

ENERGIZERS

Essence of air
Amsterdam Zuidooost

P5 Presentation

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4638719

Tutors: Stefan de Koning
Gilbert Koskamp

Delegate: Lidy Meijers



Complex Projects

INDEX



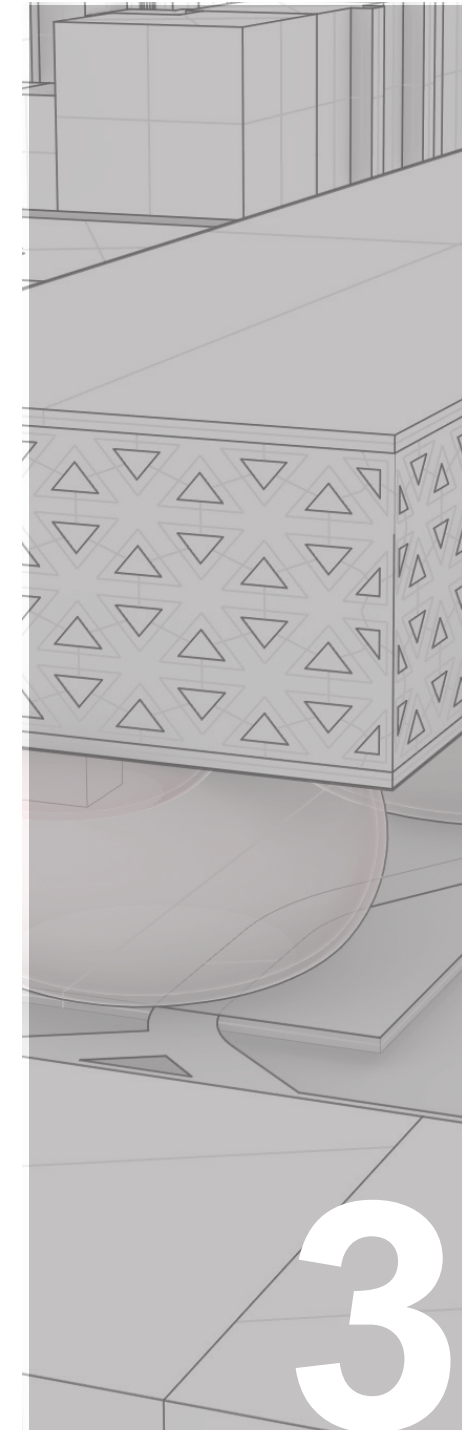
GROUP VISION



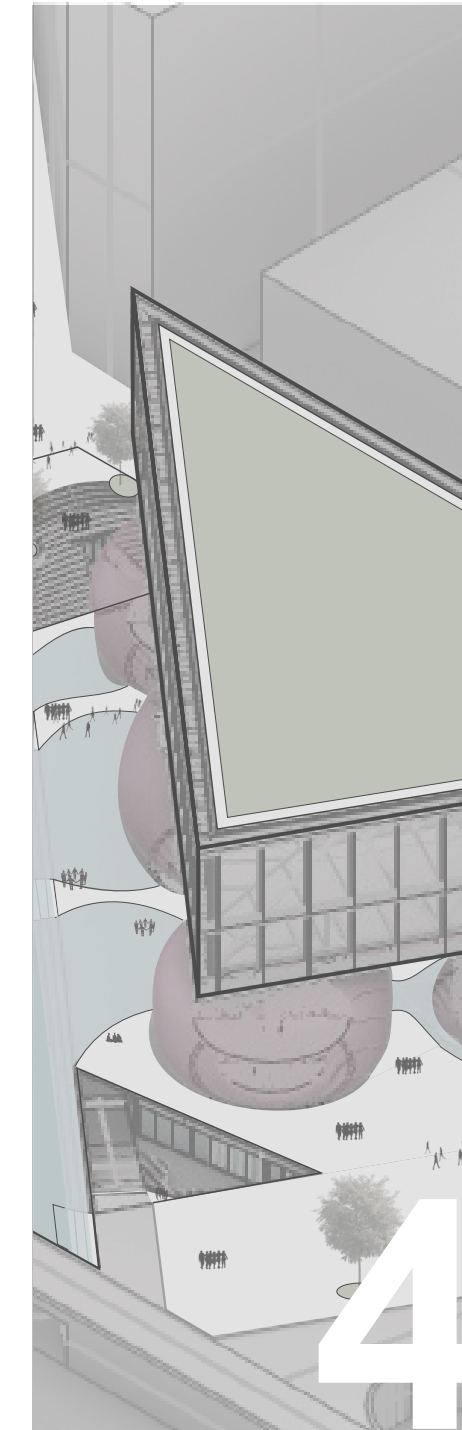
RESEARCH



ENERGY IN
THE DISTRICT



CONCEPT



ENERGIZER

5

APPENDIX



GROUP VISION

- MASTERPLAN AMSTERDAM SOUTHEAST -



GROUP VISION
- MASTERPLAN AMSTERDAM SOUTHEAST -

Centraal

Amstel

Zuid-oost

AMS 2100 sites
The site of 2018/2019 Complex Projects



Complex Project

- AMS 2100 -

GROUP VISION



1903



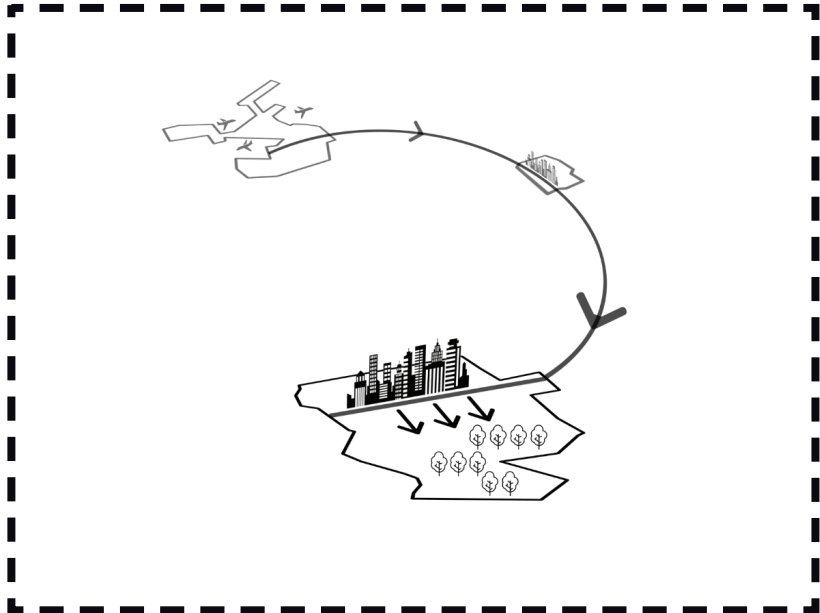
2019



2100

Course Objective
Designing for the year 2100

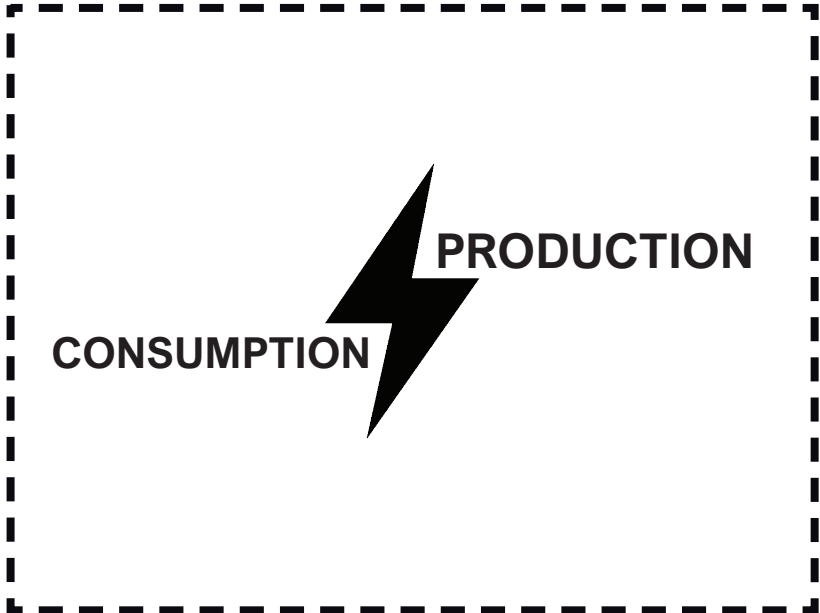
GROUP VISION



**Growing Business
district**



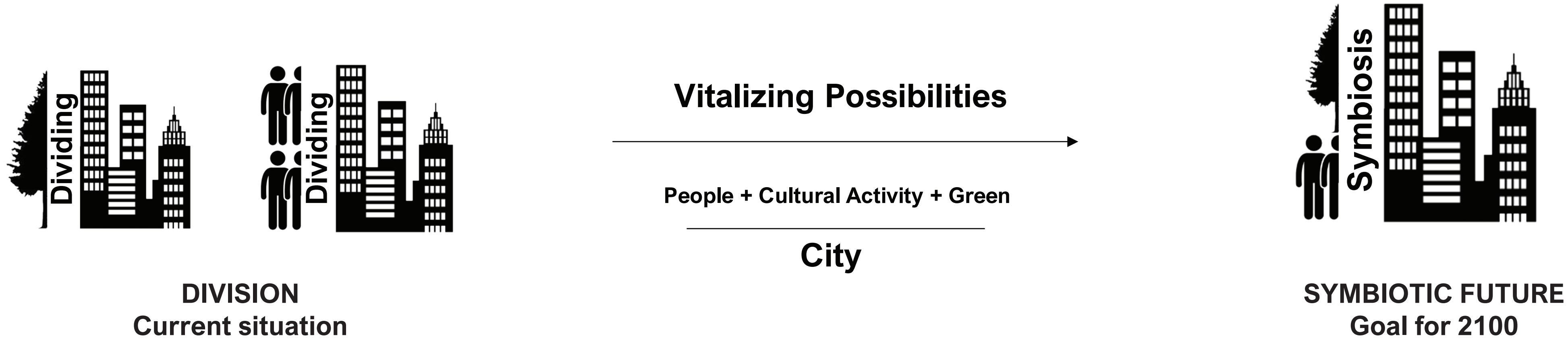
**Multi-cultural
Multi-income class**



**Confident
energy aims**

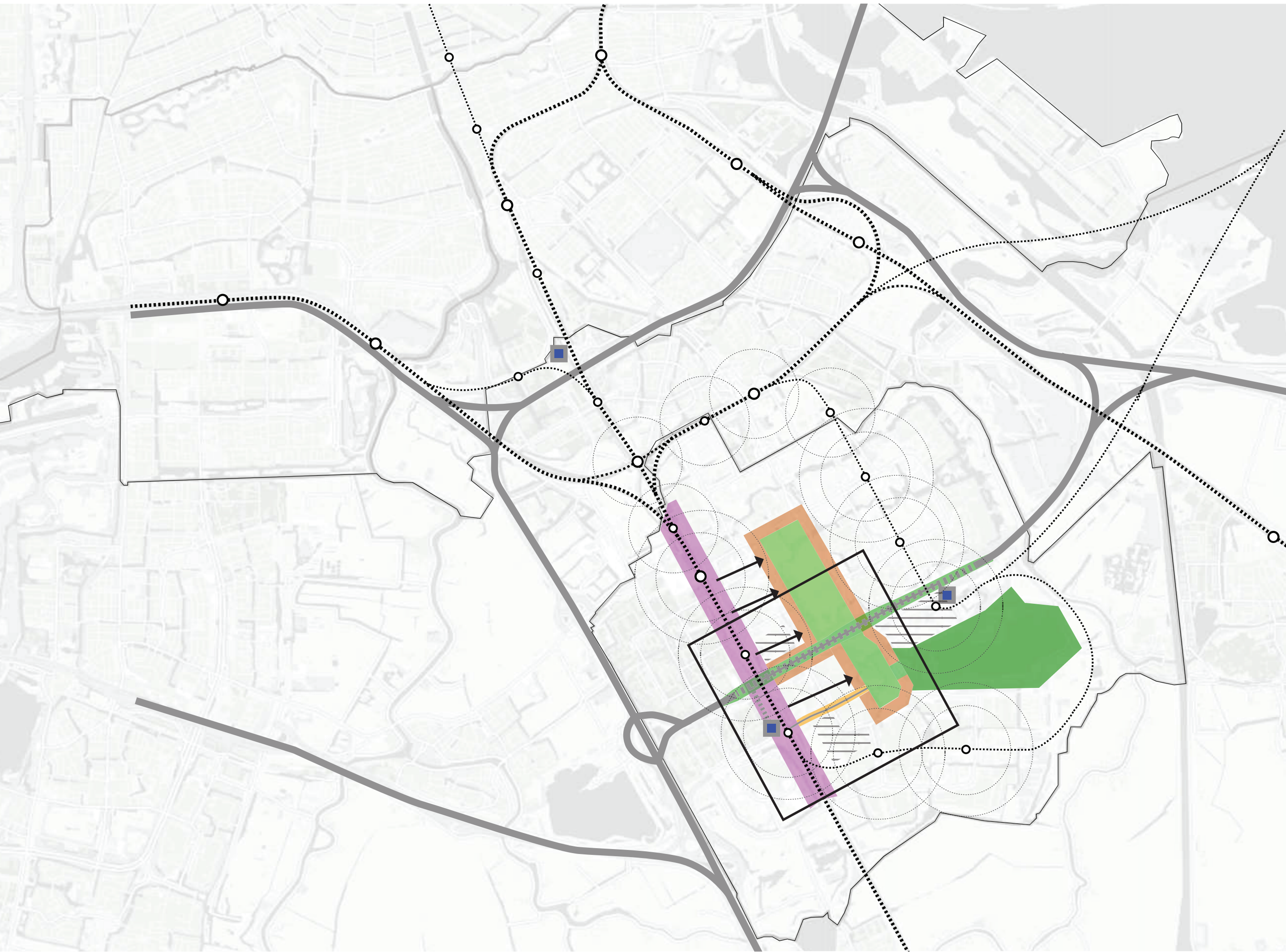
Group Research
Conclusion

GROUP VISION

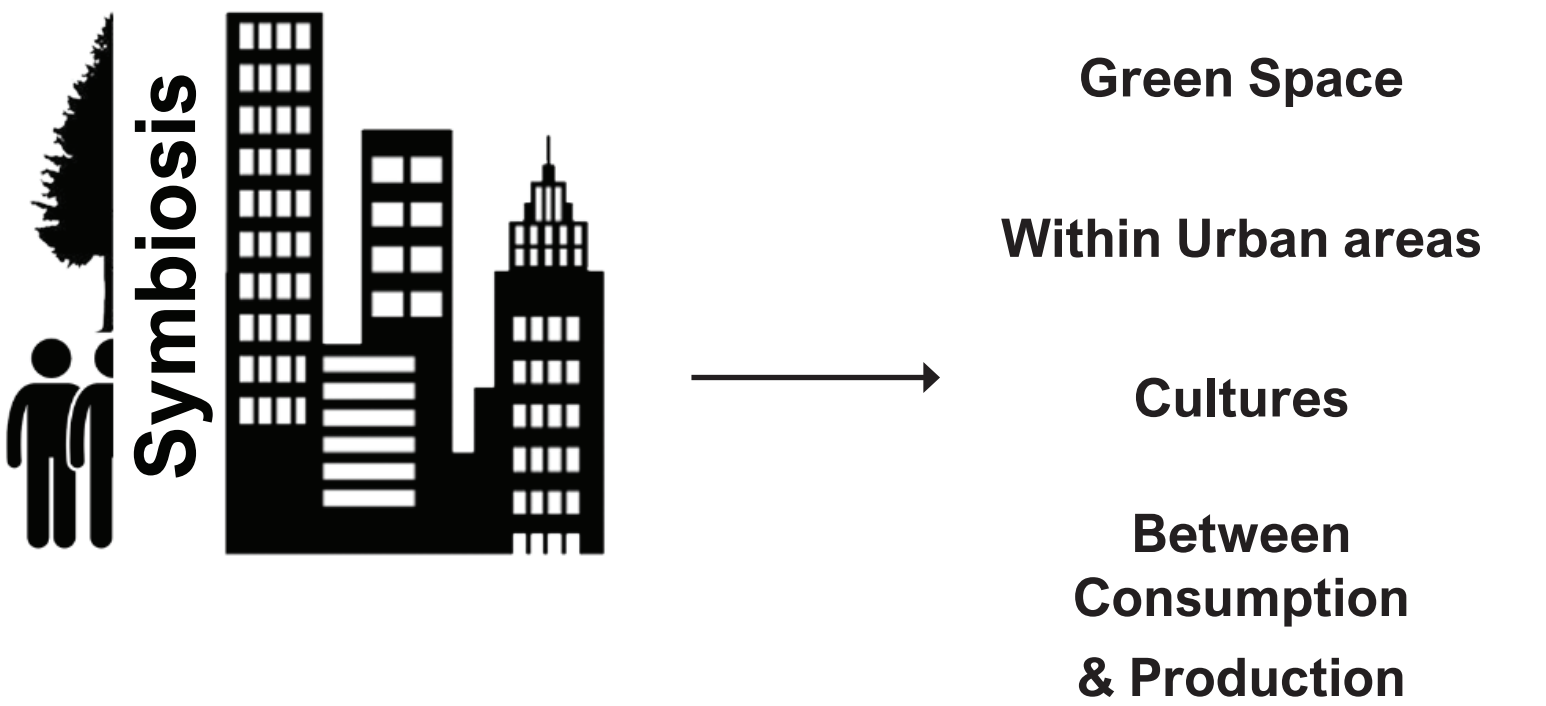


Symbiosis
Vitalizing Possibilities

GROUP VISION



The Masterplan
Amsterdam Southeast 2100 Masterplan



Parking garage		Innovation Axis	
Metrostation		Urban district	
Trainstation		Park Border	
Car		Secondary axis	
Metro		Sports park	
Train		Natural park	
Walkability radius		Wilderness park	

GROUP VISION



Green Space
Within Urban areas

Cultures

**Between
Consumption
& Production**

The Masterplan
Personal focus points



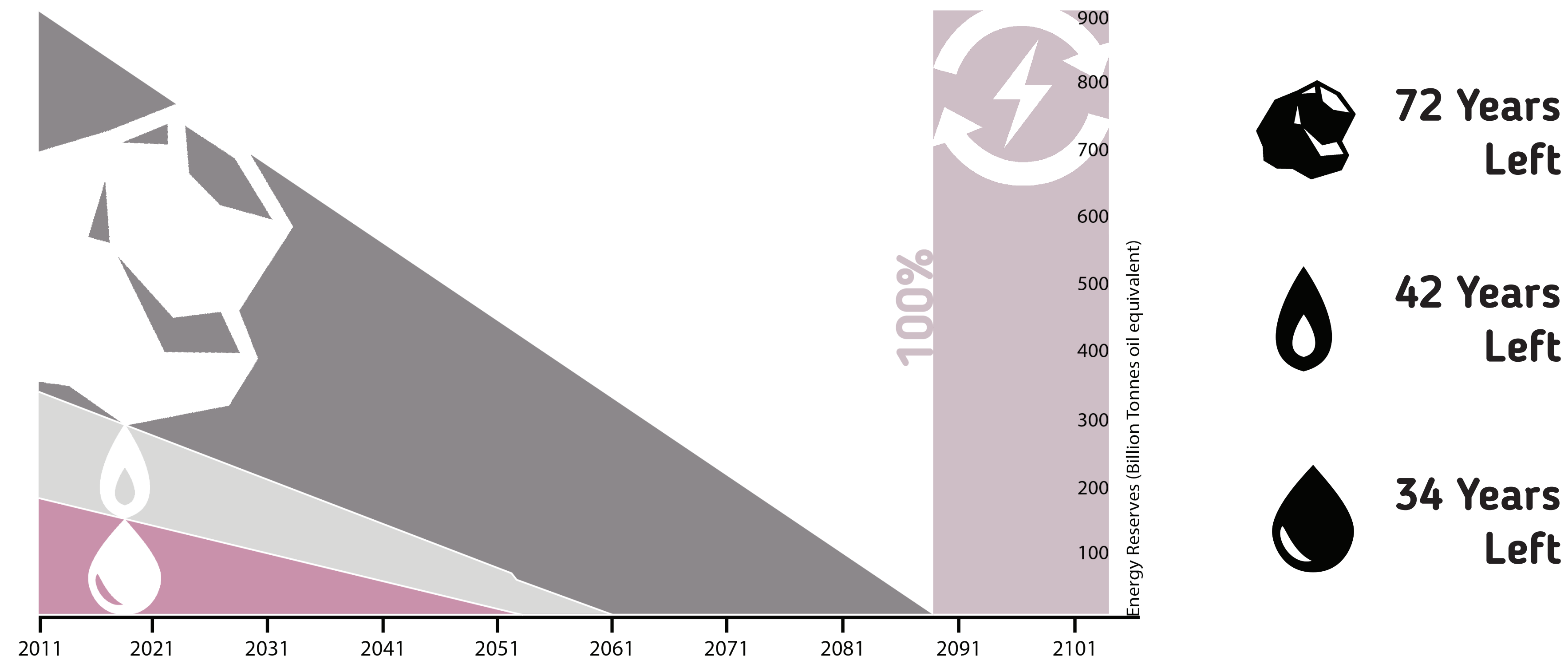
RESEARCH

“Hydrogen could be the missing link in the energy transition”

International Renewable Energy Agency

Source: Hydrogen from renewable power: Technology outlook for the energy transition, IRENA (2018)

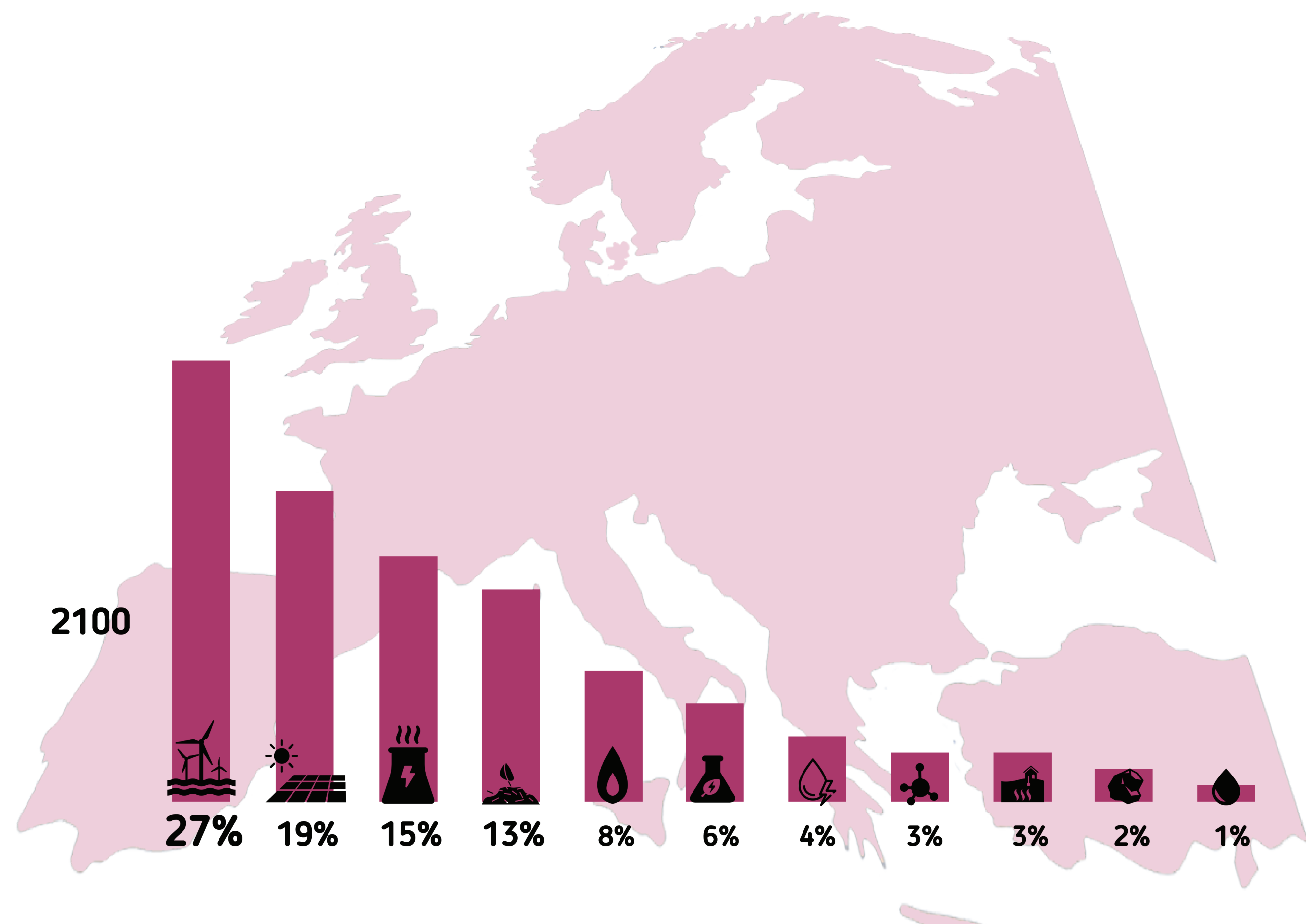
RESEARCH



Fossil Fuel Depletion
Energy Transition

Source: CIA World Factbook.gov (2018)

RESEARCH



European Primary Energy
Energy Transition

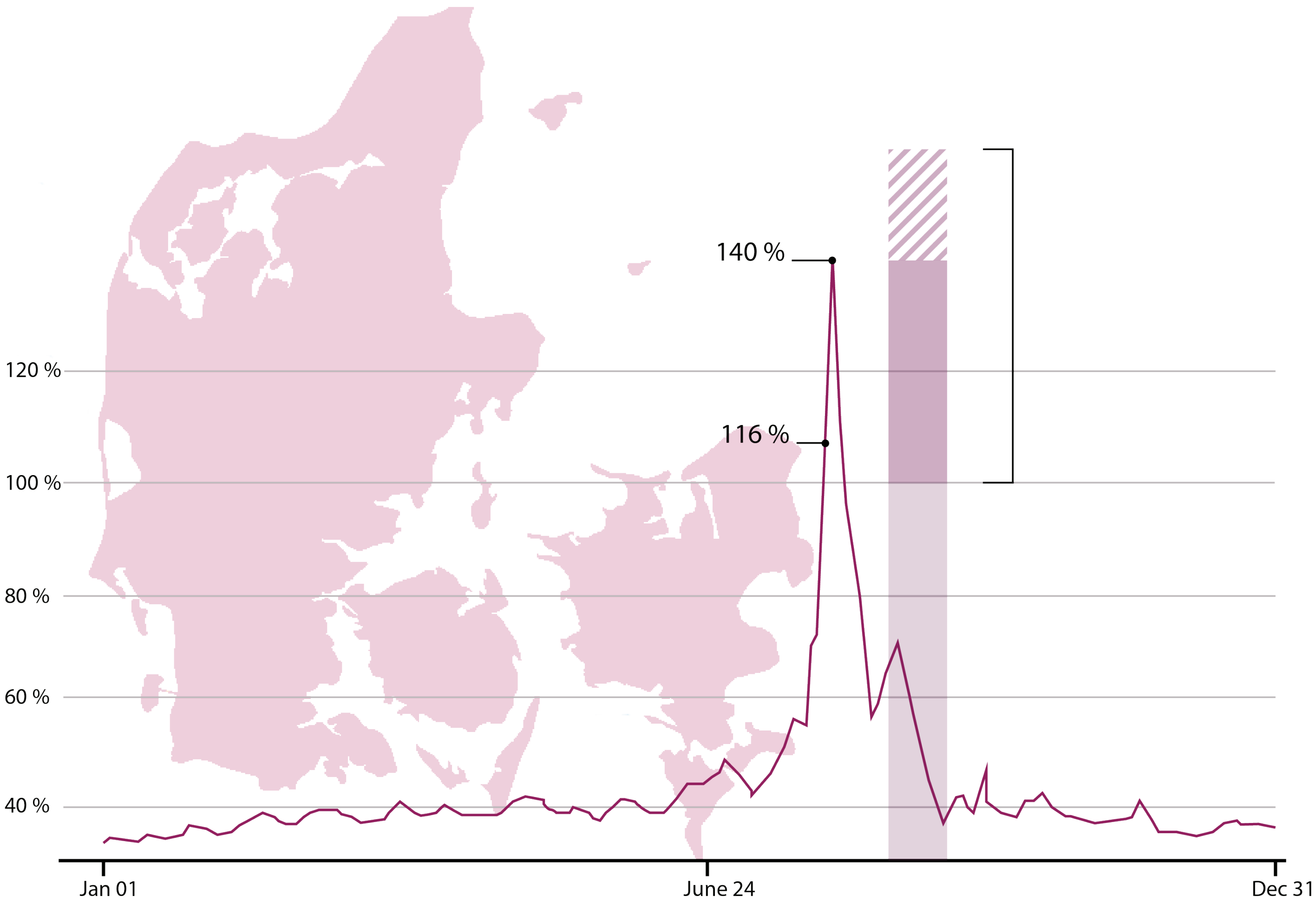
Source: SKY SCENARIO, Shell International B.V. (2018)

