

# BLUE ECONOMY AQUACULTURE FORUM





**SAN GROUP**

Passion for Innovation

# What does SAN mean?

SAN (三) is Chinese and means  
**“three”** (三).

On three legs, one can  
stand steadily no matter  
how uneven the surface  
may be.



# The 9 SAN Group Candles

Lightening our path to success



We are at the front line of  
**SUSTAINABILITY**

Our **RECIPE OF SUCCESS:**  
Passion + People = Profit

We **PROMISE** to  
our customers



## SOLID TURNOVER WITH A STRONG PERSPECTIVE FOR GROWTH ON 3 PILLARS



### Animal health

*Vaccines*  
*Veterinary Diagnostics & Services*  
*In-vitro PCR Diagnostic Products*  
*Biosecurity & Medicals*



### Plant health

*Plant Protection*  
*Plant Nutrition*  
*Plant Growth Regulators*  
*Adjuvants*



### Planet health

*Green Energy*  
*Real Estate Development*  
*Feed & Food Safety*  
*Food & Beverage Production*





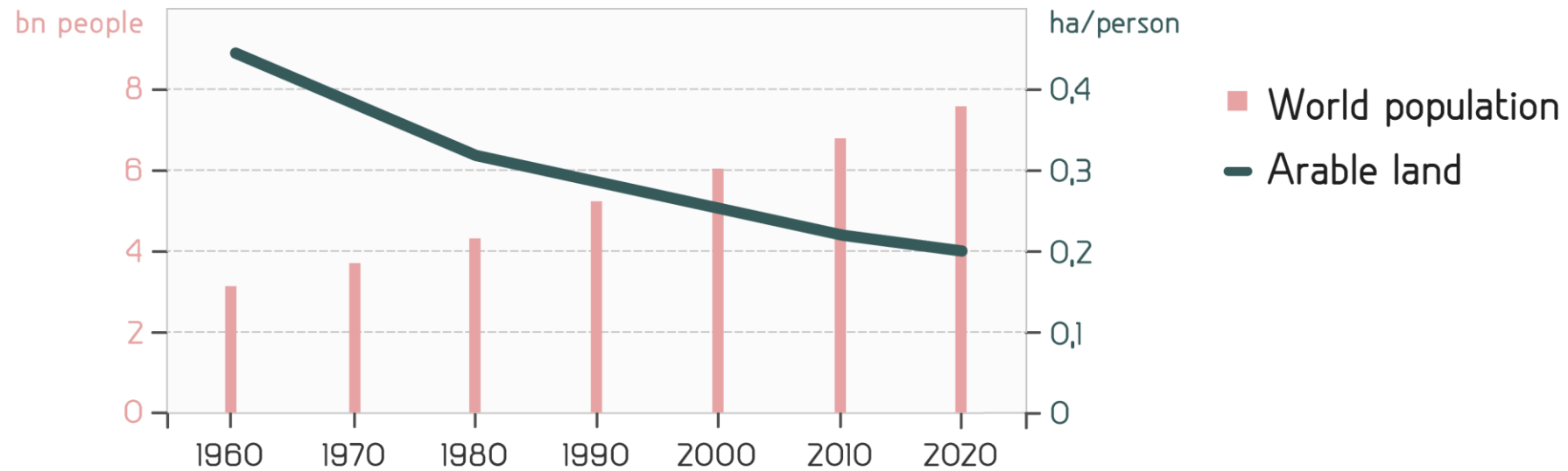
# FROM ABUNDANCE TO SCARCITY

**"Economics is the science to  
manage scarcities"**

*J. Ramoser et al*



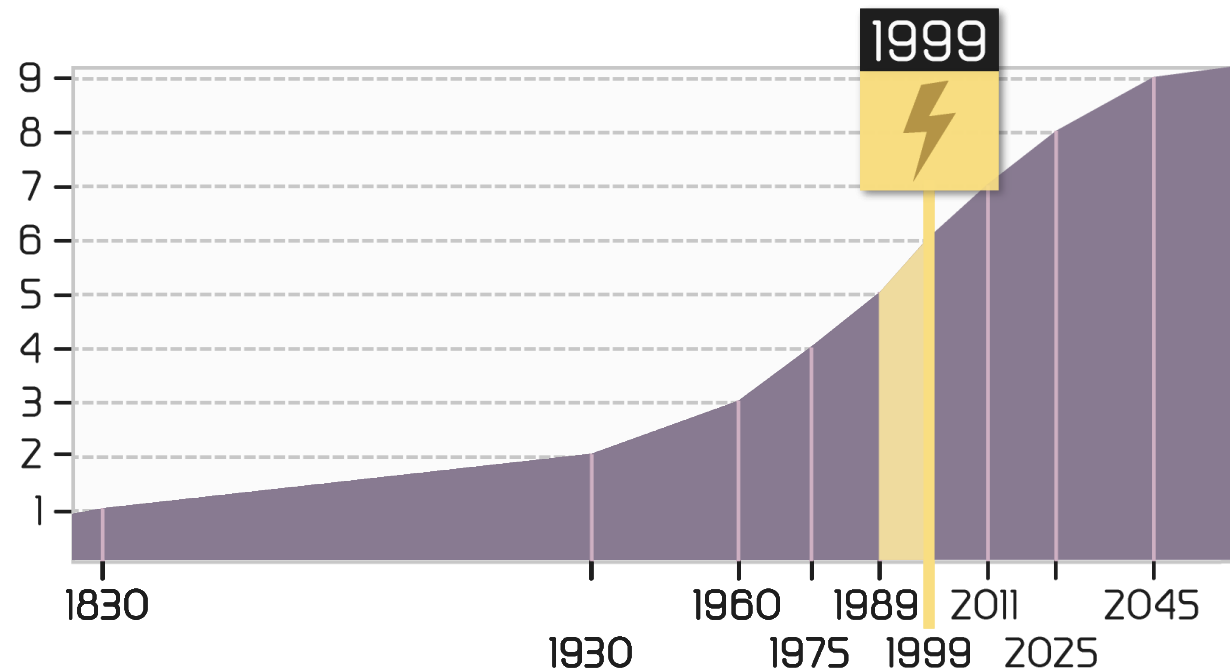
# ARABLE LAND PER CAPITA VS. POPULATION



Source: BHP Billiton investor presentation

# WHAT HAS CHANGED IN THE YEAR 1999?

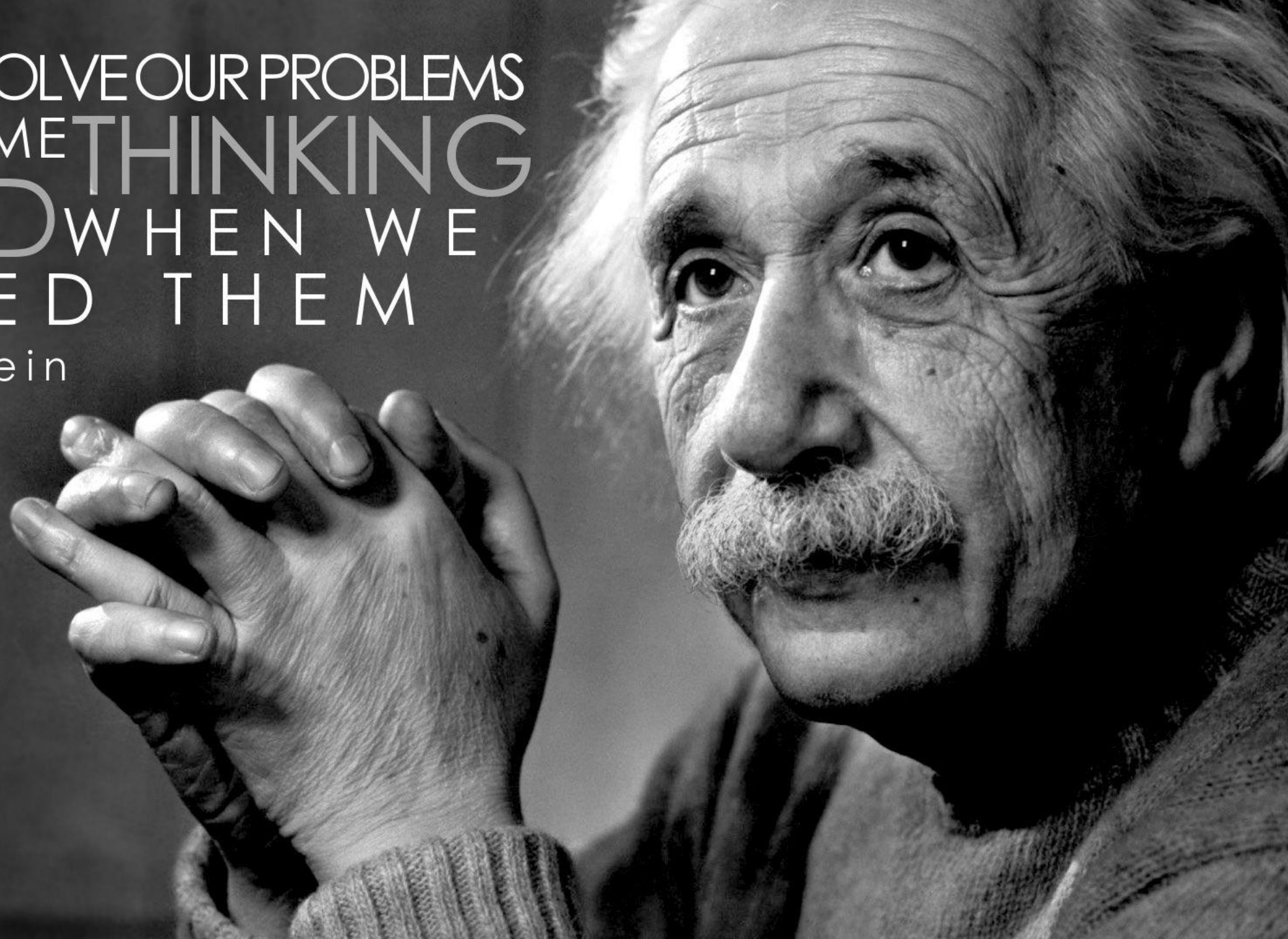
Billions of people on earth





WE CANNOT SOLVE OUR PROBLEMS  
WITH THE SAME THINKING  
WE USED WHEN WE  
CREATED THEM

-Albert Einstein



# WHAT ARE YOU DOING AS A PERSON

- Have this presentation done
- Eat more fish
- Buy an e-bike



If you don't know where you are going  
you probably aren't going to get there.



Geoffrey Moore, "Target the Point of Attack"



