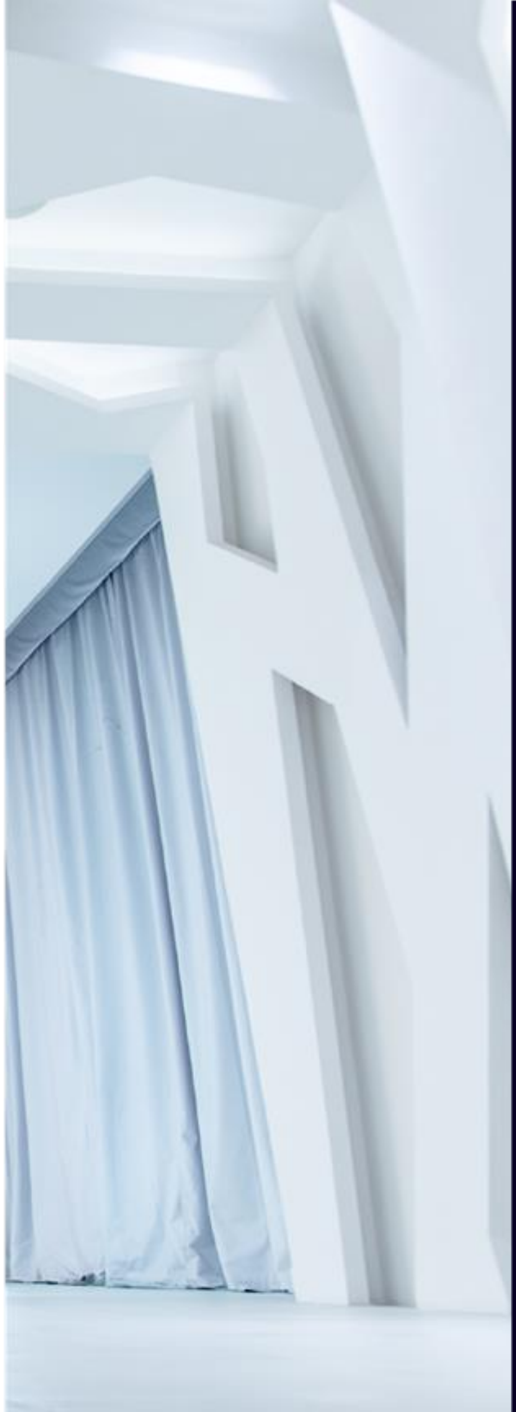
SCIENCE-BASED, DATA-DRIVEN AGRICULTURE
LEAVING EXPERIENCE AND INTUITION BEHIND

TUNGSRAM

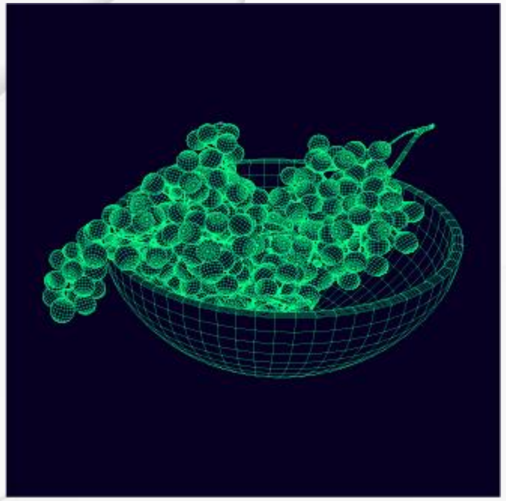
Invented in Europe – powered by Tungsram Food Autonomy



FUTURE

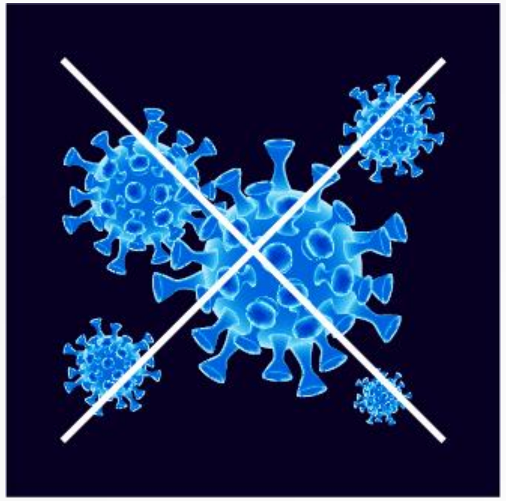
HUMAN WELLBEING

SUSTAINABLE DEVELOPMENT GOALS



FOOD AUTONOMY

(INNOVATIVE FUNDING)



