectors Creation 	<500
PRODUCTS	ADDED VALUE	PRODUCTION SYSTEM
<ul style="list-style-type: none"> Hemp Hemp By-Product Energy 	<ul style="list-style-type: none"> WWTTP Many Sectors Creation 	<ul style="list-style-type: none"> Glass + P.V Hydroponic



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		0		2
02		3		2
03		2		2
04		2		1
05		1		3
06		1		3
07		0		0
08		0		1
09		3		2
10		3		3
11		2		3
12		2		0
13		1		3

QUICK WINS



Logos for ResilientWEB (Innovate for a sustainable business), Lateral Thinking Factory, and other partners.

START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

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STEP 4 COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.

STEP 5 IDENTIFY GROWING METHODS, PARTNERS, STRUCTURES.

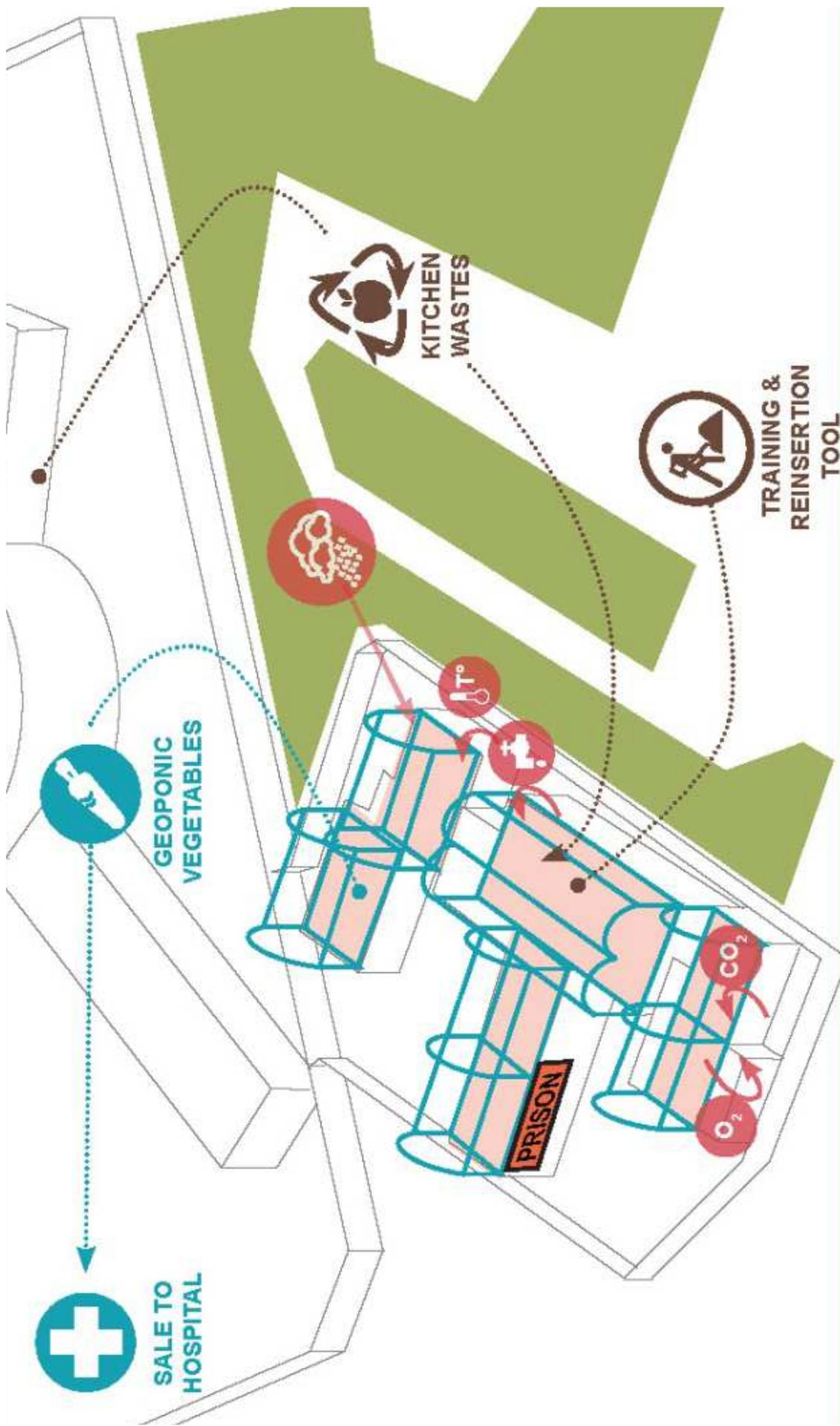
STEP 6 IDENTIFY POTENTIAL QUICK WINS.