# SAN Research & Lab Campus, Ras al Khaimah

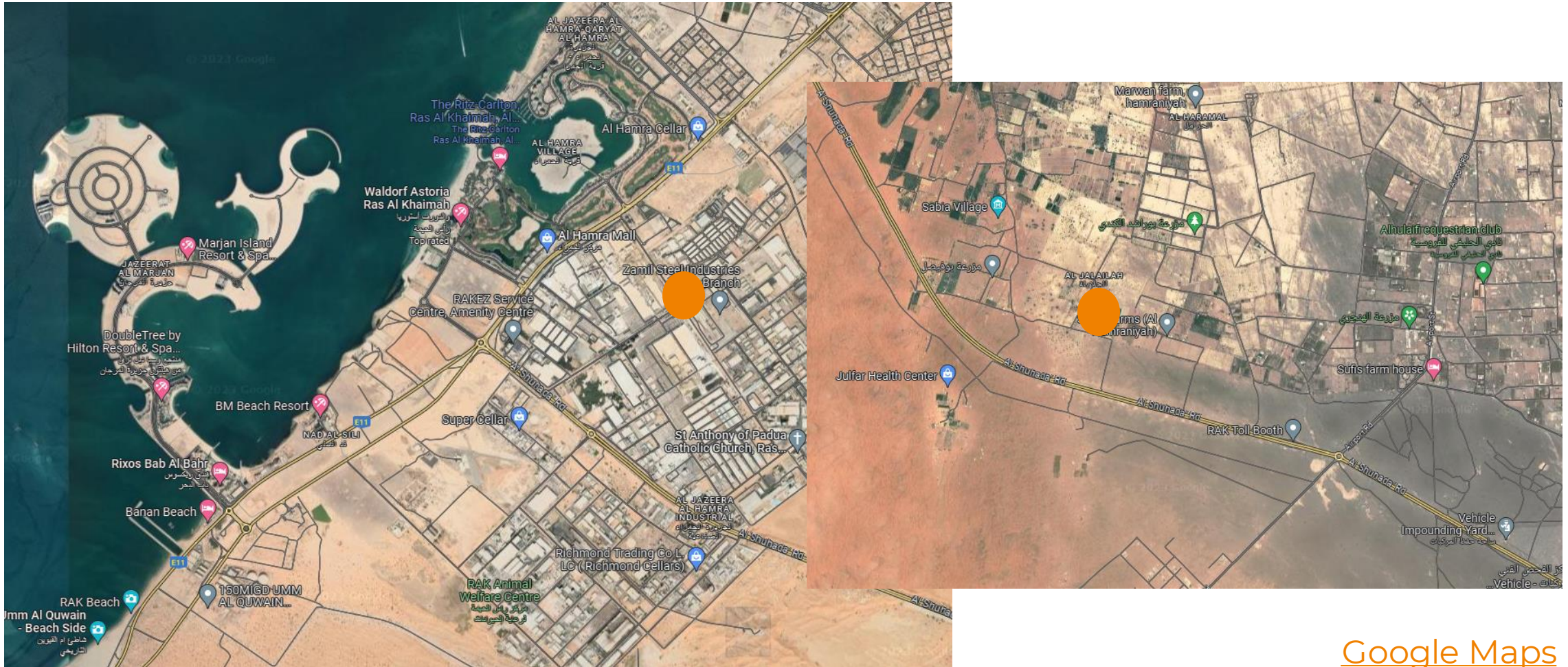
A re-circulating agriculture system powered by green energy





# Where?

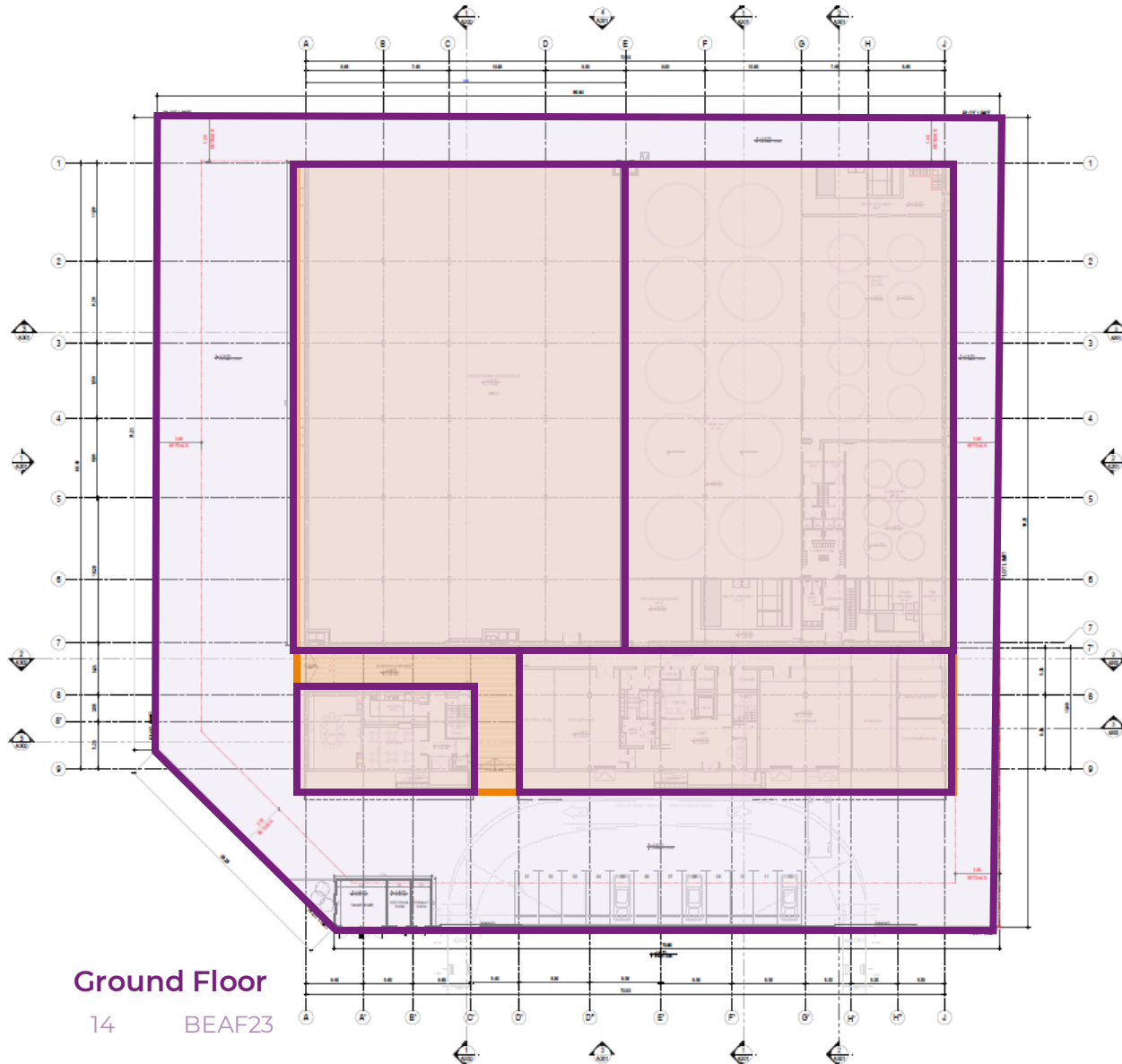
## SAN Research & Lab Campus, Ras al Khaimah



