ONE ESSE

Urban Smart Food Infrastructure & Circular Kitchen

Sustainable Smart Agriculture • Clean Energy • Advanced Food Technology

ONE ESSE

Contact: hellooneesse@gmail.com

ONE ESSE

Clean Food-Water-Energy Infrastructure Node for Urban Resilience

AI-Powered Operations • Closed-Loop Water Systems • Solar-Powered Hybrid Energy • Verifiable Data

ONE ESSE is a scalable and verifiable infrastructure solution for cities that integrate food, water, energy, and data into a single cyber-physical system.

*Current stage TRL 3–4 — concept, system architecture and integration design. There is no established prototype.

MISSION

ONE ESSE's mission is to:

Redefine access to clean food in cities as a measurable, verifiable, and sustainable urban infrastructure system by reducing energy and logistics dependency.

To transform clean food from a "choice" into a measurable and verifiable infrastructure standard for cities.

Food + Water + Energy + Data — in a single modular system.
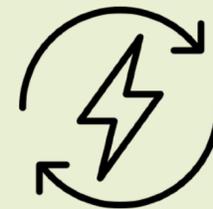
PROBLEM

Trust issue

Claims of "clean/ethical/organic" products are often unmeasured and unverifiable, raising public health concerns.
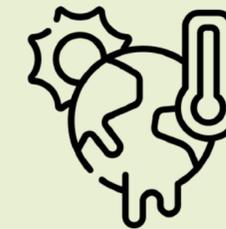
Food waste + cost pressure

Longer supply chains increase losses, raise costs; accessible "clean food" becomes narrower.

Energy-intensive and long-chain processes

Multi-layered energy consumption from planting to harvesting; storage, cold chain, packaging, and transportation.

Soil and water stress

Soil exhaustion/pollution, water scarcity, and yield fluctuations increase.

Fragility

During times of crisis/disaster, the supply chain is easily broken; cities become vulnerable to food and water access.

The problem isn't the people consuming; it's the infrastructure that normalizes the behaviour.

SOLUTION | ONE ESSE

ONE ESSE

ONE ESSE is a modular infrastructure node placed within the city.

production + on-site processing + energy + water + data verification → SINGLE NODE

PRODUCTION

Controlled environment agriculture

Hydroponic / hybrid growing systems

Predictable, year-round production independent of seasonality

PROCESSING

Production integrated, on-site processing and service

Circular flow that reduces food loss and logistics needs

WATER

Closed-loop water management

Measurement and sensor-based recovery

System architecture that reduces urban water pressure

ENERGY

Solar-assisted system architecture

Grid-interactive and energy-efficient operation

DATA & VERIFICATION

GS1 EPCIS 2.0–compliant traceability

Digital Product Passport (DPP)–ready data layer

Verifiable records from production

SETTLEMENT

Scalable for municipalities, campuses, and public spaces

WHAT IS ONE ESSE?

ONE
ESSE

ONE ESSE is a standardized, **modular, data-driven bio-infrastructure node** designed for urban environments.

- Not a conventional container farm

- A system that enables **urban resilience, operational continuity, and traceability** at city scale

- An integrated infrastructure combining **food, energy, water, and data in a single node**

FOOD LAYER
- Controlled Environment Agriculture (CEA) based architecture
- Hybrid hydroponic systems
- Designed for urban use and zero-km production

KITCHEN & SERVICE LAYER
- Integrated harvest, preparation, and service workflow
- On-site processing to reduce food waste
- HACCP-ready spatial layout and process flow
- Short supply chain and fresh-consumption model