**RENEWABLE ENERGY:
CONSUME, STORE OR LOOSE**



RESEARCH

PRODUCTION PEAKS & LOWS

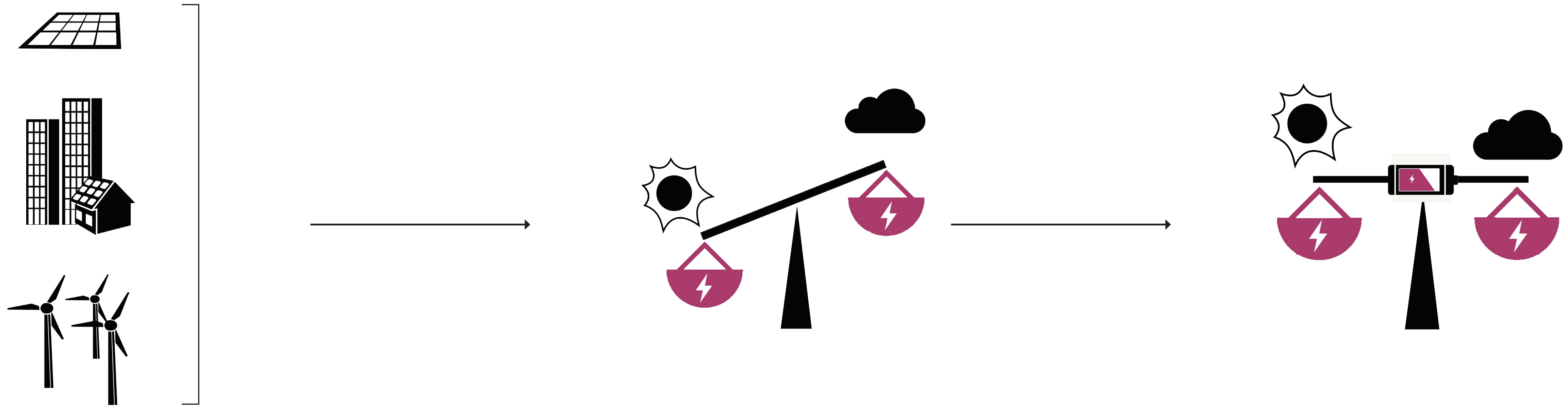


Denmark Renewable Production
Renewable Energy Sources



Source: Denmark generates record 140% of its electricity needs from wind power , Climateaction.org (2015)

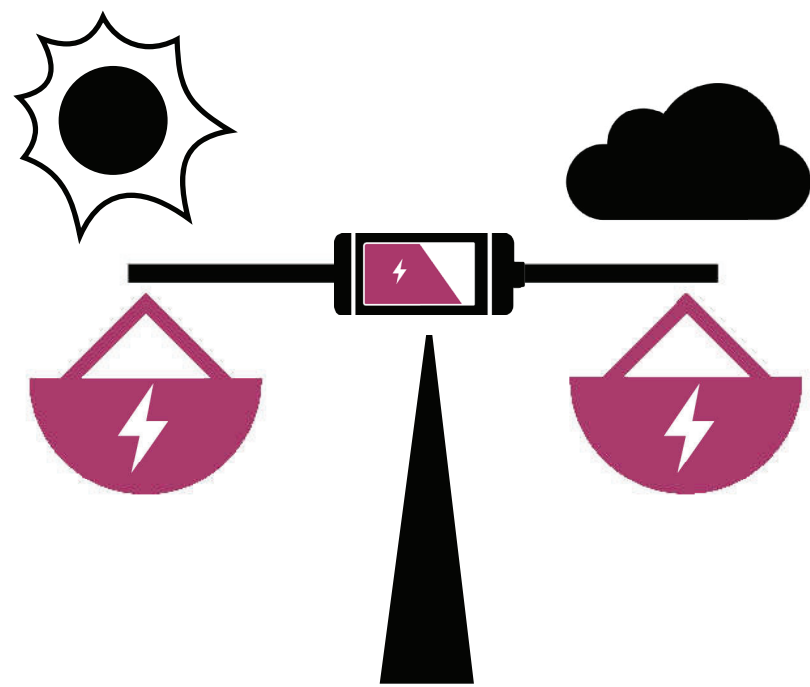
RESEARCH



Balancing Renewables
Renewable energy sources

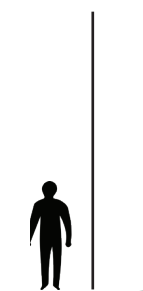
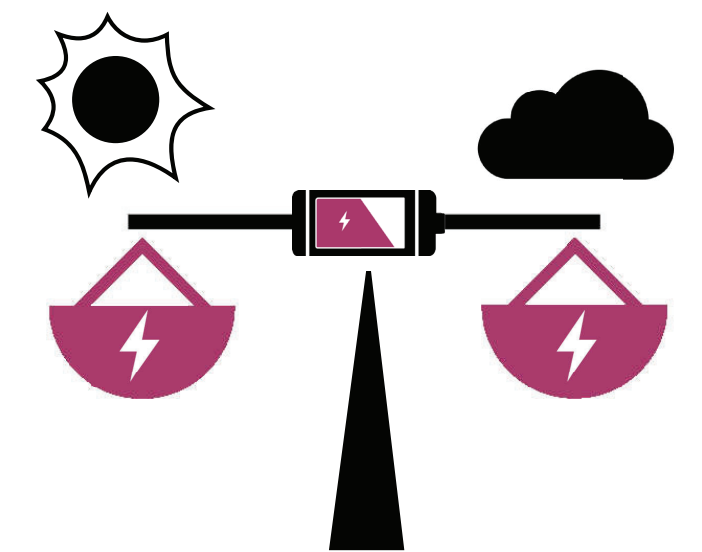
RESEARCH

CURRENT ENERGY STORAGE



Upscaling: Storage
Renewable Energy Sources

CONCEPT

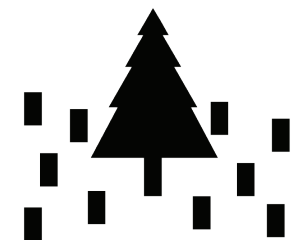


Tesla's Powerpack 100 MW
Renewable Energy Sources

PUBLIC HEALTH



ENVIRONMENTAL



ECONOMIC



RESEARCH

LITHIUM-ION



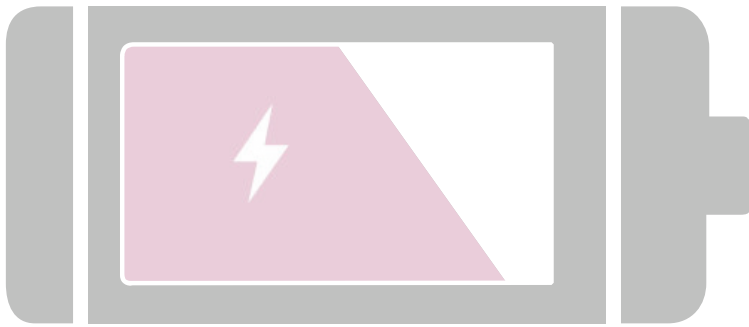
The Lithium-Ion battery
Storage Issues


RESEARCH

LITHIUM-ION



2100
LITHIUM DEPLETED
Based on reserves



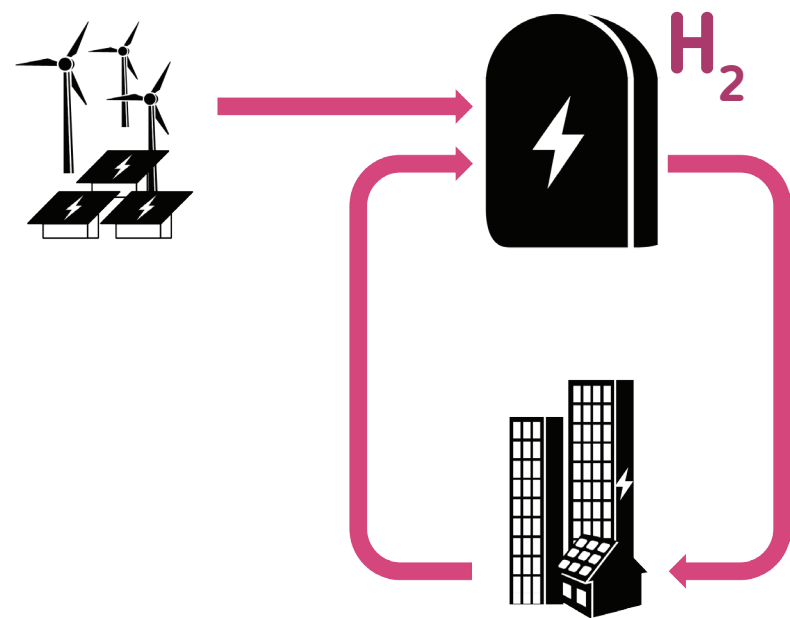
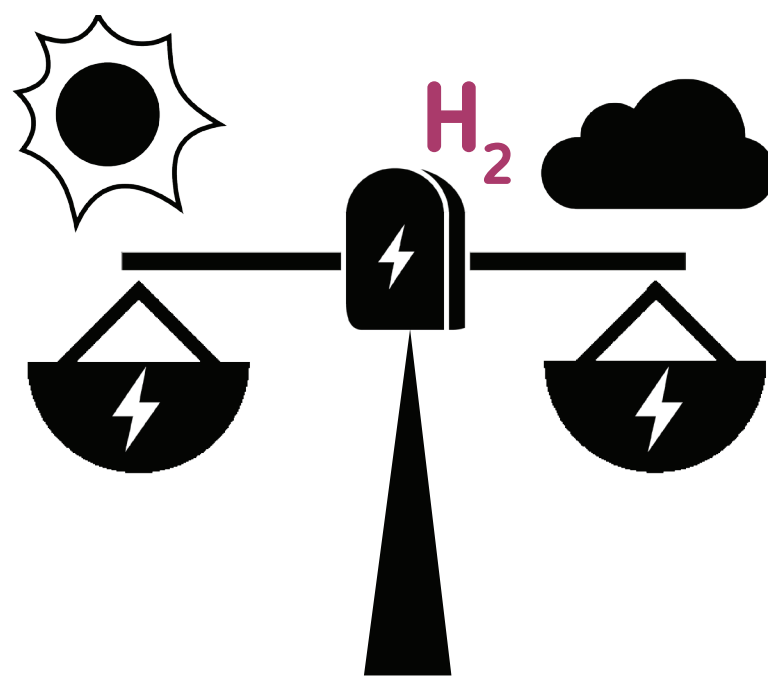
 5%
to 9%
RECYCLABLE

The Lithium-Ion battery
Storage Issues

RESEARCH

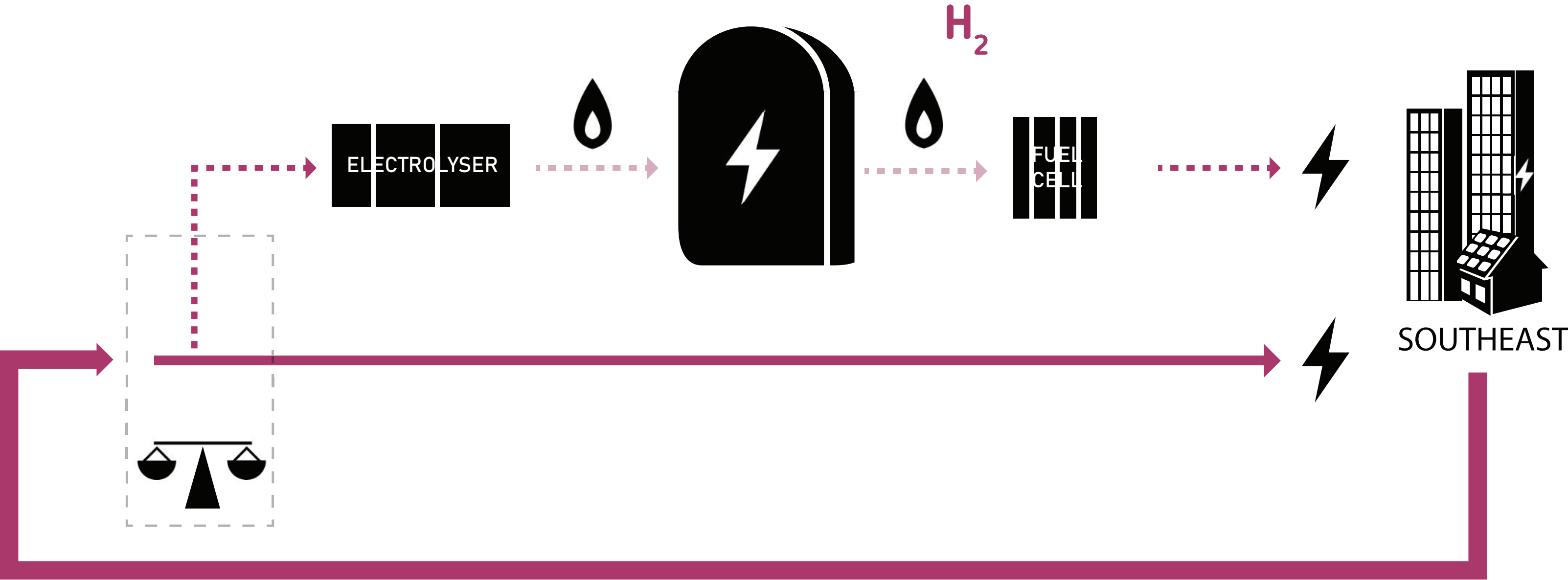
HYDROGEN GAS
ENERGY STORAGE

How can we rightfully store
renewable energy?



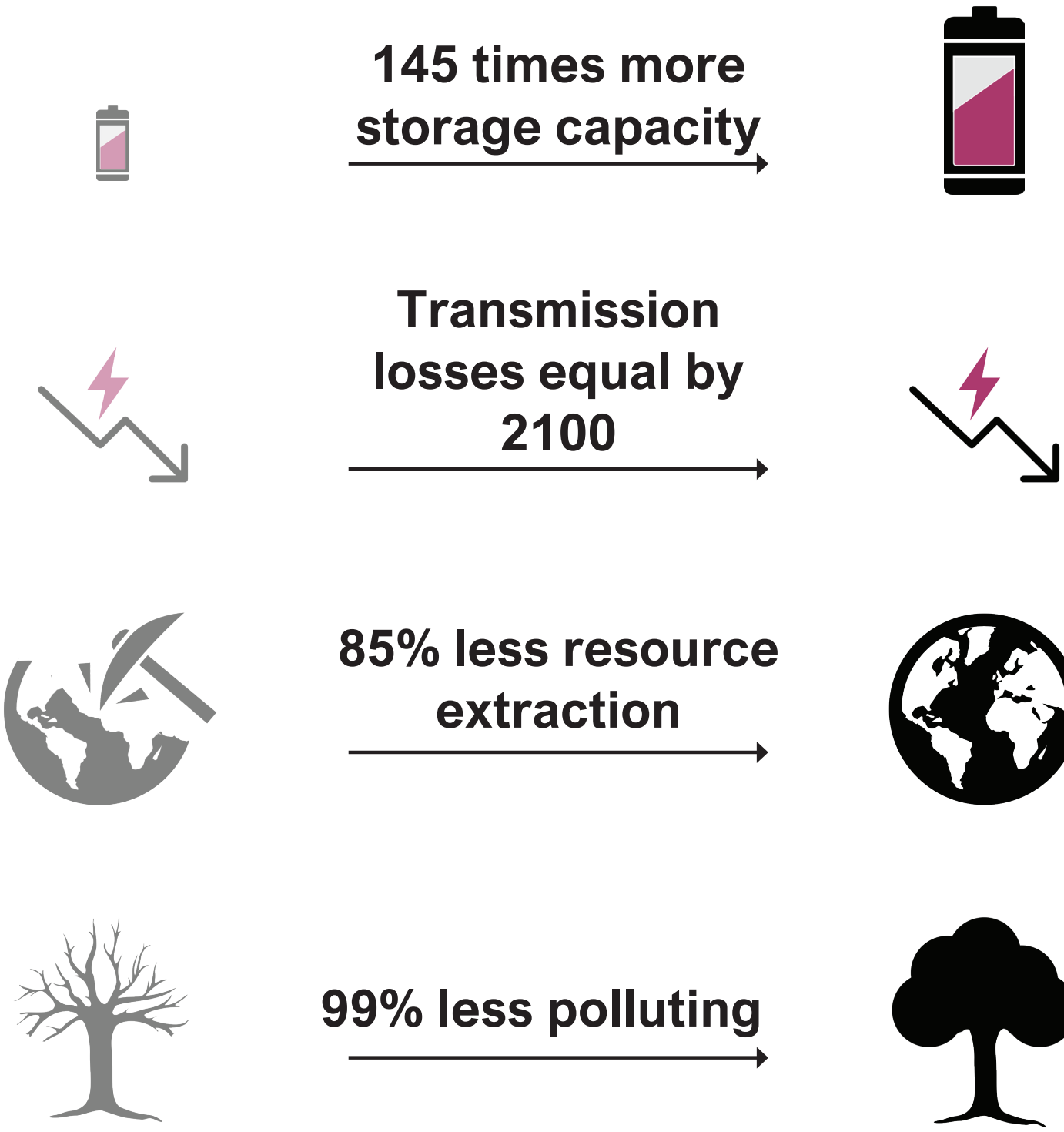
Hydrogen Gas energy storage
Renewable Energy Storage solution

RESEARCH



The Hydrogen gas storage principle
Hydrogen gas storage systems

RESEARCH



Hydrogen Gas energy storage
Renewable Energy Storage solution

RESEARCH

SCENARIO

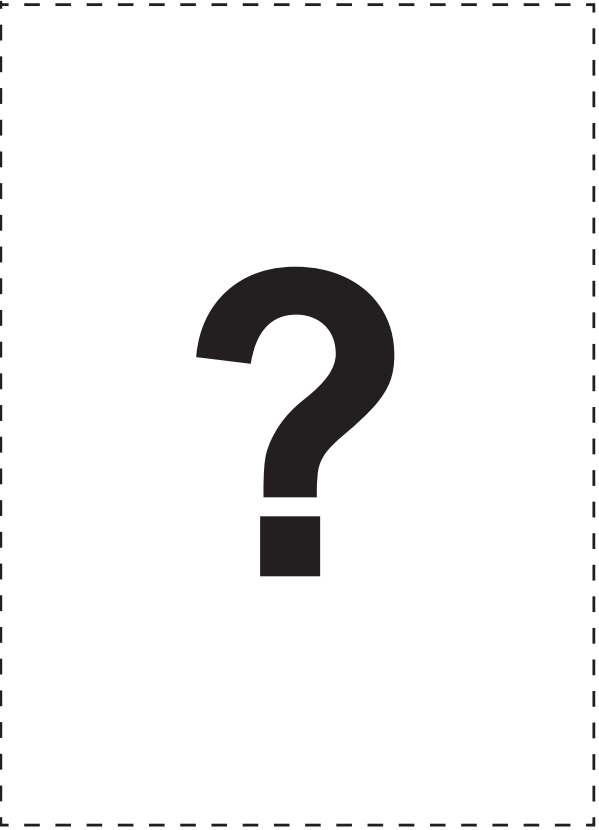
**HYDROGEN GAS ENERGY STORAGE FACILITIES WILL BE
PART OF OUR FUTURE OF ENERGY FOR THE STORAGE OF
THE SURPLUS OF RENEWABLE ENERGY.**

Scenario

RESEARCH

PROBLEM STATEMENT

“HOW CAN THE
STORAGE OF ENERGY IN HYDROGEN BE
TRANSLATED IN A SPACIAL CONCEPT TO
BECOME PART OF THE URBAN
CONTEXT?



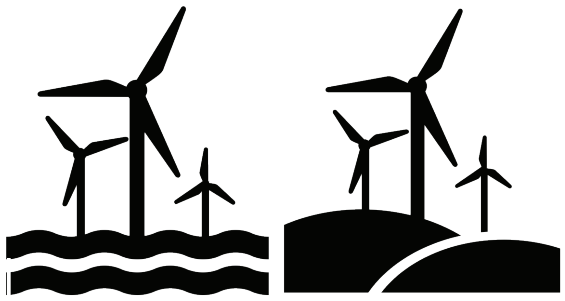
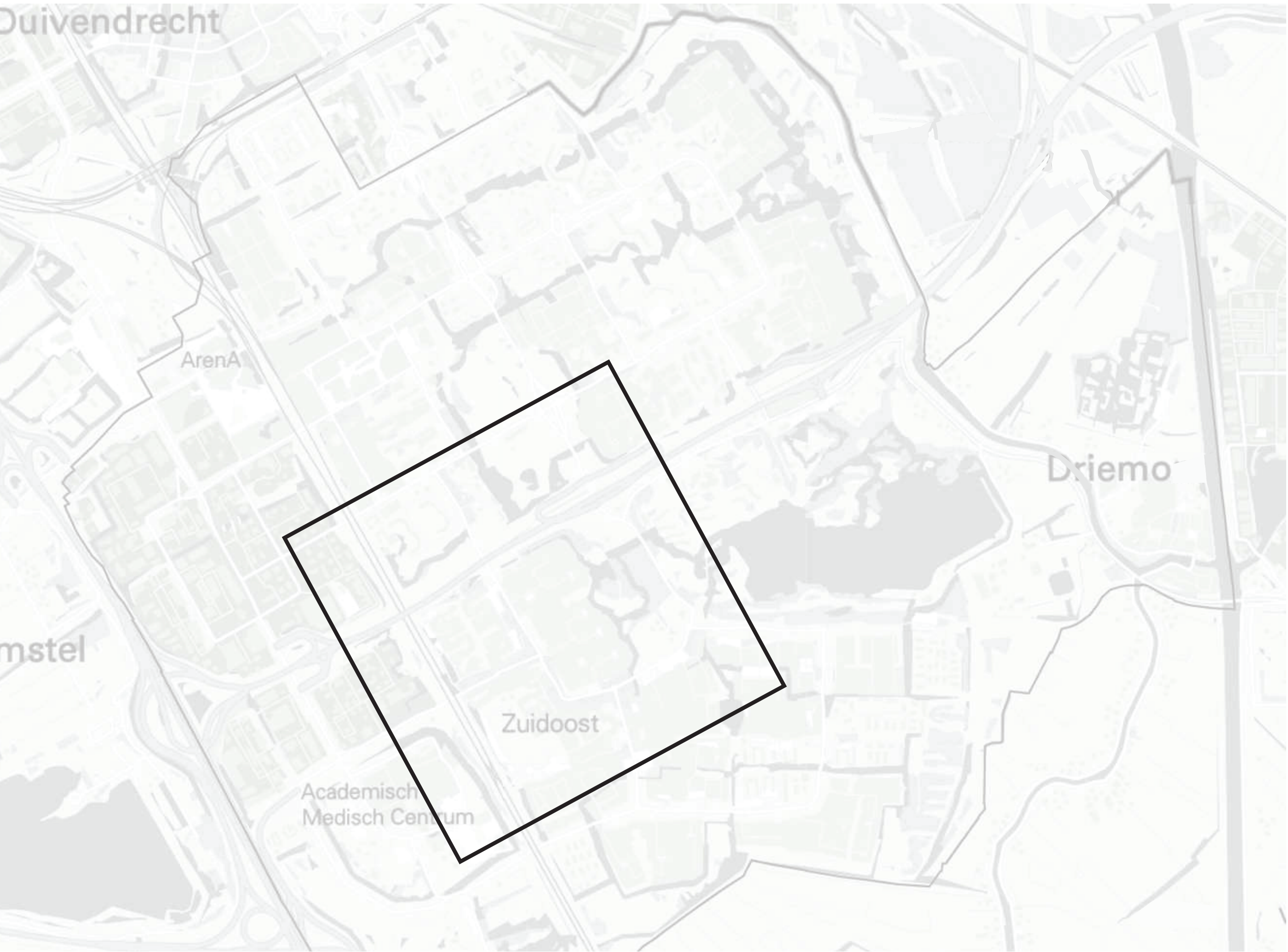
Problem Statement



ENERGY IN AMSTERDAM-ZUIDOOST

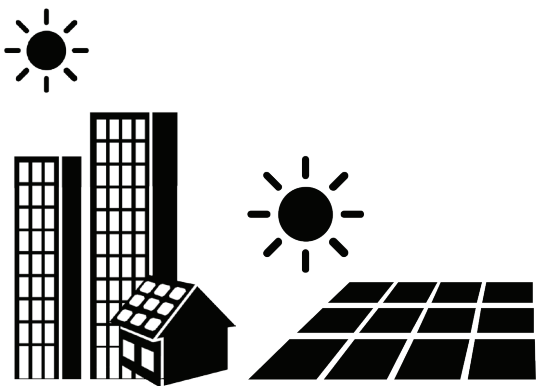
“How does the concept of hydrogen energy storage
relate to the energy trajectory of amsterdam?”