Google Maps

# What?

## SAN Research & Lab Campus, Ras al Khaimah



Plot size 8500 m<sup>2</sup>

Building with about 5800 m<sup>2</sup> usable area

Area Fish Farm 2100 m<sup>2</sup>  
RAS systems - land-based fish farming for about 100 t fishes per year

Area for expansion

Process rooms

Employees residence

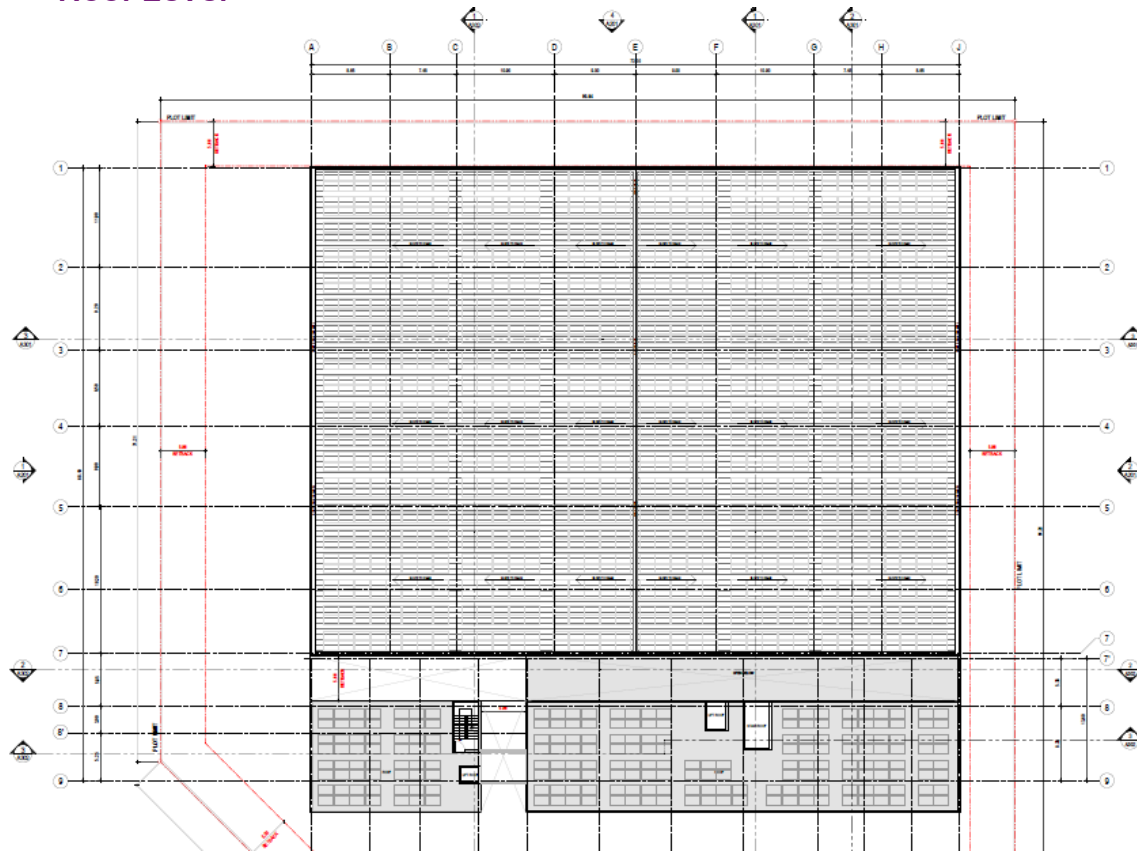


# What?

## SAN Research & Lab Campus, Ras al Khaimah

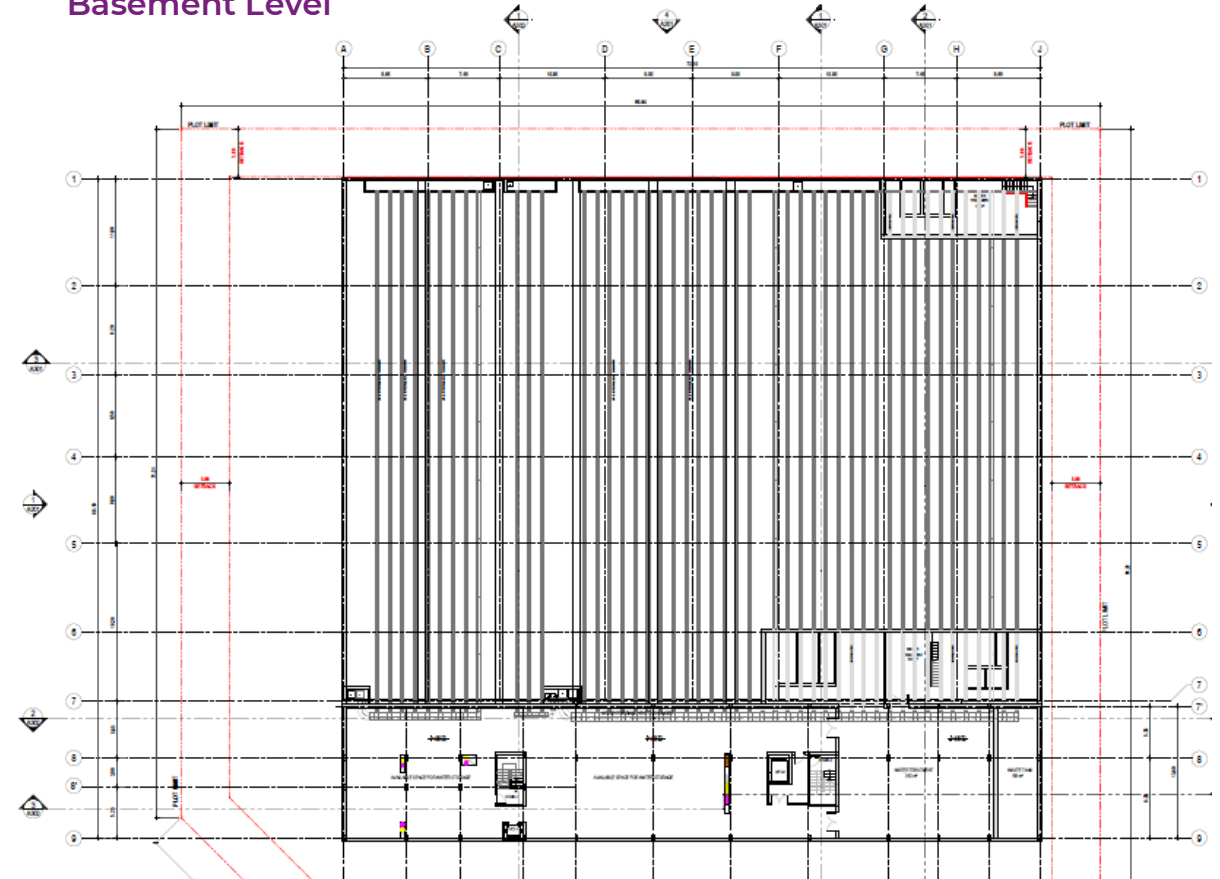
### Photovoltaic system

Roof Level



