REGENVILLAGES

The “Tesla of Ecovillages”

Tech-Integrated and Regenerative Neighborhood Development

ReGen Villages Holding, B.V.
R-Gen, Incorporated Delaware C-Corp
ReGen Labs - non-profit research in resiliency and regenerative system design

Spin-off inspired by UN Sustainability Platform brief co-authored by Prof. Larry Leifer and Chris Ford (AIA) from the Center for Design Research at Stanford University and James Ehrlich Senior Technologist and EIR Stanford University, H-STAR Institute

CURRENT STATUS

ReGen Villages has thus far raised 350k euro seed investment from a Norwegian impact and technology private equity investor. We are looking to raise 1-million euro to complete our seed round by end of Q4 2016. Subsequently we are proposing 14-million euro Series-A with current due-diligence from IKEA, IKANO, Skanska, Microsoft, Ananda, Mistletoe, KBW-Investments and TAQNIA.

PHILIPS PRIVA IBM GRUNDFOS Schneider Electric IKEA ERICSSON SKANSKA Google
EFFEKT heijmans VolkerWessels ARUP TNO VINGE ORRICK BRIDGE Legal & Finance

In-kind committed engineering support and technology contributions from Arup, TNO, Ericsson, Philips, Priva, Schneider Electric, Grundfos, – pro bono legal from Orrick, Silicon Valley – Briddge, Amsterdam – Vinge, Stockholm Vinge Brussels office for EU advocacy.

UNRESTRICTED GRANTS FOR UNIVERSITY RESEARCH IN RESILIENCY

STANFORD UNIVERSITY
WAGENINGEN UNIVERSITEIT WAGENINGEN UR
Universiteit Leiden
DTU Technical University of Denmark
Massachusetts Institute of Technology
KAUST

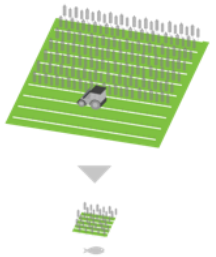
ReGen Villages is a global, tech-integrated real estate development company:
Regenerative, Resilient and Thriving neighborhoods for demanding markets

INSTEAD OF WORKING FOR YOUR HOME, WE ENVISION A HOME THAT WORKS FOR YOU...

... PRODUCING AN ABUNDANCE OF CLEAN ENERGY, FRESH HEALTHY FOOD AND WATER FOR EVERYDAY CONSUMPTION.

THE TECHNOLOGY EXISTS... IT IS JUST A MATTER OF APPLYING SCIENCE INTO THE ARCHITECTURE OF EVERYDAY LIFE.

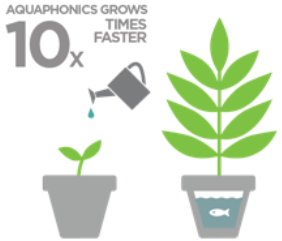
REGEN VILLAGES IS A MODEL FOR LOCAL COMMUNITY BASED FARMING SECURING SUPPLY AND SUSTAINABILITY ON SITE.



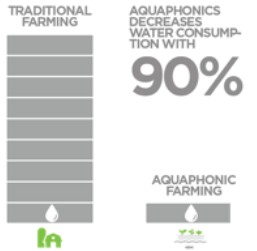
USING AQUAPONIC FARMING WE CAN DECREASE LAND USE WITH 98%...

... FREEING UP SPACE FOR BIODIVERSITY AND PERMACULTURE

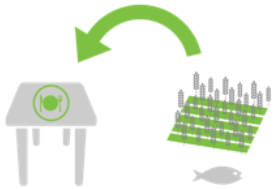
USING THE AQUAPONICS SYSTEM WE CREATE A MORE EFFECIENT AND 100% ORGANIC WAY OF PRODUCING FOOD.



AQUAPONICS HAVE THE CAPACITY TO GROW 10 TIMES MORE PRODUCE IN THE SAME FOOTPRINT AS TERRESTRIAL FARMING....



... WHILE DECREASING WATER CONSUMPTION WITH 90%



... AND ELIMINATING TRANSPORTATION AND ENABLING FARM-TO-TABLE.

...AND THE CLOSED CIRCUIT ECOSYSTEM EMITS NO NITROGEN AND PHOSPHORUS TO THE SURROUNDING ENVIRONMENT.

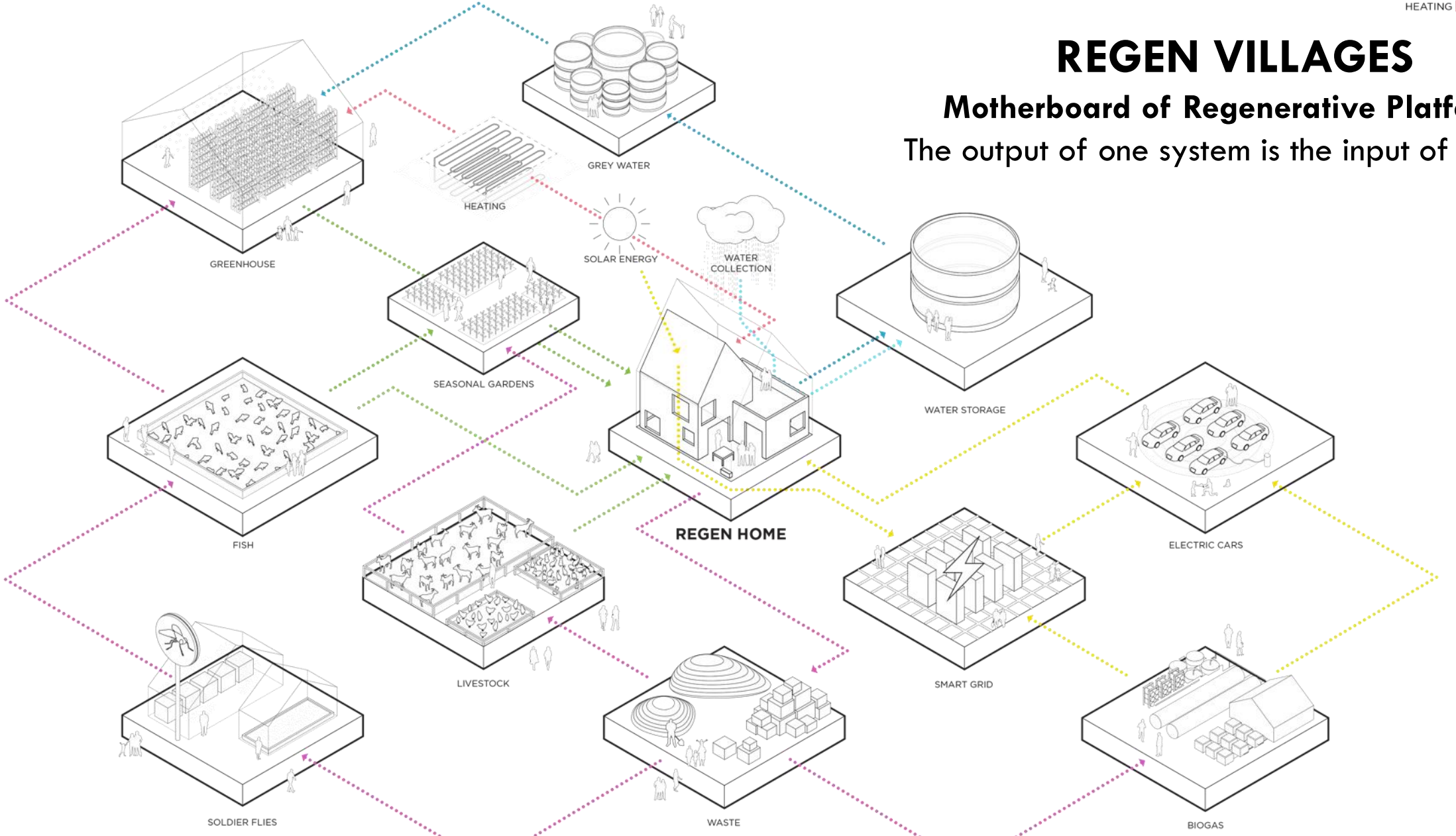
CREATING A VILLAGE THAT DOES NOT DEPLETE THE ENVIRONMENT, BUT RESTORES IT.