WATER & RESOURCE MANAGEMENT
- Closed-loop water systems
- Measurement-based consumption optimization
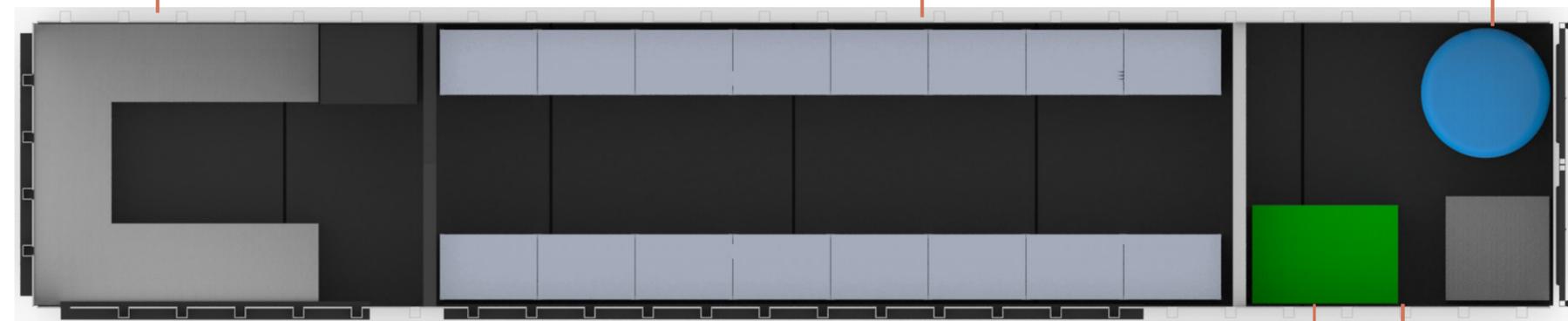
DATA & VERIFICATION LAYER
- GS1 EPCIS 2.0 compliant, event-based traceability
- DPP-ready (Digital Product Passport) data structure
- Verifiable records of production, energy, and operations
- Regulation and reporting-ready infrastructure

INFRASTRUCTURE LAYER
- Grid-interactive energy management (EMU)
- Solar-assisted hybrid configuration
- Closed-loop heat and water recovery
- Sensor-driven monitoring with edge control

ONE ESSE does not reinvent farming — it redefines urban food infrastructure.

FOOD PRODUCTION

ONE ESSE

ONE ESSE treats food production not as a "yield promise", but as a **measurable, verifiable urban infrastructure** function.

PRODUCTION APPROACH

Controlled environment agriculture (CEA) with hybrid hydroponics, configured per crop mix. (NFT / Ebb & Flow configurations evaluated during pilot phase)

CHEMICAL POSITIONING

Designed to minimise pesticide use by system design, without absolute "zero-chemical" claims. (Compliance-first, regulation-aligned approach)

PERFORMANCE LANGUAGE

Output, quality and waste are defined as target KPIs, measured and reported during pilot operations (batch-based monitoring).

VERIFICATION

Yield, quality and operational continuity are assessed via batch-level data, based on measurement, not declarations

There is no established field prototype. All values will be clarified through pilot validation.

ARTIFICIAL INTELLIGENCE INTEGRATION

A **measurement-based** decision support system is not an autonomous authority; it is an optimization tool that **empowers the operator with data** while leaving the ultimate authority to the human.

PRODUCTION & PLANT DECISION SUPPORT

Plant-specific target bands (LED spectrum, photoperiod, EC–pH), prescription/environmental optimization recommendations.

OPERATION AND QUALITY

Harvest timing recommendations, batch-based quality standardization, anomaly detection, and maintenance recommendations.

ENERGY AND RESILIENCE OPTIMIZATION

Load prioritization, solar production forecasting and peak-shaving

OpEx reduction and critical load continuity

ENERGY MANAGEMENT

ONE
ESSE

HYBRID ENERGY ARCHITECTURE

Solar contribution: 40–70% self-consumption target, configuration-dependent

Grid integration: Smart-grid compatible structure with peak-shaving capability

BESS: Operational continuity for critical loads

ENERGY MANAGEMENT UNIT

Dynamic load management: Prioritisation of lighting, climate, and water systems

Forecasting: Weather-based solar production forecasting and tariff-aware cost optimisation

Objective: Reduce energy OpEx volatility and enable predictable operating costs

RESILIENCE MODE

Grid outage scenarios: 24+ hours of critical operational continuity (design target)

Low-energy operation modes: Plant-health-preserving strategies under constrained energy conditions

There is no claim of "100% off-grid".