### Earth cooling system

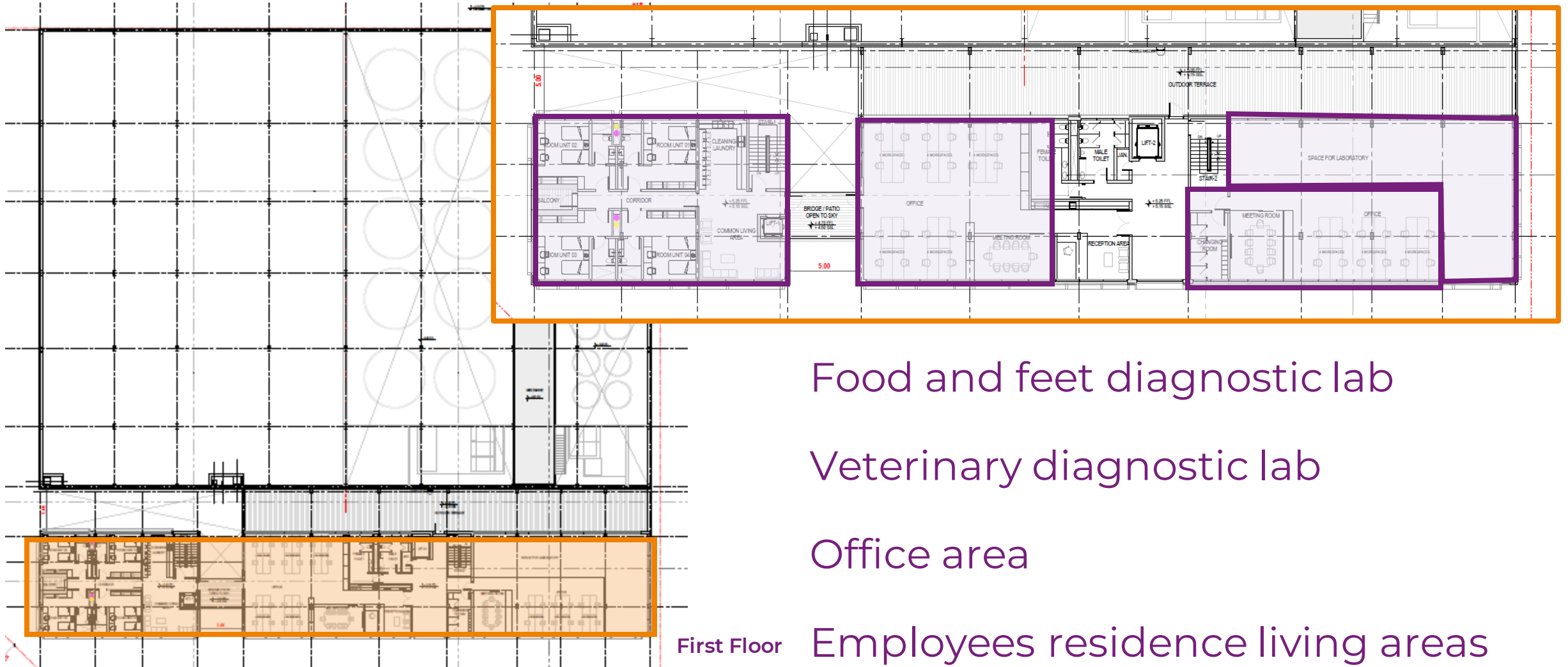
Basement Level





# What?

## SAN Research & Lab Campus, Ras al Khaimah



# What?

## SAN Research & Lab Campus, Ras al Khaimah

### Recirculation Aquaculture System

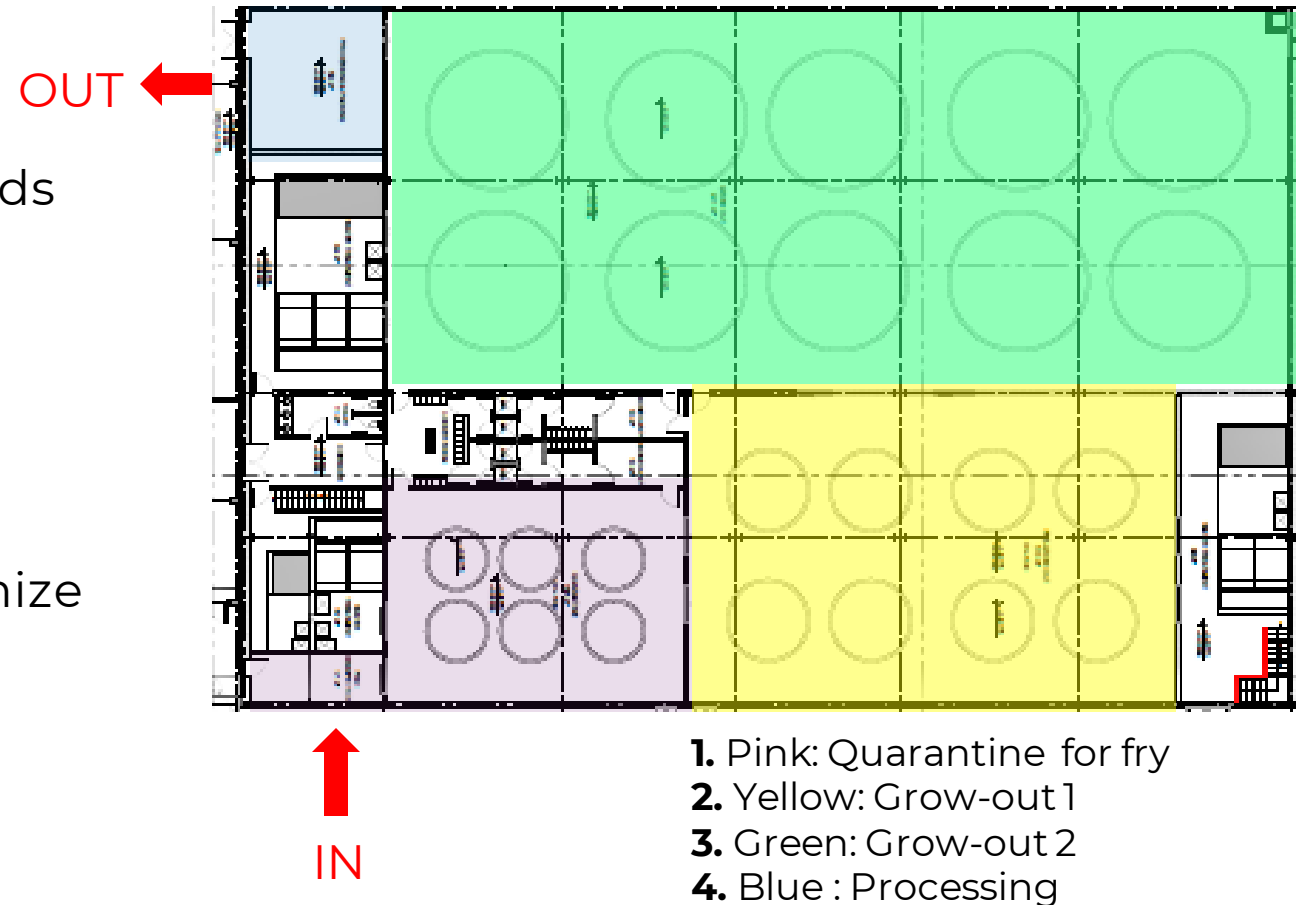
Biosecurity lock for staff and all goods

Disease free Barramundi fingerling  
come in separated unit for Stage 1

Growth-out in phase 2 and 3

Automated feeding system to maximize  
Growth

Harvested fresh fish in clean area to  