ENERGY
FOOD
WASTE
COLLECTED WATER
GREY WATER
HEATING

REGEN VILLAGES

Motherboard of Regenerative Platforms

The output of one system is the input of another



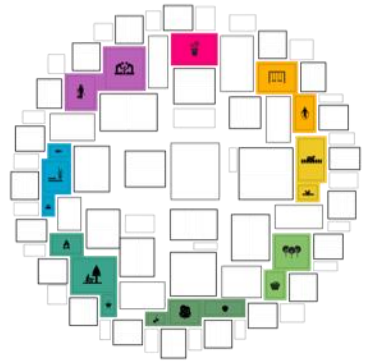
EFFEKT

Replicating the nexus globally

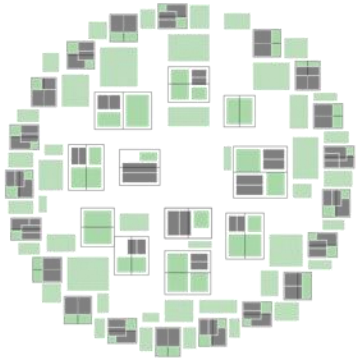
Customizing the regenerative platforms substrate
To match each climate zone and region

PROGRAM LAYOUT

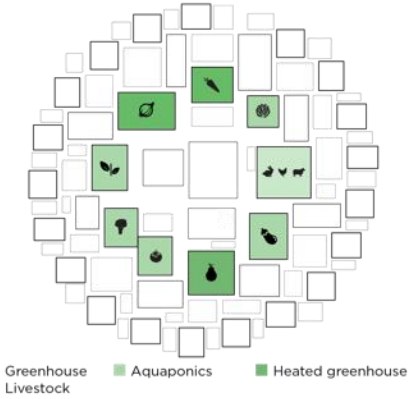
SOCIAL SPACE



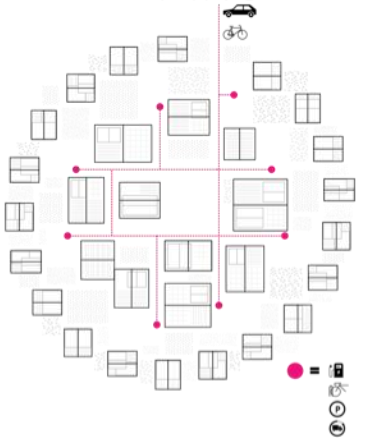
GREEN SPACE



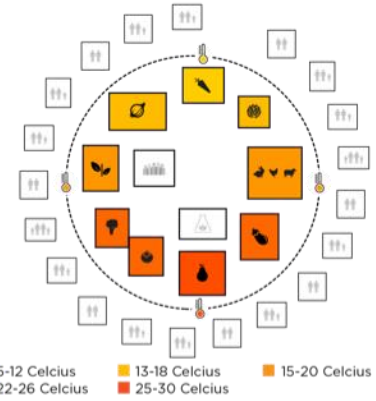
FOOD PRODUCTION



INFRASTRUCTURE



CLIMATE ZONES



EFFEKT

Building regenerative, off-grid communities that produce more organic food, clean water, renewable energy and mitigated waste at the neighborhood scale