STEP 7 ALIGN EXPECTATIONS WITH REALITY

STEP 8 FINALISE BIG FEATURES

STEP 9 ROADMAP TIMETABLE

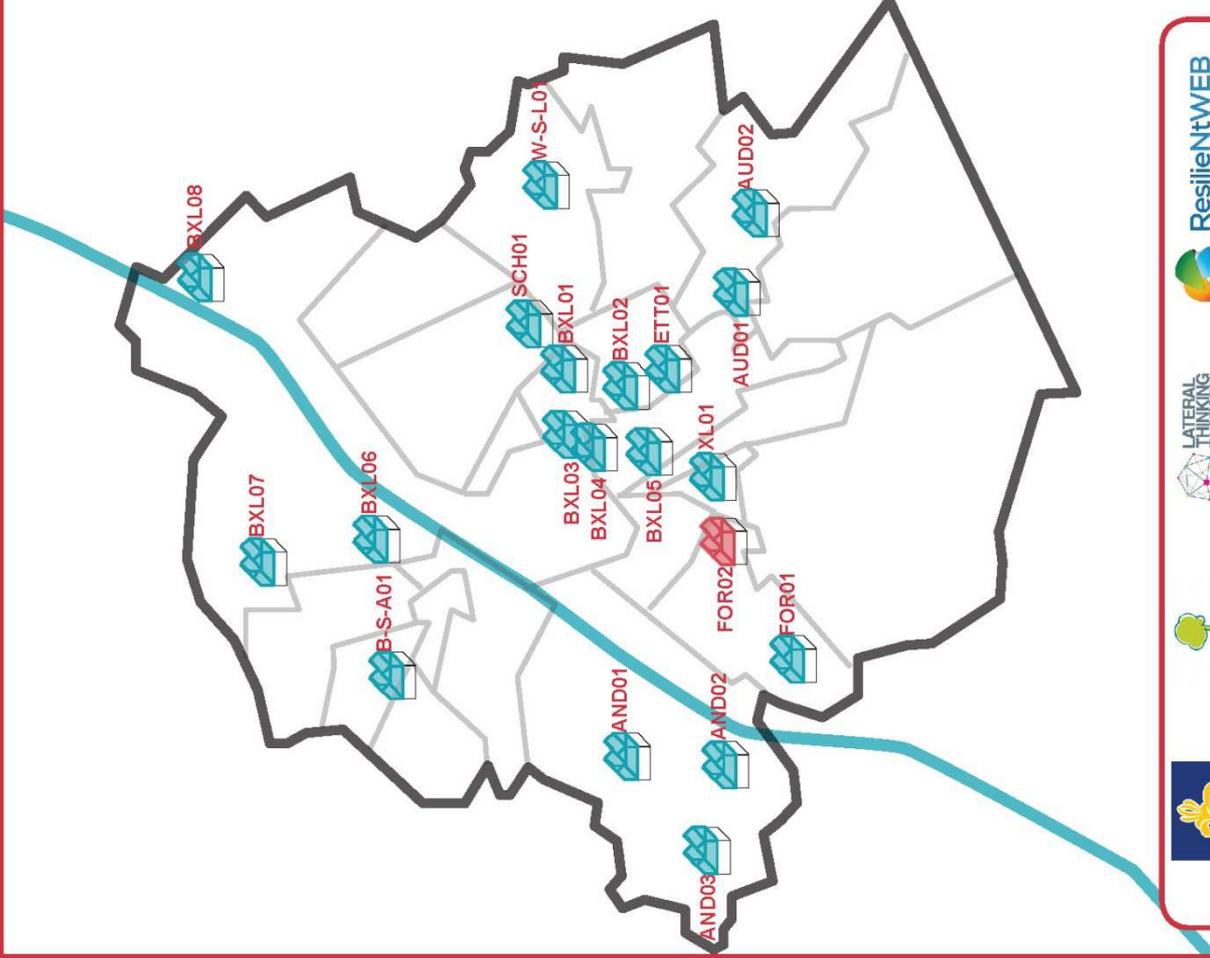
WIN-WIN SITUATION



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		2		1
02		1		2
03		0		2
04		1		3
05		3		3
06		2		3
07		1		0
08		2		0
09		3		3
10		3		2
11		0		0
12		3		3
13		1		2

QUICK WINS



START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

STEP 2 QUICKSCAN FINANCIAL RESOURCES.

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STEP 8 FINALISE BIG FEATURES

STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

INDOOR FARMING IN RBC // 2014

SCH01

Delhaize Schaarbeek

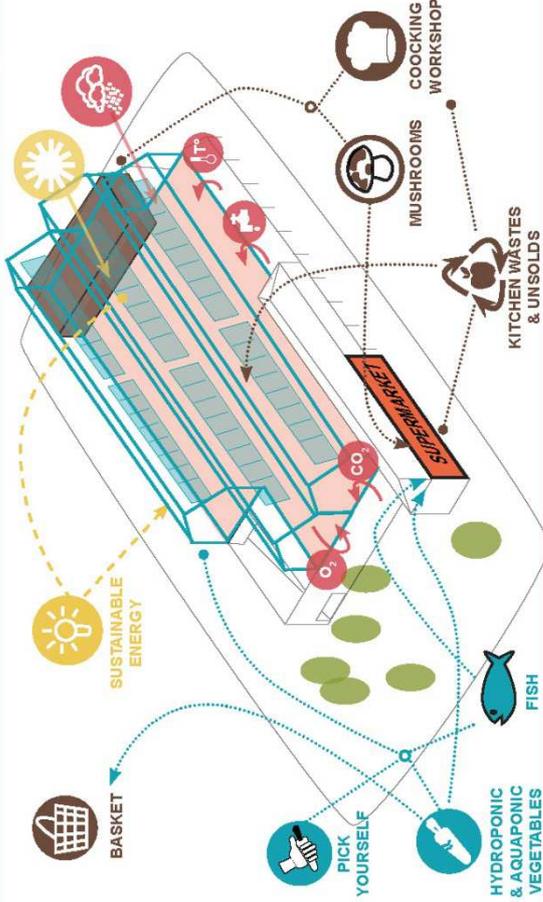
AVENUE LEON MAHILLON
1030 SCHAERBEEK



ResilientWeb
Innovate for a sustainable business



PROJECT SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area M > 1.000m ² 91m x 91m	Use SHOP: Nutrients availability HEAT: CO ₂ , H ₂ O UNNSOLD VEG: Apple icon	Host DELHAIZE	Accessibility EASY: Stairs icon	Context PRIVATE: House icon
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Available area 2.900 m² de toiture.

Building use and structure

Ce supermarché de l'enseigne Delhaize présente une toiture bien proportionnée avec la possibilité de mettre en place un accès facile en profitant du parking juste en-dessous de la toiture. A noter que les supermarchés de l'enseigne Delhaize touchent une clientèle aisée. Beaucoup des supermarchés de cette enseigne ont à Bruxelles une configuration intéressante pour accueillir une indoor farming. Un exemple parmi d'autres.