WATER MANAGEMENT

ONE ESSE

CLOSED-LOOP WATER ARCHITECTURE

- 85–95% water reuse target (configuration-dependent)

- Minimal water losses compared to open-field agriculture and conventional kitchens

- No wastewater discharge by design

MEASUREMENT-BASED, LOW-CHEMICAL TREATMENT

- Filtration + UV / physical treatment (pilot-specific configuration)

- **Continuous monitoring:** pH, EC, turbidity, flow rate

- **Goal:** Reduce chemical dependency and enable predictable maintenance and system behaviour

DIGITAL WATER MANAGEMENT

- Loop optimisation based on crop recipes, climate conditions and water quality

- Batch-level water use and recovery records

- Data-driven decision support ensuring operational consistency

In ONE ESSE, water is not a consumable — it is a **measured, managed and optimised** resource.

PUBLIC HEALTH, ETHICS & DNSH

ONE ESSE

INDIRECT CONTRIBUTION TO PUBLIC HEALTH

- Minimising chemical exposure through controlled environments

- Freshness and short supply chains through zero-kilometer production

- Verifiable transparency through batch-based records

DNSH — COMPLIANCE BY DESIGN

- **Climate:** Reduced dependence on logistics and cold chain

- **Water:** Closed-loop use (no discharge)

- **Land & biodiversity:** No land degradation with soilless system

- **Circularity:** Minimising waste and loss through on-site processing

ETHICS & DATA SECURITY

- Not a health product (no medical claims)

- Only operational and batch-level data is processed (no personal data)

- All impact KPIs are measured in pilots

ONE ESSE does not sell health claims; it designs urban infrastructure **that reduces risk and enables verifiable data.**

ONE ESSE VERIFIED™

ONE
ESSE

Not a claim , evidence

Verifiable Trust via Digital Product Passport (DPP) & GS1 EPCIS 2.0

Seed-to-Data-to-Fork

Event-based transparency from production to service

HOW IT WORKS

GS1 EPCIS 2.0 — What / Where / When / Why
Batch-level events:
- Sowing
- Growth (periodic snapshots)
- Harvest
- Preparation / Processing
- Service / Distribution

WHAT IS RECORDED

- Batch ID & time stamps
- pH / EC target ranges (measured values, not guarantees)
- Energy source share (grid / solar)
- Water reuse metadata
- Operational process logs

WHAT IS DELIVERED

- QR / Digital Link access
- ESG, DNSH & Scope-3 reporting outputs
- DPP-compliant data packages

COMPETITION & SYSTEMIC DIFFERENTIATION

ONE ESSE

Most existing solutions are **single-layered:** focused on production only, hardware only, or software only.

This approach fails to deliver **verifiability, resilience, and system-level scalability.**

Strategic Differentiation & Defensibility
ONE ESSE is not a product or a machine.
It is a **measurable, standards-based** urban food infrastructure system.

Defensibility pillars:
- Physical infrastructure + operations + data as **one system**
- GS1 EPCIS 2.0 **event based** traceability
- Digital Product Passport (DPP)-ready architecture
- **Measurement driven optimisation** of energy, water and production
- Hard to replicate integration of **infrastructure, standards and verified data**

CRITERIA	VERTICAL FARMS	IN-STORE GROWING	ONE ESSE
Focus	production	On-site growing	Infrastructure + Data
Energy	Grid-dependent	Mostly grid	Solar-assisted hybrid
Logistics	Required	Reduced	Zero-km
Kitchen	None	Limited	Integrated, HACCP-ready
Trust	Claims	Partial	VERIFIED™
Resilience	None	None	Resilience mode
Data	Proprietary	Limited	GS1 EPCIS 2.0 / DPP

BUSINESS MODEL

ONE ESSE delivers physical infrastructure, operational service, and verifiable data as one integrated system.

Multi-Layer Revenue Model   Infrastructure + Operations + Verified Data

On-Site Production & Service

On-site production in controlled environments

Products: fresh greens, salads, smoothie ingredients

Zero-km supply, no logistics or cold chain dependency B2C / B2B

Revenue: Product sales + service contracts

Systems & Infrastructure

Modular ONE ESSE infrastructure nodes

Direct sale or long-term leasing

Package includes:

Installation, Maintenance & operational support

Energy, water, and production software layer

Revenue: Infrastructure sales, leasing and service packages

ONE ESSE VERIFIED™

GS1 EPCIS 2.0 & DPP-ready traceability

Batch-level production & operational data

ESG, DNSH and Scope-3 reporting outputs

Access via QR codes / Digital Links

Revenue: SaaS subscriptions and enterprise reporting services

Projects & Integrations

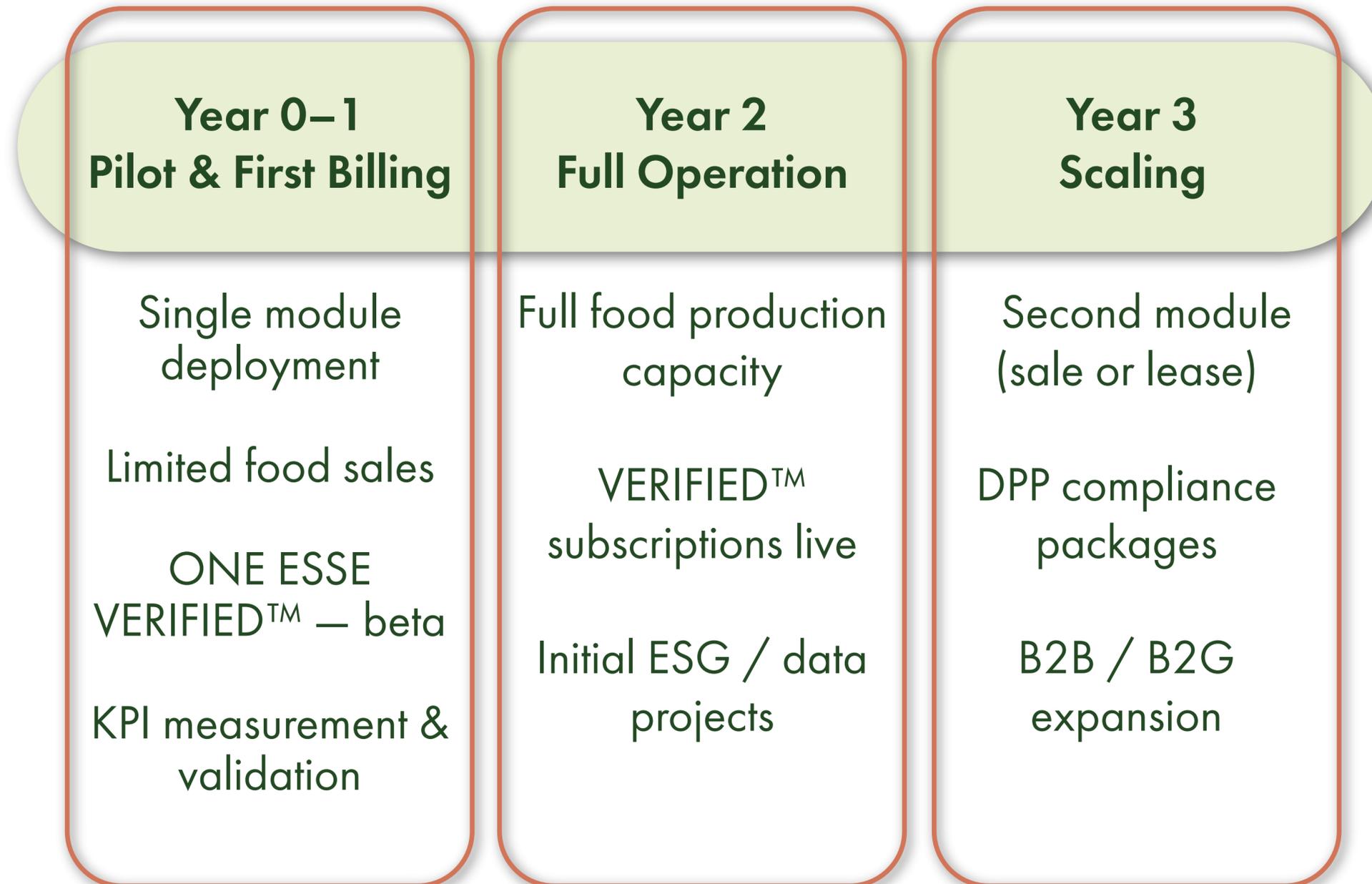Municipalities, universities, campuses, living labs

Pilot deployments and system integrations

Data-driven sustainability and impact projects

Revenue: project-based contracts and long-term platform usage

REVENUE TIMELINE

ONE ESSE

Revenues Activate in Phases — Not Simultaneously

Year 0–1 Pilot & First Billing	Year 2 Full Operation	Year 3 Scaling
Single module deployment	Full food production capacity	Second module (sale or lease)
Limited food sales	VERIFIED™ subscriptions live	DPP compliance packages
ONE ESSE VERIFIED™ — beta	Initial ESG / data projects	B2B / B2G expansion
KPI measurement & validation		

Data revenue will be activated once the operation is verified.