EFFEKT

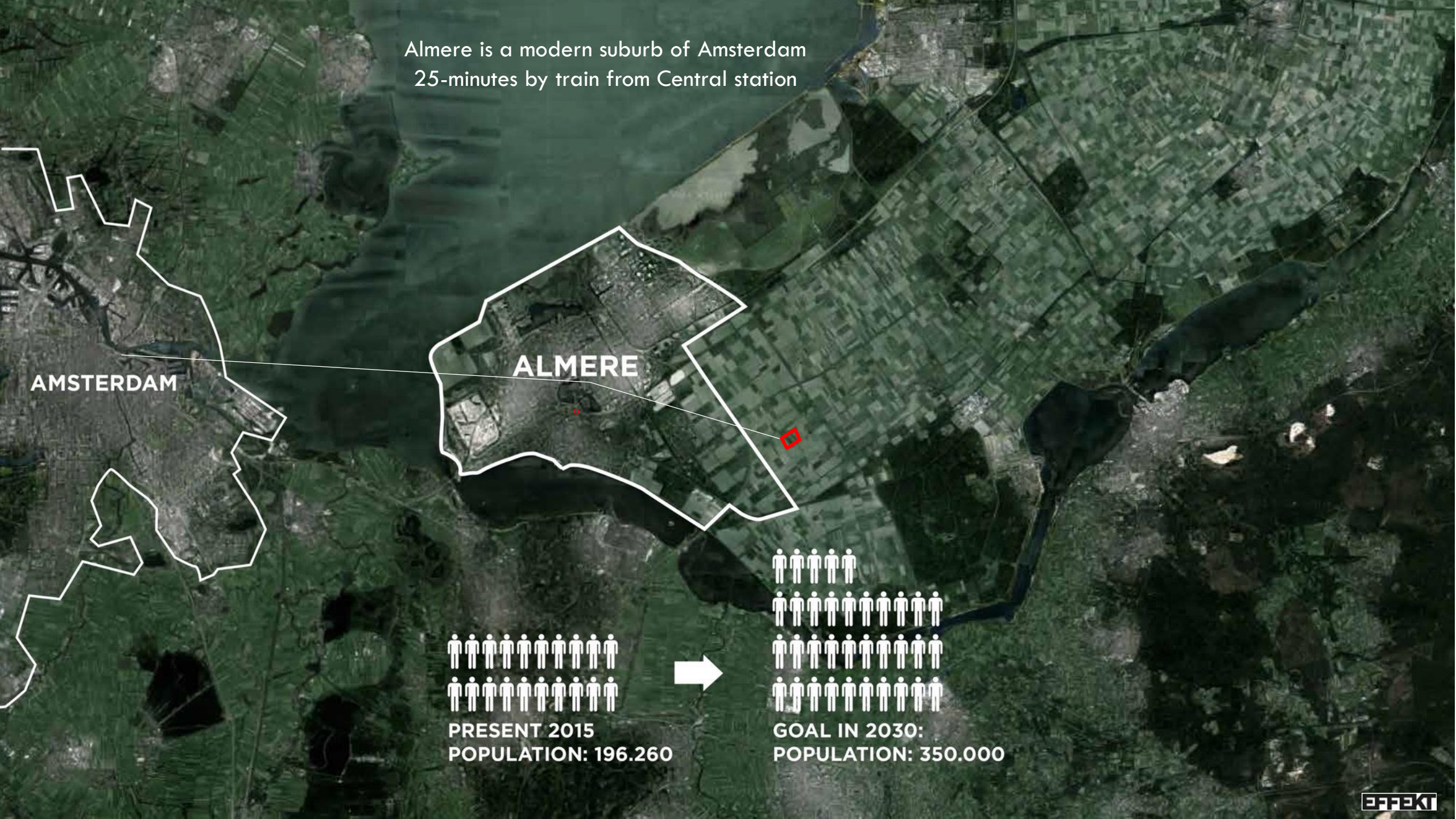
REGEN VILLAGES

Updated 30-March, 2016

DRAFT DESIGN

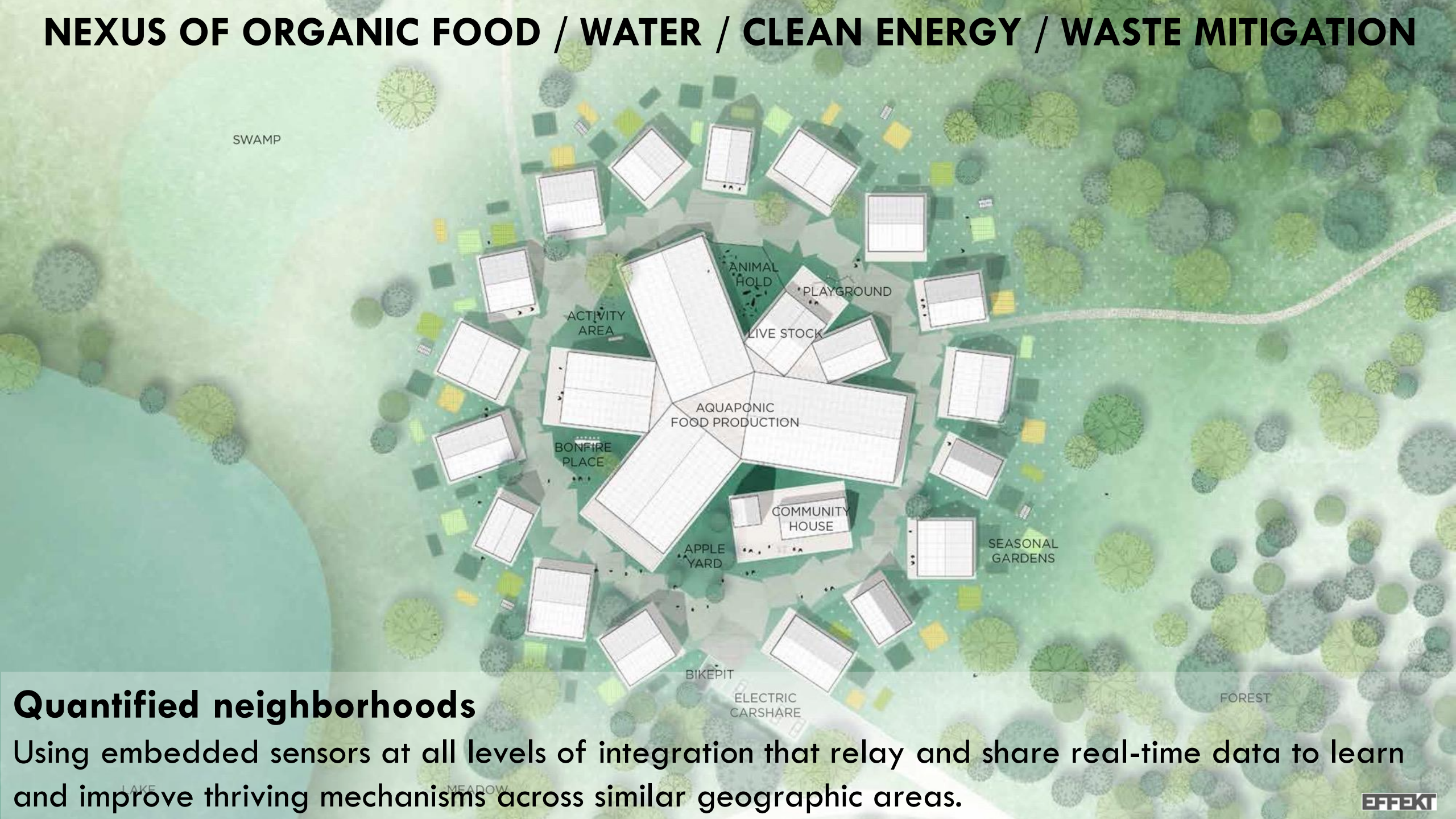
FIRST PILOT COMMUNITY
100 Integrated Homes
Almere, Netherlands
Breaking ground – Spring 2017