Context

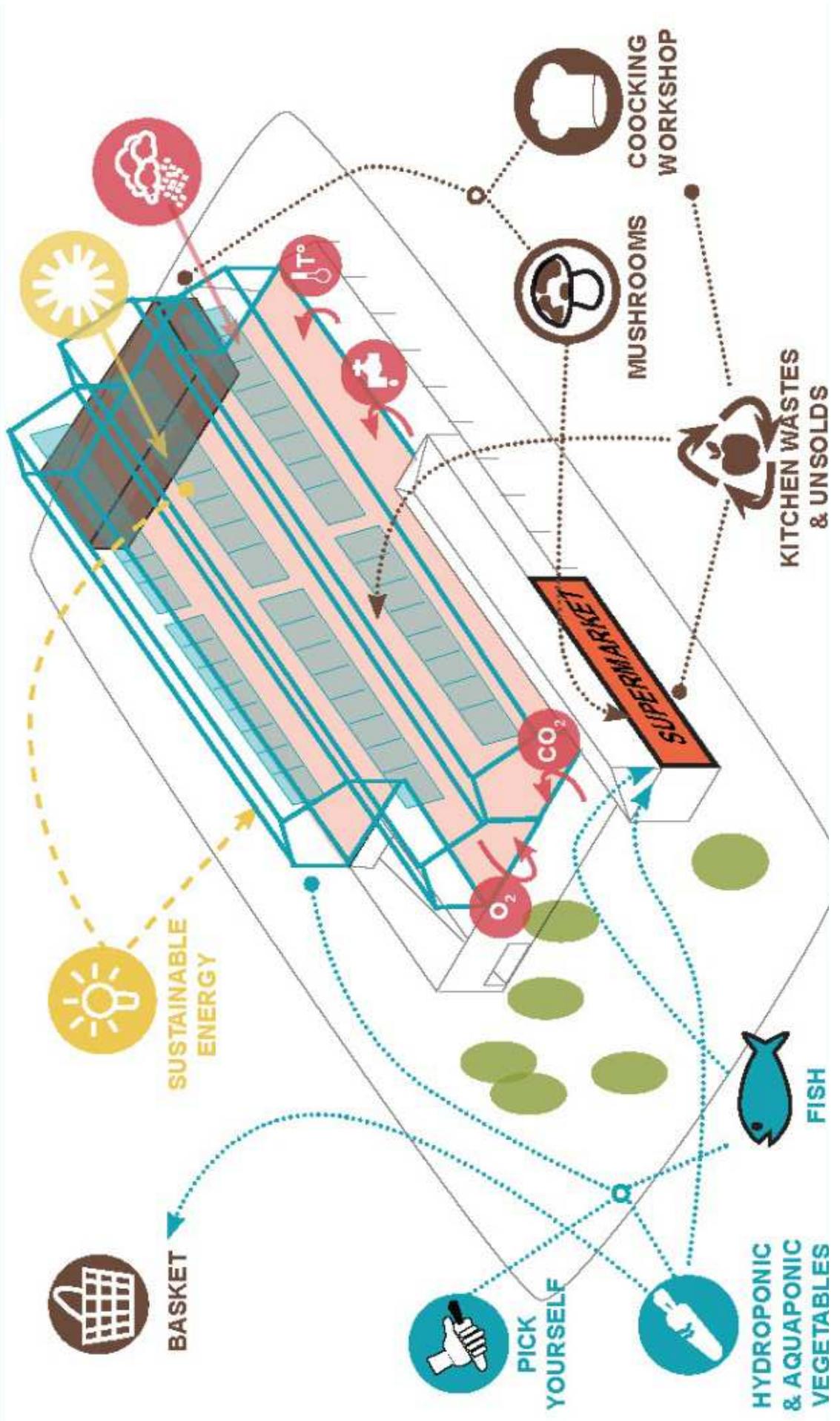
Accessibilité RRU en zone C – BUS STIB 28,61
Dans un quartier résidentiel, peu de commerces de proximité mais quelques restaurants. Ecole à proximité immédiate. Partenariat à développer avec le supermarché en-dessous.

Nutrients availability XXX

KNOW WHAT YOU WANT

Votre enseigne Delhaize a depuis toujours, comme ambition de vous fournir des produits de la plus grande qualité. Aujourd'hui, nous vous proposons d'aller un pas plus loin avec notre espace de culture sous serre où vous pourrez venir choisir directement sur les plants, les produits de votre choix. Impossible de faire plus frais...
Nous vous proposons également dans cet espace, des cours de cuisine de légumes de saisons, et autre innovation, vous pourrez à présent amener vos déchets ménager de cuisine que nous transformerons en compost. Ce petit geste vous apportera des réductions directement déductible à la caisse.