SANITATION

(CHAIN)

LIVABLE ENVIRONMENTS

(ENERGY & COST EFFICIENT, SMART BUILDINGS & CITIES)

GLOBAL CHALLENGES & SOLUTIONS

GLOBAL CHALLENGES & SOLUTIONS

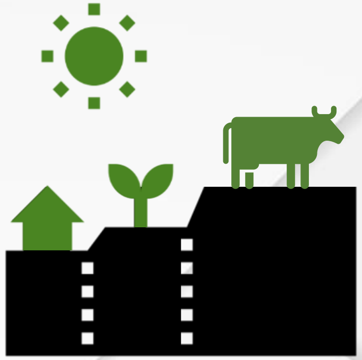
STARVING COUNTRIES CAN'T BE HAPPY

Most of the countries with alarming or serious status on the **Global Hunger Index** occupy the last third of the **UN World Happiness Index**

POPULATION GROWTH

9.7 bn people on the planet by 2050, mainly in Africa, where climate change hits the hardest – **50% more food needed in 10 years**

GLOBAL LAND USAGE FOR FOOD PRODUCTION



Natural habitat has decreased from 65% to less than 20%; almost 50% of open field agricultural output is used to **feed animals**; 1.5-5 Celsius **temperature growth** by 2050

FEEDING THE POPULATION

We need to provide **2200 healthy calories per day** to the global population from local sources

PROPOSED SOLUTION

Indoor farming is the most viable solution

TUNGSRAM'S CAPABILITIES

Tungsram connects to 13 of the UN Sustainable Development Goals (SDG)

PREVENT

REDUCE

REVERT

ADAPT

10 FOR 10 VISION
10 MILLION HUNGARIANS FOR 10 BILLION PEOPLE

THE CHALLENGES

WATER
Atmospheric capture
Raindrops
Treated water

FERTILIZER
Bio-waste
Animal + human feces

AUTOMATION

CO_2
Credit system

DECENTRALIZED MICROGRID
Reduce cost by 95% in 10 years

1 MILLION SELF-SUFFICIENT UNITS FOR AFRICA

LIGHT

ELECTRICITY
Heating/cooling
Solar energy
Storage

REMOTE OPERATION
Over the shoulder technology

ANIMAL FEED
Non-bovine milk
Chicken (eggs)
Fish

SEEDS
Accelerated breeding (non-GMO)

TUNGSRAM FOOD AUTONOMY

TUNGSRAM FOOD AUTONOMY - TFA

MISSION

Humanity to reach self-sufficiency using locally produced healthy food

VISION

- Sustainable future for us and our children by decreasing the footprint of agriculture.
- Food autonomy and safety through high quality technology and products for humanity.
- Tailor-made solutions for agricultural challenges using the combination of advanced lighting and greenhouse technology with plant biology.

TFA

TECHNOLOGY BASED BUSINESS

1 AGRITECH LIGHTING

2 INDOOR FARM TECHNOLOGY

MARKET SEGMENT BASED BUSINESS

3 URBAN FOOD

4 ANIMAL FEED

5 FUNCTIONAL PLANTS

AGRITECH LIGHTING (ALI)