TARGET USE CASES

ONE ESSE

Municipalities & Public Spaces (B2G)
Local food security and Access
Disaster resilience and critical infrastructure continuity
Urban Living Labs and pilot deployments
ESG, DNSH-aligned and auditable public reporting

Campuses & Hospitals
Continuous, traceable on-site production
Education, research and applied innovation environments
Public-health-sensitive, low-risk infrastructure

Corporate Campuses & Large Facilities
Scope-3 emissions reduction
ONE ESSE VERIFIED™ data infrastructure
DPP-ready, auditable compliance reporting

Disaster Response & Temporary Settlements
Operational continuity via Resilience Mode
Reduced logistics and supply chain dependency
Rapid deployment through modular systems

ONE ESSE addresses urban infrastructure needs — not a single customer

EU & SDG ALIGNMENT

ONE
ESSE

European Green Deal
Water, energy, waste efficiency
Local production and reduction
in logistics and cold chain

DNSH
Closed-loop water system
Chemical minimization
No land use

Farm to Fork
On-site production and
processing
Traceability (VERIFIED™)

2 ZERO HUNGER

Intra-city access,
crisis resilience.

3 GOOD HEALTH AND WELL-BEING

Freshness,
minimization of
chemical load.

6 CLEAN WATER AND SANITATION

Closed-loop, water
reuse targets.

7 AFFORDABLE AND CLEAN ENERGY

Solar-assisted
hybrid energy goals

11 SUSTAINABLE CITIES AND COMMUNITIES

Urban infrastructure
node approach

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Waste reduction,
traceability.

13 CLIMATE ACTION

Reduction of
emissions from
logistics.

17 PARTNERSHIPS FOR THE GOALS

Municipality,
University, NGO and
Living Labs

Living Lab = Measure • Learn • Validate

- Real-world KPI measurement under operational conditions
- Multi-stakeholder environments (public sector, institutions, society)
- Early reduction of technical, operational, and regulatory risks
- Open, anonymized, and aggregated data outputs
- Evidence-based iteration from pilot to scale

ONE
ESSE

System (uptime): **≥ 90%**

Water reuse rate: **85–95%**

Energy resilience: **≥ 24 hours** autonomous operation

Daily output (target): **22–25 kg**

Data integrity & completeness: **≥ 95%**

All KPIs are measured, validated, and reported within Living Lab pilots.

FINANCIAL MODEL

ONE ESSE

CAPEX
~€195k / 1 module
(food + energy + water + data in one asset)

OPEX
~€35k / (annual – target)
(optimized, volatility-aware)

ROI
24–36 month
(model-dependent)

MULTI-LAYERED INCOME STRUCTURE

Food Production
€140.000 – €190.000

ONE ESSE VERIFIED™
(Data / SaaS)
€8.000 – €15.000 +
ESG

Infrastructure Leasing
€48–60k / year

ONE ESSE is not a single-income business, but a scalable infrastructure economy.

ROADMAP & TRL EVOLUTION

ONE
ESSE

TRL7 - Scalability

TRL6 - Living Lab Pilots

TRL5-6 - With Funding

TRL3-4 - Now

System concept and architecture defined

Energy–water–data integration logic validated

No deployed prototype; KPIs at assumption level

Integrated sub-system prototypes

Measurement & instrumentation setup

Physical integration of energy, water and data layers

1–3 real-world pilot installations

KPI validation, iteration, public/institutional partnerships

DNSH and DPP data verification

Replicable deployment package (BOM & SOP)