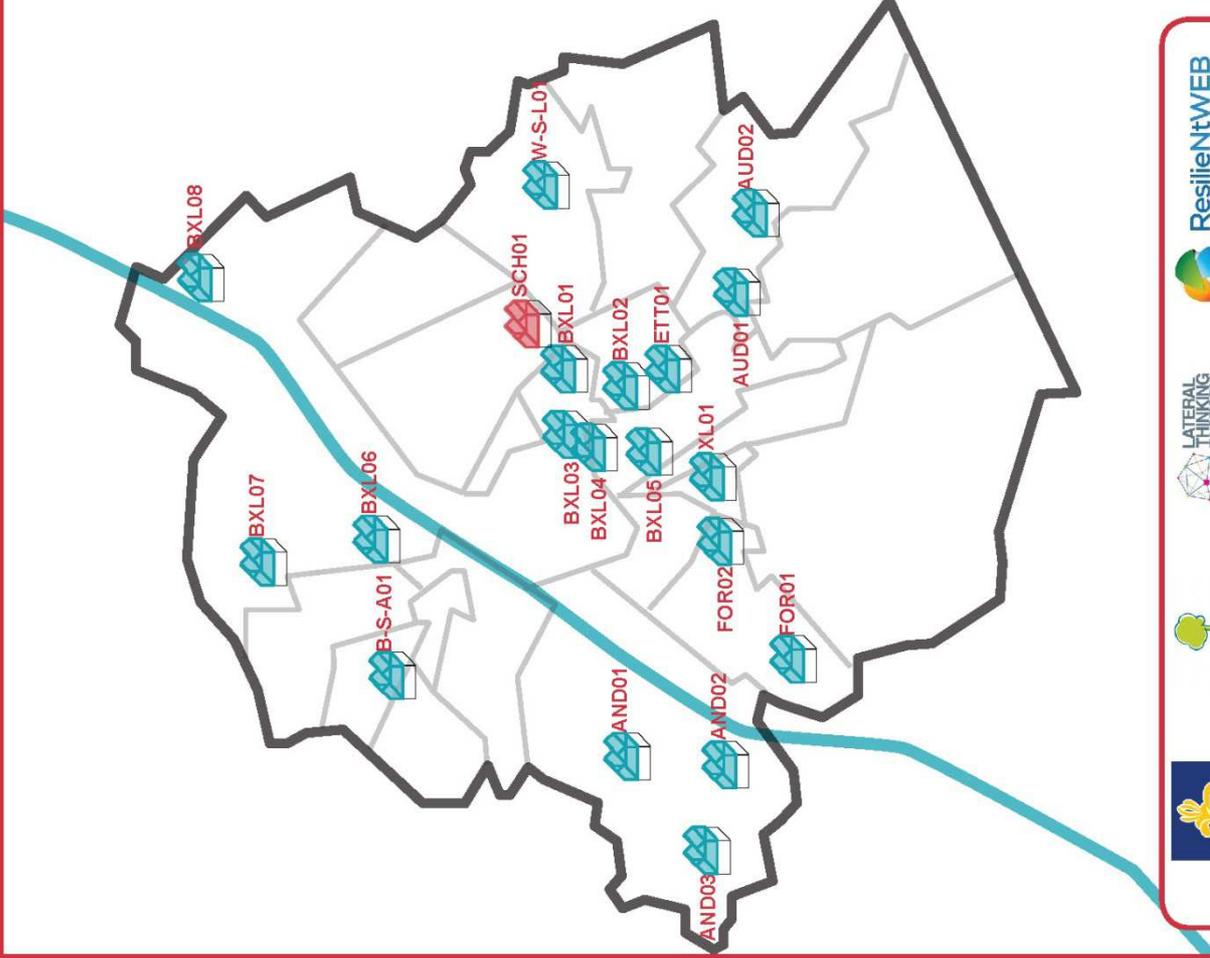
WHY DO IT? PRODUCT VEG. (Carrot icon) CSR (Thumbs up icon) LESS LOGISTIC (Truck with slash icon) RECYCLING AIR (Air cycle icon) ENJOY THE HEAT (Sun icon)	STAKEHOLDERS DELHAIZE (Delhaize logo) ECO IRIS (Eco Iris logo)	FTE 5-15
ADDED VALUE PICK YOURSELF (Hand holding produce icon)	PRODUCTION SYSTEM GLASS + P.V. (Glass and PV icons) HYDROPONIC (Hydroponic system icon) AQUAPONIC (Aquaponic system icon)	
PRODUCTS VEGETABLES (Carrot icon) FISH (Fish icon) ENERGY (Lightning bolt icon) MUSHROOMS (Mushroom icon) COMPOST (Compost bin icon)		



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		3
02		3
03		0
04		2
05		2
06		1
07		3
08		2
09		2
10		2
11		1
12		3
13		1
14		2
15		2
16		1
17		2
18		2
19		3
20		2
21		0
22		2
23		2
24		2
24		1
26		3

QUICK WINS



START TO PLAN

STEP 1 IDENTIFY STAKEHOLDERS, THEIR GOALS & ORGANISATIONAL CULTURE.

STEP 2 QUICKSCAN FINANCIAL RESOURCES.

STEP 3 IDENTIFY POTENTIAL VALUE-ADDED SERVICES.

STEP 4 COMPARE POTENTIAL VALUE-ADDED SERVICES TO STAKEHOLDER GOALS.

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STEP 7 ALIGN EXPECTATIONS WITH REALITY

STEP 8 FINALISE BIG FEATURES

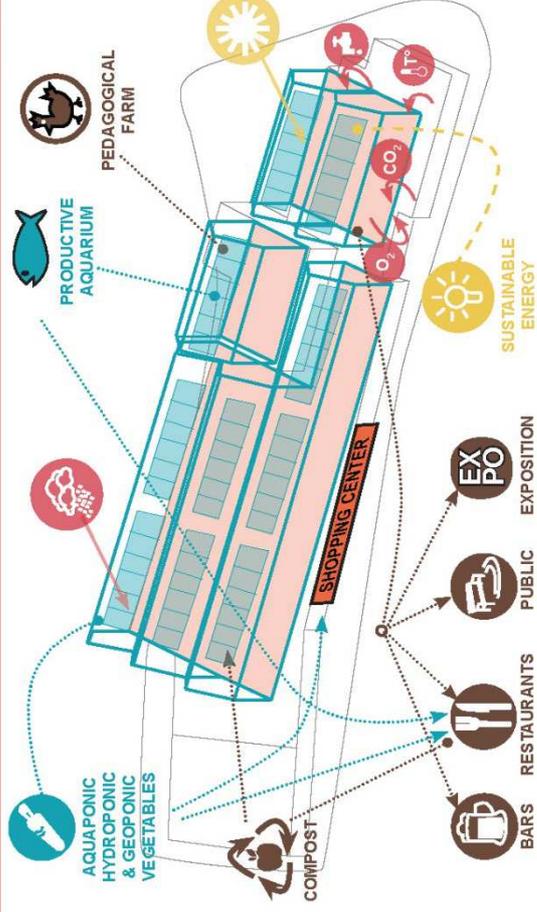
STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION



BULEVARD DE LA WOLUWE
1200 WOLUWE-ST-LAMBERE

PROJECT SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area XL > 10.000m ² 425m	Use RETAILS & RESTAURANTS Nutrients availability HEAT CO ₂	Host SHOPPING CENTER WOLUWE H ₂ O	Accessibility EASY	Context PRIVATE Shopping cart icon
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Available area

26.300 m² (2,6Ha) de toiture avec quelques différences de niveaux. Parking déduit.

Building use and structure

Le Shopping Center de Woluwe est un des plus grand centre commercial de la RBC. Nombreux commerces en tous genres. L'accessibilité en véhicule est possible depuis le parking aérien sur la toiture sud.

Context

Accessibilité RRU en zone B – Métro STIB 1 , BUS STIB 29,42,45 Bus DELIJN 359,659.

Le centre commercial accueille à son niveau inférieur une série de restaurants et de commerces alimentaires de petite et moyenne taille. Présence également de fleuristes.

XXX

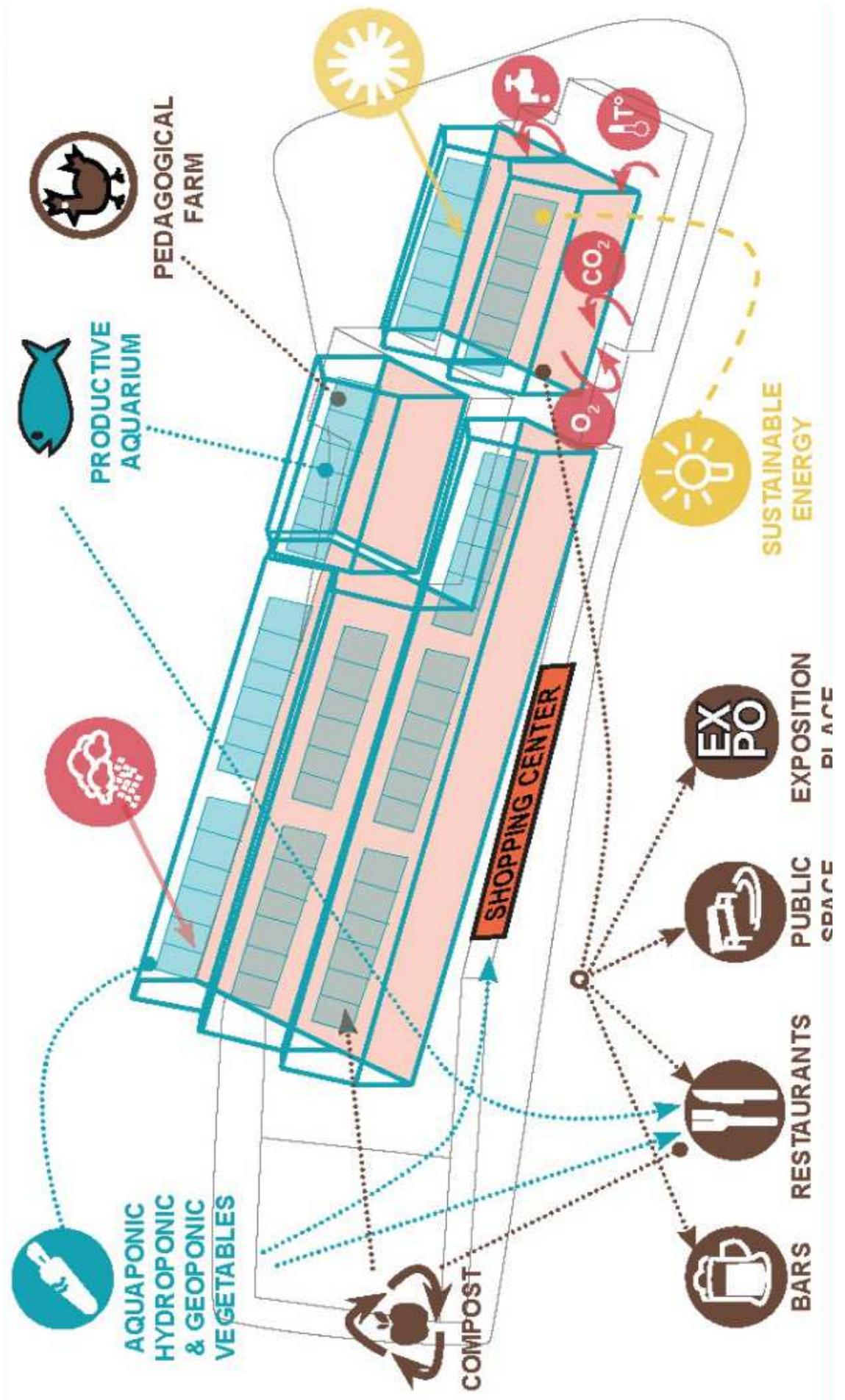
Nutrients availability

KNOW WHAT YOU WANT

Votre Shopping Center Woluwe fait peau neuve. Avec le nouvel espace sur le toit rempli de serres, nous vous proposons un "nouveau monde d'expérience". Une grande partie de nos restaurants et magasins alimentaires seront approvisionnés directement par nos espaces de cultures sur les toits, de plus vous pourrez venir vous détendre dans un de nos locaux (bars, restaurants,...) sous serre.

