



# THE TRAIL

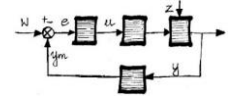
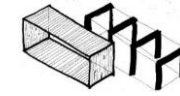
BY VINCI CONSTRUCTION

## HYBRID EARTHSHIP

Bioarchitecture & Conventional earthship  
Environmental engineering

Prefabrication &  
Frame structures

Automation  
– BMS / BEMS



**Energy:** Thermal solar heating and cooling, solar and wind electricity

**Garbage Management:** Reuse and recycling built into construction and daily living

**Sewage Treatment:** Self-contained sewage treatment and water recycling

**Shelter:** Building with natural and recycled materials

**Clean Water:** Water harvesting and long term storage

**Environment:** minimizing a harmful effect on human health and the environment

**Food:** In-home organic food production capability

**Constructon:** reliability and durability

**Construction process:** quality, time and effectiveness

**Frame construction:** building open plan and flexibility for future needs and usage

**Climate change:** design for climate change

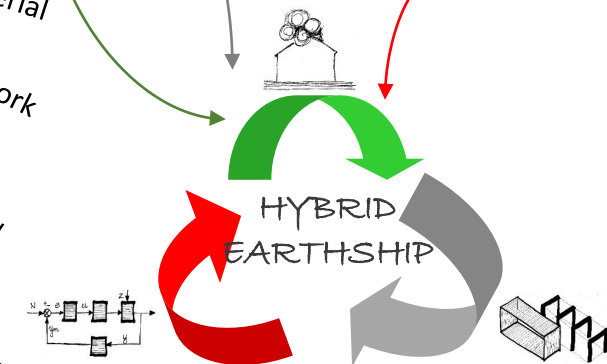
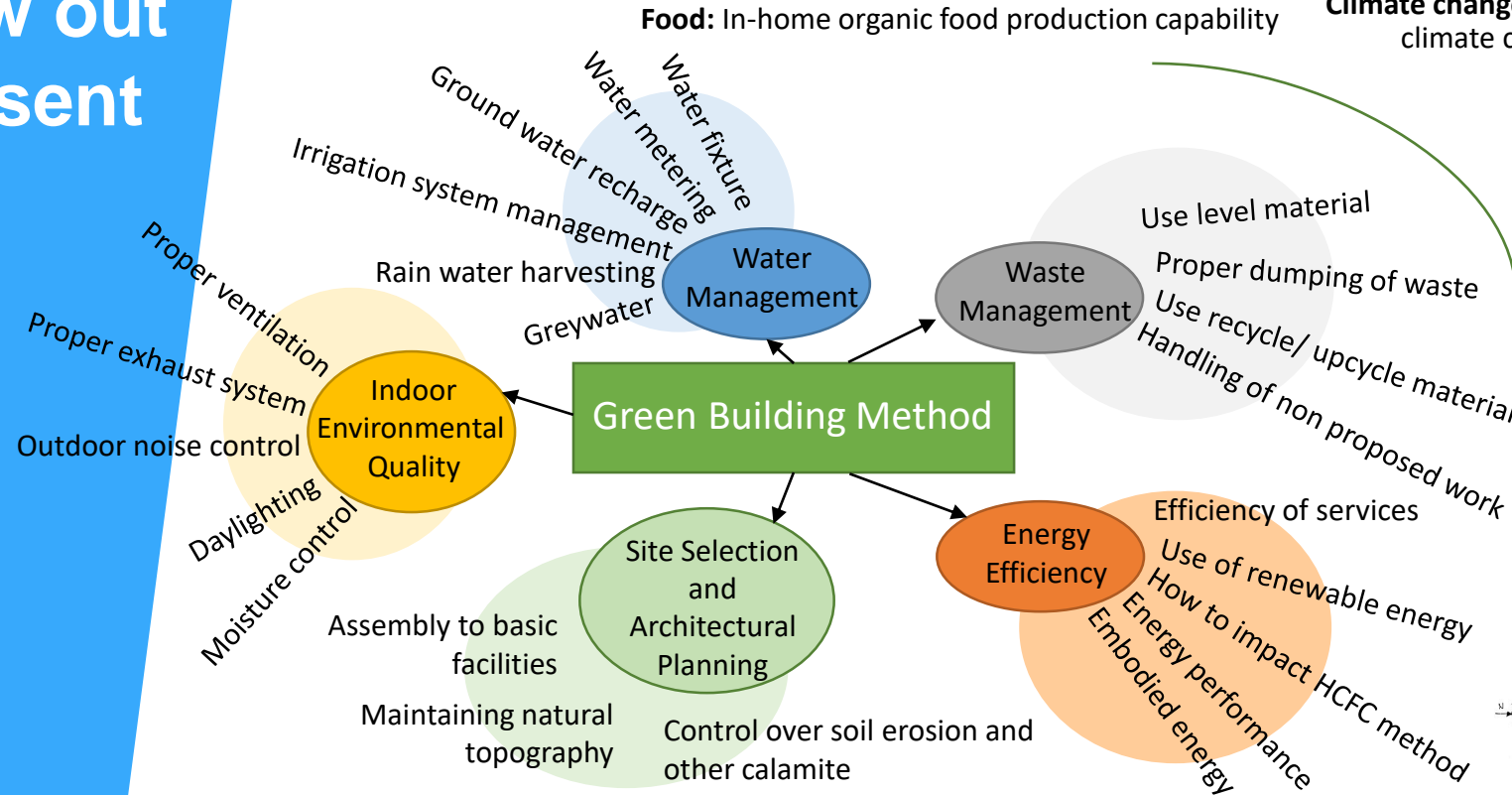
**Energy:** optimisation of energy use by energy conservation, recovery and substitution