The Netherlands was selected
as the initial pilot of ReGen Villages


Almere is a modern suburb of Amsterdam
25-minutes by train from Central station
AMSTERDAM
ALMERE
PRESENT 2015
POPULATION: 196.260
GOAL IN 2030:
POPULATION: 350.000


ALMERE CENTRE
8 km
OOSTERWOLD
10 Km
First pilot village, Oosterwold
on certified organic farmland

NEXUS OF ORGANIC FOOD / WATER / CLEAN ENERGY / WASTE MITIGATION



Quantified neighborhoods

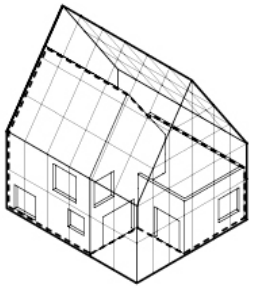
Using embedded sensors at all levels of integration that relay and share real-time data to learn and improve thriving mechanisms across similar geographic areas.

EFFEKT

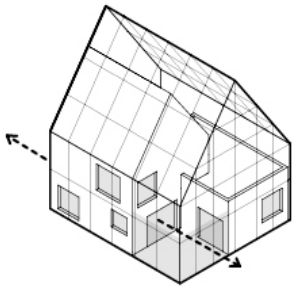
ENERGY+ POSITIVE HOMES

Built Environment Homes

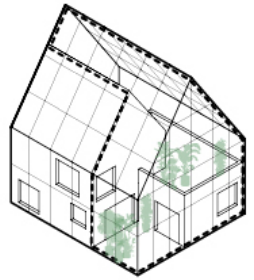
Utilizing a combination and passive and active energy conserving and generating materials (phase change), and employing built environment methodologies, energy positive, zero-carbon homes can be erected rapidly and at a lower construction cost with less waste.



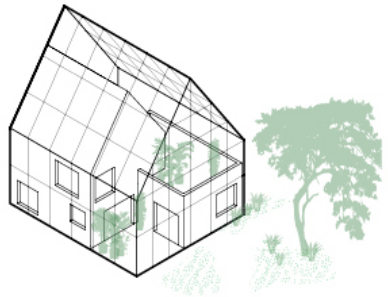
PREFABRICATED AND DEMOUNTABLE LIVING BOX



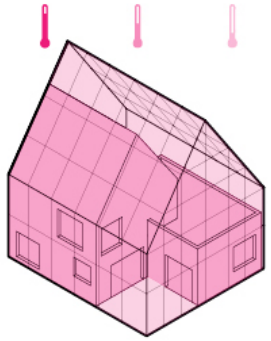
OPENABLE



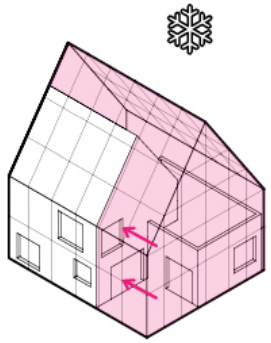
EXTENDED LIVING ZONE



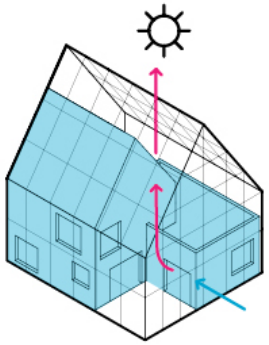
INSIDE & OUTSIDE BLENDS



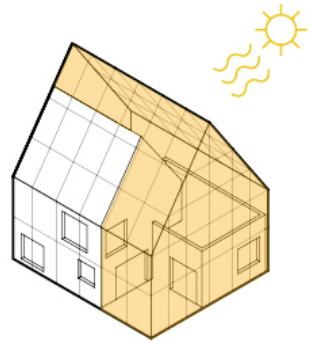
PASSIVE HEAT + HEATED SPACE



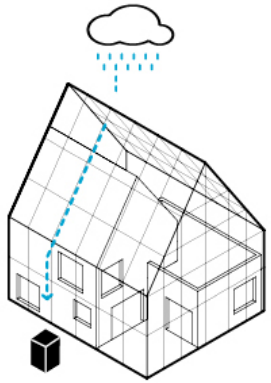
PREHEATED AIR IN WINTER



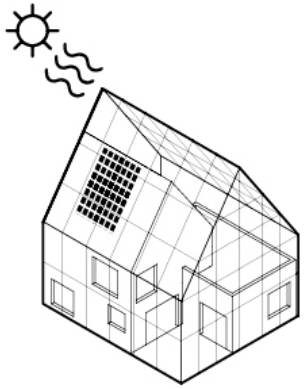
NATURAL VENTILATION



EXTENDING SUMMER SEASON



BUILT IN WATER COLLECTION

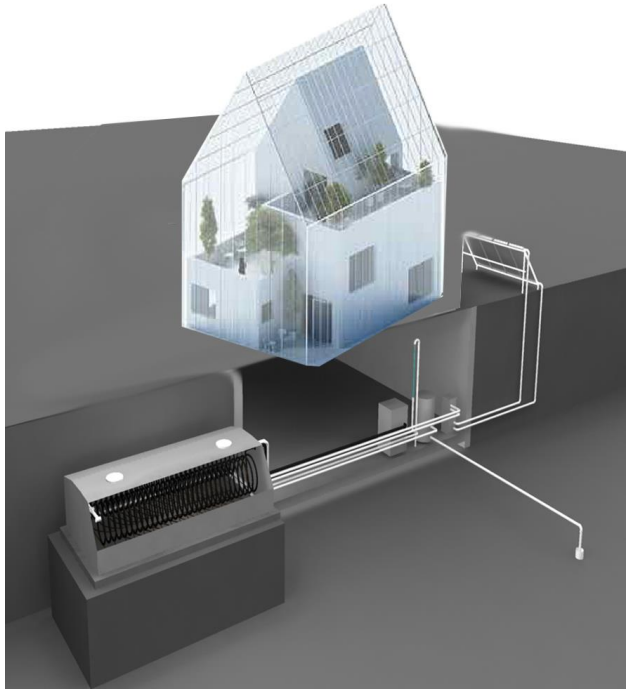


BUILT-IN SOLAR ENERGY

WATER ENERGY CYCLE

Geothermal bore holes

Provide year-round temperate heating and cooling that circulate water down into the earth, as a means to regulate low-energy climate control in homes and buildings above. Geothermal Heat Pumps transfer heat from and to the ground. They do that through closed loops of plastic pipes buried either horizontally or vertically in the ground below the frost line where the temperature is consistently between 40° to 80° F depending on where you live. (Enviga Geothermal 2015)