Ne manquez pas de venir visiter également notre aquarium productif, notre ferme animale et surtout notre toute nouvelle halle aux Foires et exposition, entièrement vitrée! Votre nouveau Shopping Center Woluwe produit, pour vous, un nouveau champs de plaisirs...

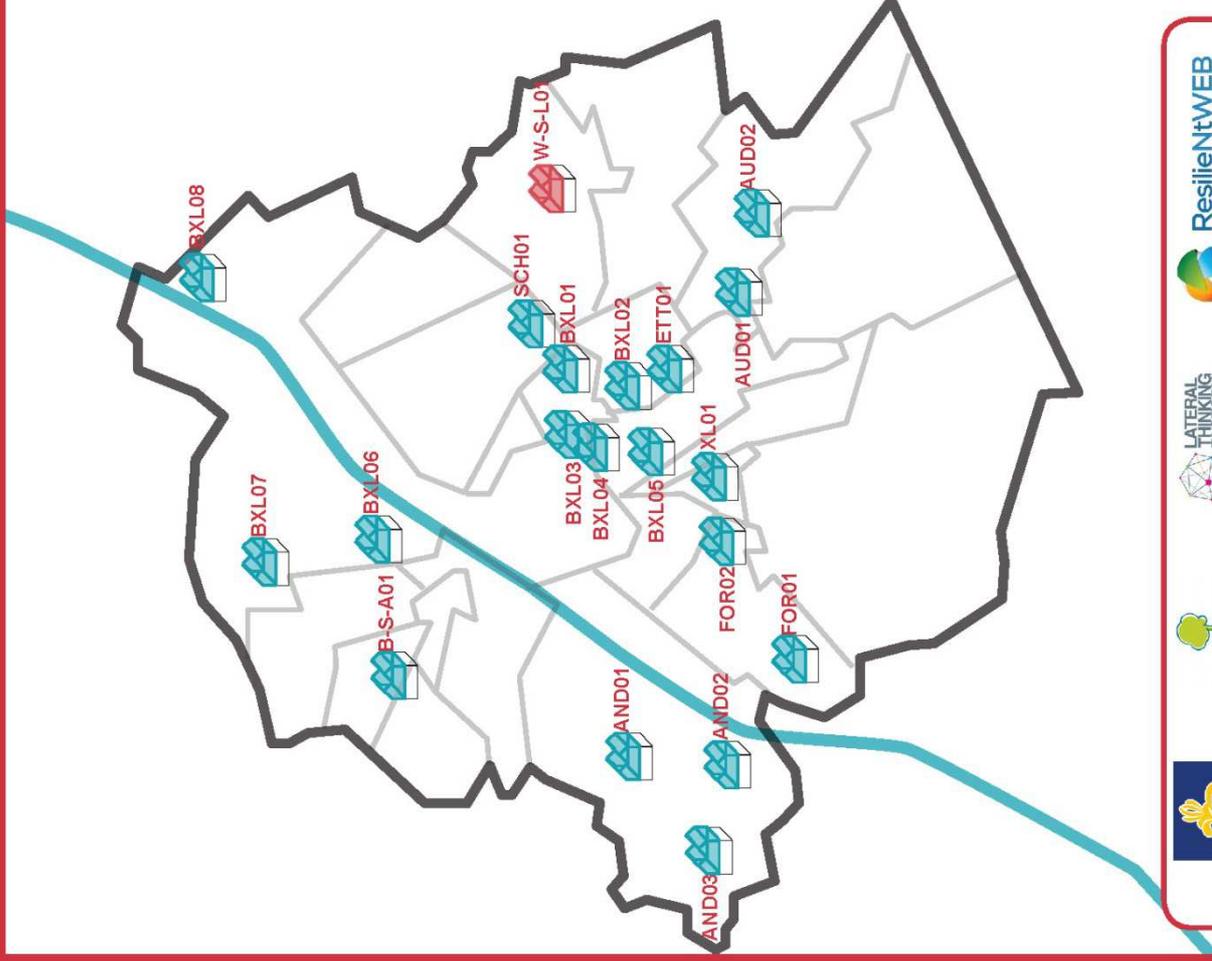
WHY DO IT? PRODUCT VEG. OPPORTUNITIES €++ COMPOST UNSOLIDS UNDER-USED SPACE ???	CSR RECYCLING AIR SUSTAINABLE ENERGY LESS LOGISTIC	ENJOY THE HEAT NEW PUBLIC SPACE	STAKEHOLDERS RESTAURANTS EX PO PRODUCTIVE PEDAGOGICAL FARM	FTE 75-100 HIGH VISIBILITY
PRODUCTS VEGETABLE FISH COMPOST ENERGY	PRODUCTION SYSTEM GLASS + P.V. HYDROPONIC AQUAPONIC GEOPONIC	ADDED VALUE PRODUCTIVE PEDAGOGICAL FARM		



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		3
02		2
03		0
04		3
05		2
06		1
07		1
08		3
09		3
10		3
11		1
12		2
13		2
14		2
15		2
16		1
17		3
18		3
19		3
20		1
21		2
22		2
23		2
24		1
24		2
26		3

QUICK WINS



Logos for ResilientWEB (Innovate for a sustainable business), Lateral Thinking Factory, and other partners.