ENERGY IN
AMSTERDAM-ZUIDOOST



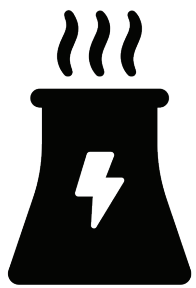
27%

WIND POWER
By 2100



19%

SOLAR POWER
By 2100



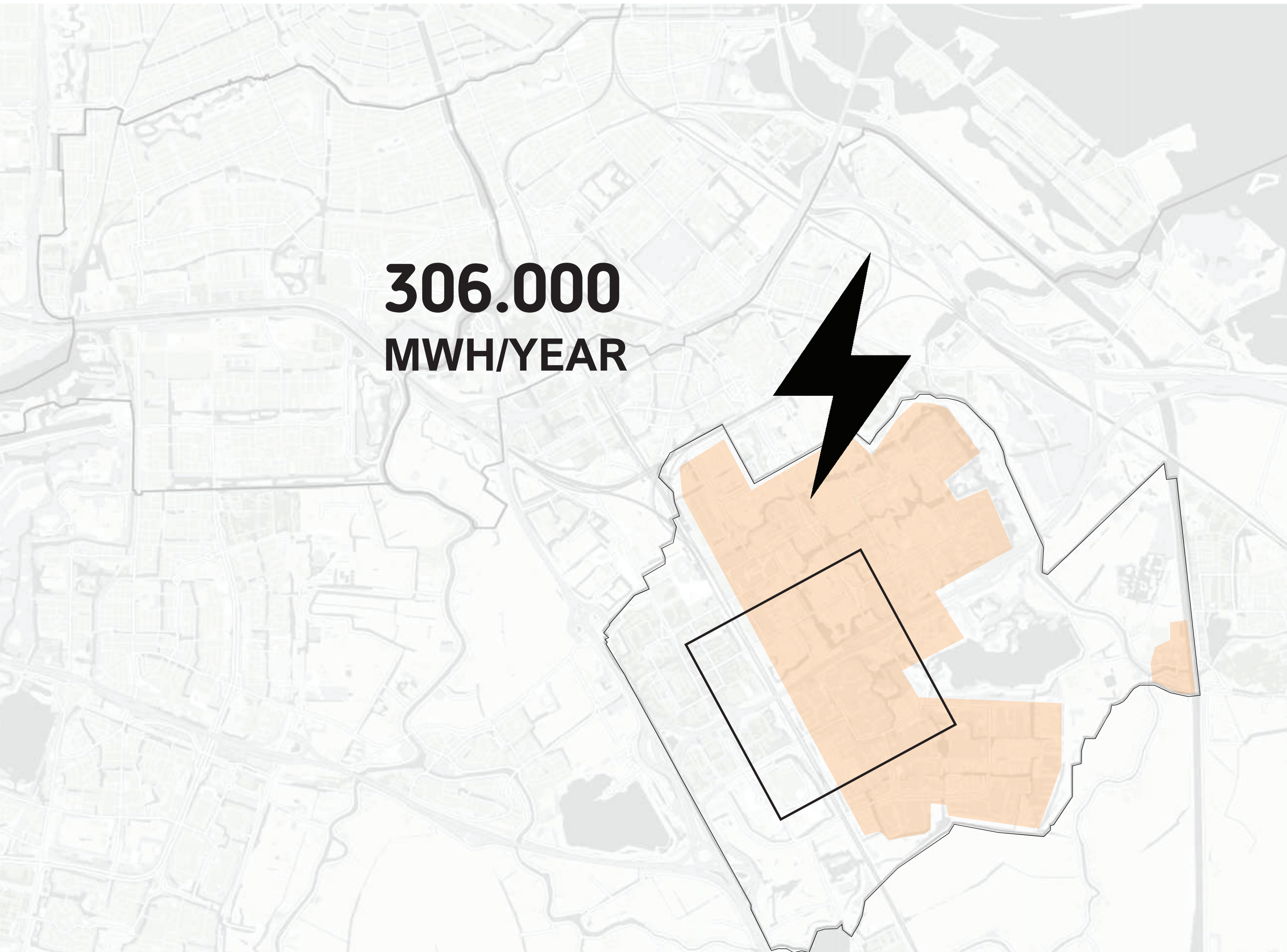
15%

NUCLEAR POWER
By 2100

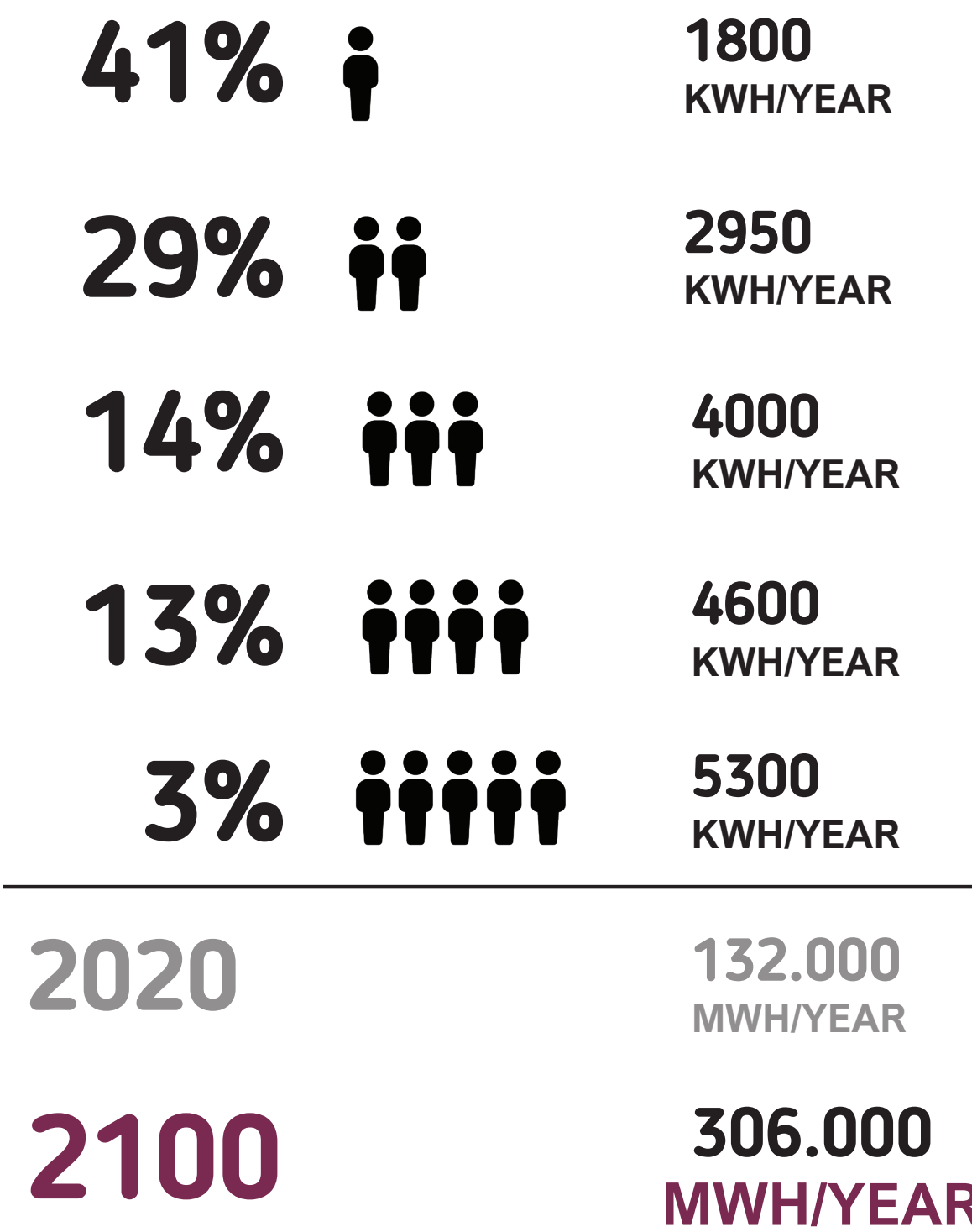
Prognoses main actors
Energy Production

Source: Source: SKY SCENARIO, Shell International B.V. (2018)

ENERGY IN
AMSTERDAM-ZUIDOOST



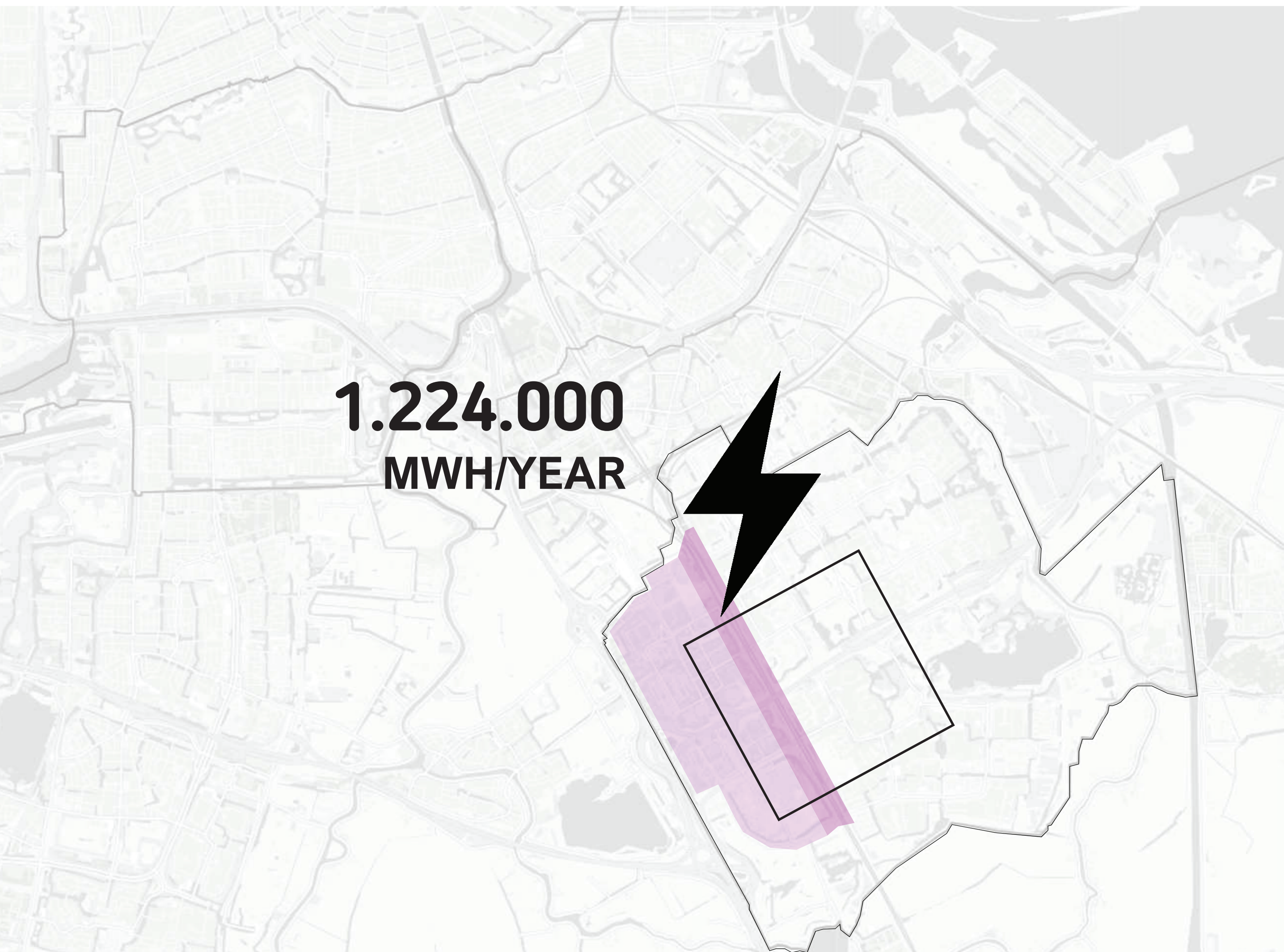
Residential Consumption
Southeast Energy Consumption



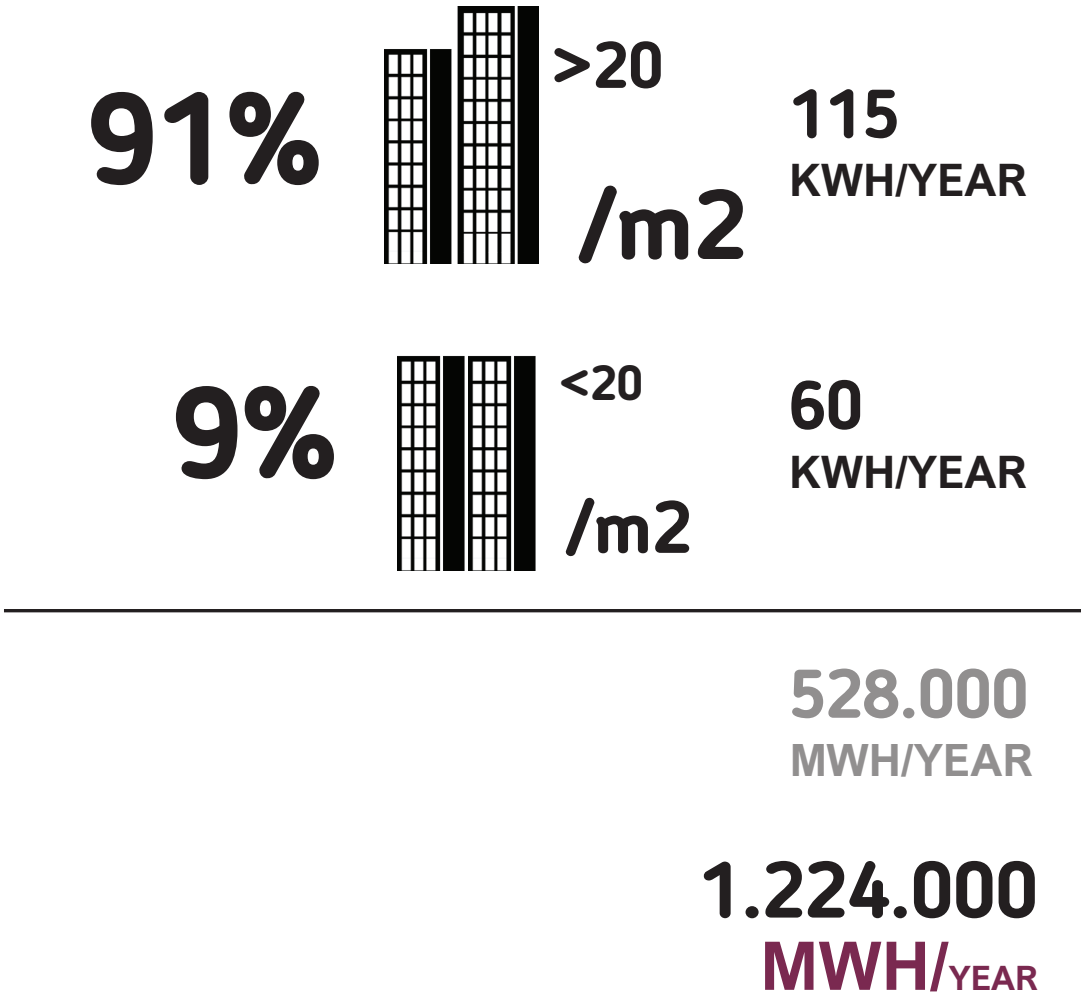
Residential district 

Source: Wat-is-een-gemiddeld-energieverbruik, Energiesite.nl (2018), Huishoudens; samenstelling, grootte, regio CBS (2018)

ENERGY IN
AMSTERDAM-ZUIDOOST



Corporate Consumption
Southeast Energy Consumption



Business district
Innovation Axis

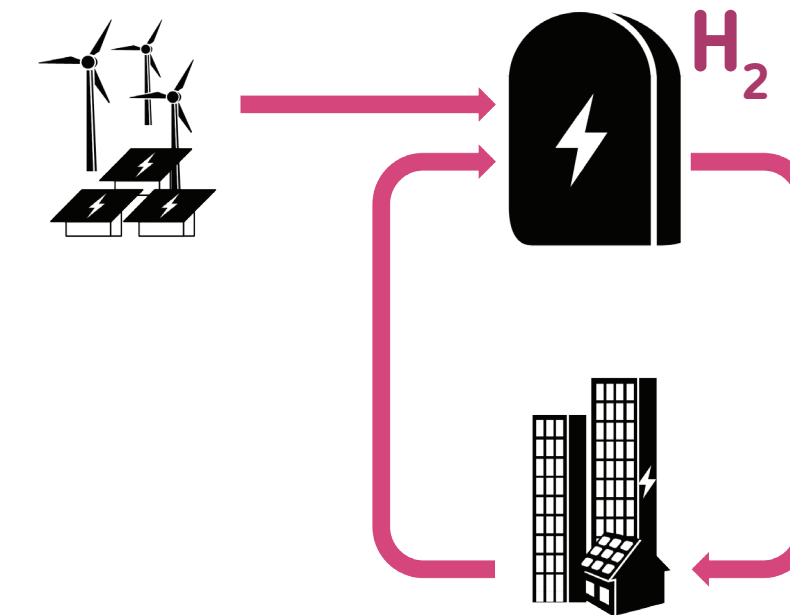
Source: Energieverbruik kantoor, Minder.nl (2018)

ENERGY IN AMSTERDAM-ZUIDOOST

What if 60* percent of energy required for
consumption would be stored in Hydrogen gas
storage facilities?

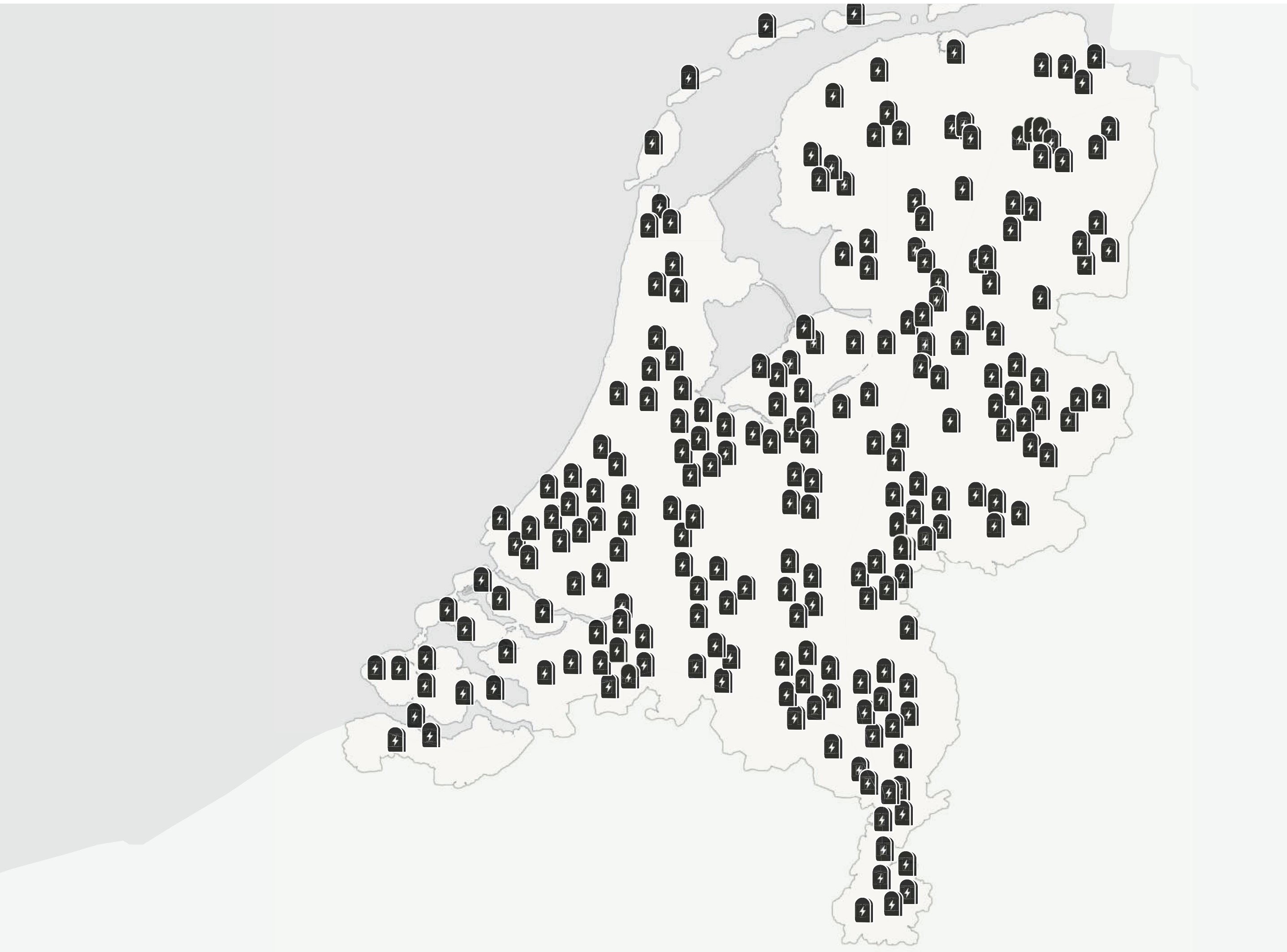


HYDROGEN GAS ENERGY STORAGE



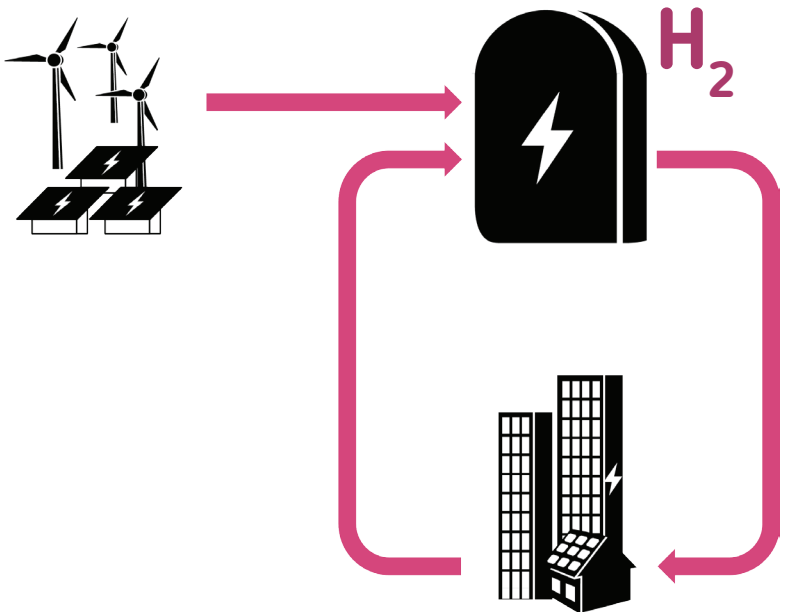
What if? *based on the Denmark case
Renewable Energy storage

ENERGY IN
AMSTERDAM-ZUIDOOST



Future hydrogen storage facilities
Renewable Energy storage

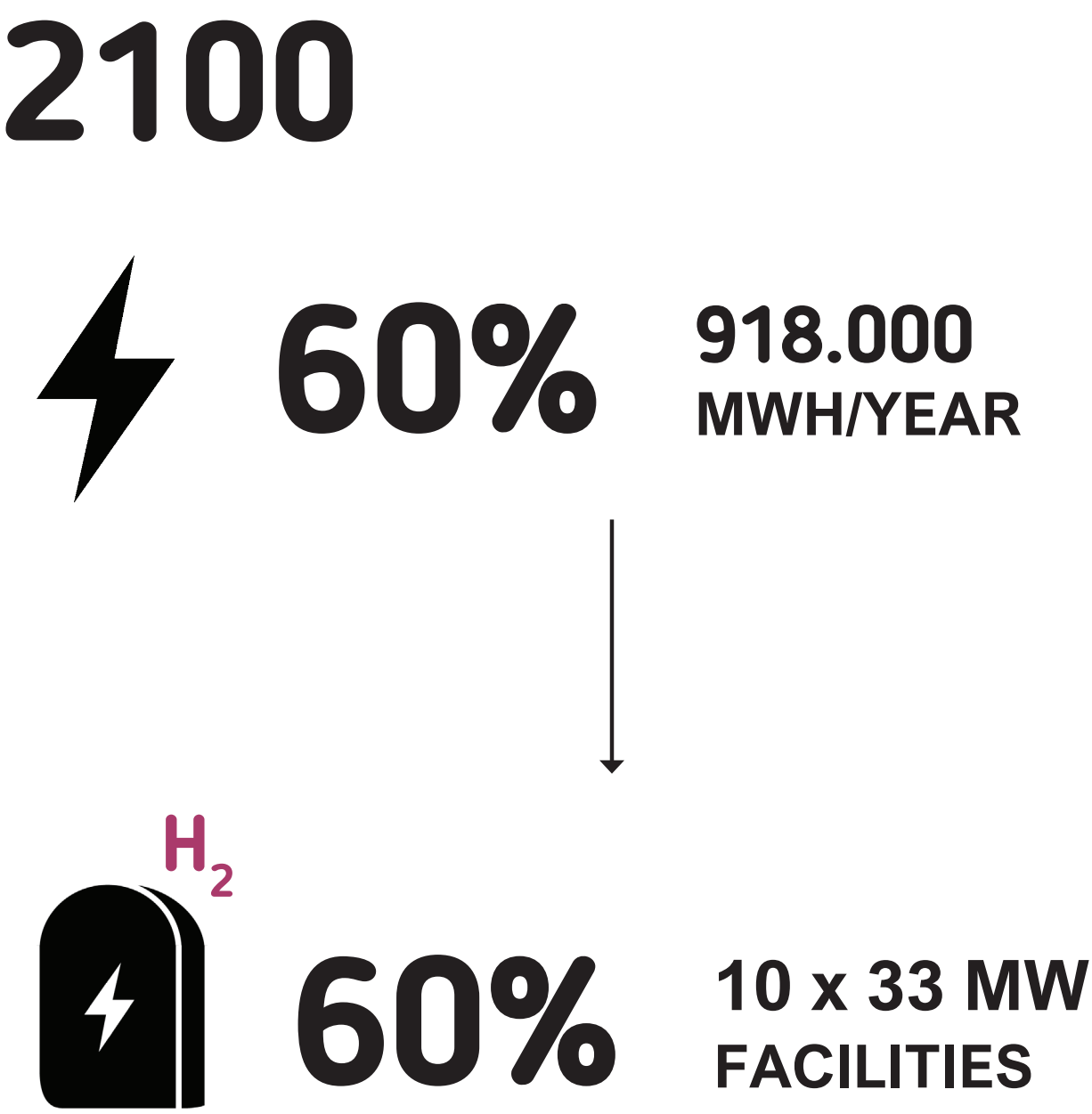
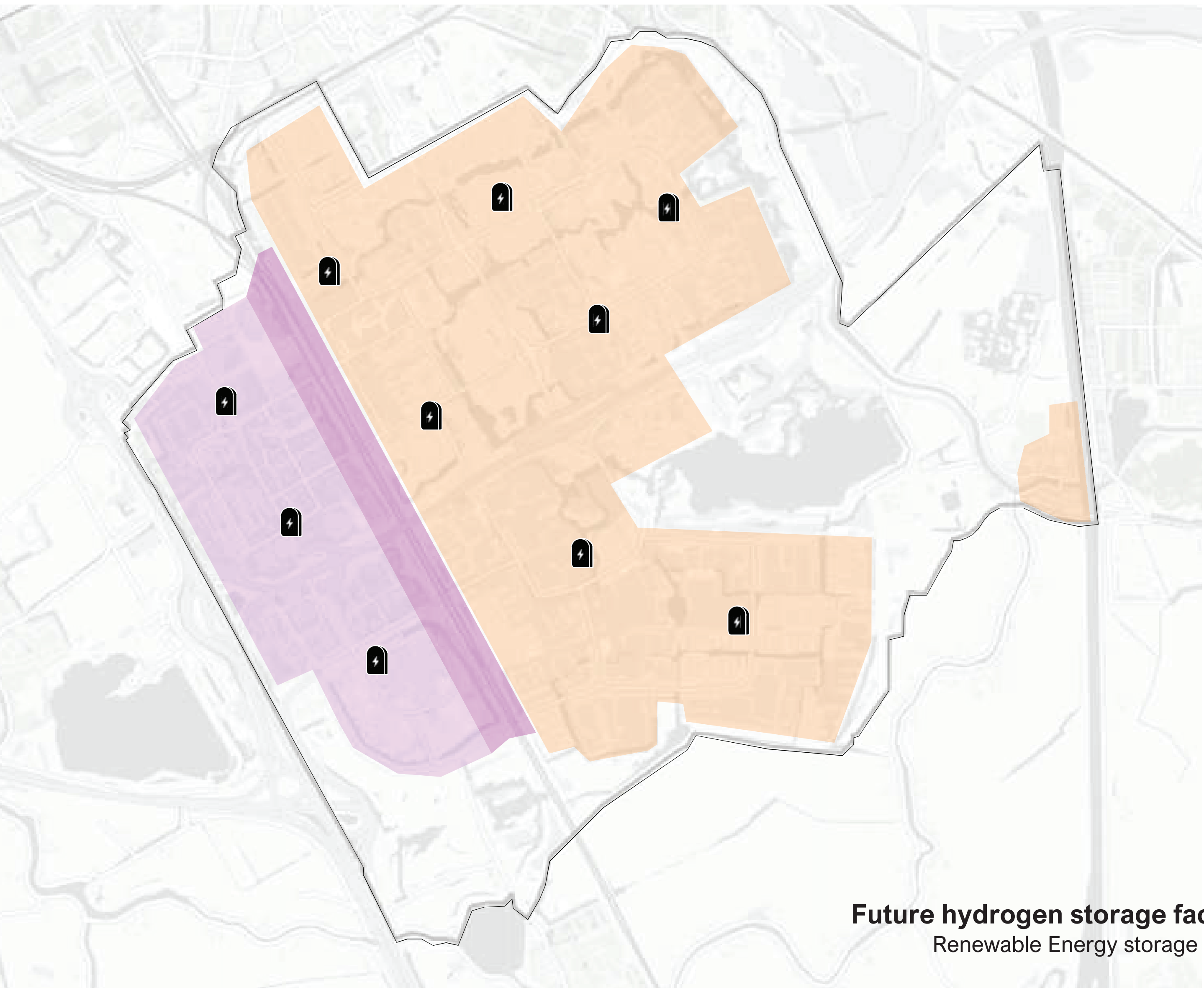
2100