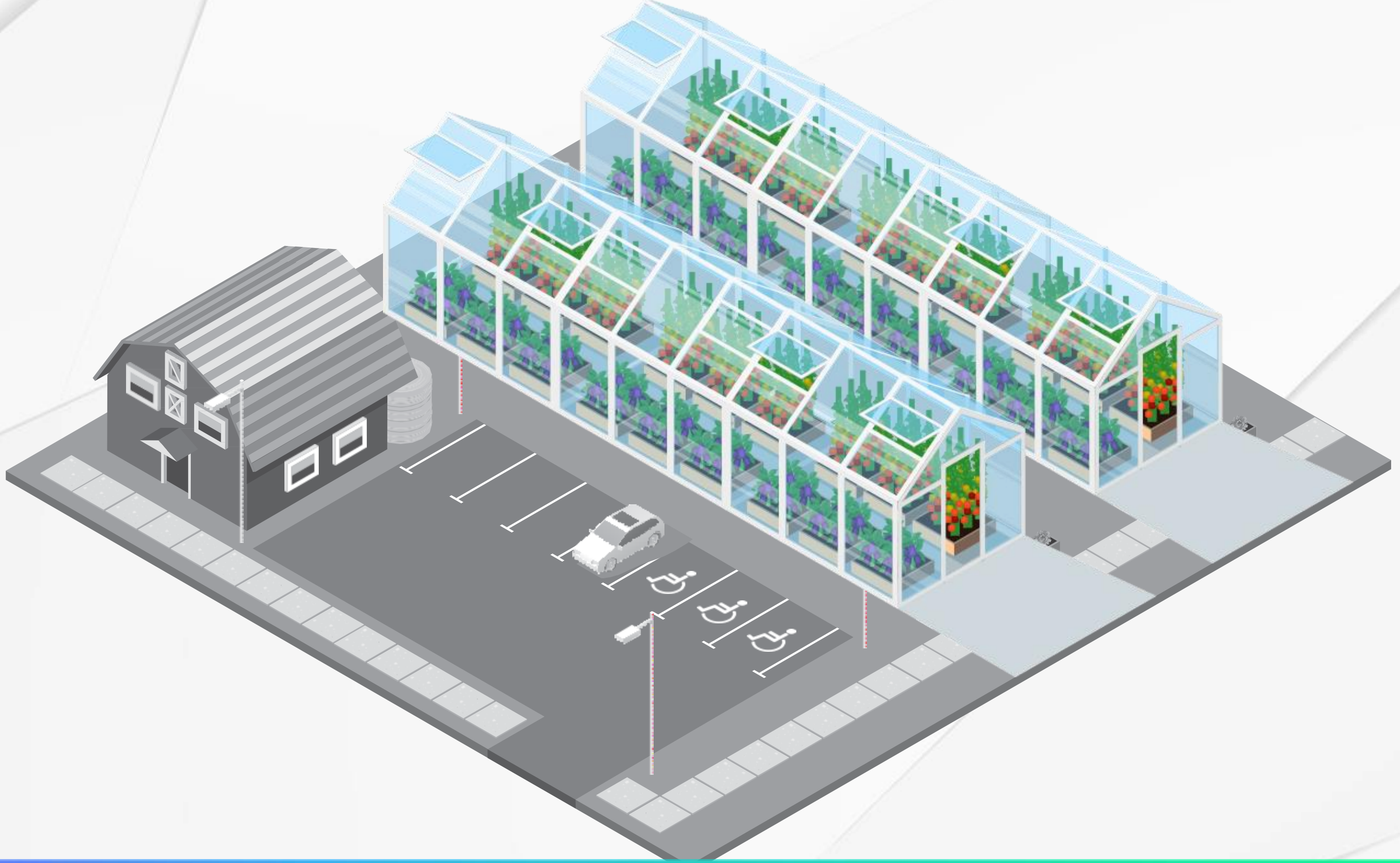
TFA	TECHNOLOGY BASED BUSINESS	1 AGRITECH LIGHTING
		2 INDOOR FARM TECHNOLOGY
	MARKET SEGMENT BASED BUSINESS	3 URBAN FOOD
		4 ANIMAL FEED
		5 FUNCTIONAL PLANTS

ALI SERVES THE LED REVOLUTION IN THE HORTICULTURAL INDUSTRY

SOLUTION

- **World class indoor farming LED lighting product portfolio** and traditional HID product
- **Full-service provider, including demand survey, design planning and implementation**

TFA products are designed for installations in new or already established greenhouses.



Toplight Double Linear

Toplight Single Linear

Toplight Research

Interlight

ALI REFERENCES SHOW WIDE VARIANCE OF MARKET & ACADEMIA

Lans

- Innovative top tomato grower
- Joint lighting solution development
- Contracts for 2021 and 2022

vitarom Geschmack mit Sternchen

- Large tomato grower in Germany
- Returning customer
- Contracts for 2020, 2021 and 2022

SILVESTRIS The Essential Oil Distillery

- Global biotech company specialized on plant extracts
- Biggest chamomile oil extractor in the world

Fraunhofer

- Leading German Institute for Molecular Biology
- Returning customer with 3 laboratories with our fixtures

HODKERTÉSZ a minőségi magyar termékek szállítója

- The first Hungarian greenhouse using LED artificial light

GROWING UNDERGROUND SW4

- World's first underground farm situated in World War Two air raid shelter under south London

DEBRECENI EGYETEM

- Major Hungarian agricultural UNI's
- Four R&D locations from aquaponics to outer space conditions

THE SUMMER BERRY COMPANY

- Major UK berry grower
- Three years joint research for strawberries

Gemüsebau Steiner natürlich - frisch - nachhaltig

- One of the biggest Bavarian tomato growers
- Several locations with different LED setup