Thermal Batteries

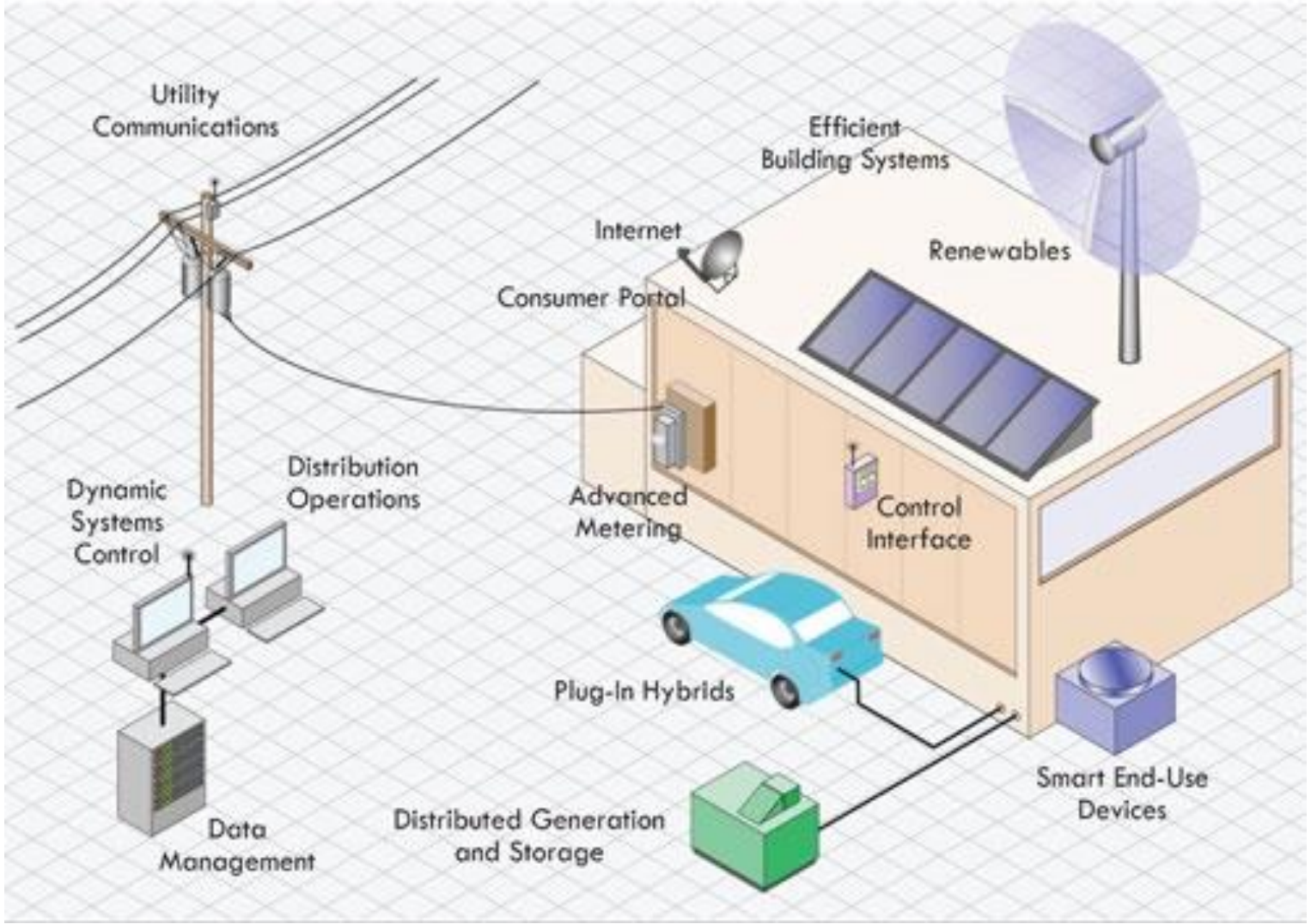
A Thermal Battery System is an innovative renewable energy mechanical system for homes. By combining solar thermal collectors, a water source heat pump, and a latent-capable Thermal Battery, site-derived renewable energy can heat and cool buildings. Poly cistern tanks with an internal heat exchanger are filled with phase change material of water. This tank is buried in the earth outside a home and readily collects and stores energy that have been integrated with the system. (Woolpert, 2013)

MICROGRID GENERATION/STORAGE/LOAD-BALANCING

A microgrid is an approach to electrical distribution that allows local users more control over the optimization of power sources and uses. Technically, it is a grouping of small, independent power-generating equipment connected to computer systems that monitor, control and balance energy demand, supply and storage in response to changing energy needs.

Microgrids produce electricity locally, have discrete electrical boundaries and provide a single point of connection to the larger utility grid. One of the distinguishing features of a microgrid is the ability to disconnect from the utility grid (called “islanding”) to provide autonomous power in response to demand needs or external events, such as power outages or other emergencies.

Typically, one or more conventional generation assets comprise the core of the microgrid, such as a diesel generator, and other distributed power systems may produce electricity from renewable or nonrenewable sources, such as solar photovoltiac or fuel cell systems.
By balancing local energy demand with electricity generated and stored on-site, a microgrid can produce secure, reliable and affordable energy for entire communities or for commercial, industrial and government facilities.