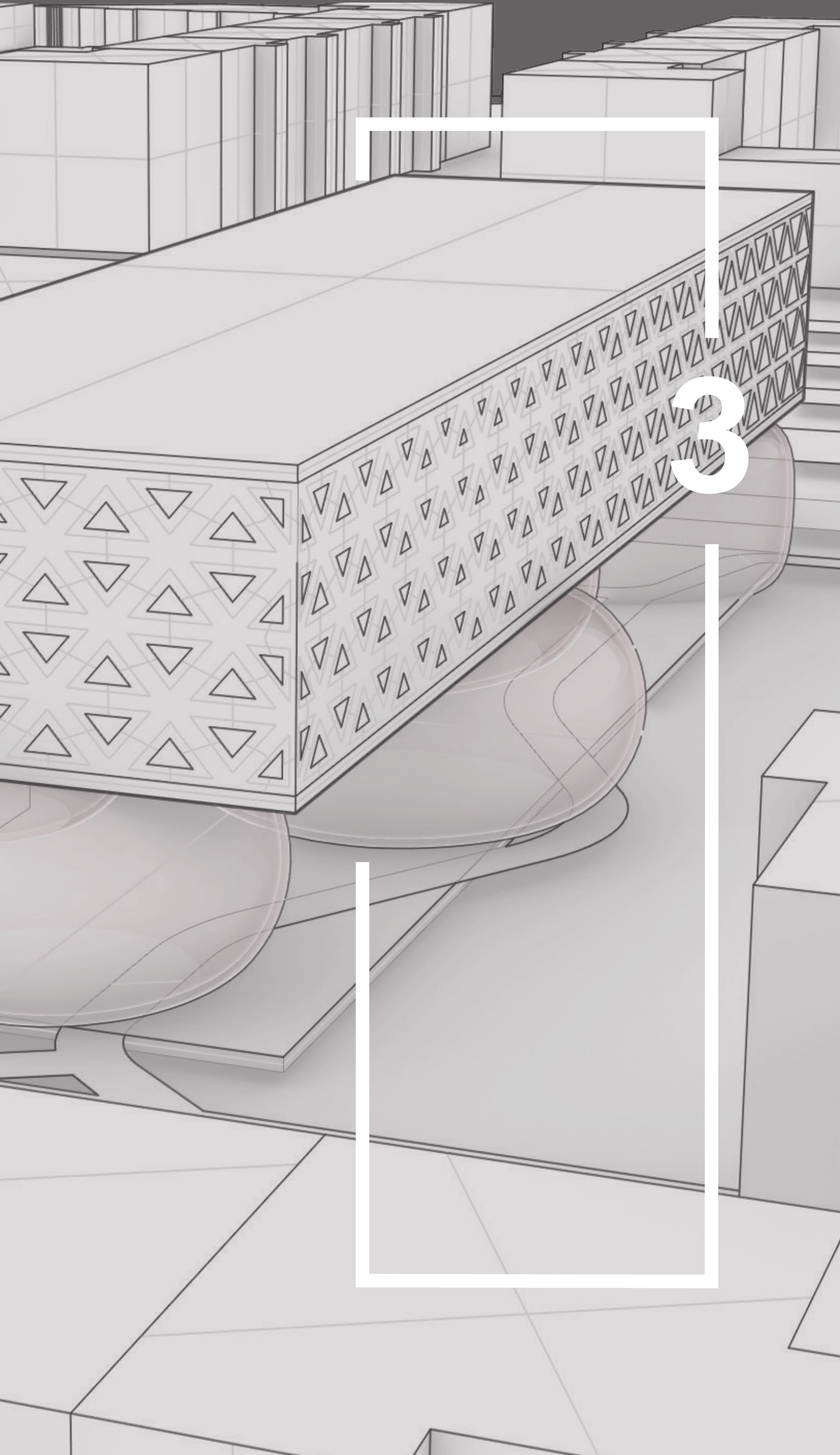
Hydrogen gas energy
storage facilities



ENERGY IN
AMSTERDAM-ZUIDOOST



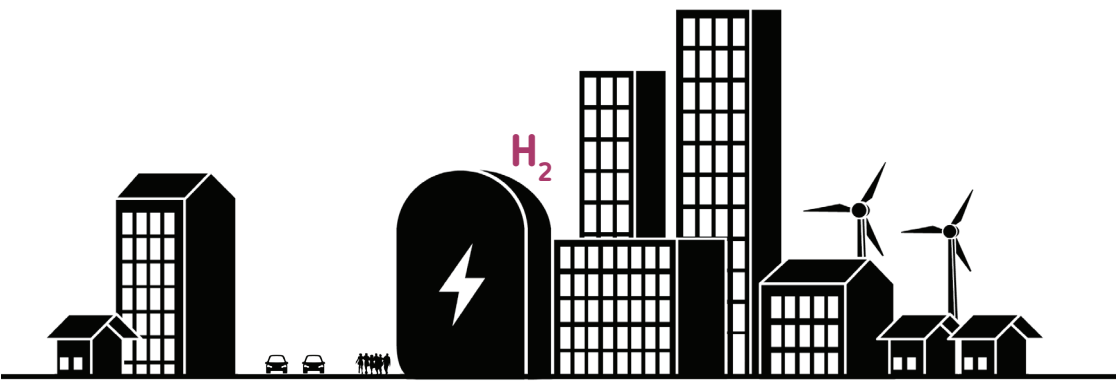
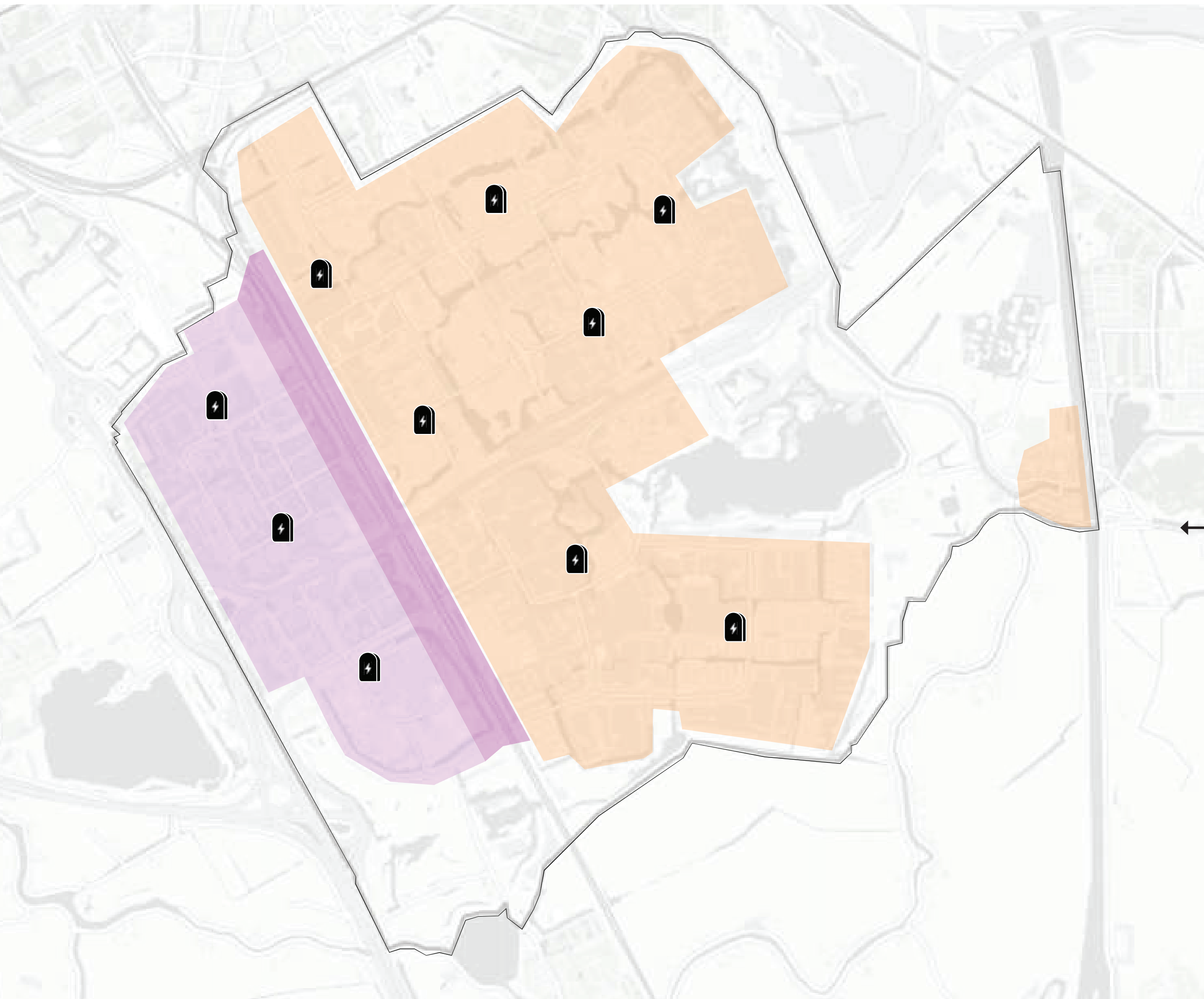
- Business district
- Innovation Axis
- Residential district
- Hydrogen gas energy storage facilities



CONCEPT

“How can this necessary storage of energy in hydrogen be translated in spacial concept in symbiosis with its urban context?”

CONCEPT

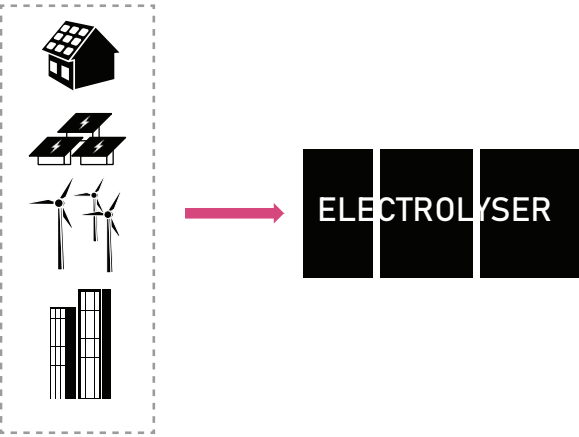


A SERIES WITH SAME PRINCIPLE
FOR WHICH **ONE** IS DEVELOPED

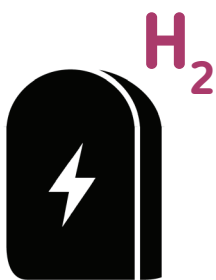
A series of facilities
Urban hydrogen energy storage facility

CONCEPT

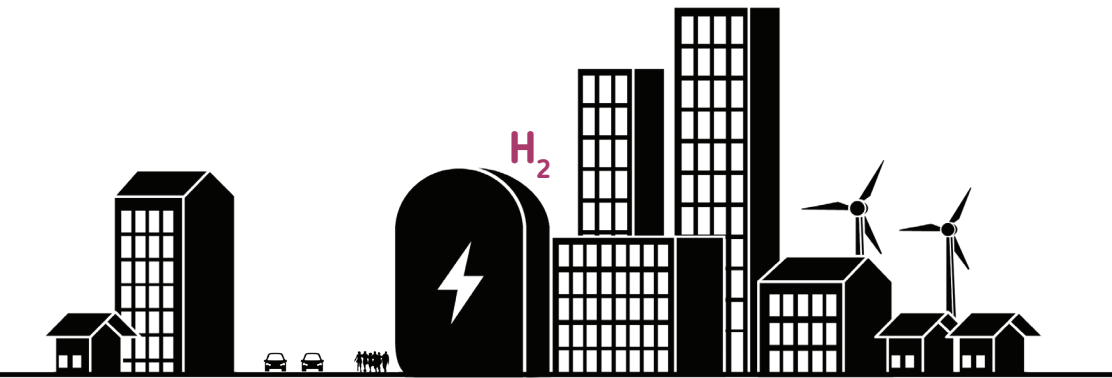
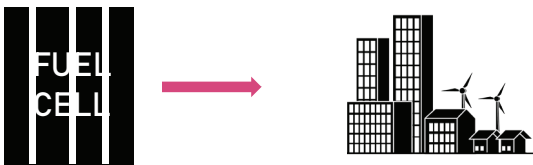
CONVERSION OF
ENERGY



STORAGE OF
ENERGY



DISTRIBUTION OF
ENERGY



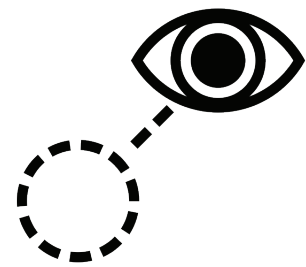
Hard Program of Requirements
Urban hydrogen energy storage facility

RESEARCH

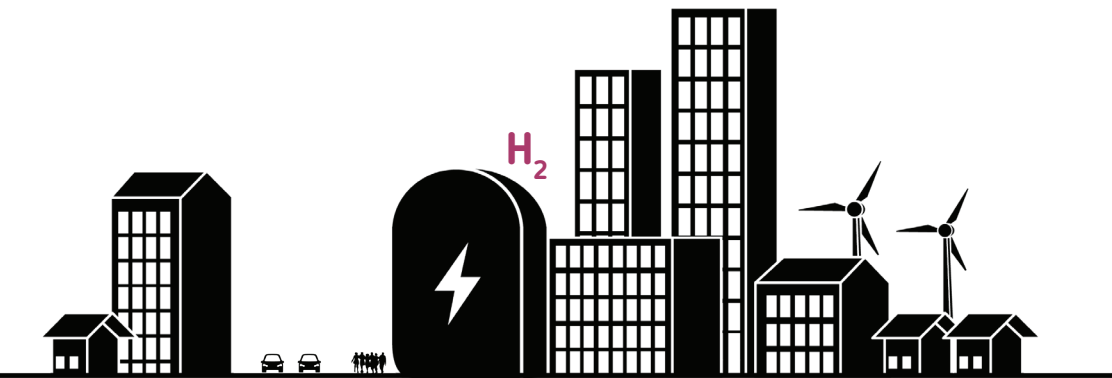
FEEL OF
SAFETY



DISTINCTIVE

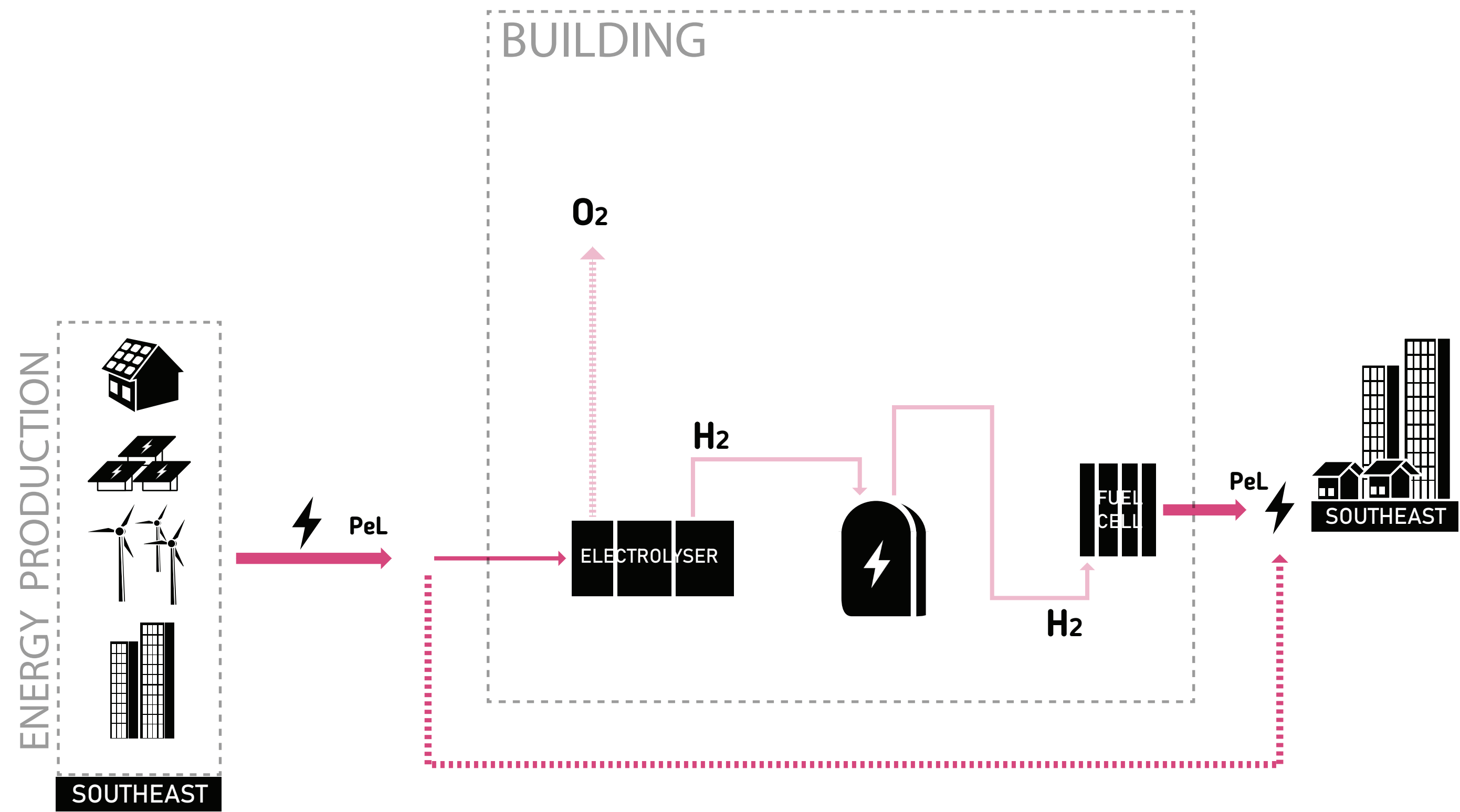


RELATIONSHIP WITH
CONTEXT



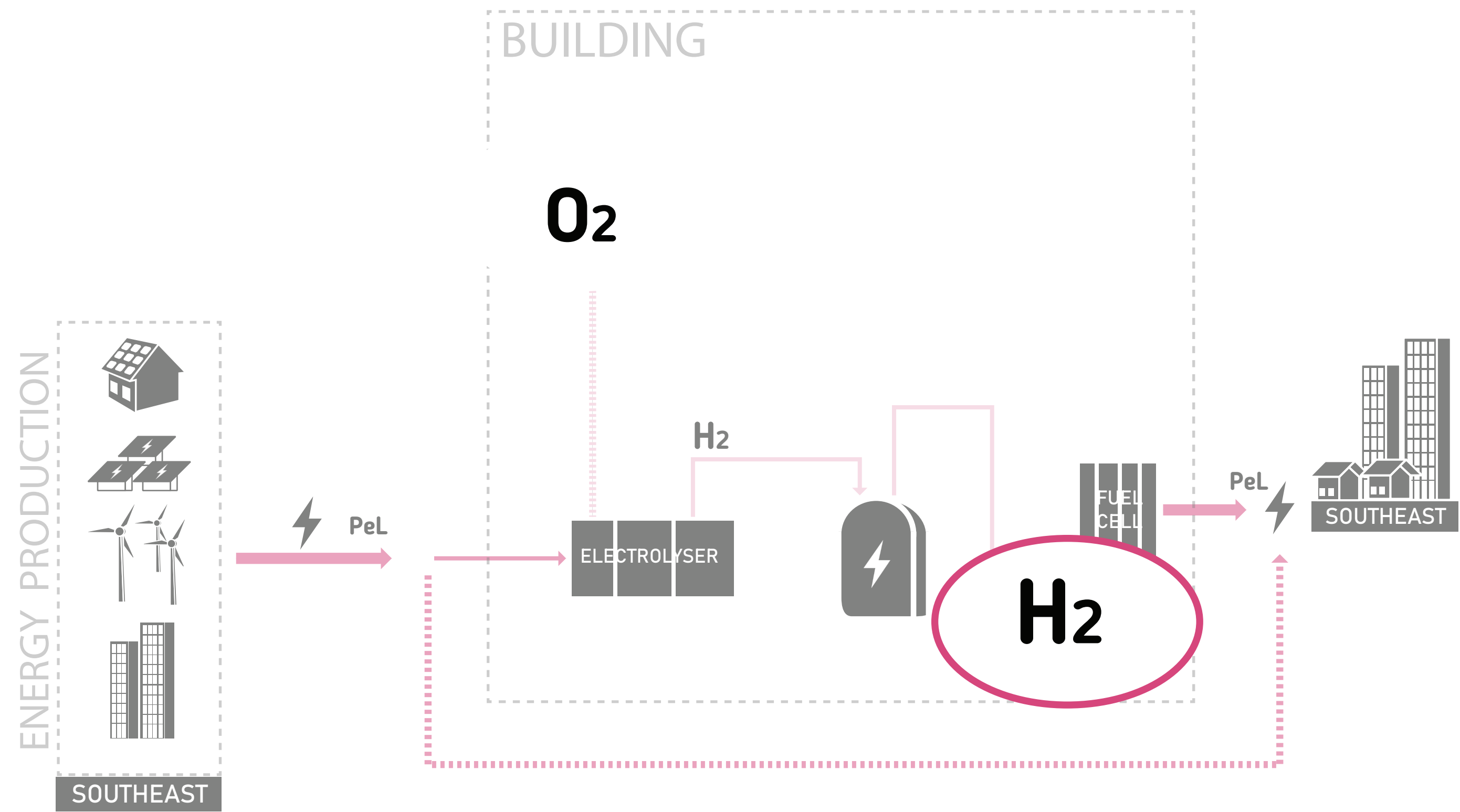
Soft Program of Requirements
Urban hydrogen energy storage facility

CONCEPT



Energy System= reason of building
Urban hydrogen energy storage facility

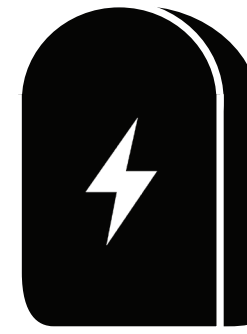
CONCEPT



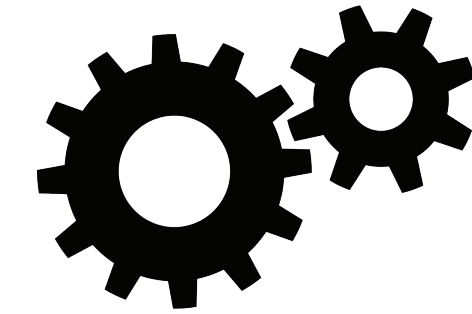
Energy System= reason of building
Urban hydrogen energy storage facility

CONCEPT

H₂ hydrogen gas



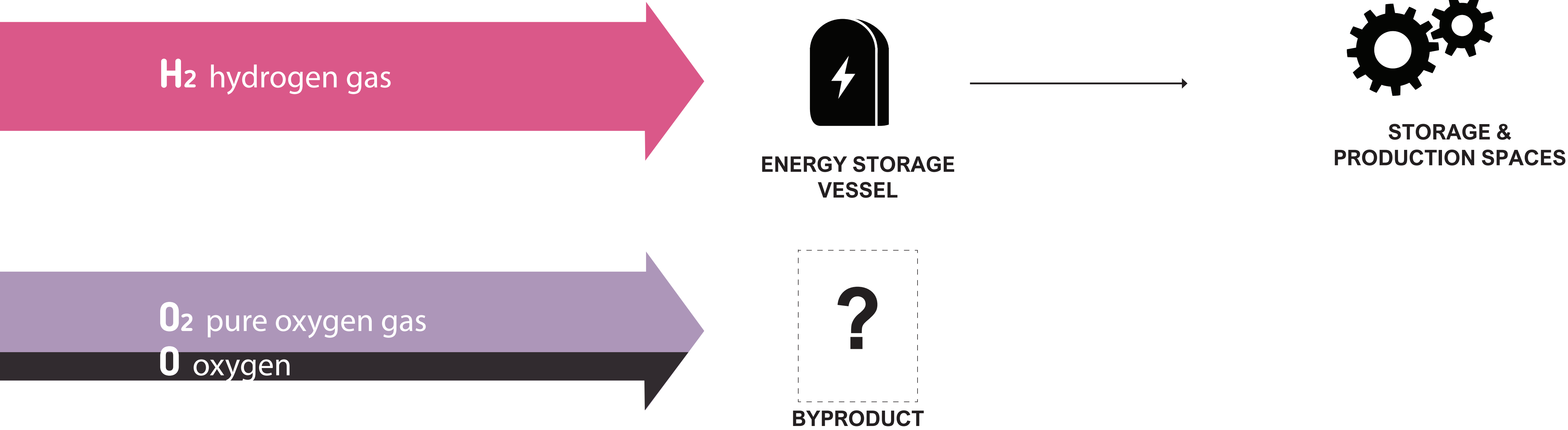
**ENERGY STORAGE
VESSEL**



**STORAGE &
PRODUCTION SPACES**

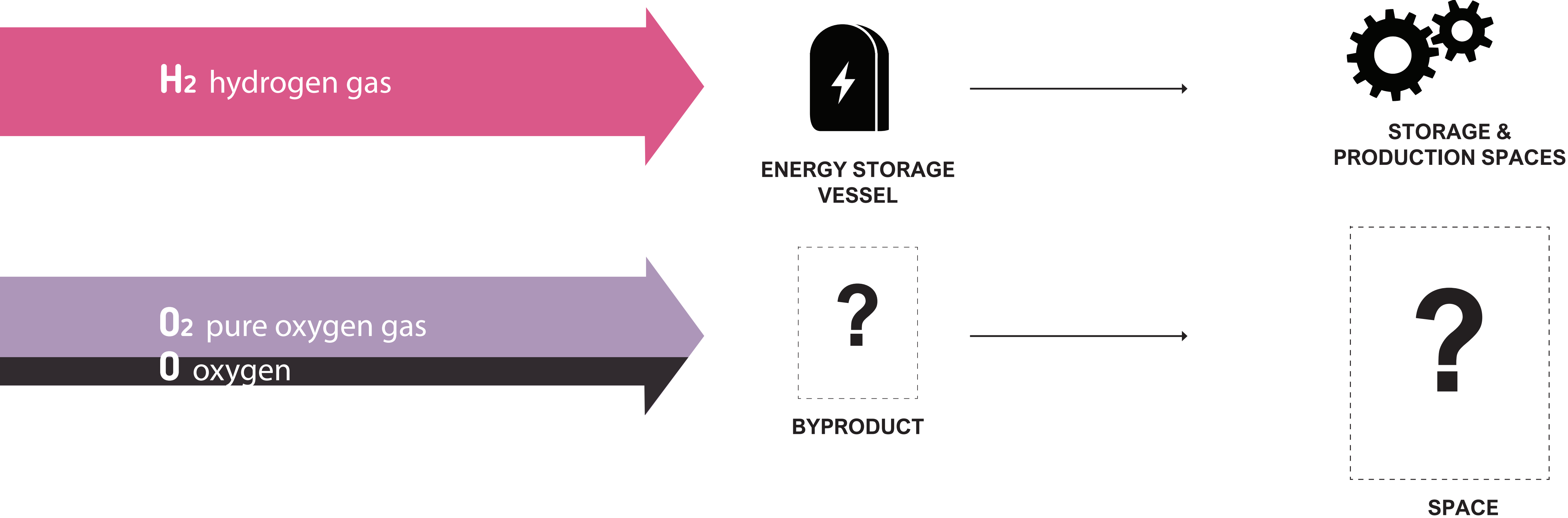
Making full use of the system
Urban hydrogen energy storage facility

CONCEPT



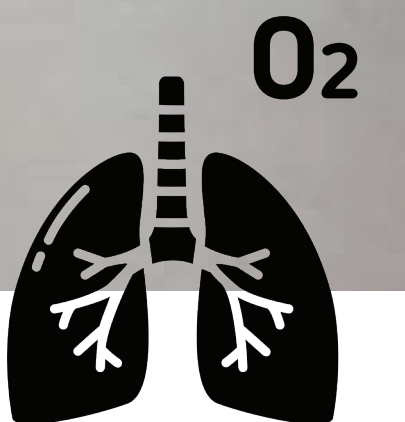
Making full use of the system
Urban hydrogen energy storage facility