avoid Cross contamination



**Production of Barramundi in a bio-secure environment**

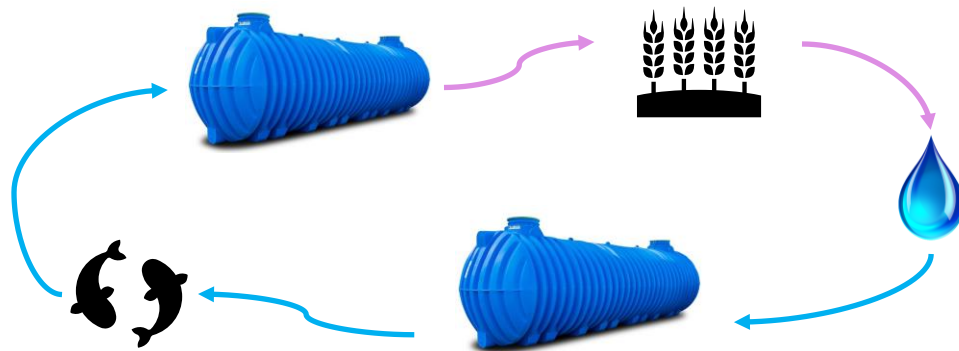
# What?

## SAN Research & Lab Campus, Ras al Khaimah

### Regenerative agriculture - water cycle - no waste of water

#### Plantfarm

Enriched water of the fish farm recirculation for irrigation and as fertilizer on the field



- Groundwater wells
- Water treatment

Further use of salt solution



We want to grow Bambara Groundnut



How do we act sustainably  
in our projects?