HIGH-YIELD ORGANIC FOOD PRODUCTION

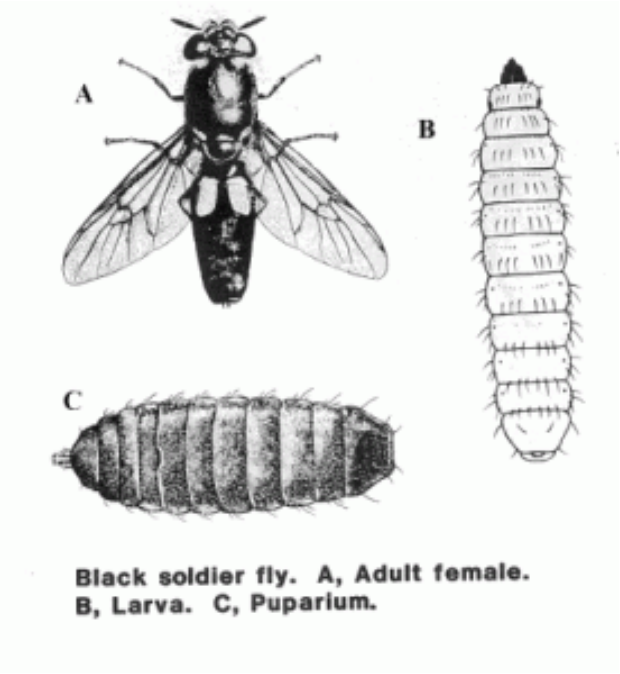
Vertical Growing Systems

High-yield organic food production in controlled greenhouse environments provides over 33% increase in yield (9+ harvests over 6), with nearly 65% less labor, and using low-energy LED lighting, geothermal heating and cooling, vertical farming can produce over 110,000 pounds of food per hector per year. In combination with seasonal gardens, food forests and permaculture practices it is estimated that 100 families could supplement their nutritional inputs by 60% in developed countries, and more than likely 100% in developing areas. (Ehrlich, 2014)

Aquaponics Ecosystem Integration

Cultivating several species of fresh water fish, shrimp and crawfish in embedded and adjacent high-volume tanks is an integral part of the closed-loop organic food nexus. Fish waste is converted from ammonia to nitrite and then nitrates through biological interaction, where the effluent from the fish tanks is used as fertilizer for the soil-free grow beds, providing the edible vegetation all they need to thrive. The nitrate rich water then flows back to the fish tanks saving nearly 85% water that would otherwise be lost due to drainage or evaporation. (Ehrlich, 2013)

CLOSED-LOOP ORGANIC BIOGENERATORS



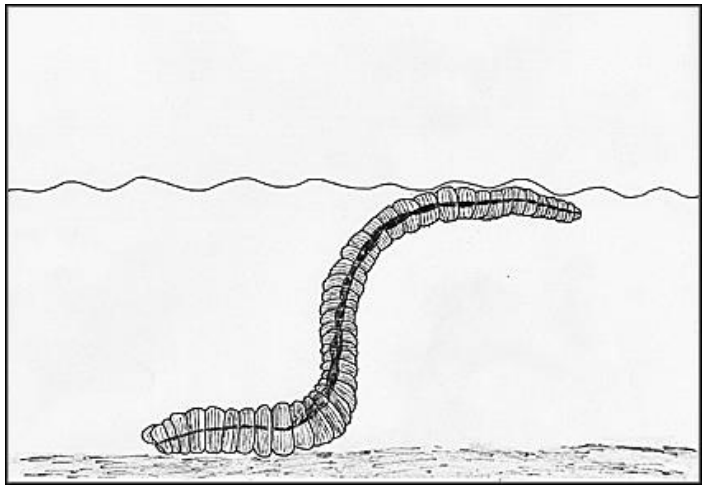
Black soldier fly. A, Adult female. B, Larva. C, Puparium.

Hermetia illucens – Black Soldier Fly Larvae

The system comprises several zones for culturing different organisms, like black soldier fly larvae (Hermetia illucens), the freswater worm (Lumbriculus variegatus), the aquatic fern Azolla sp, a high content of omegas-3 plant purslane (Portulaca orelacea), vegetables, fish and chicken in the same loop. The connections and interactions between different zones of this system are crucial; also the unique methods for culturing some of those organisms are described. (Alfredo Llecha, August 2016)

Lumbriculus variegatus – Aquatic Red Worms

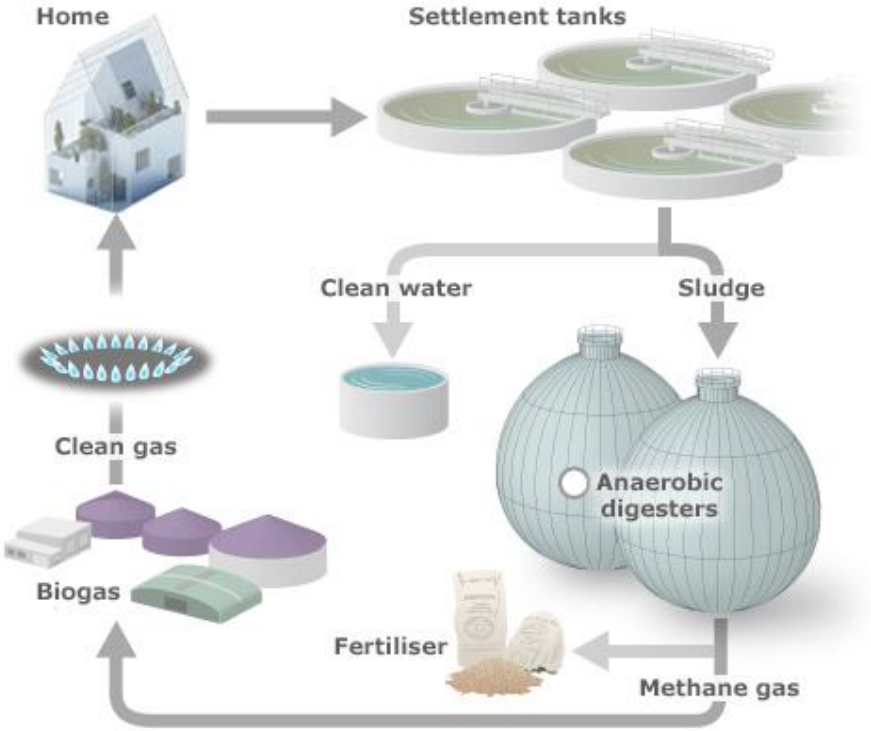
Freshwater worms of the species Lumbriculus variegatus (Oligochaeta, Lumbriculidae, common name blackworms) grown on safe low-grade organic waste may be a suitable replacement for fishmeal. Analysis ofFA and amino acid composition of L. variegatus grown on fish feed concluded that the FA and amino acid composition render this worm species an excellent fish feed, that is equivalent to, or better for fish growth and health than regular fish feeds, such as Artemia (brine shrimps) or dry feeds. (Mount et al. (2006)