Certification roadmap and business model validation

Ready for investor and B2G scale-up

TEAM

ONE ESSE

Founder

Bircan Herdem
Woman-Led Deep Tech

herdembircan@gmail.com

Team & Partner

Beyza Topçuoğlu
Finance & Strategic
Partnerships Lead

**Assist. Prof. Dr.
Cansu Kaya Ülken**
IP & Legal Strategy

**Prof. Dr.
Özlem Atlı Eklioğlu**
Health Sciences and
Sustainable Food
Systems

**Prof. Dr.
Hakan Yılmaz**
Gastronomy and
Circular Kitchens

**Prof. Dr.
Selvin Yeşilay**
Sustainability & DNSH

EVbee
An energy and
engineering company that
produces mobile charging
solutions for electric
vehicles.
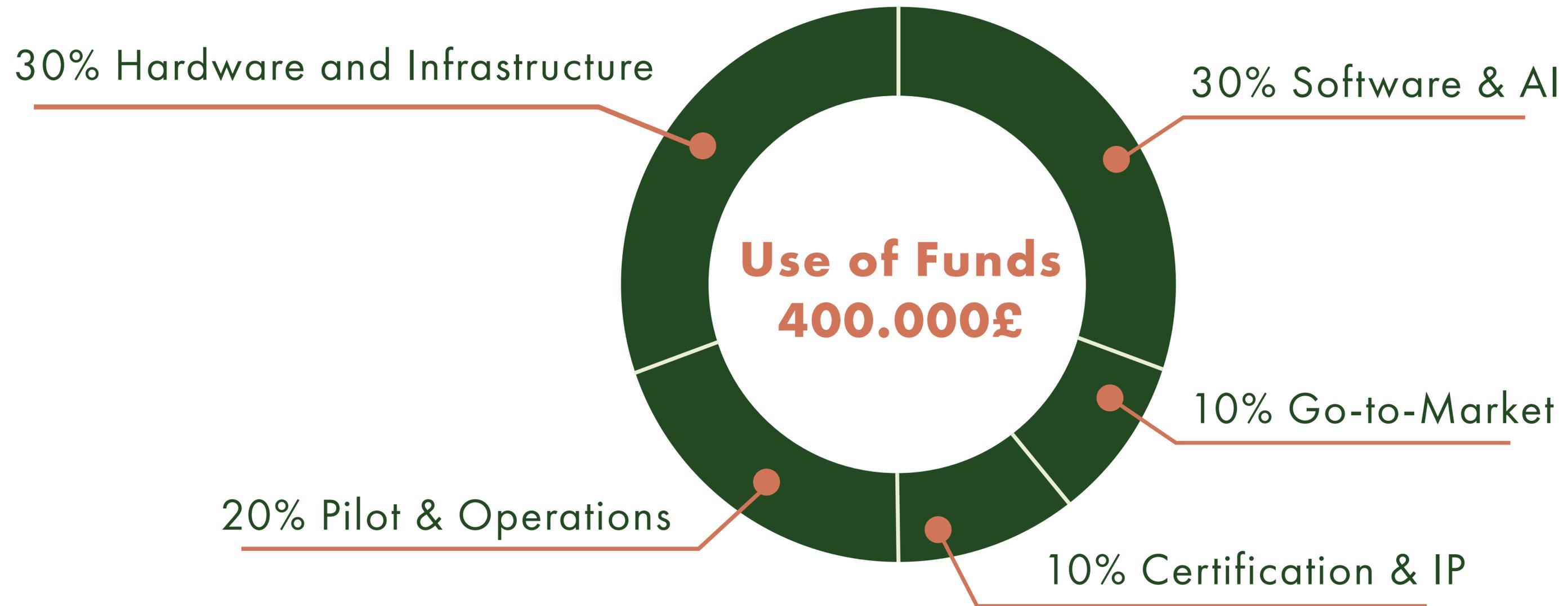
Safe, sustainable, and verifiable food infrastructure
for every city, every neighbourhood, and every community.

ONE ESSE transforms food from a market commodity into a core urban life
infrastructure, enabling cities to build **resilient, sustainable, and
health-oriented** futures.

Food · Water · Energy · Data — integrated as one urban system

ONE ESSE

Urban Smart Food Infrastructure & Circular Kitchen

Sustainable Smart Agriculture • Clean Energy • Advanced Food Technology

thank you

Contact: hellooneesse@gmail.com
herdembircan@gmail.com