START TO PLAN

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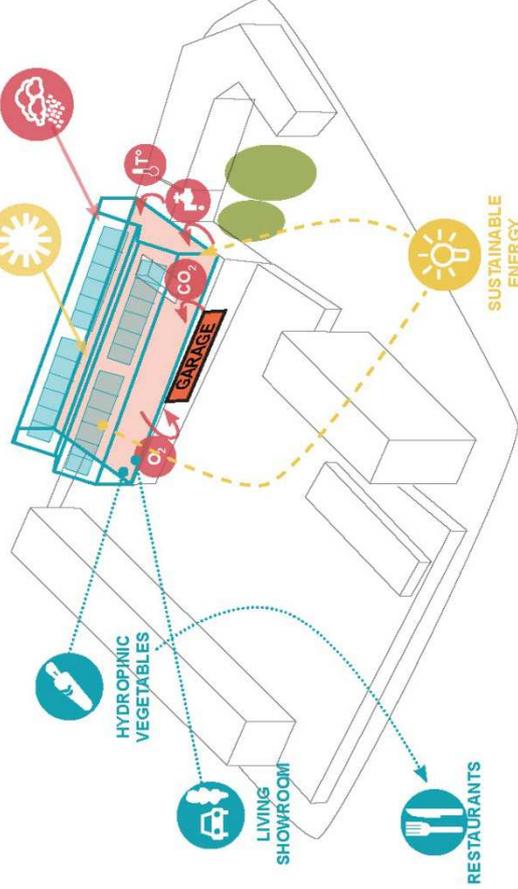
STEP 9 ROADMAP TIMETABLE

WIN-WIN SITUATION

Rue Américaine
1050 Ixelles



PROJECT SYSTEM-HOLISTIC DIAGRAM



KNOW WHAT YOU HAVE

	Available area L > 3.000m² 85m 40m	Use GARAGE Nutrients availability HEAT CO ₂ H ₂ O	Host AVIS & AVIS RENT	Accessibility EASY	Context PRIVATE
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Available area 8.600 m² (0.86Ha) de toit plat. C'est une surface considérable tenant compte de la situation urbaine du projet.

Building use and structure L'activité principale du site est liée à l'automobile, avec entre autre les sociétés D'Ieteren et Avis. Le bâtiment est principalement occupé par des bureaux, mais également par des ateliers et un showroom. Le site est divisé en deux toitures. La toiture la plus évidente est de 3.300 m² et dispose d'un accès aisé grâce à la présence d'une rampe pour véhicule.

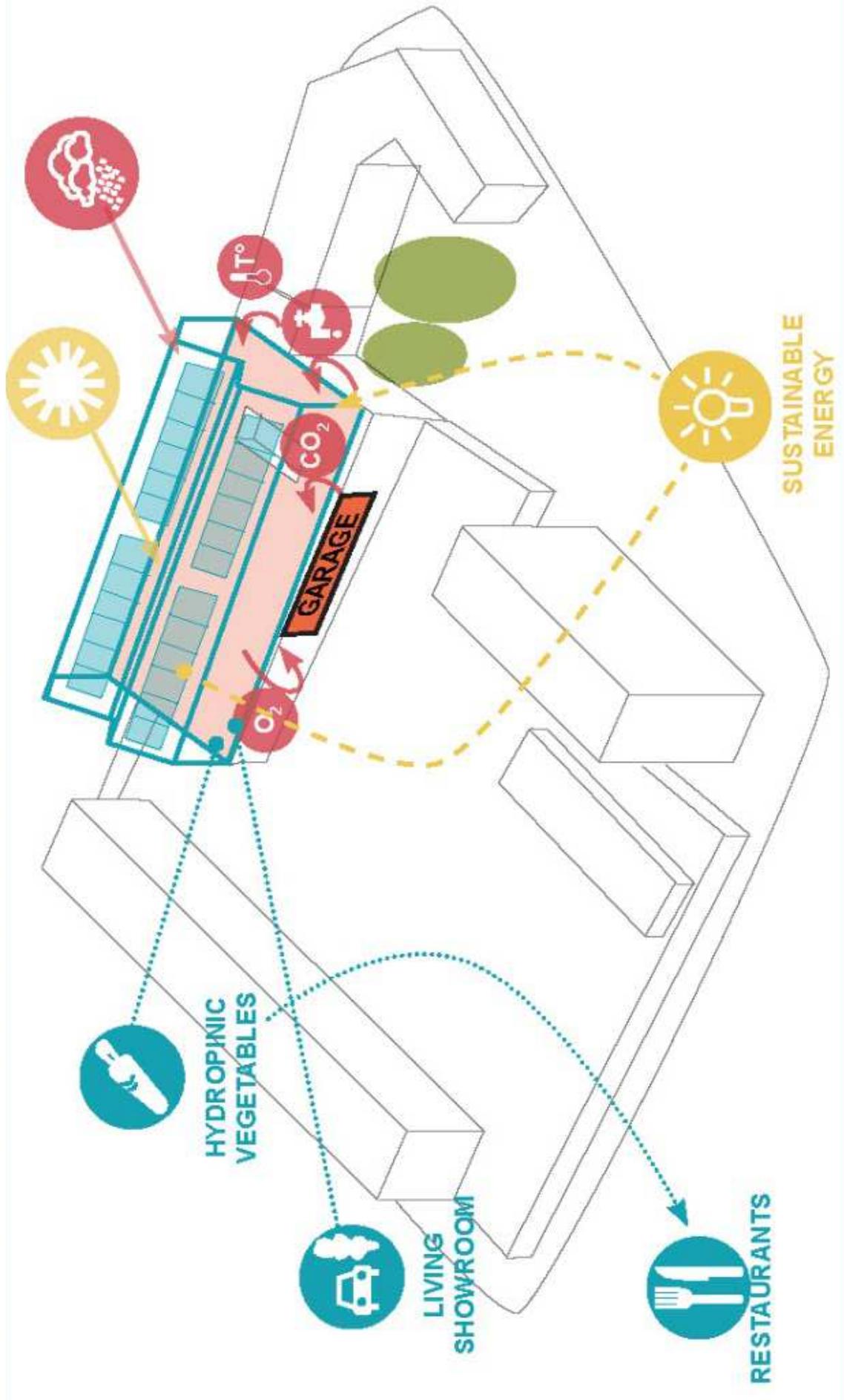
Context Accessibilité RRU en zone C - Bus STIB 60
Situé en plein quartier résidentiel huppé. Quartier très vivant avec de nombreux commerces de proximité et beaucoup de restaurants. En face du groupe scolaire De Ten Bosch