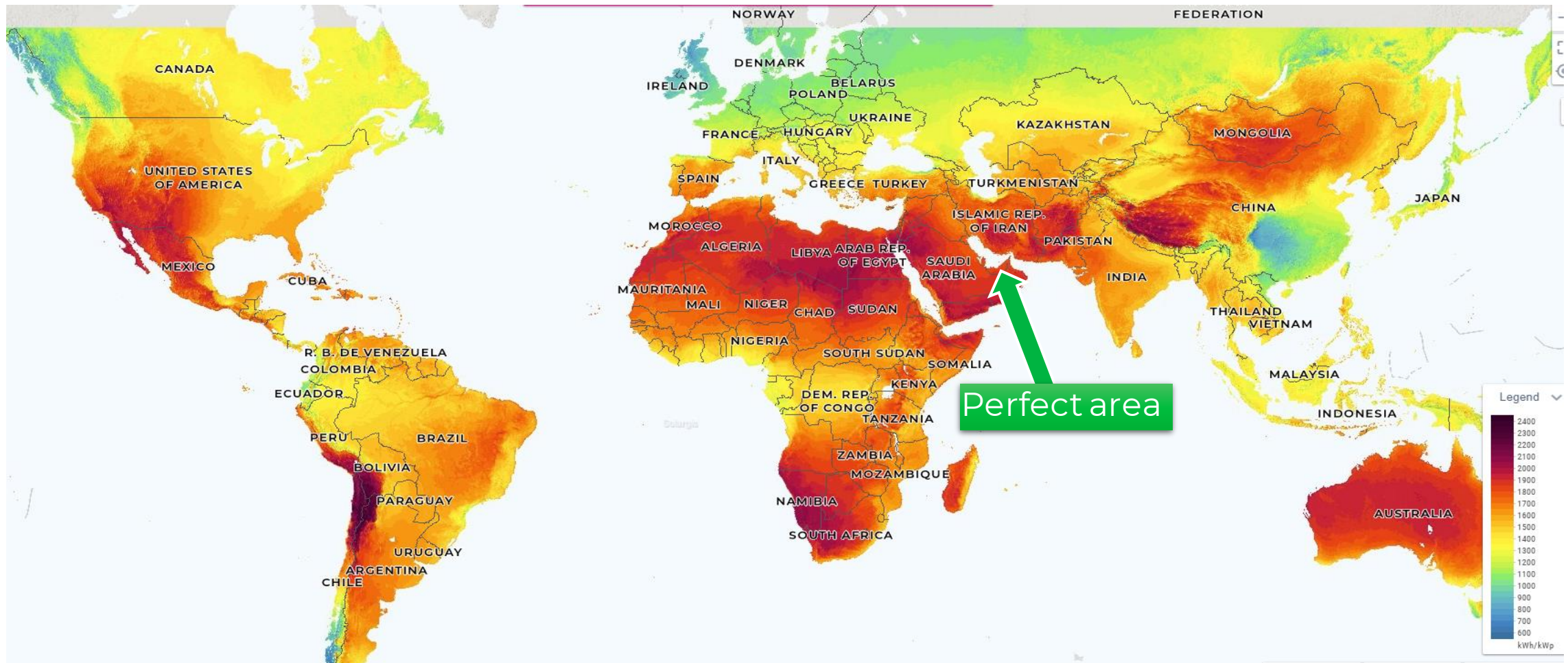
Use the primary energy that  
is available...





# Primary Energy SUN

## Global Solar Atlas



# Primary Energy & Resources

converting to?



SUN

WATER

SOIL

AIR



Our Mission:  
24/7 use the primary energy for food production









# SAN Biotech Park Industrial Zone Austria - Europe





# Primary Energy

WATER

Hydrogen production

SUN

PV-System

SOIL

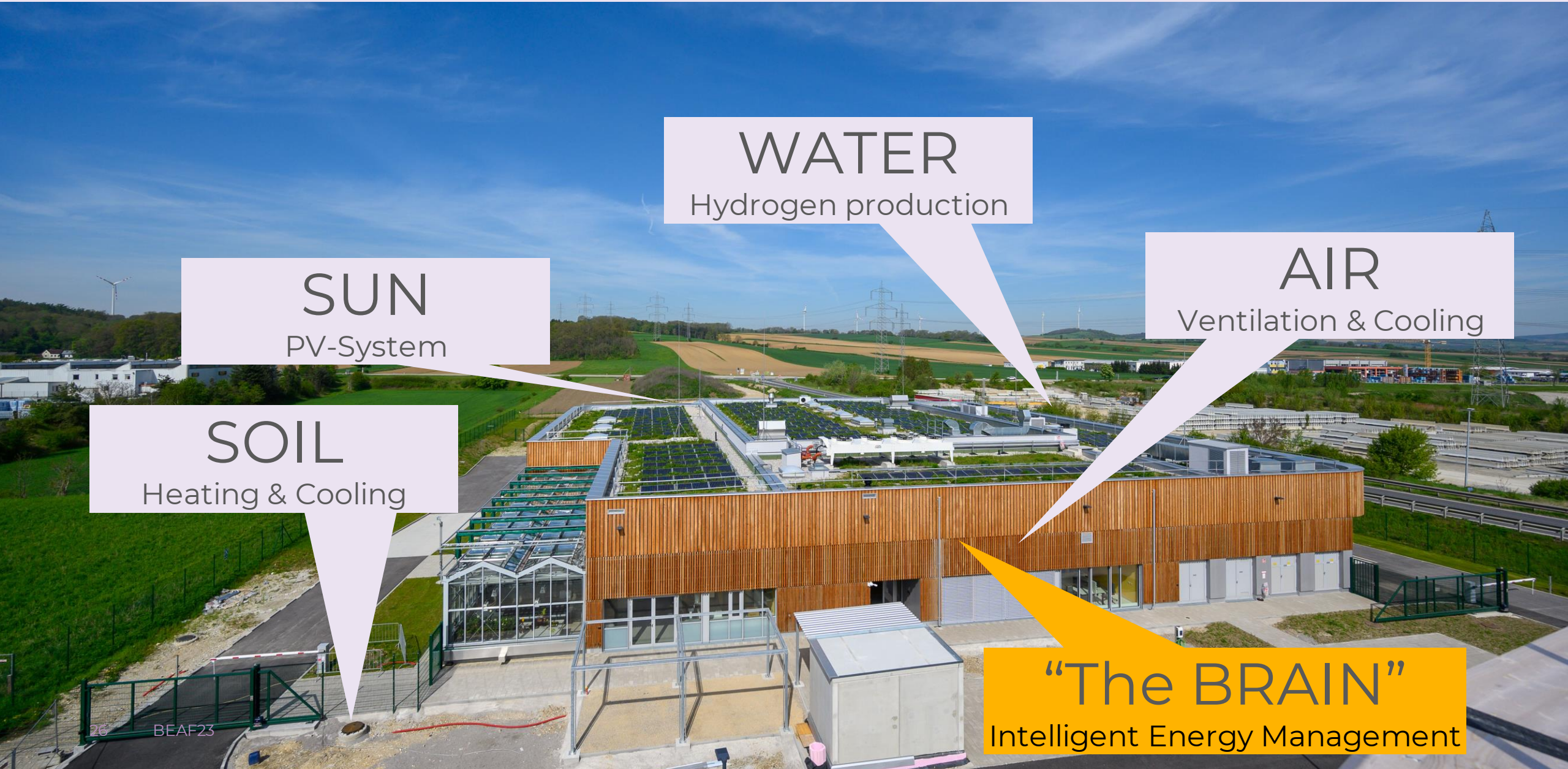
Heating & Cooling

AIR

Ventilation & Cooling

“The BRAIN”