CONCEPT



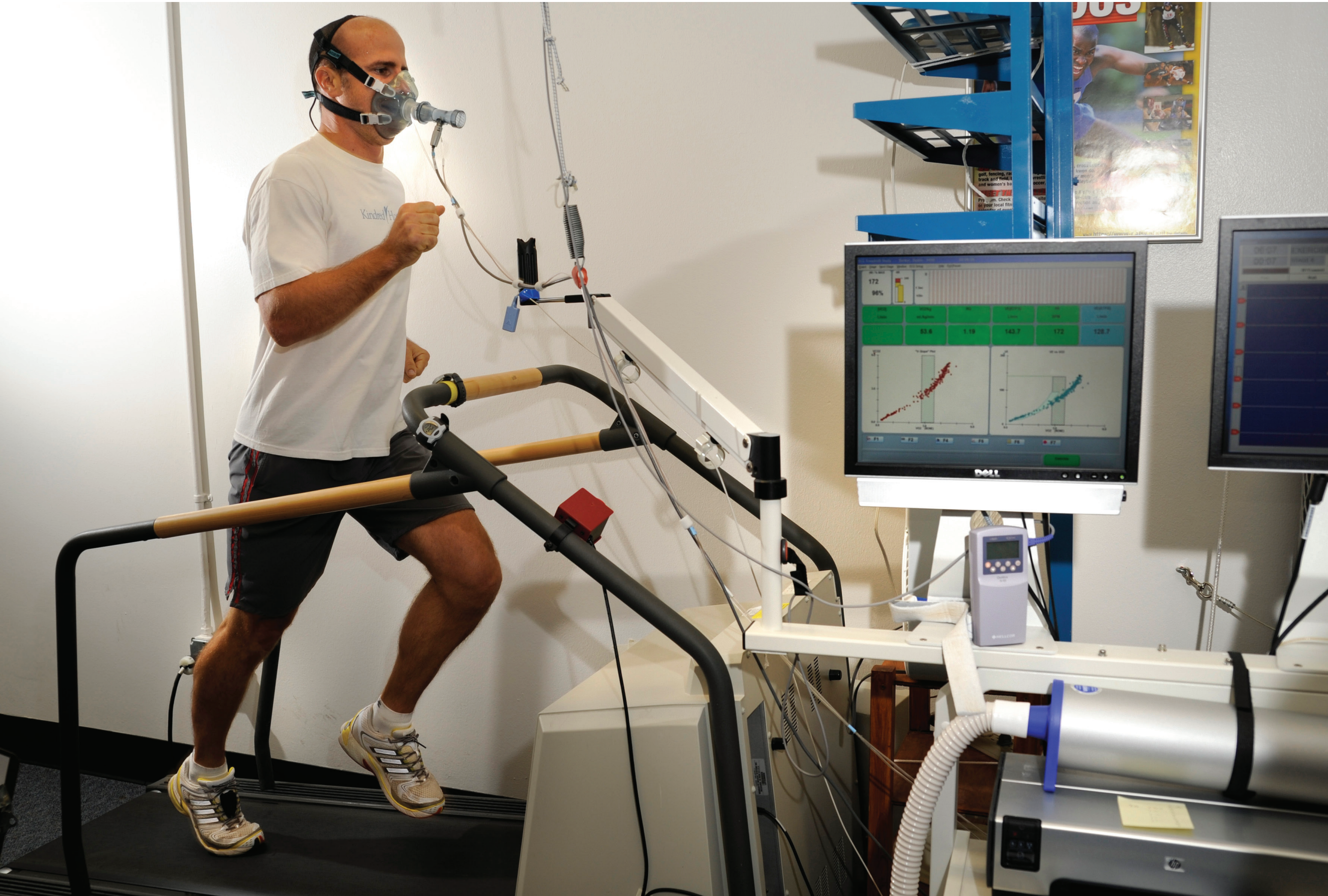
Making full use of the system
Urban hydrogen energy storage facility

CONCEPT



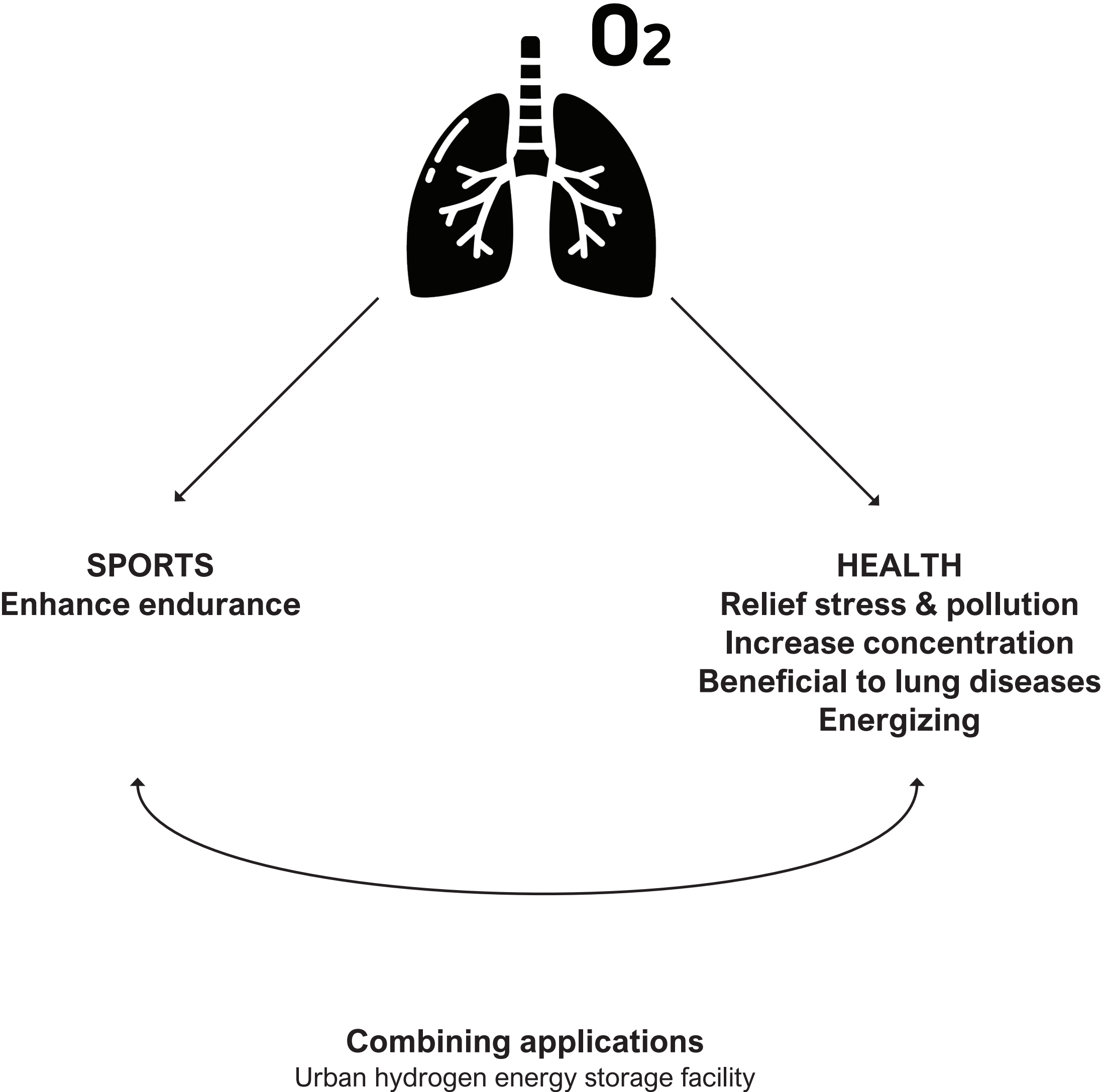
2019 Oxygen therapy
Urban hydrogen energy storage facility

CONCEPT



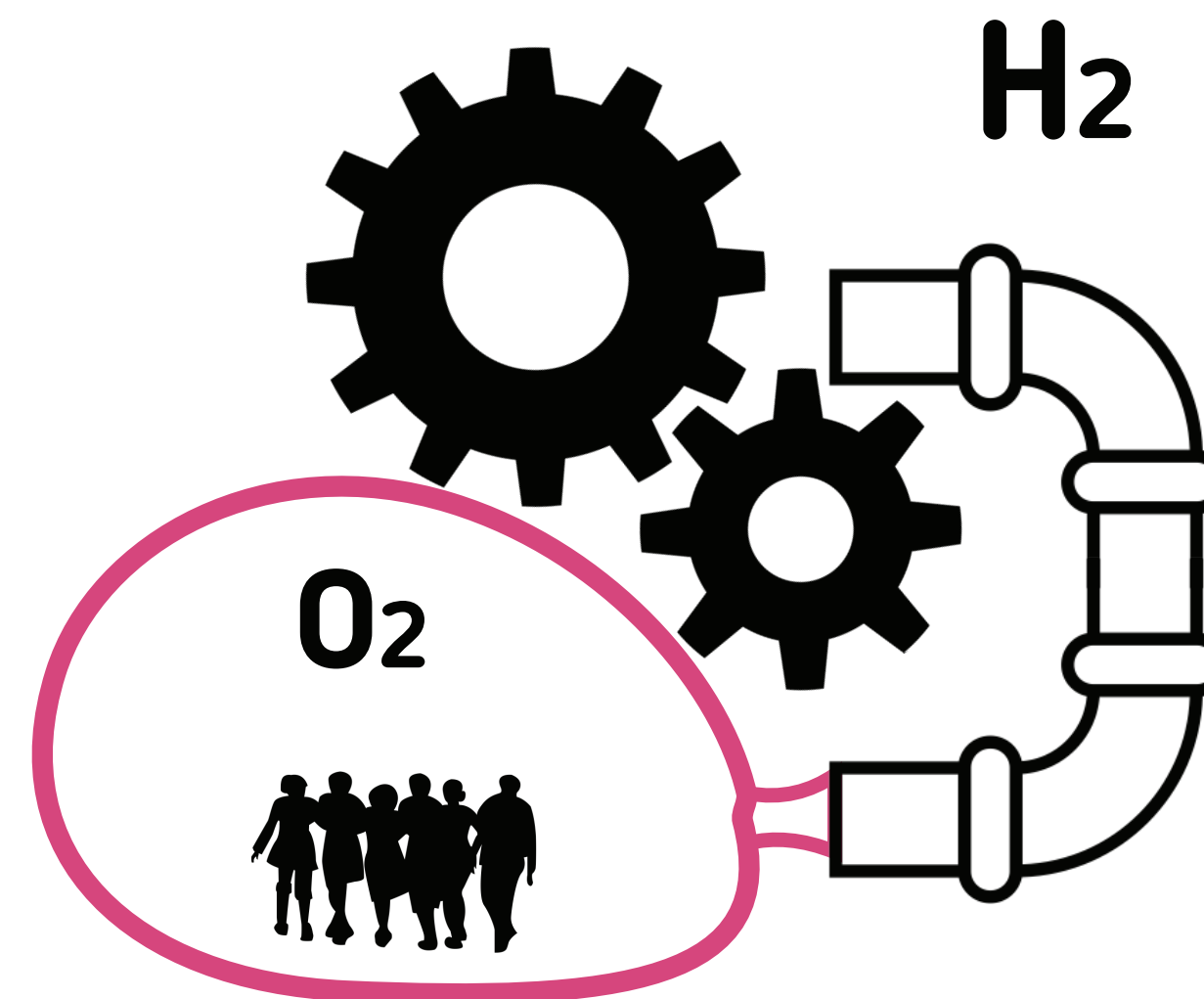
2019 Oxygen training
Urban hydrogen energy storage facility

CONCEPT



Source: The Benefits of Oxygen Therapy,
Verywellhealth.com (2019)

CONCEPT

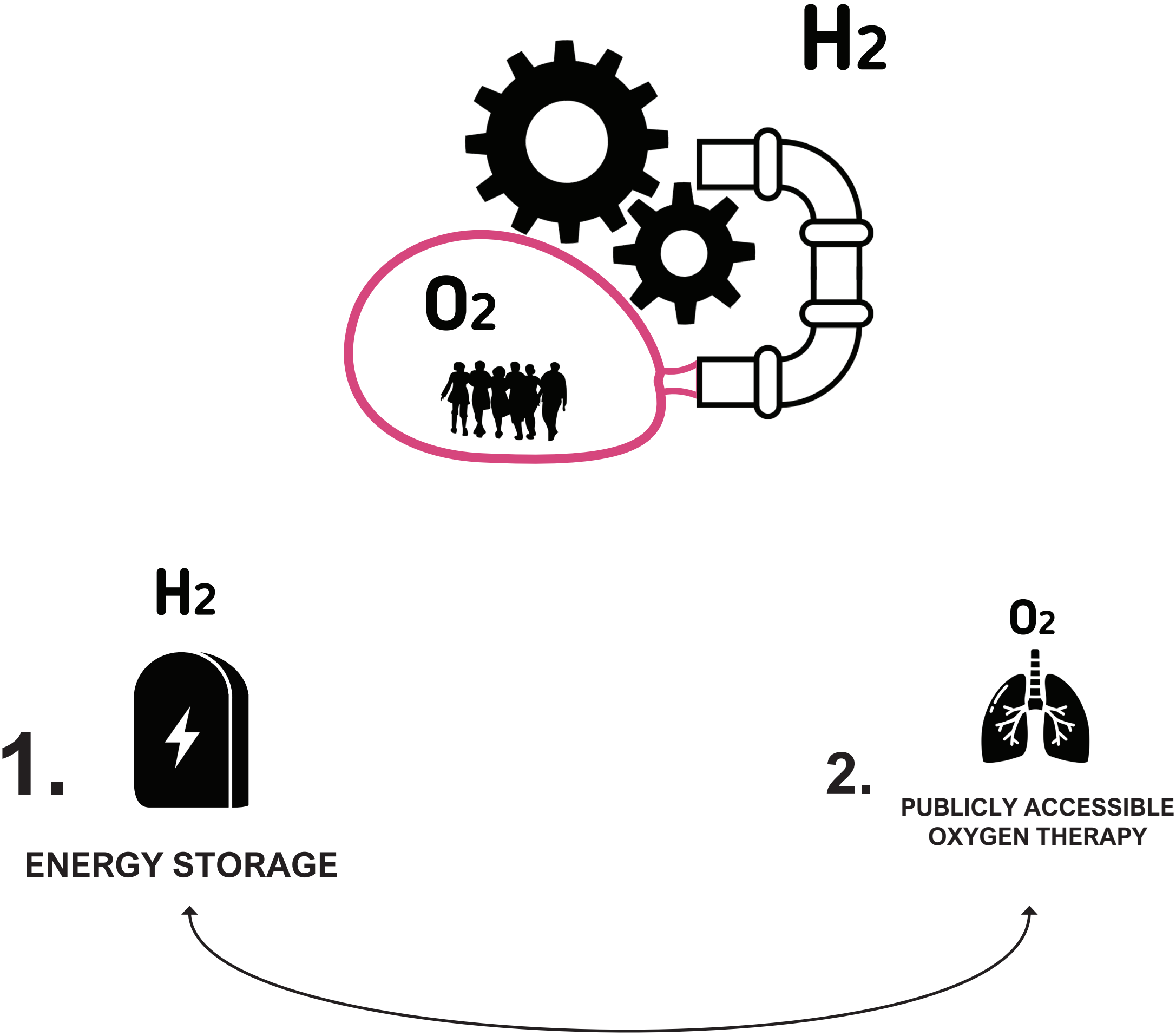


THE SYSTEM AS CREATOR
OF SPACES

The Concept

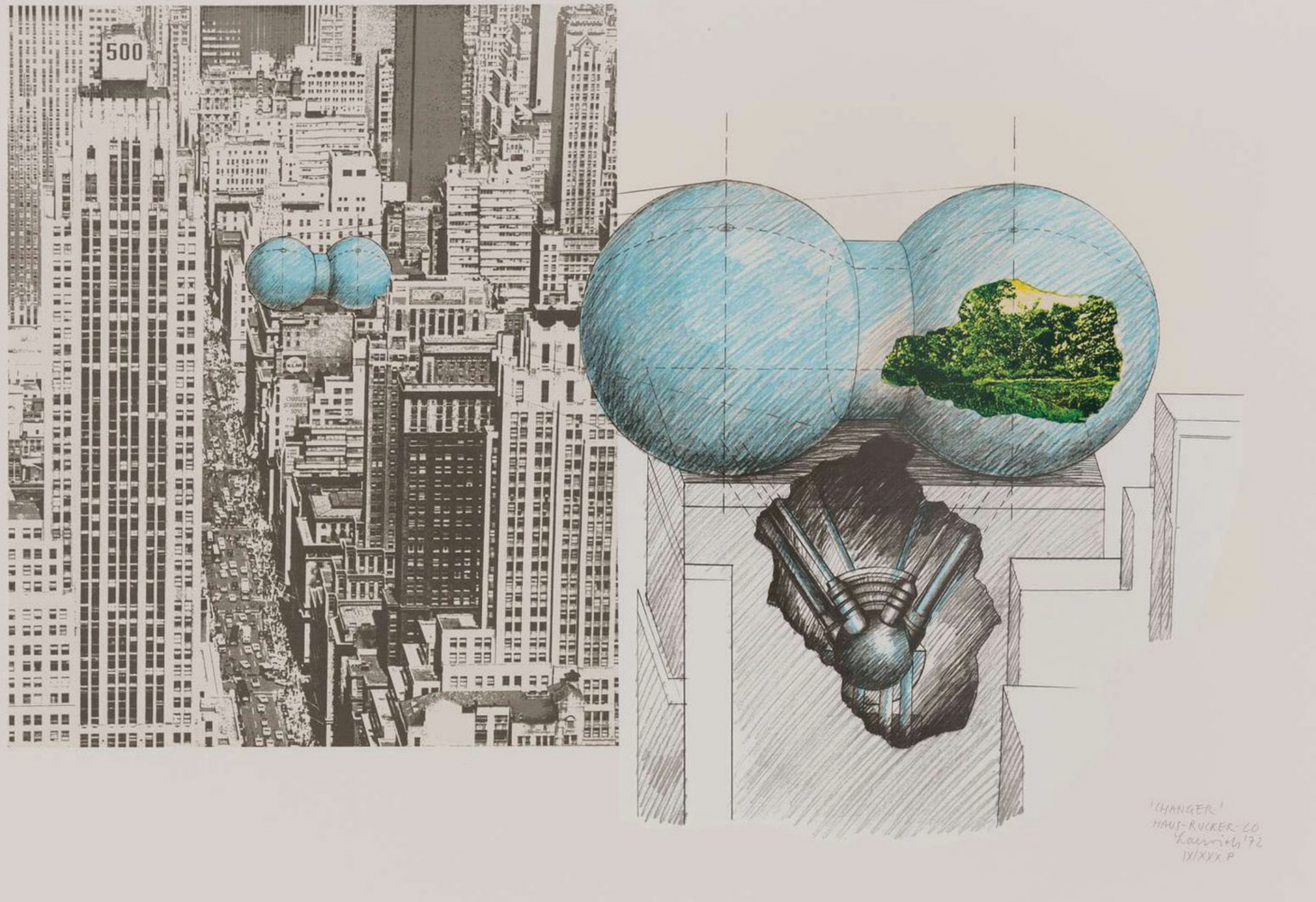
Urban hydrogen energy storage facility

CONCEPT



The Concept
Urban hydrogen energy storage facility

CONCEPT

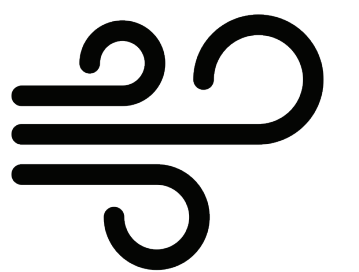


What could 2100 oxygen therapy spaces look like?

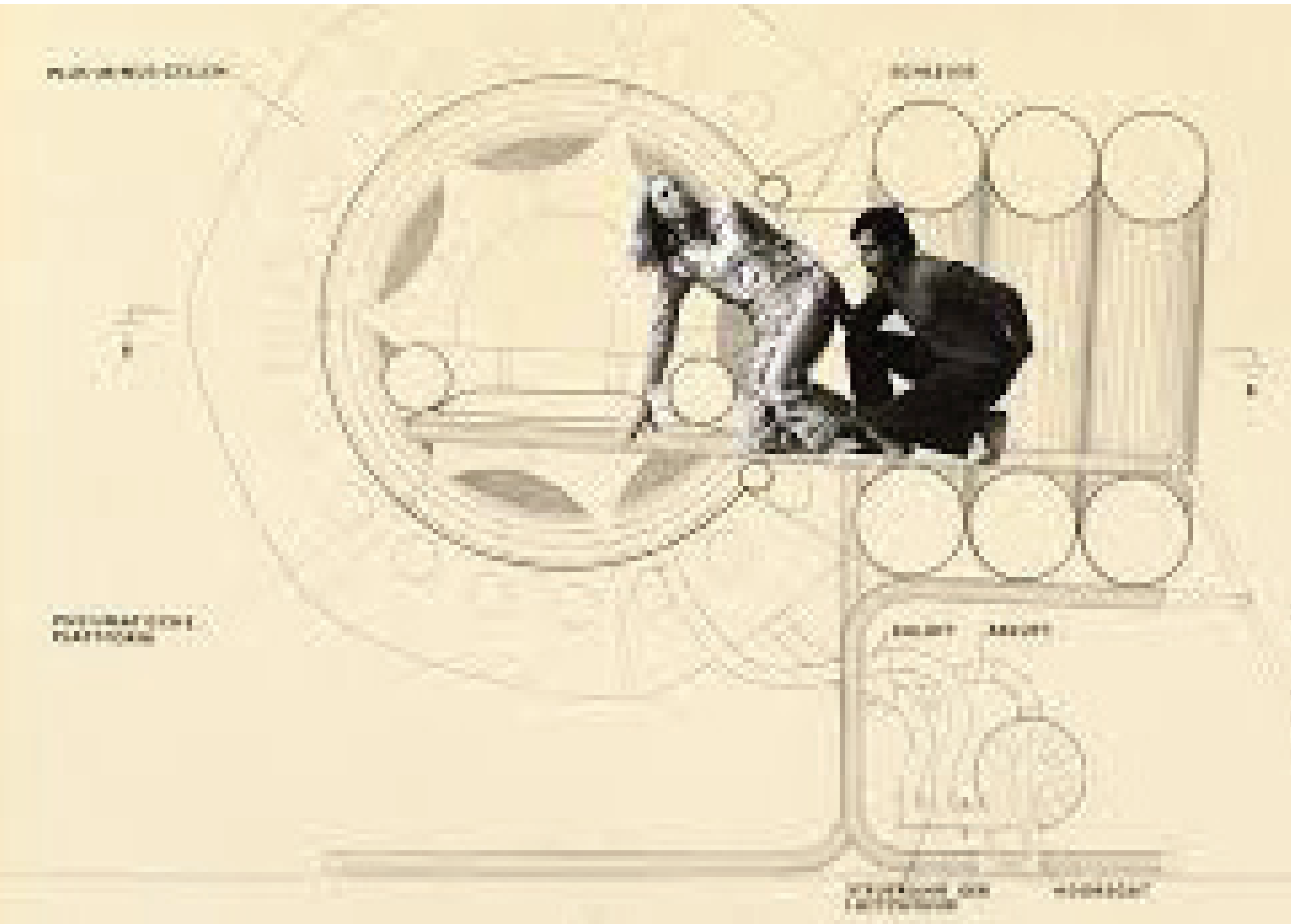
**Haus- Rucker- Co
Artist**

Taking their cue from the situationist's ideas of play as a means of engaging citizens, Haus-Rucker-Co created performances where viewers became participants and could influence their own environments, becoming more than just passive onlookers. An inflatable structure emerged from the façade of an existing building creating a space for relaxation and play.

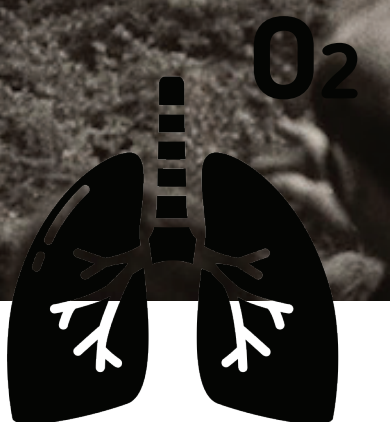
Inflatable spaces
Urban hydrogen energy storage facility



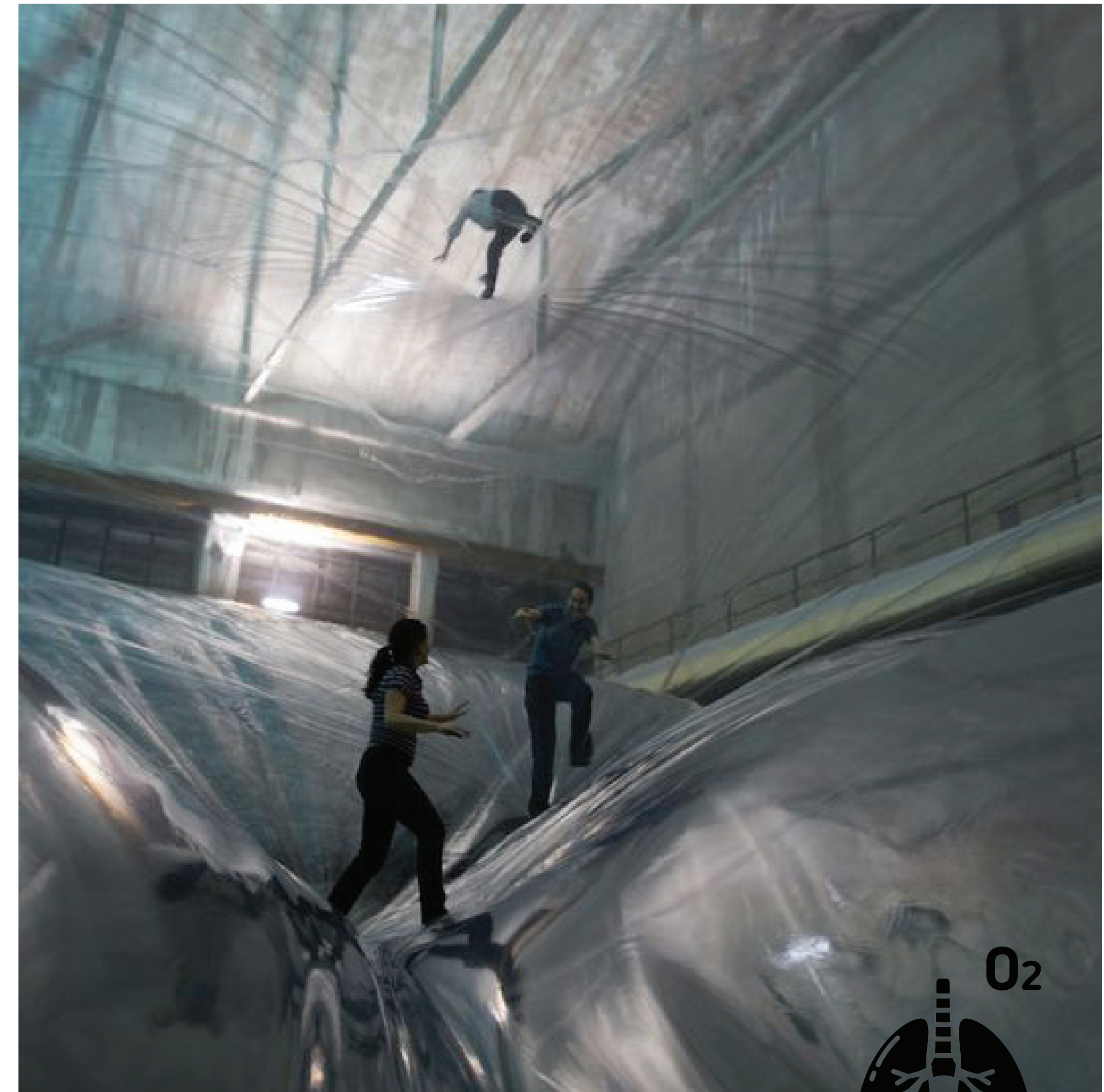
CONCEPT



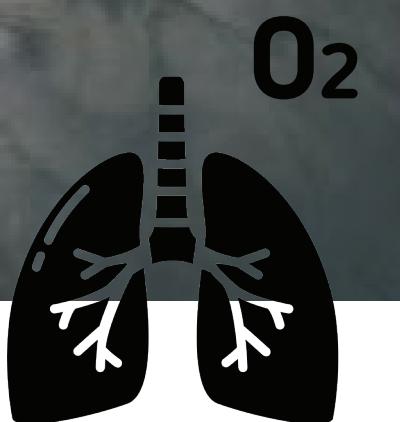
Inflatable spaces
Urban hydrogen energy storage facility