Berry Gardens

- New UK strawberry greenhouse
- Biggest berry supplier to Tesco

University of Reading

- Global Top 10 agricultural UNI in UK
- 3 year R&D collaboration for strawberries
- Whole UNI greenhouse campus illuminated with our LEDs

MAGYAR TUDOMÁNYOS AKADÉMIA 1825

- Two institutes of Hungarian Academy of Science using our research toplights

URBAN FOOD

TFA

TECHNOLOGY BASED BUSINESS

MARKET SEGMENT BASED BUSINESS

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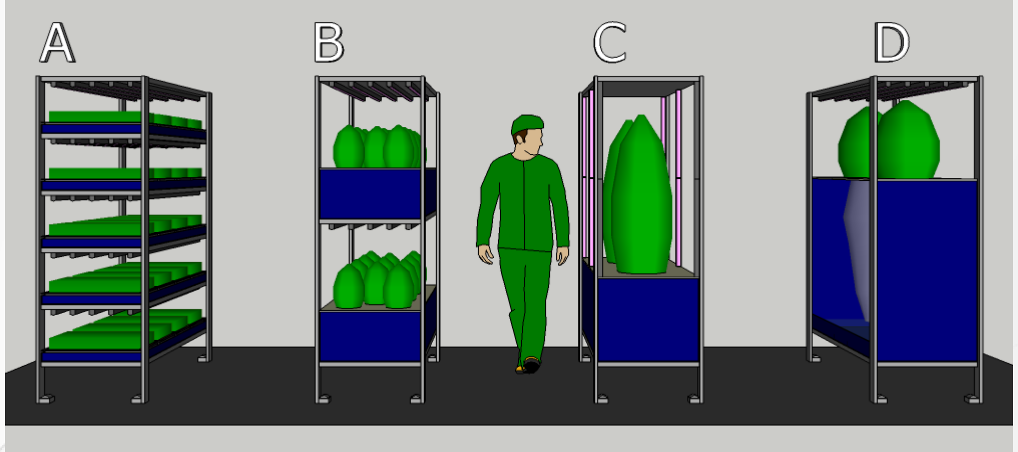
THE POWERGROW SYSTEM IS THE SOLUTION FOR CONTROLLED ENVIRONMENT PLANT GROWTH