WATER WASTE CYCLE

Anaerobic Digestion Process

Anaerobic Digestion occurs in *biodigesters* and produces biogas. It removes *Biochemical Oxygen Demand (BOD)* from sewage, conserves nutrients (especially nitrogen compounds) and most importantly reduces pathogens. After each flush, it will take 23 days for the waste to go through the treatment process and reenter the homes as biogas. The sludge-y "leftovers," effluent, from the anaerobic digestion will be used as fertilizer. (Jerger, D. & Tsao, G. 2006)



Hydroponic Living Machine

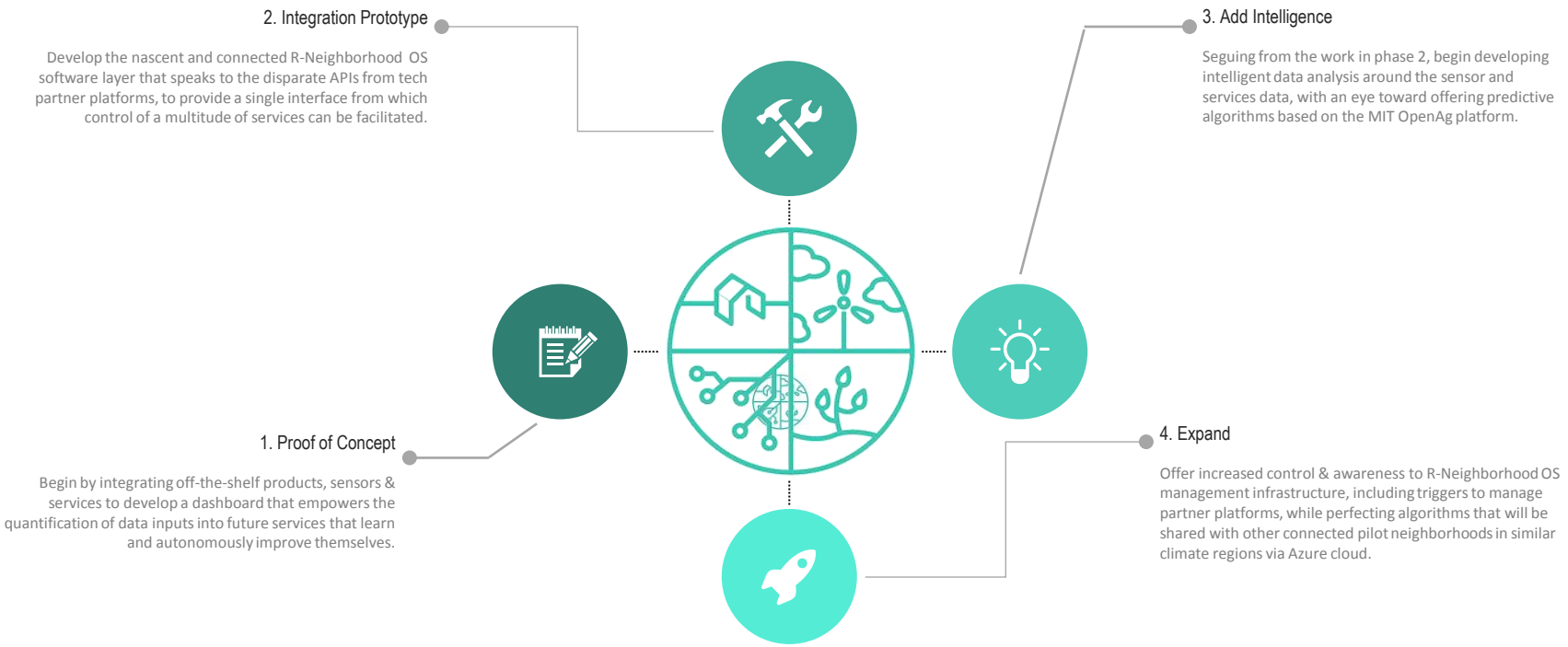
Water enters a series of Hydroponic Reactors which are filled with a textile material and covered with vegetation supported on racks and aerated with bubble diffusers, providing the oxygen required for treatment, while keeping the tank contents mixed. The roots of the vegetation provide surfaces for attached microbial populations' growth, while vegetation itself serves as habitat for beneficial insects and organisms that graze on microbial biomass. A light-weight aggregate is placed on top of the racks, creating a natural biofilter that remove any residual odor. (Dr. Jon Todd 2014)

Integrating Microsoft Azure to support Tech-Integrated and Regenerative Neighborhood OS Research

Submitted by James Ehrlich Jamese@stanford.edu, Professor Larry Leifer leifer@stanford.edu
& William Cockayne, Ph.D., cockayne@stanford.edu — Stanford University

Stanford University's Center for Design Research proposes to integrate the emerging Regenerative Neighborhood OS (R-Neighborhood OS) with Microsoft Azure. Our goals with the Azure platform are to, first and foremost, tie into the Azure IoT Hub, and later leverage the Intelligence + Analytics tools during later phases of "quantified neighborhood" development, for tech-integrated residential design thinking. Using Azure should speed the deployment of the Regenerative Neighborhood OS to tie together the wealth of smart (and not so smart) devices, systems, and real-world services being deployed in real-world applications.

The initial R-Neighborhood OS prototype will be piloted in Eden, Utah at the Summit at Powder Mountain development with support of state and local governments and Utah State University research partners, as well as industrial "smart product and service" suppliers. With the expectation that the integration of partners' smart services, sensors, and the application UX best practices will facilitate resiliency via regenerative platforms at the neighborhood scale.