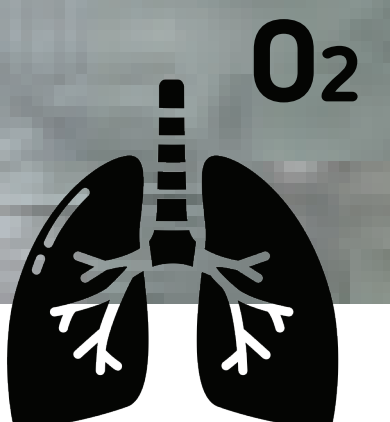
CONCEPT



2100 Oxygen therapy
Urban hydrogen energy storage facility

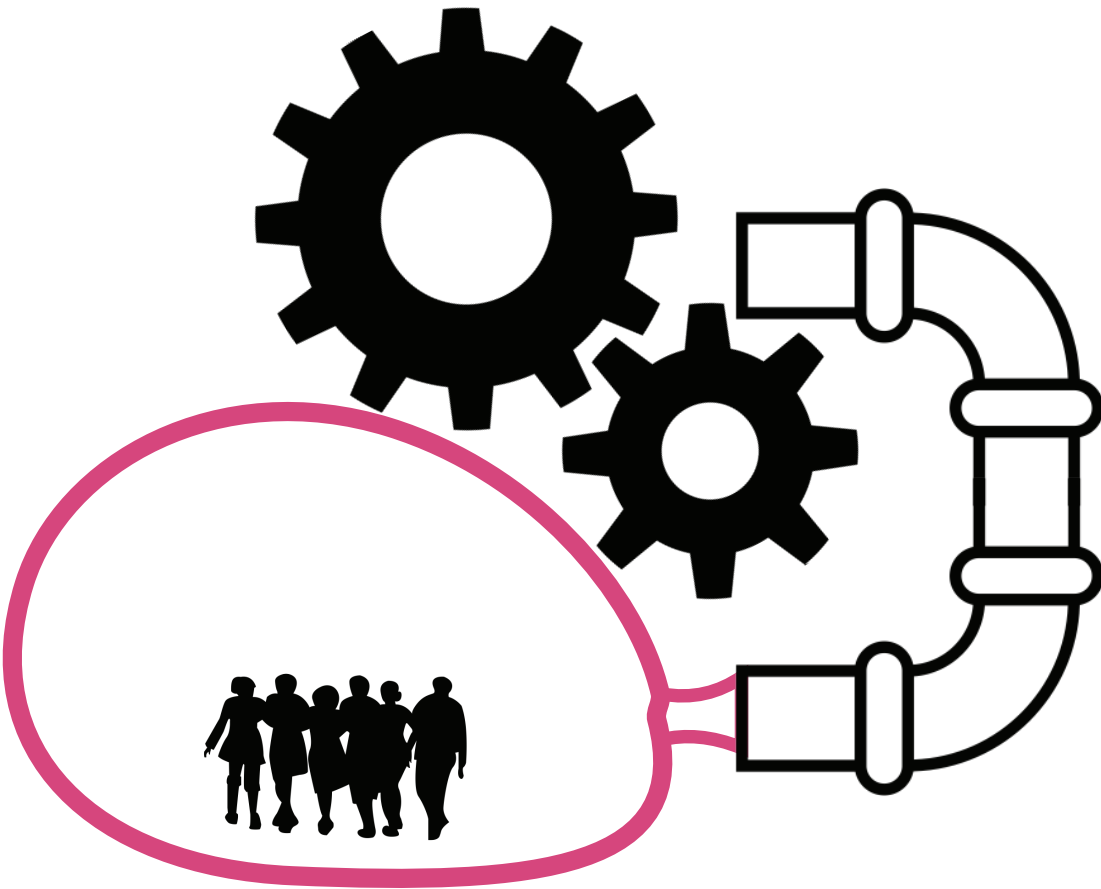


CONCEPT



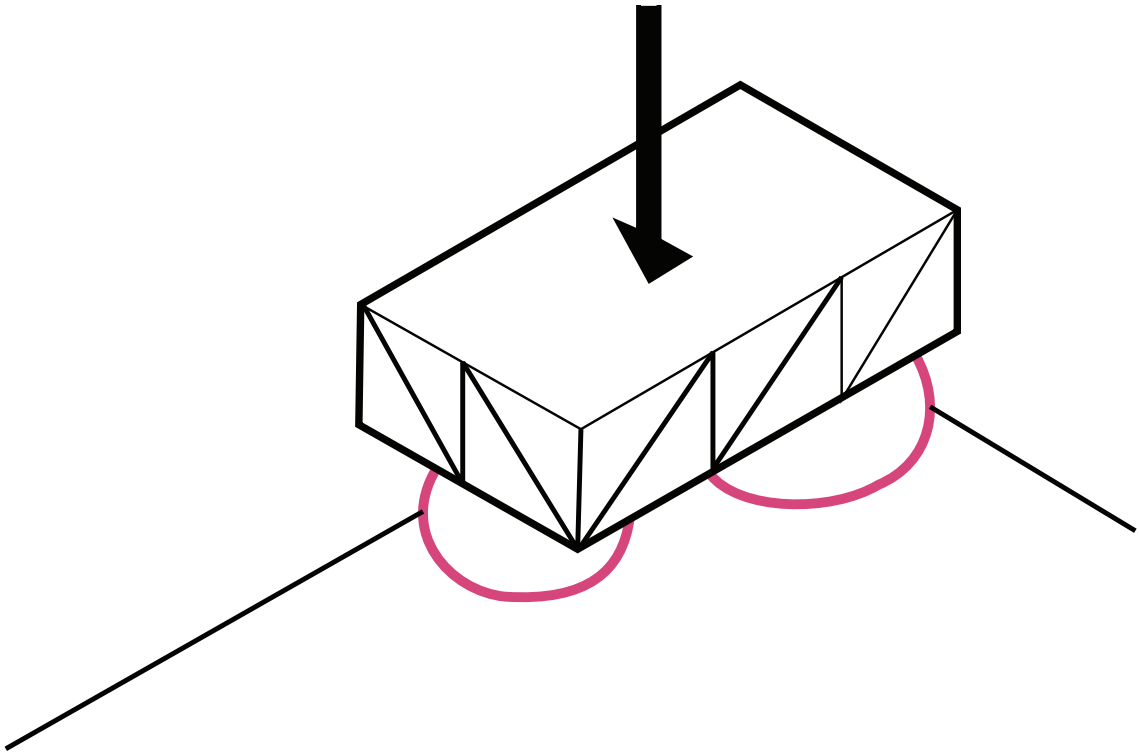
2100 Oxygen therapy
Urban hydrogen energy storage facility

CONCEPT



H₂ production takes urban space,
while shaping new spaces.

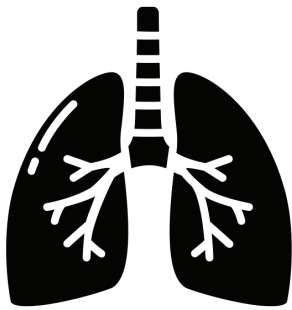
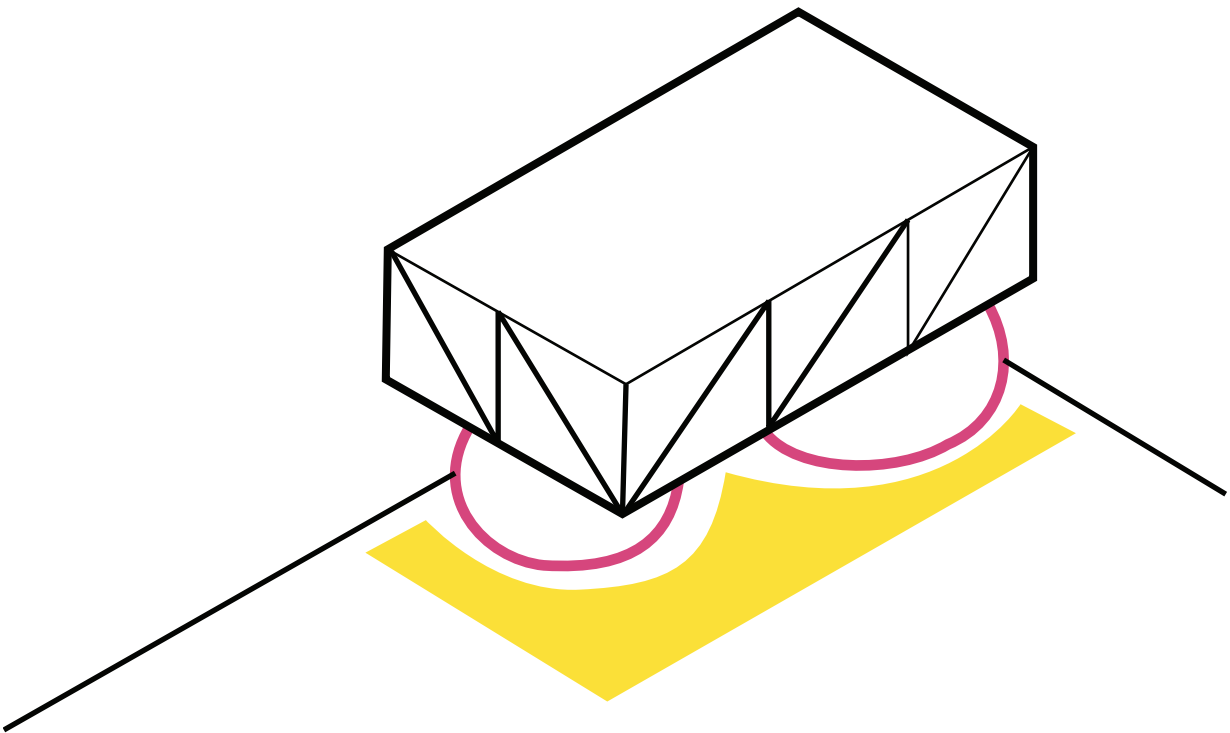
H₂ = Air



Air the literal base

Spatial concept
Urban hydrogen energy storage facility

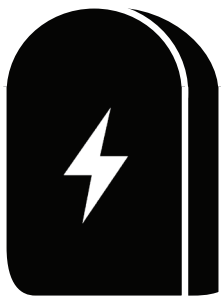
CONCEPT



PHYSICAL
Accessible exercise
Relief physical strains



SOCIETAL
Activities
adaptive to community

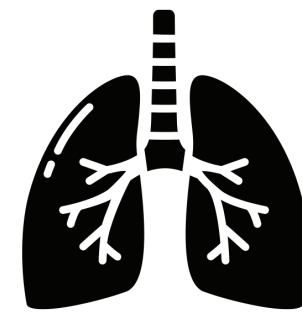
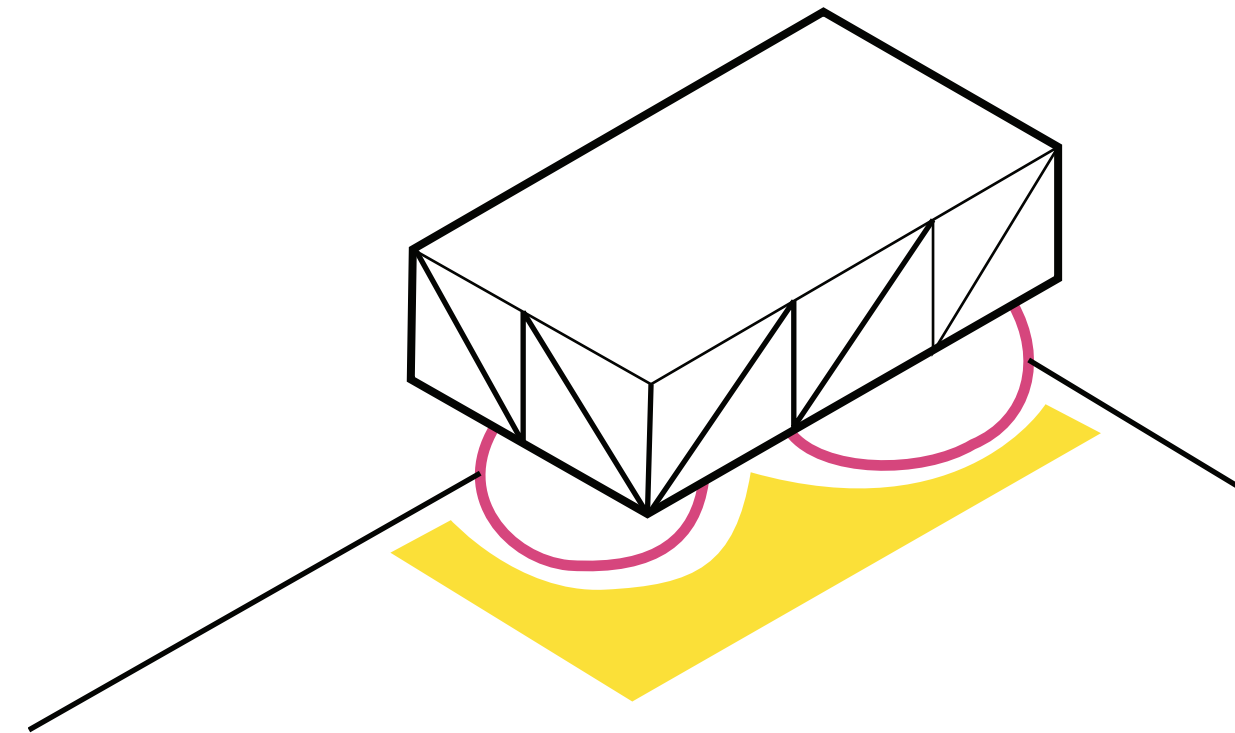


ENERGY
Replacement of
lithium batteries

Aims

Urban hydrogen energy storage facility

CONCEPT



Health and sport centres



Dynamic public spaces

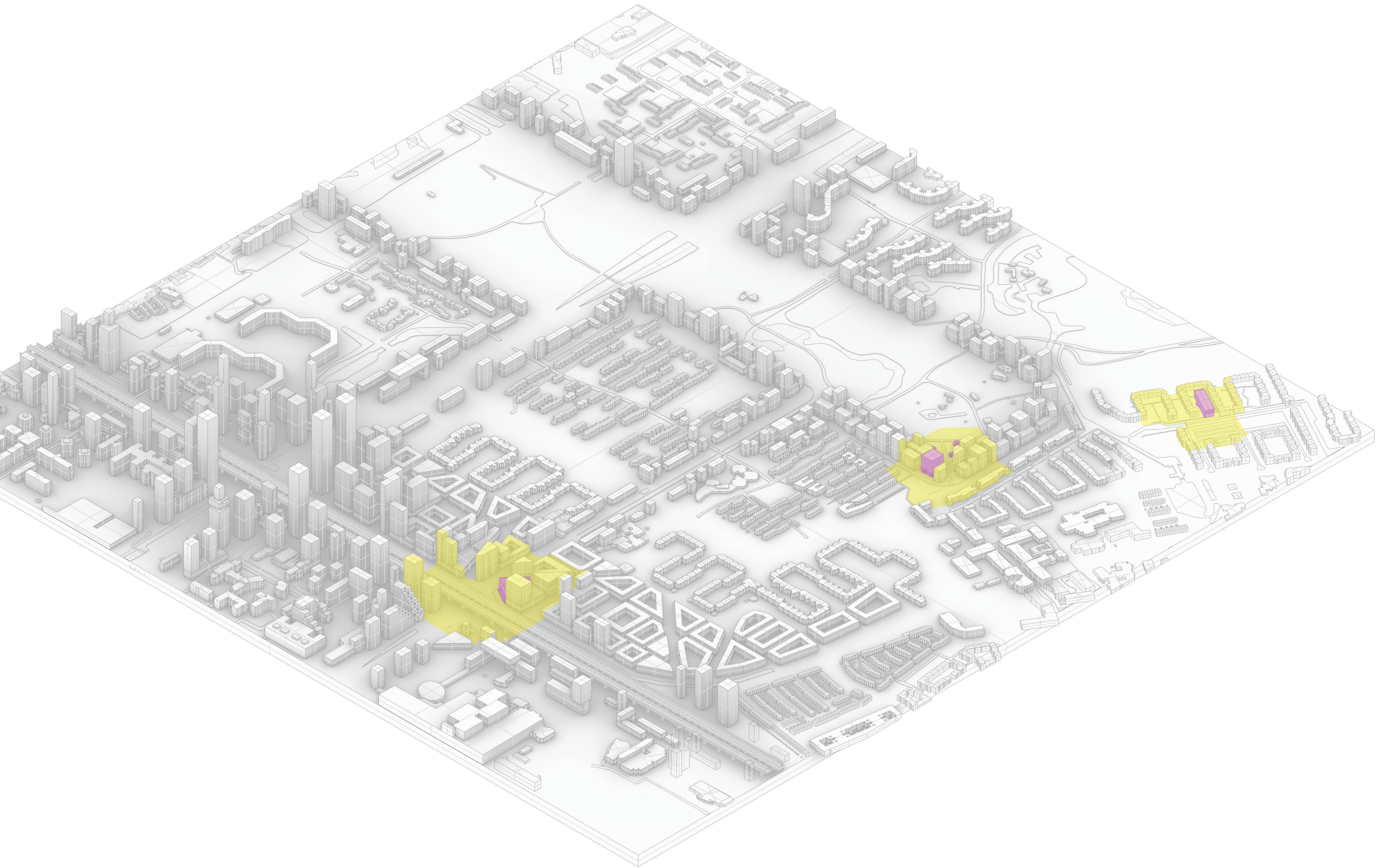


Renewable energy storage

What does it offer?

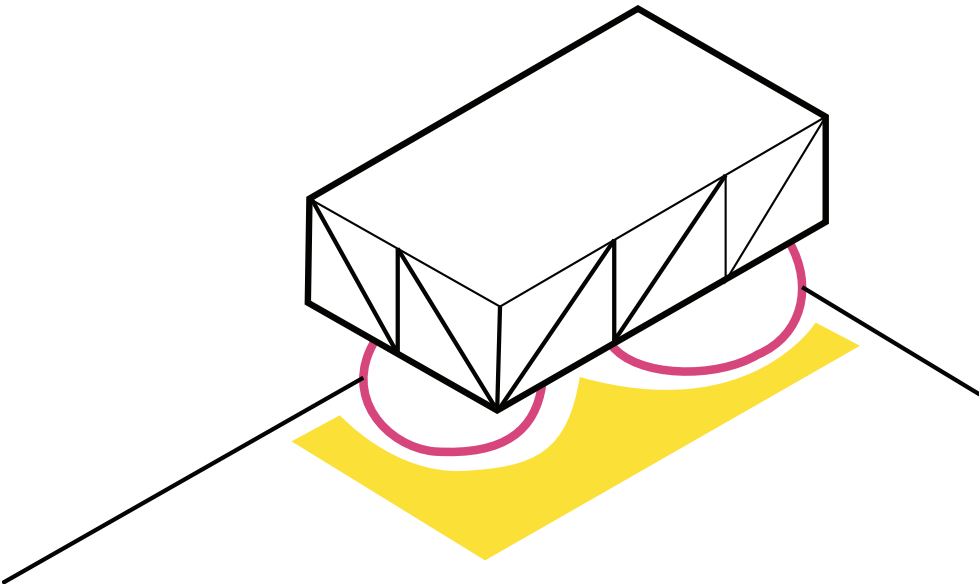
Urban hydrogen energy storage facility

RESEARCH



Facility Sites

Urban hydrogen energy storage facility



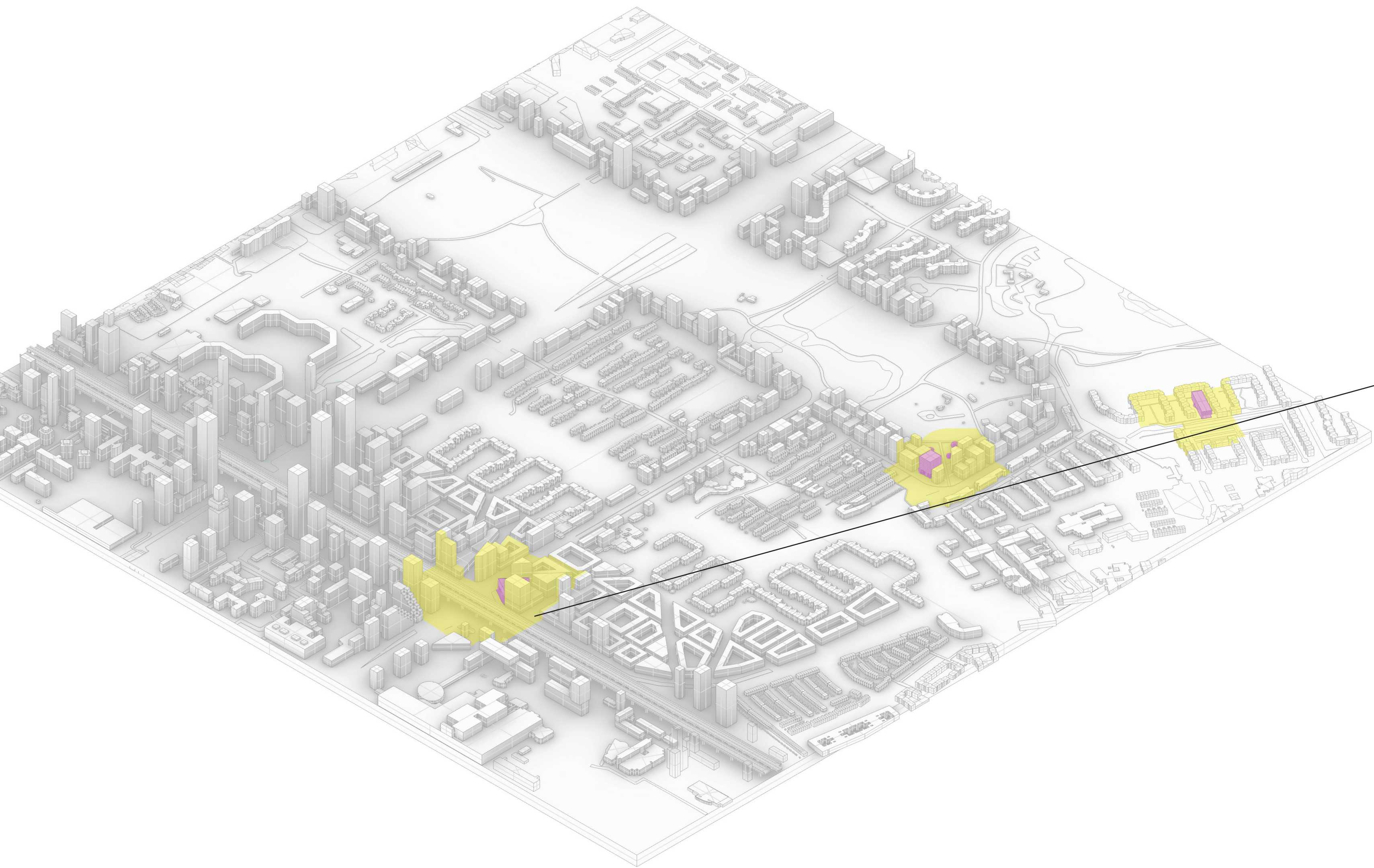
CONCEPT



Sub-functions reponds to site character
Urban hydrogen energy storage facility

Business district

CONCEPT



Chosen Project facility
Urban hydrogen energy storage facility

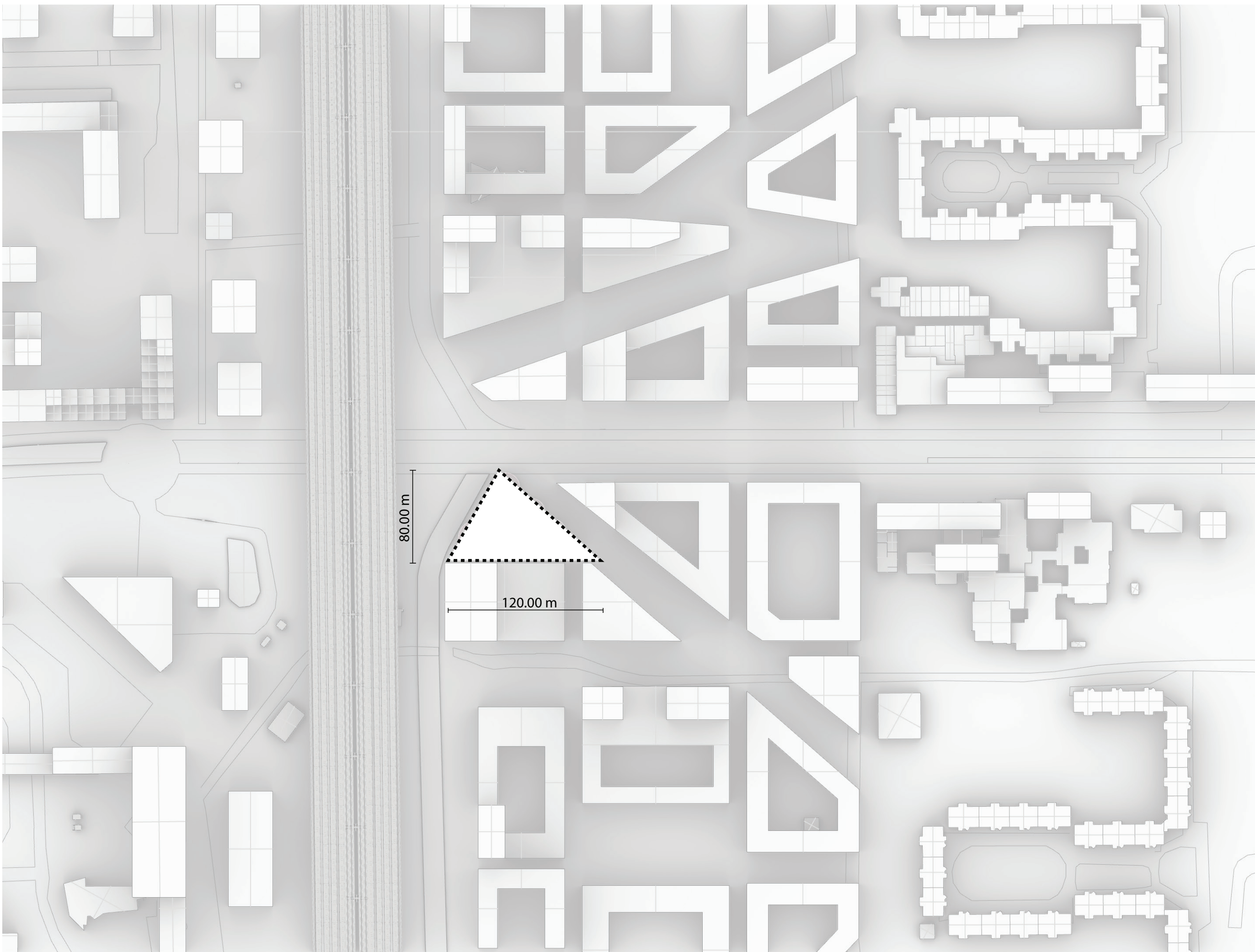
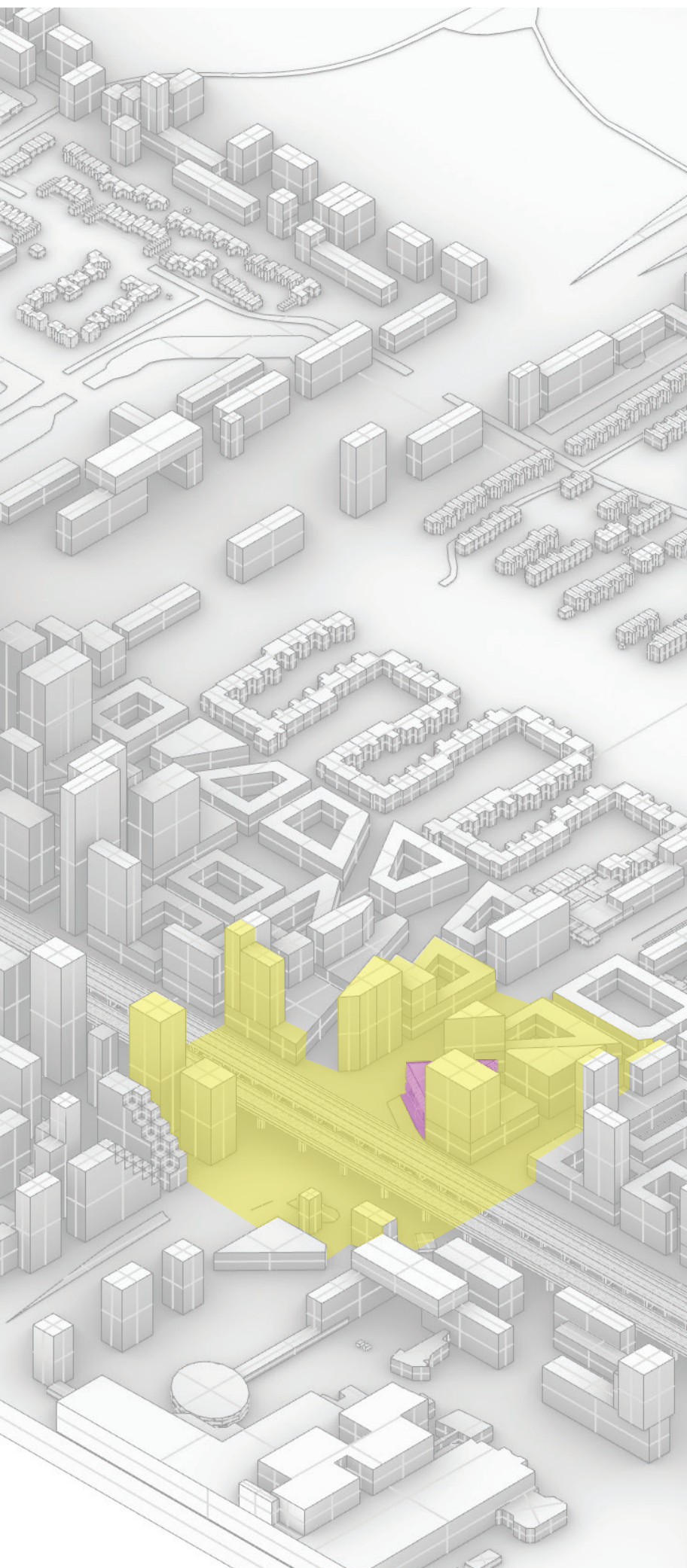