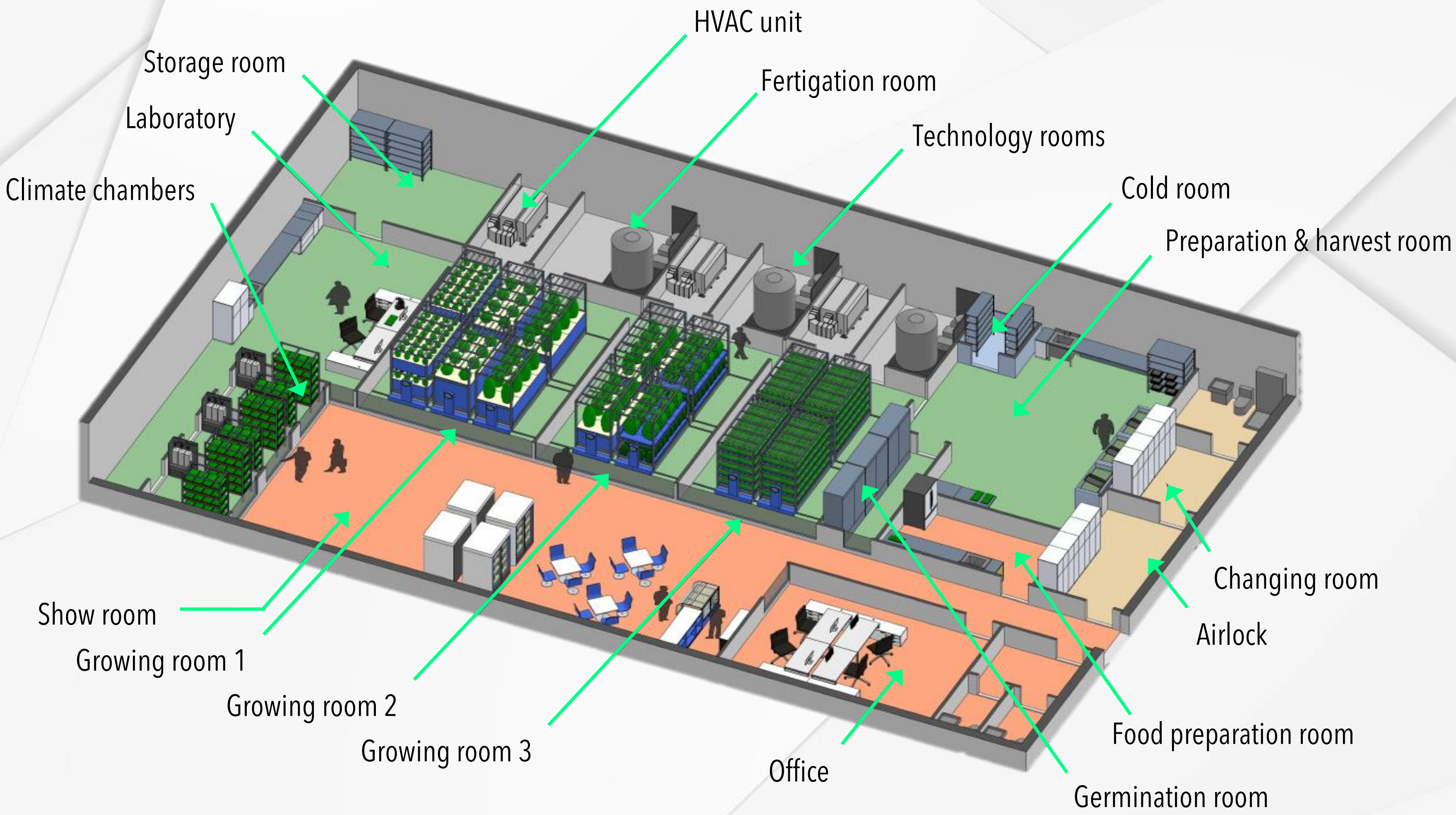
VERTICAL FARMING SOLUTIONS

- TFA Urban Food designs and builds **fully automated vertical farms** under PowerGrow brand name
- The PowerGrow system is perfectly tailored to customer needs for each **client and plant type**
- TFA Urban Food operates, maintains the farm and continuously upgrades the growth recipes to obtain highest yield and quality produces
- **Highly scalable and multipliable** industrial production modules (A, B, C, D) for various crops and grow technologies



TFA POWERGROW SYSTEM HAS BEEN DESIGNED BASED ON A MODULAR CONCEPT

VERTICAL FARMING SOLUTIONS



600 m² Precision Indoor Farm with a net growing area of 200 m².

REMOTE MONITORING SYSTEMS ENSURE CONTROL OF ALL PARAMETERS

VERTICAL FARMING SOLUTIONS

TFA's PowerGrow monitors and remotely controls the environment and the daily operation of indoor farms. Remote management solutions on Android, iOS and Windows platforms are available to monitor and verify the functioning of the control equipments through a web interface.
AI and machine learning solutions under development, using data collected by the sensors monitoring specific conditions related to plants and their environment.

- Sensor
- Remote management
- Equipment control
- Analytics & Machine Learning.
- Lighting Controls

- Maintain Ideal Micro-Climate
- Enhance Irrigation and Fertilization Process
- Control Infection & Avoid Disease
- Prevent thefts & Increase Security
- Optimize Yield
- Enhance Chemical & Resource-Use Efficiency
- Minimize manual Intervention

EARLY-STAGE BUSINESS LINES

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TFA DEVELOPS A CIRCULAR AGRICULTURAL SYSTEM INVOLVING BELOW ELEMENTS

INDOOR FARMING

Designing and constructing indoor farms

Work-to-date

Developed and built a R&D farm

Ability to scale up to large commercial farms

First customer negotiations in progress

Clients

Farm developers

Partners

R&D partners

ANIMAL FEED

Producing high quality nutrition for animals

Work-to-date

Forming collaboration with international and Hungarian partners

Clients

Farmers

Partners

R&D

FUNCTIONAL PLANTS

Using plants to produce proteins and inputs for other applications

Work-to-date

First farm delivered

Joint experiments with a pharmaceutical company and young plant producer

Clients

Processing Industry

Partners

R&D

Goal is to achieve organic and unorganic growth through market validation, industrialization, potential acquisitions (selected IPs) & scalable solution development

WHY DO WE NEED A ZERO WASTE AGRICULTURAL SYSTEM?