**Indoor climate:** increasing your ability to manage comfort and air quality throughout the building

**Management:** management, controlling and monitoring the mechanical and electrical equipment, savings on annual operation costs, quality, time and effectiveness of construction process

# HYBRID EARTHSHIPS

– buildings of the future grew out of the present



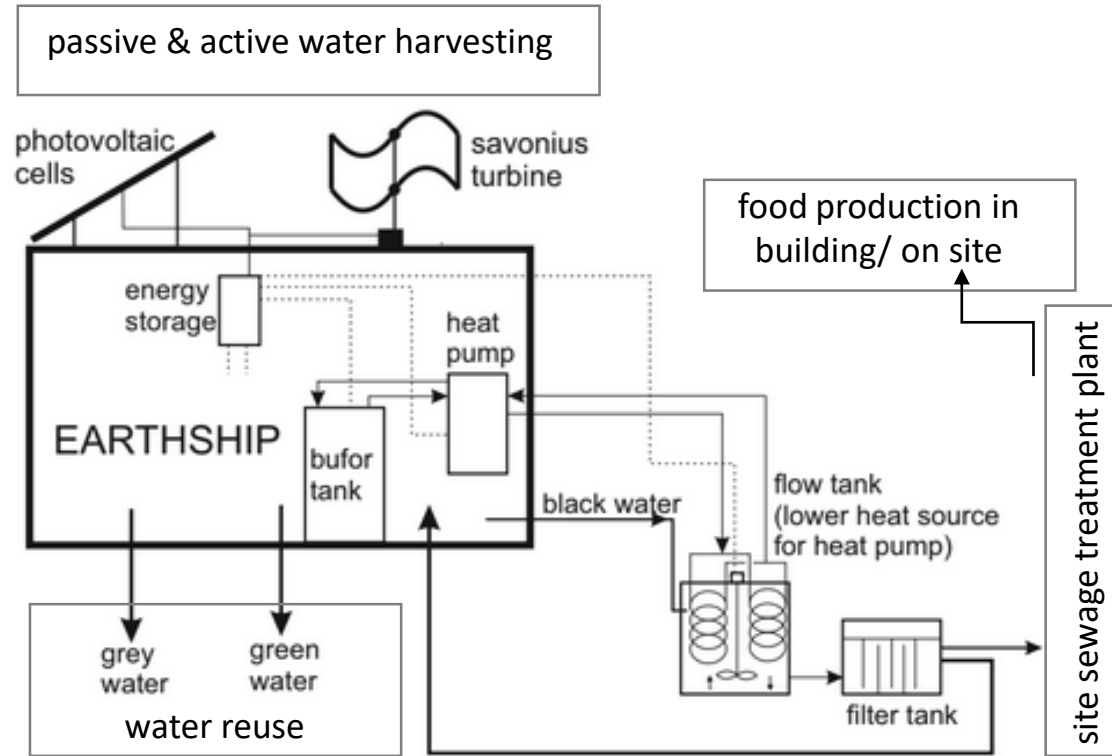
# Combination of BATs in areas of architecture, automation, civil & environmental engineering