Intelligent Energy Management





# Intelligent Energy Management “The brain”

SAN Group Sites

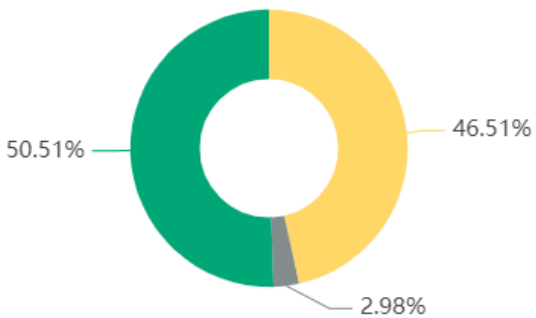
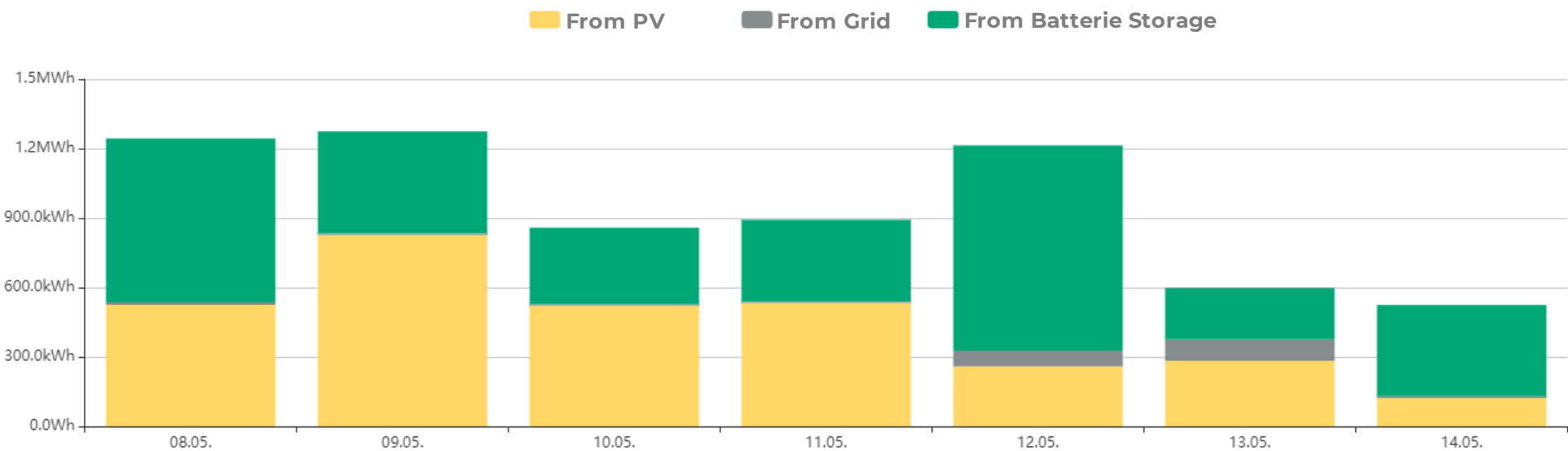


## Implement

1. Energy Monitoring systems
2. process/building control systems



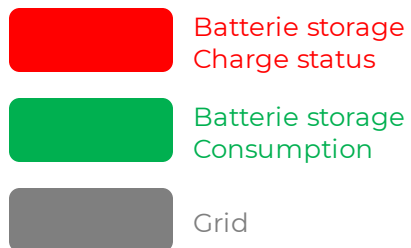
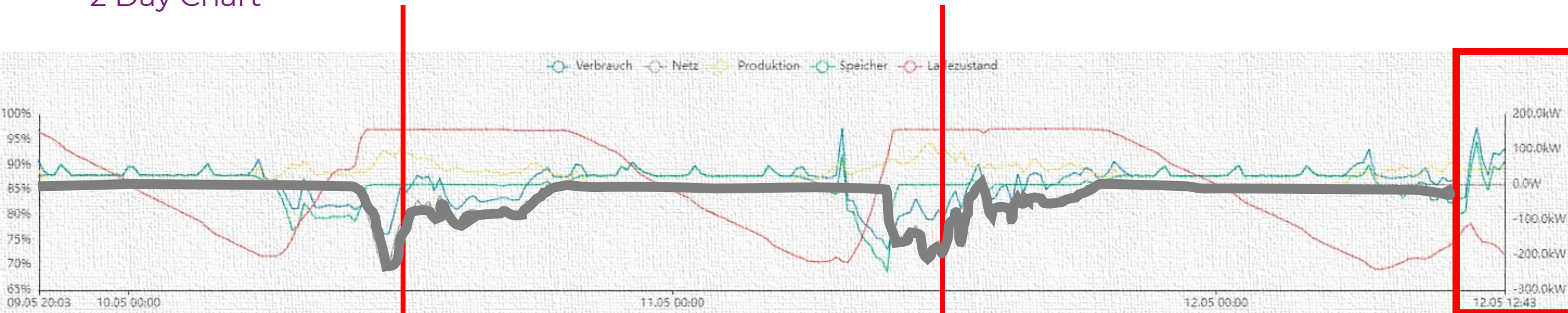
# Intelligent Energy Management & Monitoring



|                       |          |
|-----------------------|----------|
| From PV               | 3.1MWh   |
| From Grid             | 197.0kWh |
| From Batterie Storage | 3.3MWh   |
| Total                 | 6.6MWh   |

# Intelligent Energy Management & Monitoring

## 2 Day Chart







# THANK YOU ...

**... for your attention.**

*Passion for innovation*

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