70% GROWTH in the demand for animal-based foods by 2050

26% OF ALL GREENHOUSE GAS EMISSIONS is produced by the food indsutry

~270 MILLION DAIRY COWS in the world

100 POUNDS FEED is eaten per day by dairy cow

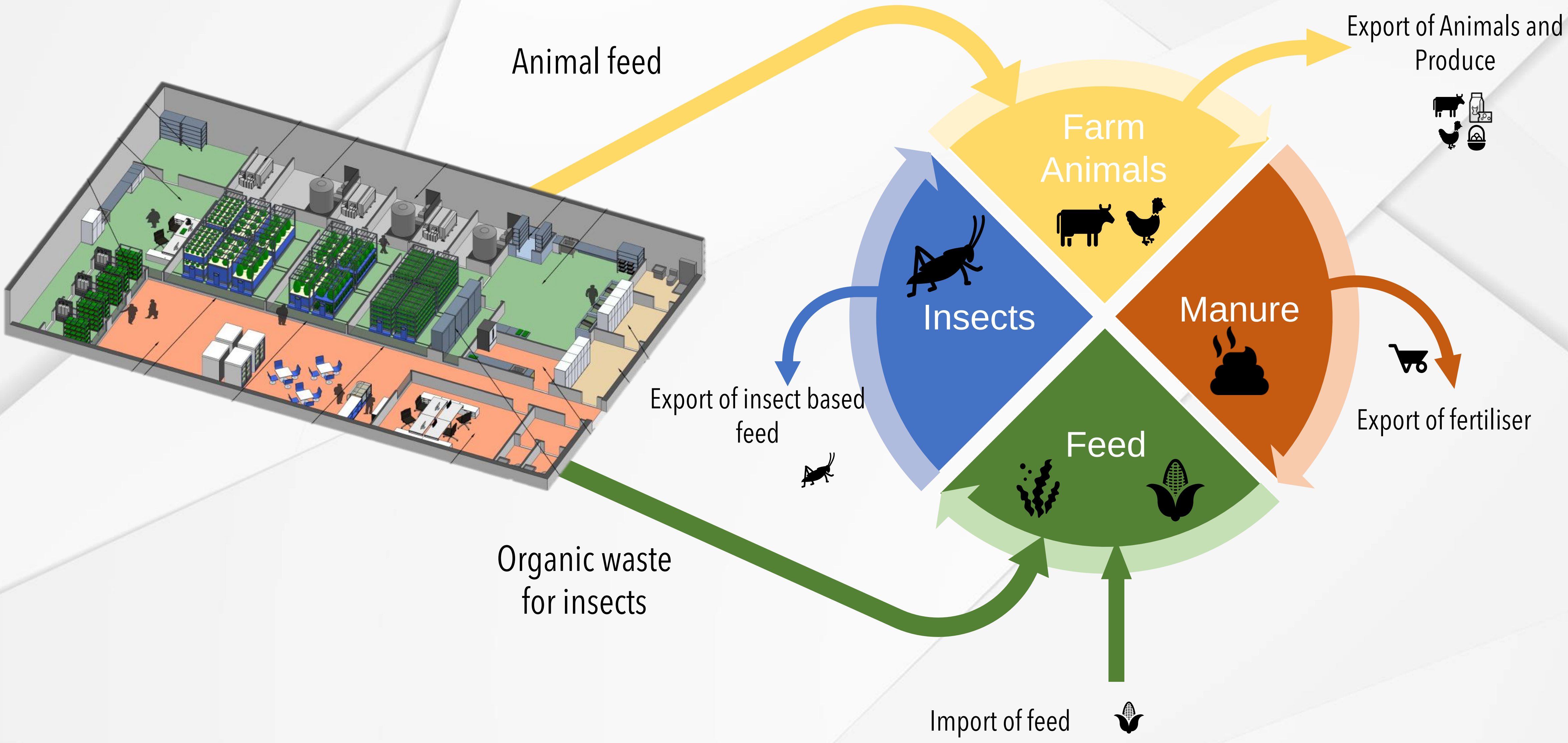
144 GALLONS WATER is used to produce 1 gallon of milk

93% OF THAT WATER is used to grow feed for dairy cattle

140 000 KM2 CROPLAND is used to grew feed crops for dairy cows only in the USA

CURRENTLY THERE ARE LITTLE COMPETITION AND ALMOST UNLIMITED OPPORTUNITIES IN THIS MARKET

THE SCALABLE TFA CIRCULAR ZERO WASTE AGRICULTURAL SYSTEM



LET US BUILD THE FUTURE TOGETHER!

Please contact us:

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