## Construction & material concept

- durable frame construction (recycled steel or reinforcement concrete from CDW) & open plan of construction (frames)
- use of construction demolition waste (CDW) based materials in minimum 60%
- partly prefabricated envelope (opaque panels) made from natural materials (straw, hemp, wood particles, other) or upcycling garbage materials or CDW
- thermal mass and high thermal quality of building envelope
- high quality of windows ( $U_w$ ,  $g$ ,  $L_t$ )
- inverted roofs especially green ones

## Energy concept

- HVAC and other building energy systems including passive cooling
- water source heat pump
- energy recovery
- active windows (energy generation)
- energy harvesting – generation on site and storage system
- material recovery/ reuse/ upcycling including construction stage
- passive and active solar protection
- smart lightning system



## Water management

- water harvesting (passive and active)
- closing loop of water use
- site sewage treatment plant

## Building management concept

- smart operating and control strategies
- deep learning BEMS
- HVAC and other building energy systems

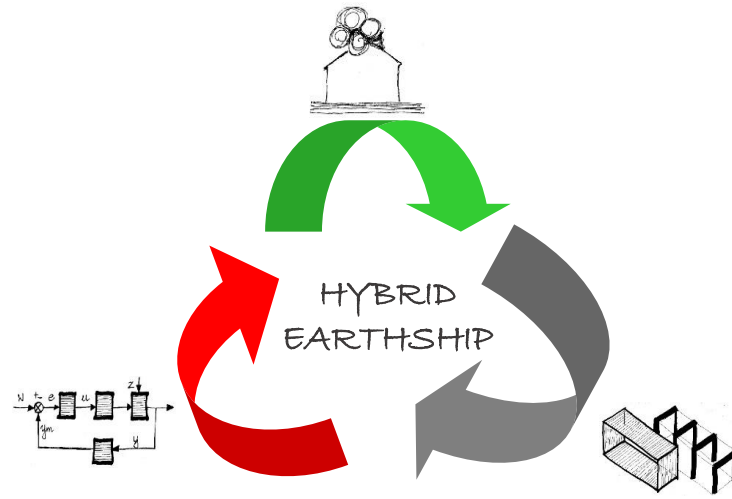
## Additional concepts

- space zoning
- food production in building/ on site



# Hybrid partly pre-made modern earthship

## Advantages & Benefits



- multiplication and upscaling of the 4 technique (Reduce, Reuse, Recycling -> Upcycling, Renew) into additional: Recover, Refine, Retrofit, Replace, Revitalization, Rethink, Responsibility, Re-'other'
- sustainable material management & circular economy
- combination of Best Available Techniques (BATs) in areas of architecture, civil engineering & environmental engineering, automation (BEMS)

- minimizing a harmful effect on human health and the environment
- use of local materials
- reduction of the CO2 and other polutions foot print
- more efficient use of resources
- climate change design
- reduction of thermal island effect
- natural refrigerants in technical systems (0 ODP Ozone Depletion Potential, low GWP Global Warming Potential)
- technical systems with very low TEWI & LCCP factors
- partly self-sufficient food production
- structural strength
- extending lifespan of construction and protection of embodied energy
- flexibility to change the interior plan
- construction time, quality and accuracy
- optimization of sources use
- contributing to long-term competitiveness
- efficiency increasing of technical systems
- reduction of energy demands
- reduction of maintenance costs
- technical systems monitoring
- data collecting

# HYBRID EARTHSHIP



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