4

THE ENERGIZER

Project facility

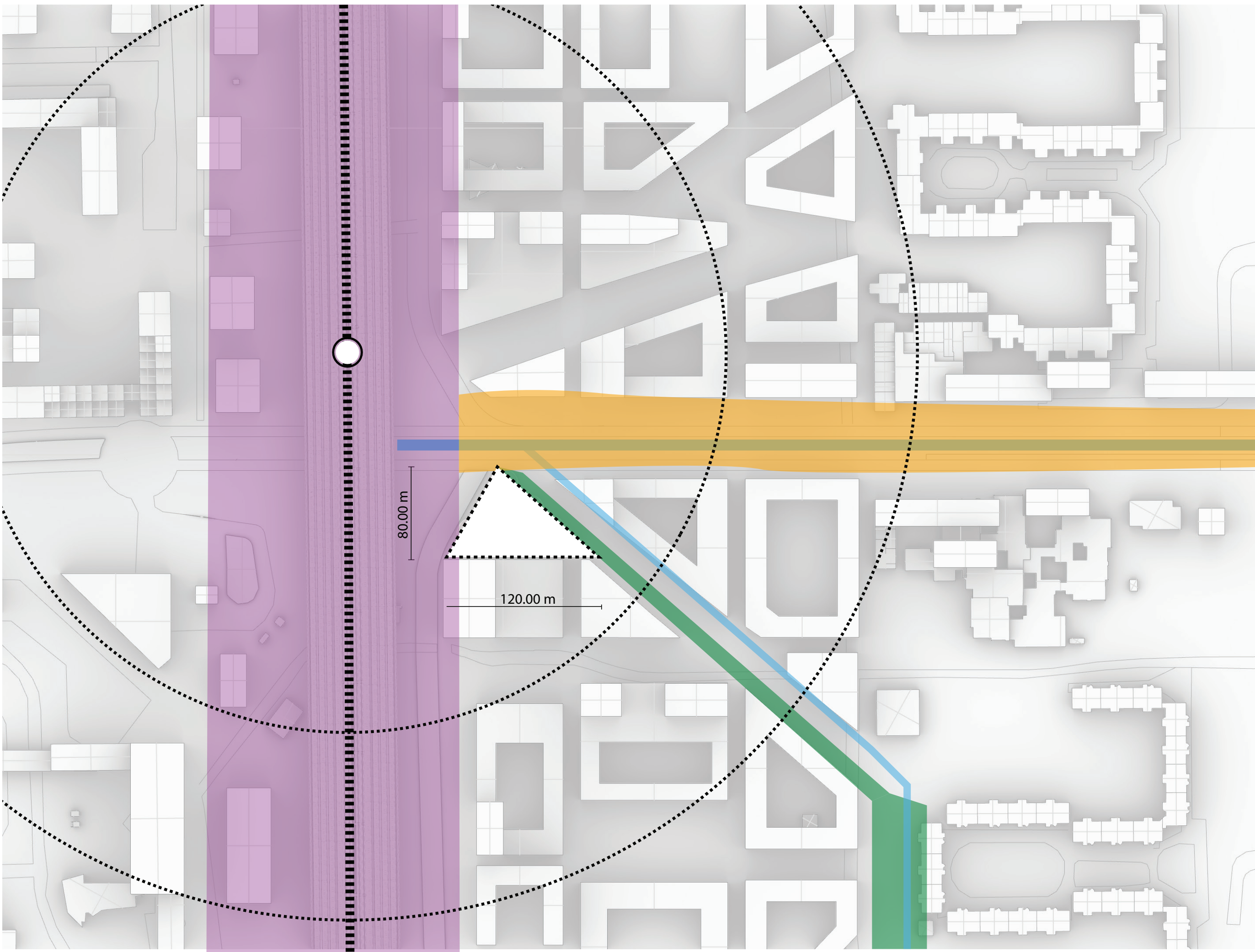
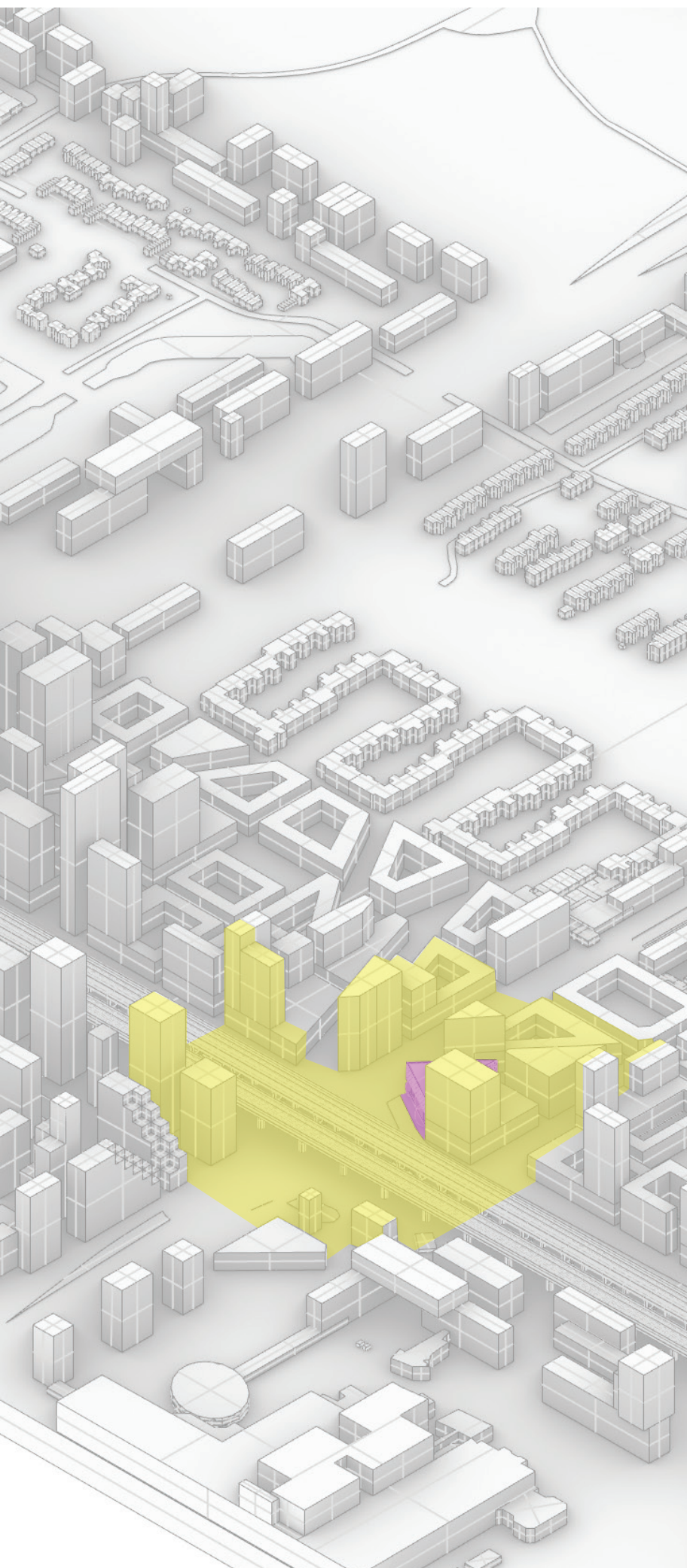
THE ENERGIZER



Site: Innovation Axis
The Energizer

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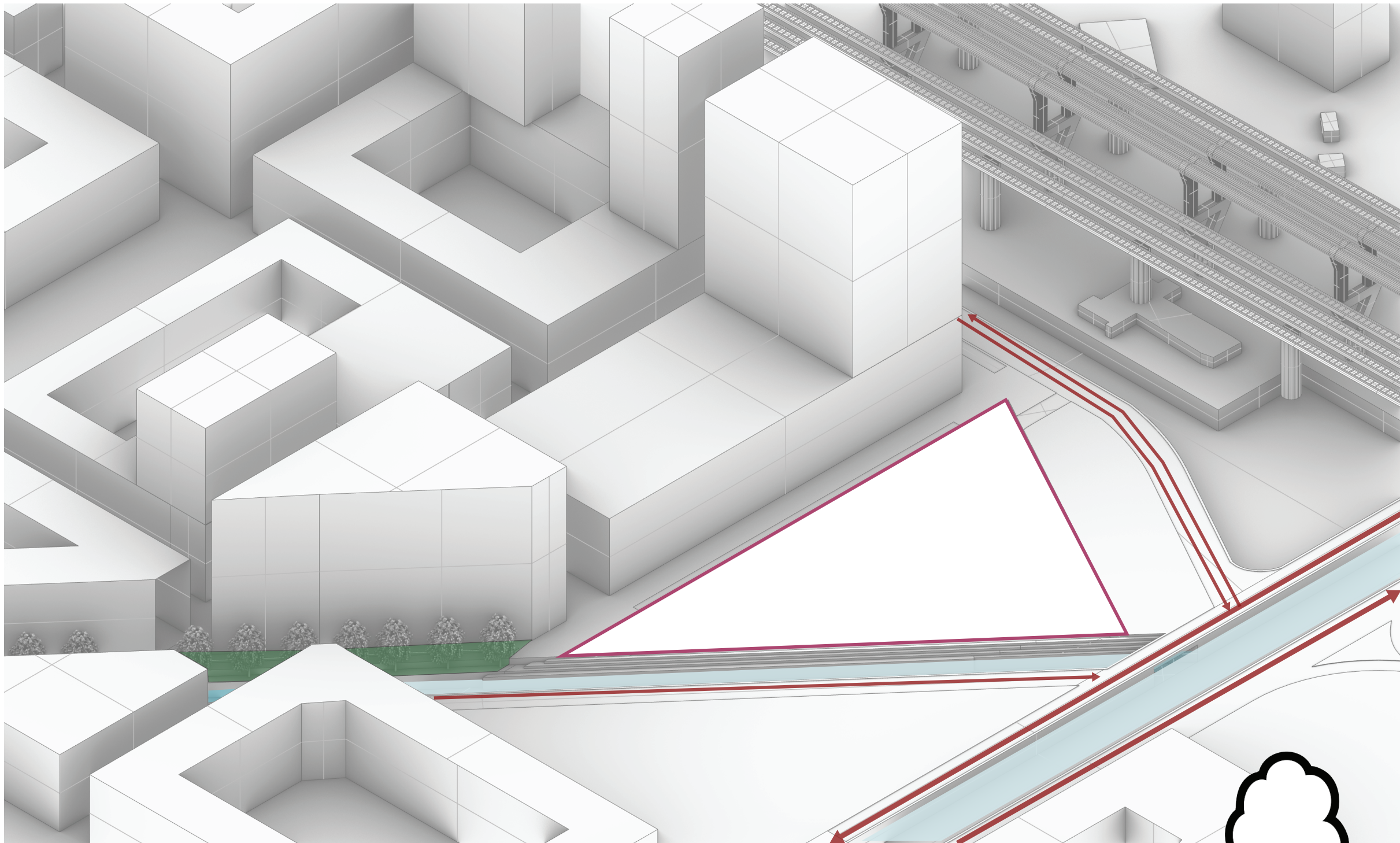
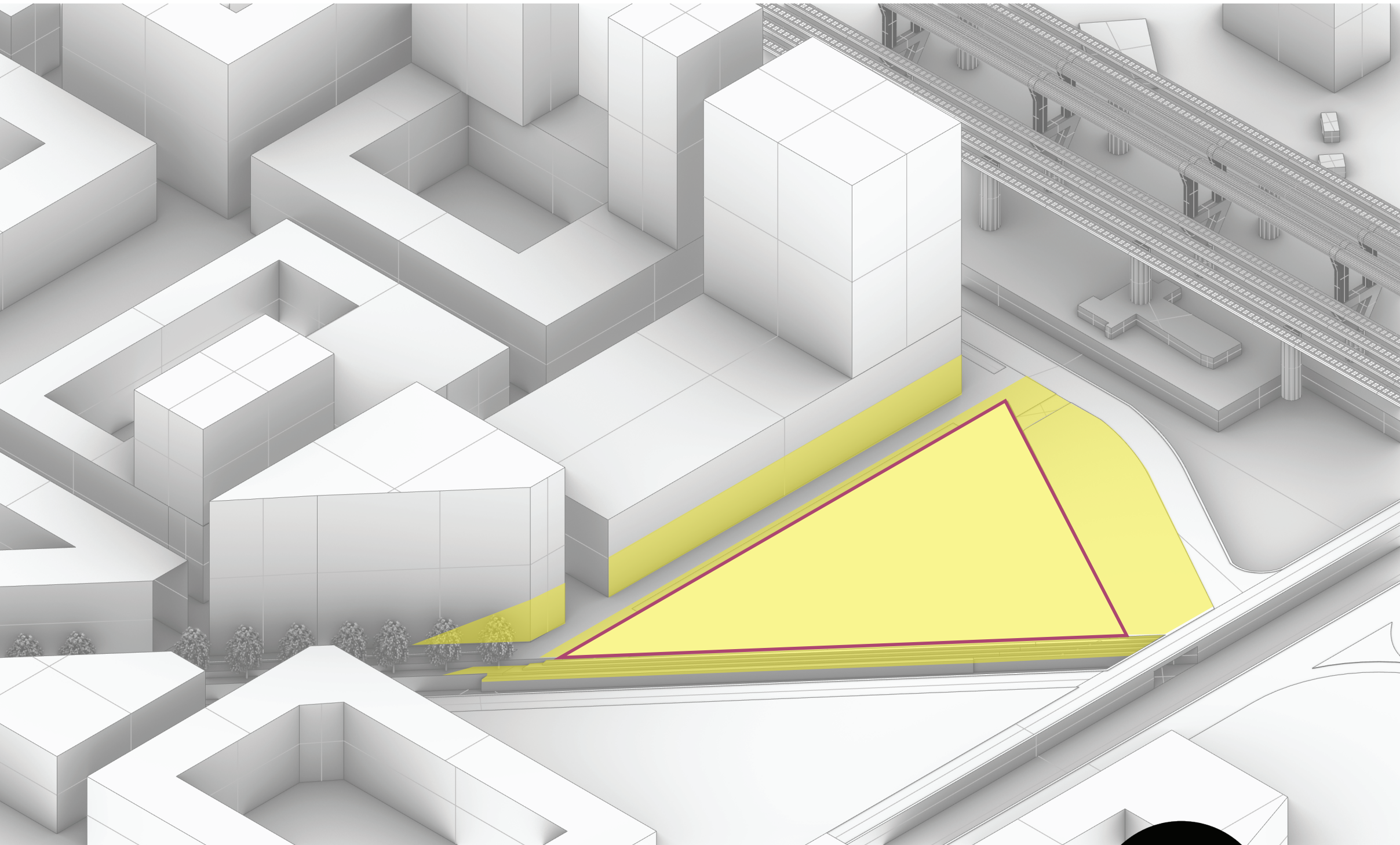
THE ENERGIZER



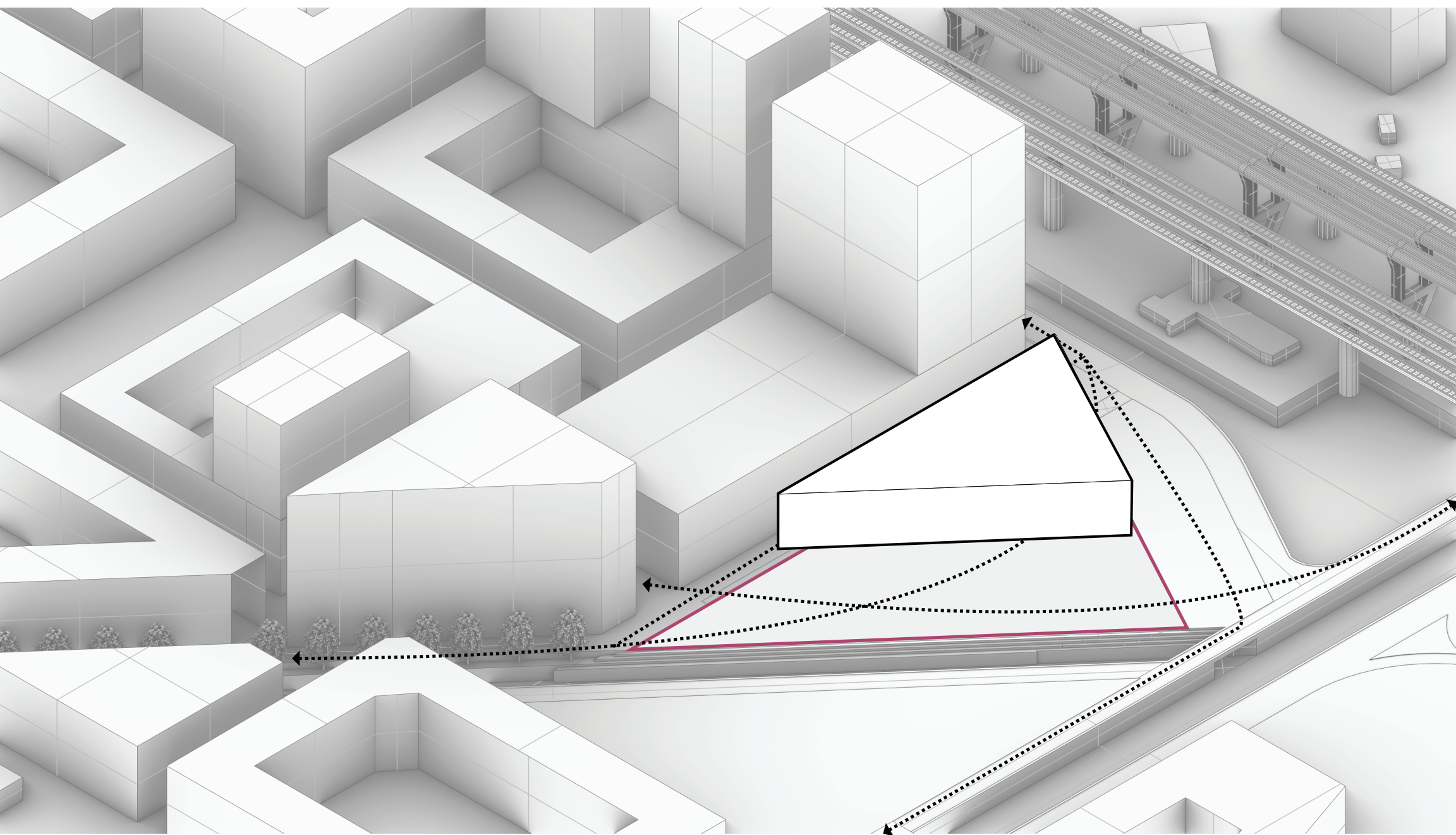
Site: Innovation Axis
The Energizer

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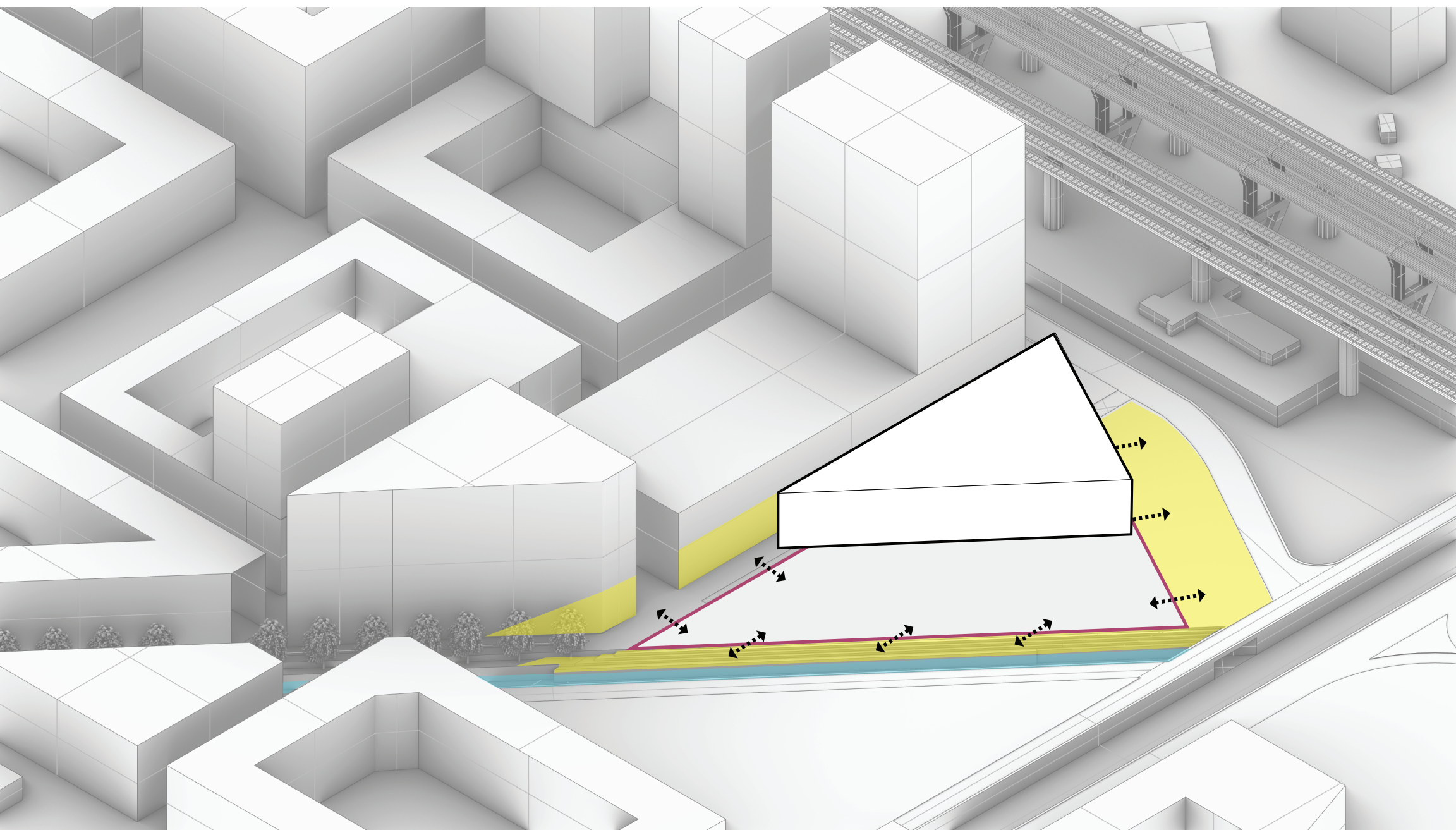
THE ENERGIZER