Nutrients availability XXX

KNOW WHAT YOU WANT

Dans le cadre de notre démarche "Think Blue", nous privilégions l'acte à la parole en investissant dans un projet de serre urbaine et de production d'énergie renouvelable (grâce à des panneaux solaires) sur les toits de notre ShowRoom Ixelles. Ces aménagements produiront des aliments de qualités pour les commerces et restaurants du quartier et notre énergie alimentera une partie de nos besoins dans nos bureaux et dans notre magasin.
Il n'y a pas que nos voitures qui doivent penser à améliorer leur empreinte écologique, c'est l'actions de chaque éléments du système qui pourra produire un changement...

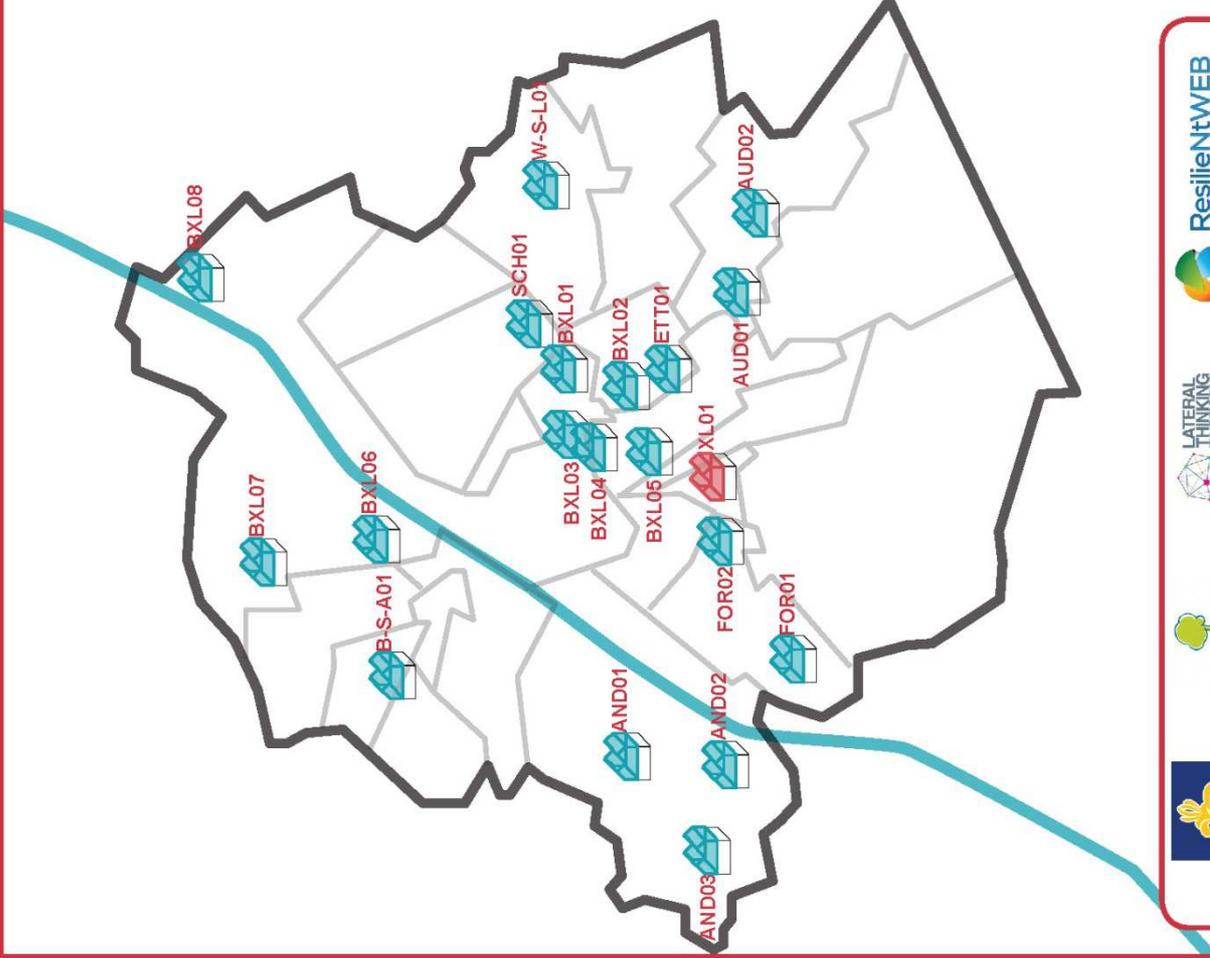
WHY DO IT? €++ NEWBUSINESS OPPORTUNITIES RECYCLING AIR LESS LOGISTIC UNDER-USED SPACE VEG. ??? SUSTAINABLE ENERGY LIVING SHOWROOM	STAKEHOLDERS RESTAURANTS CUSTOMERS LOYALTY	FTE 15-30
PRODUCTS VEGETABLE ENERGY	ADDED VALUE CUSTOMERS LOYALTY	PRODUCTION SYSTEM GLASS + P.V. HYDROPONIC



INTEGRATED INDOOR FARMING PLANNING
TOOLBOX

01		3		2
02		1		2
03		0		0
04		2		2
05		2		3
06		1		3
07		0		1
08		0		1
09		3		2
10		3		2
11		3		1
12		3		0
13		1		3

QUICK WINS



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WIN-WIN SITUATION