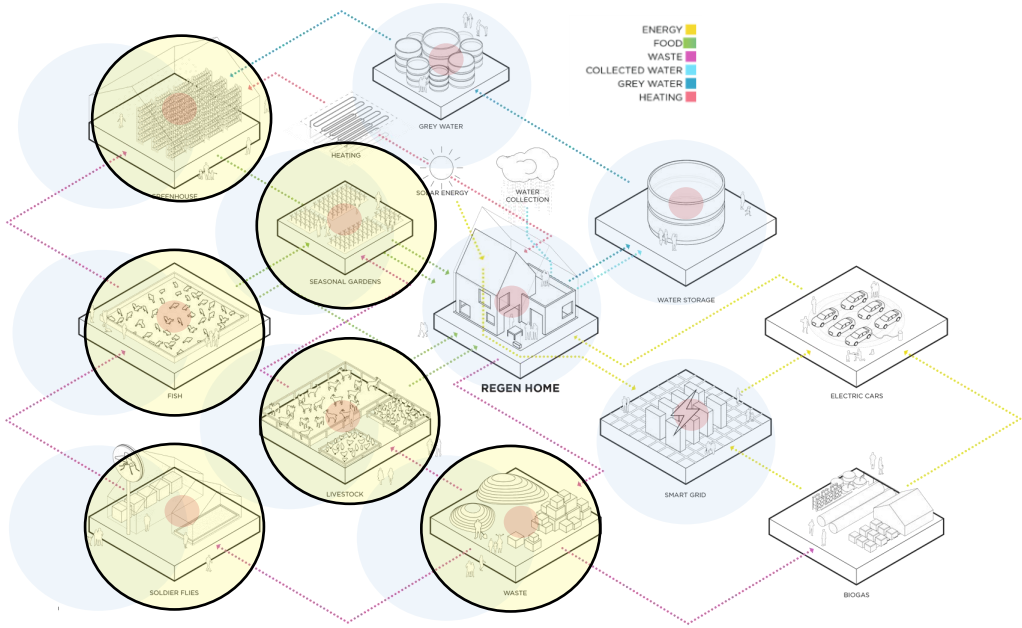


Quantified Neighborhoods — Phases II & III

Going forward, Regenerative Neighborhood OS phases II and III will begin to use the sensors and services deployed on top of the Regenerative Neighborhood OS to 'learn' and 'improve' living via the Microsoft Azure Cloud - creating the "quantified regenerative neighborhood" network that can be applied globally.

Using embedded sensors at all levels of integration that aggregate and relay real-time data to learn and improve thriving mechanisms across similar geographic areas and climate zones.

The proposed Azure solution will be implemented at ReGen Villages across the globe, powering regenerative, off-grid communities, producing more organic food, clean water, renewable energy and mitigated waste at the neighborhood scale.



Shared System Partners

SIM-CI – (Alliander) Infrastructure simulation and modeling
Schneider Electric - Microgrid
Philips Home Lighting, Street Lighting, CityFarm Lighting
Priva horticultural controls
Grundfos water pumps
Ericsson – 5G connectivity
Arup – Engineering feasibility
TNO – Energy feasibility
EFFEKT – Lead architect
PowerHouse – Local architect
LEAF – Water/Water Waste

University Partners

Professor Larry Leifer, - Stanford University Center for Design Research
Jan Willem van der Schans - Wageningen University, nutritional input research
Andrew Buffmire - University of Utah, "Global Change & Sustainability Center" (GCSC)

PIPELINE

2016/2017
Summit at Powder Mountain, Eden, Utah – developing regenerative prototype infrastructure at 8500' to research quantified integration of organic food production, water harvesting, waste digestion, clean energy generation, storage and microgrid distribution all at altitude.

2017/2018
Neighborhood pilot community Almere, Netherland

2018-2023
Northern Europe Pilots
Lund, Sweden
Ede, Netherlands
Oslo, Norway
Frederikssund, Denmark

2023 -2033
MENA arid pilot context
Dubai
Emirates
Saudi Arabia
Rural India

PIPELINE

Venice Biennale Global press release

Powder Mt. Utah USA

Oosterwold/Floriade Almere, Netherlands

Lund, Sweden Near to the IKEA HQ

Oslo, Norway

Munich, Germany

Frederikssund, Denmark

Malaysia, Saudi Arabia, India, Africa, Asia, and U.S.

May, 2016 Partner EFFEKT architects showcasing ReGen Villages as the centerpiece of sustainability for the Venice Biennale architectural world exposition. Global press announcement celebrating the first pilot community breaking ground in Holland in 2016 – UPDATE: June 1, 2016: ReGen Villages went viral around the world

Phase I – 2016-2017

First prototype of ReGen OS "Quantified Regenerative Neighborhood" at Summit at Powder Mountain, Utah, USA

Phase I! – 2017/2018

First 150-200 home pilot community breaking ground: Almere, Netherlands **June, 2016** – 200,000 m2 reserved in Oosterwold district + 25 home integrated condo complex near to the Floriade area of central Almere.

Phase II! - 2018-2022

Four concurrent developments to follow across Northern Europe proposing EU regional funding for 300 million Euro - Lund, Sweden, Oslo, Norway, Frederikssund, Denmark (JV partnering with Ross Jackson) and regenerative dormitories near Munich, Germany. Connecting Cloud-AI between villages in this climate region to learn and improve from each other, growing the database that actuates autonomous responses to variables in a similar geographic area.

- **Phase IV– 2023 -2030**

3 Billion Euros fundraising sovereign wealth toward the Regenerative Global Real Estate JV Development Fund, enabling scale for regenerative community development through partnership, collaboration and cooperation across levels of government and universities. Providing meaningful returns and impact to investors, while creating resilient and thriving neighborhoods that put families in reach of self-reliance and governments in a better position to withstand dynamically changing environmental and economic times

Developments across Malaysia, Saudi Arabia, India, China – parts of Africa and the U.S.

CORE TEAM

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FOUNDER, CEO

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Chevron, Deutsche Bank
COO

Don Scott
E-MU Systems, Creative Labs
CFO

Kristen Resar
Greystone & Co.
REAL ESTATE FINANCE

Andrew Milne
Stanford University
CTO- IOT

Dan Popovici
Google, SSL
CTO - BIO

Marjolein Shiamatey
Shinbone Networks
SENIOR TECHNOLOGIST

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Henry Jackson
Architect Catalyst Design

Lawrence Williams
SpaceX, Tesla Motors

Viveca Fallenius
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EU Lobbyist

Sinus Lynge
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ReGen Villages Architectural Advisor

David Armitage
Real Estate Developer
ReGen Villages, Advisor

REGENVILLAGES

Tech-Integrated and Regenerative Neighborhood Development

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