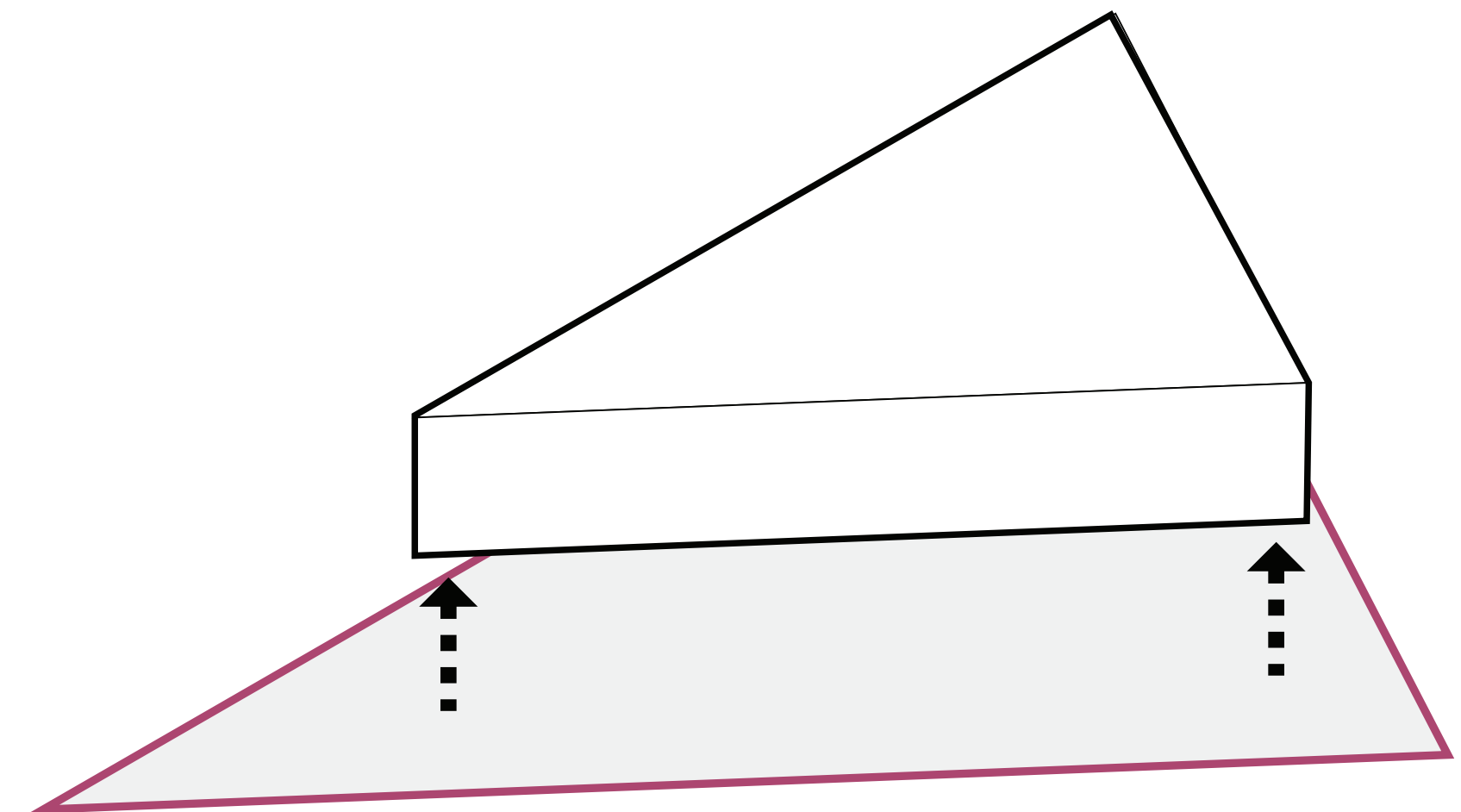
Site
The Energizer



THE ENERGIZER

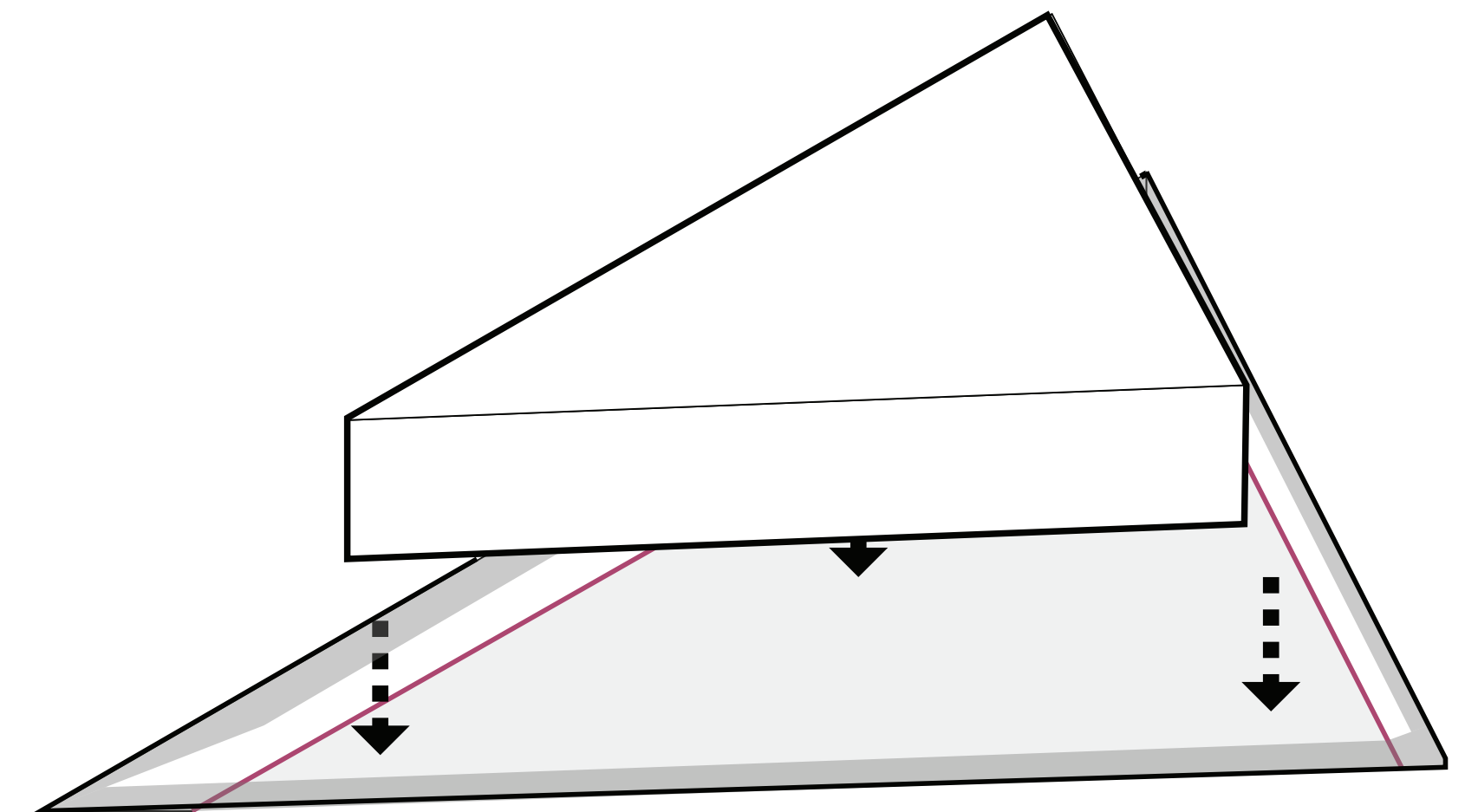
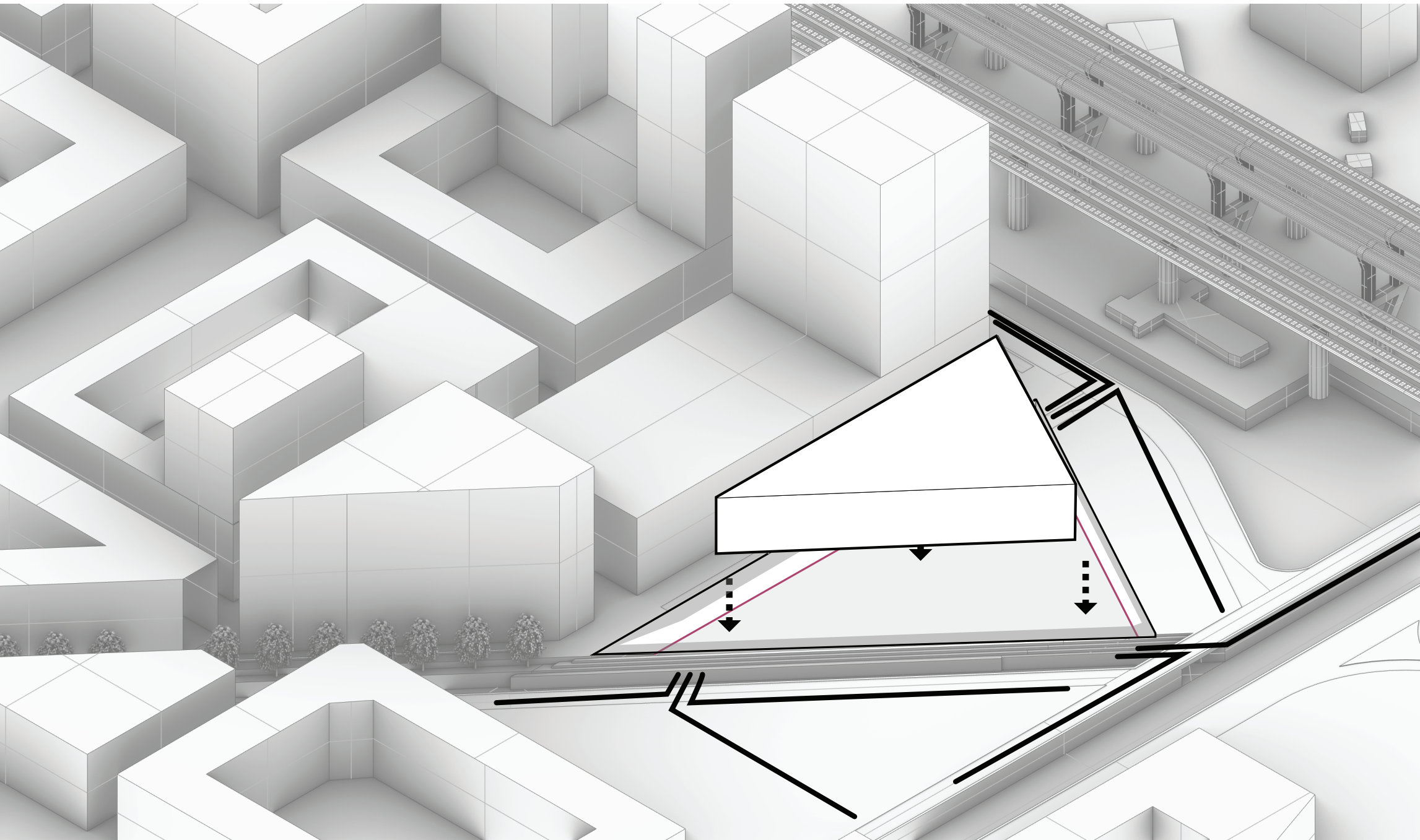


Shape
The Energizer



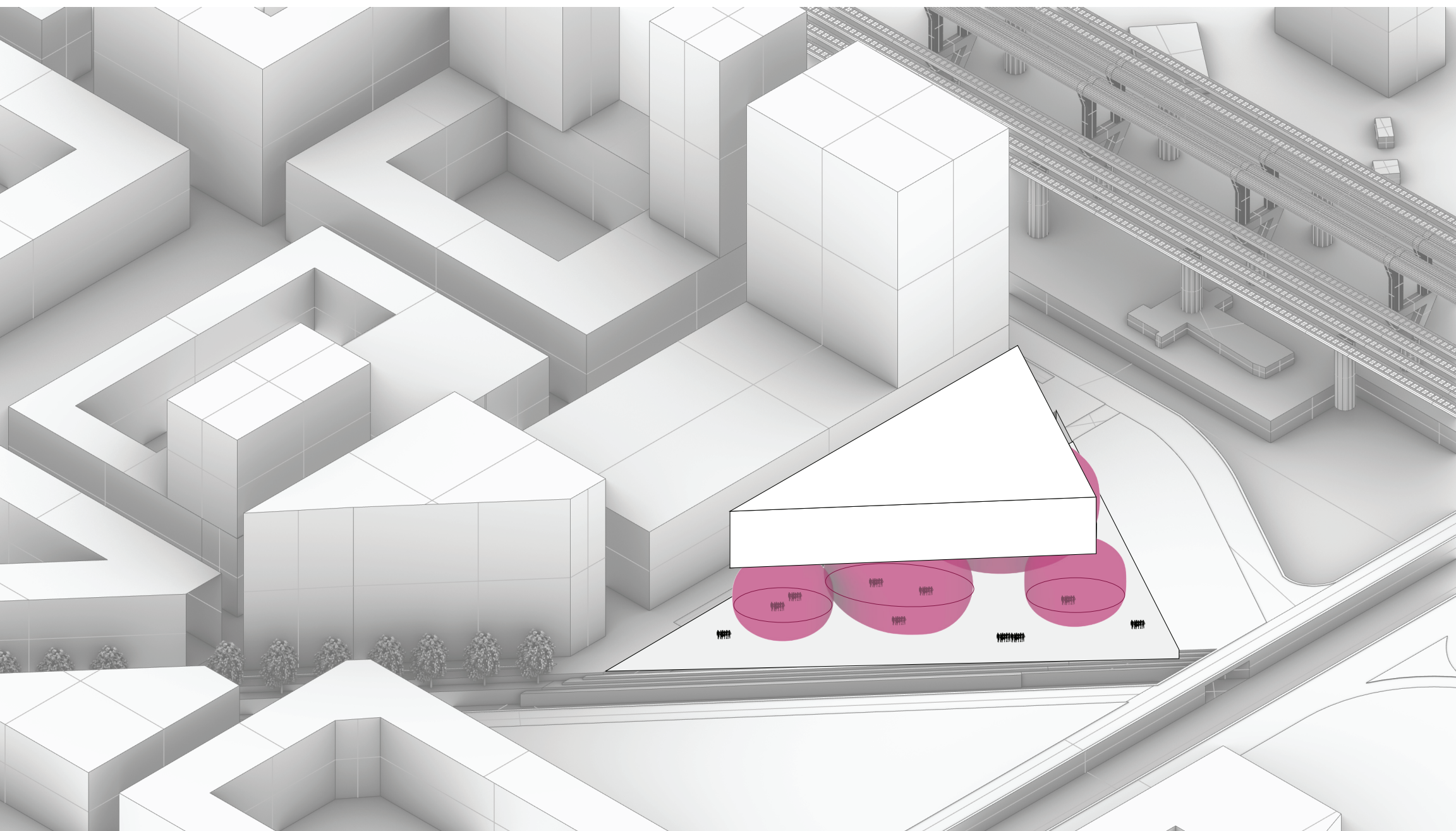
Minimal site disturbance

THE ENERGIZER

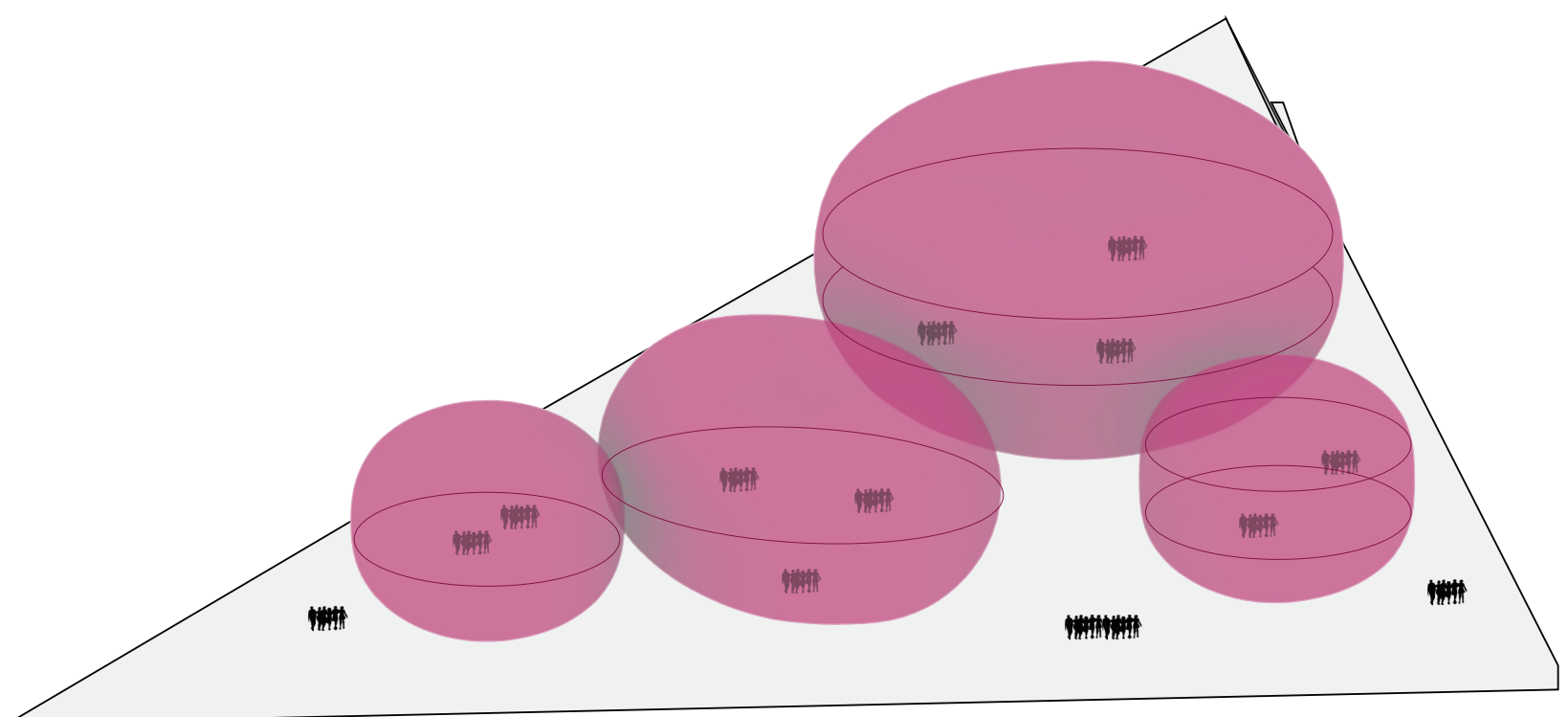
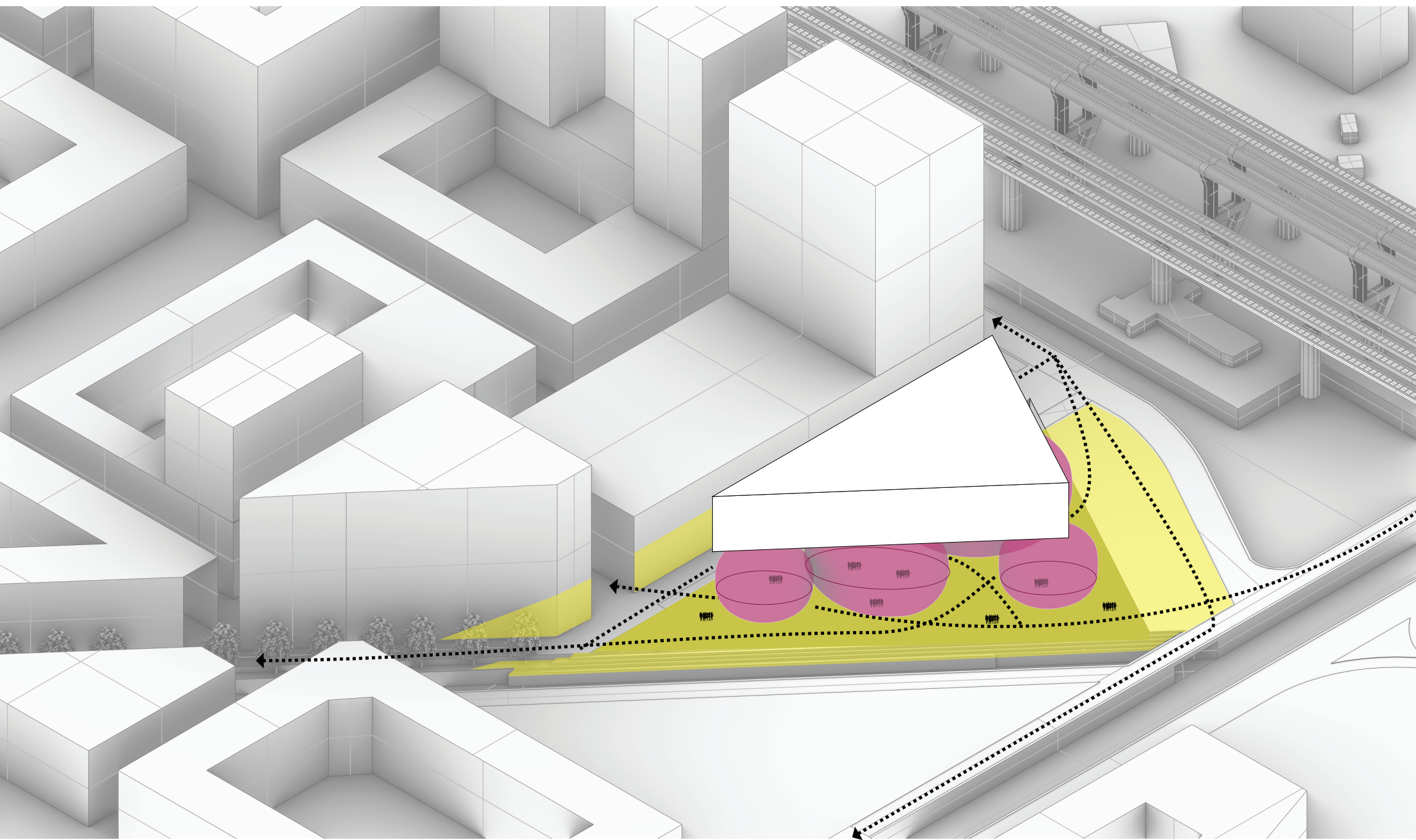
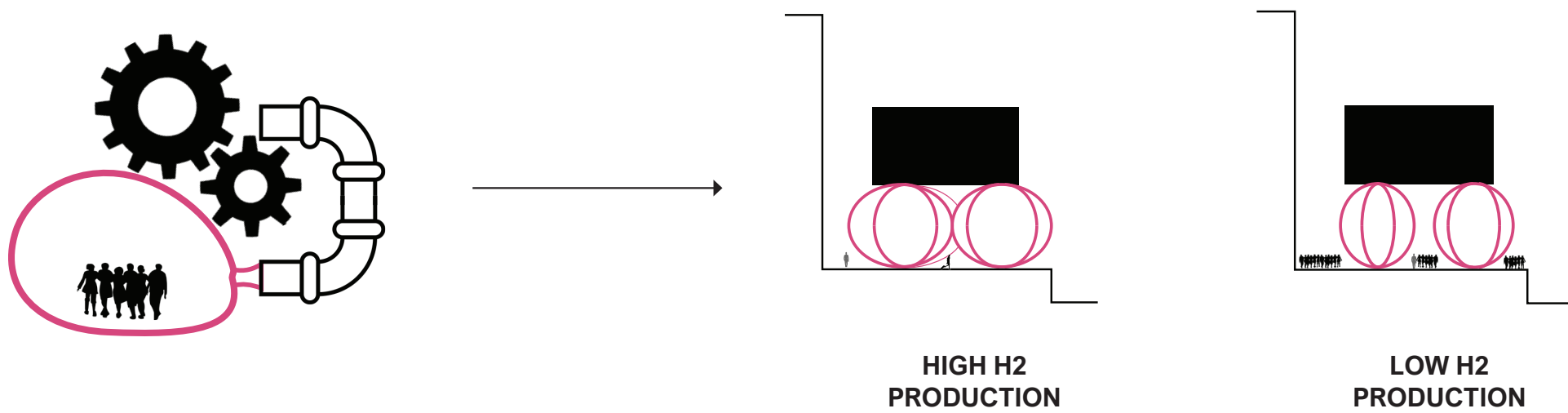


Below ground to connect to the grid

Shape
The Energizer



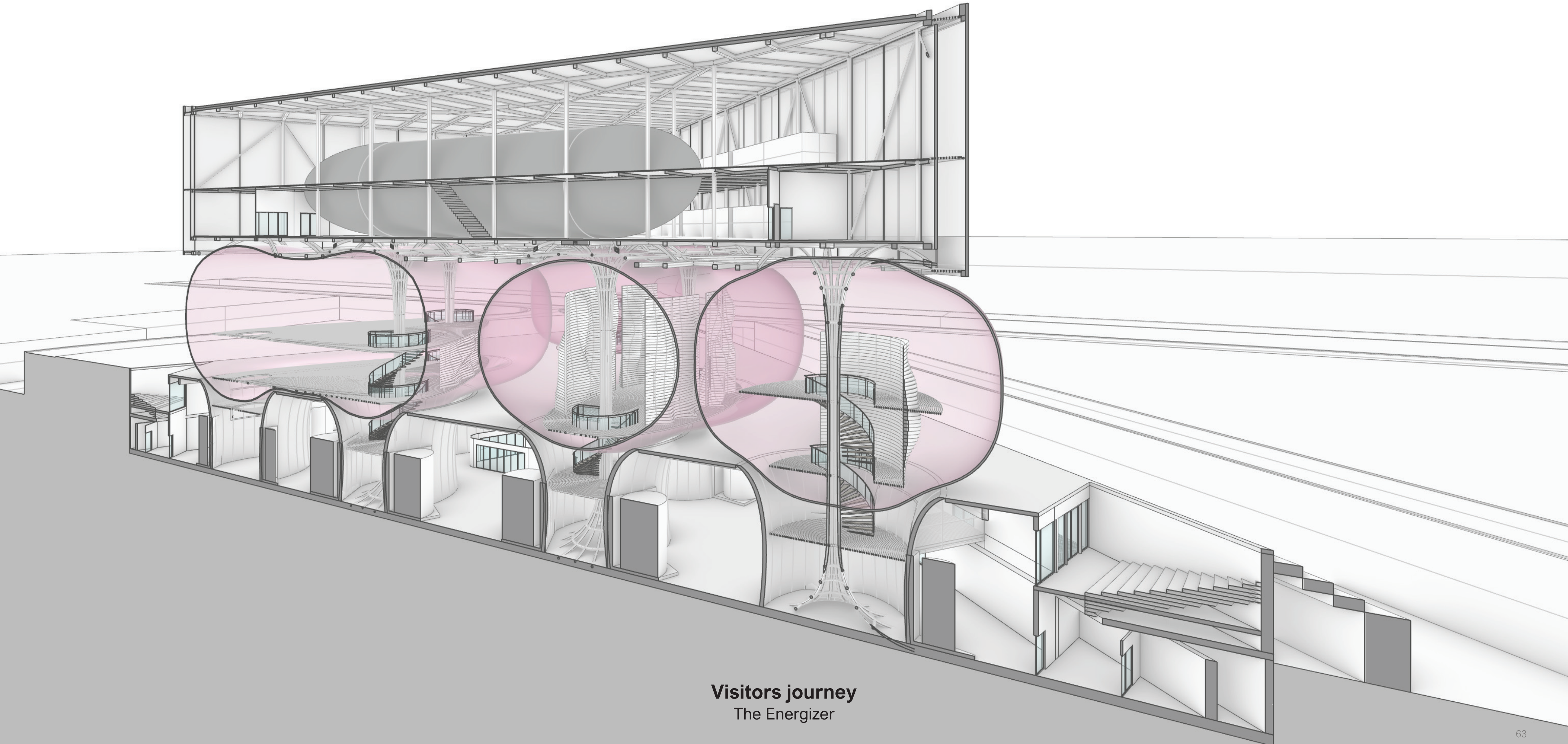
THE ENERGIZER



Return the public space with a distinct character

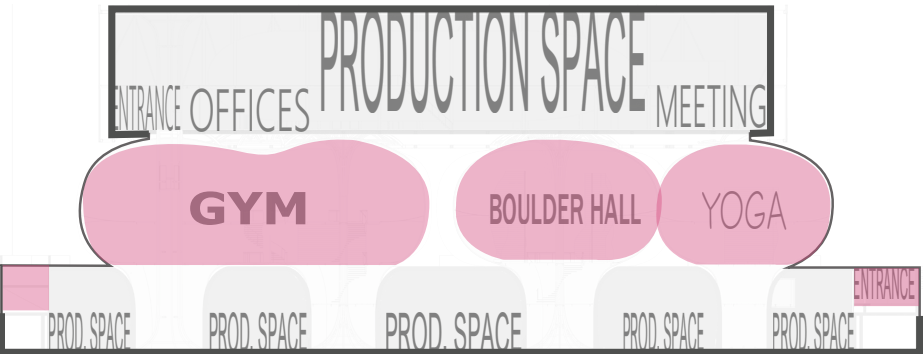
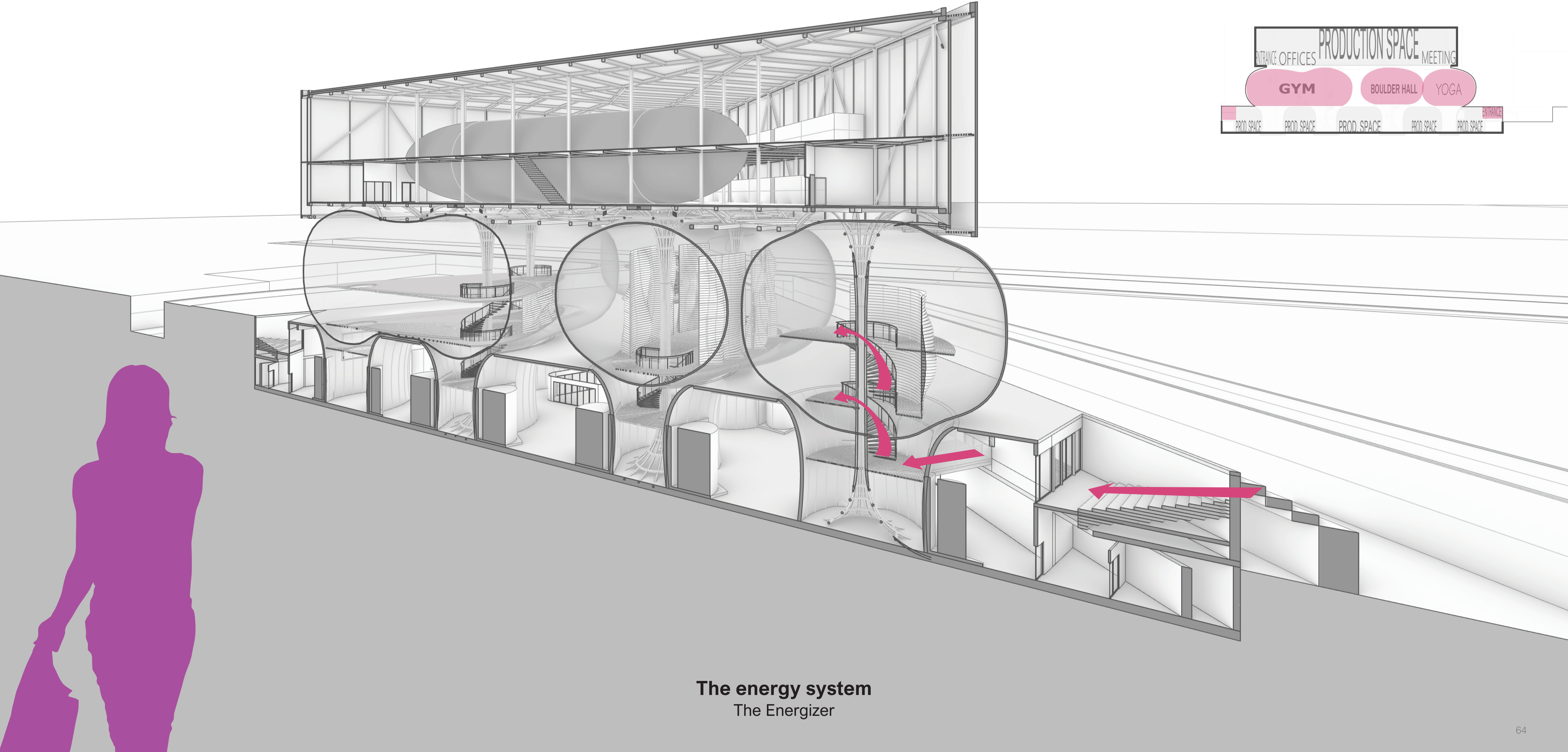
Shape
The Energizer

THE ENERGIZER

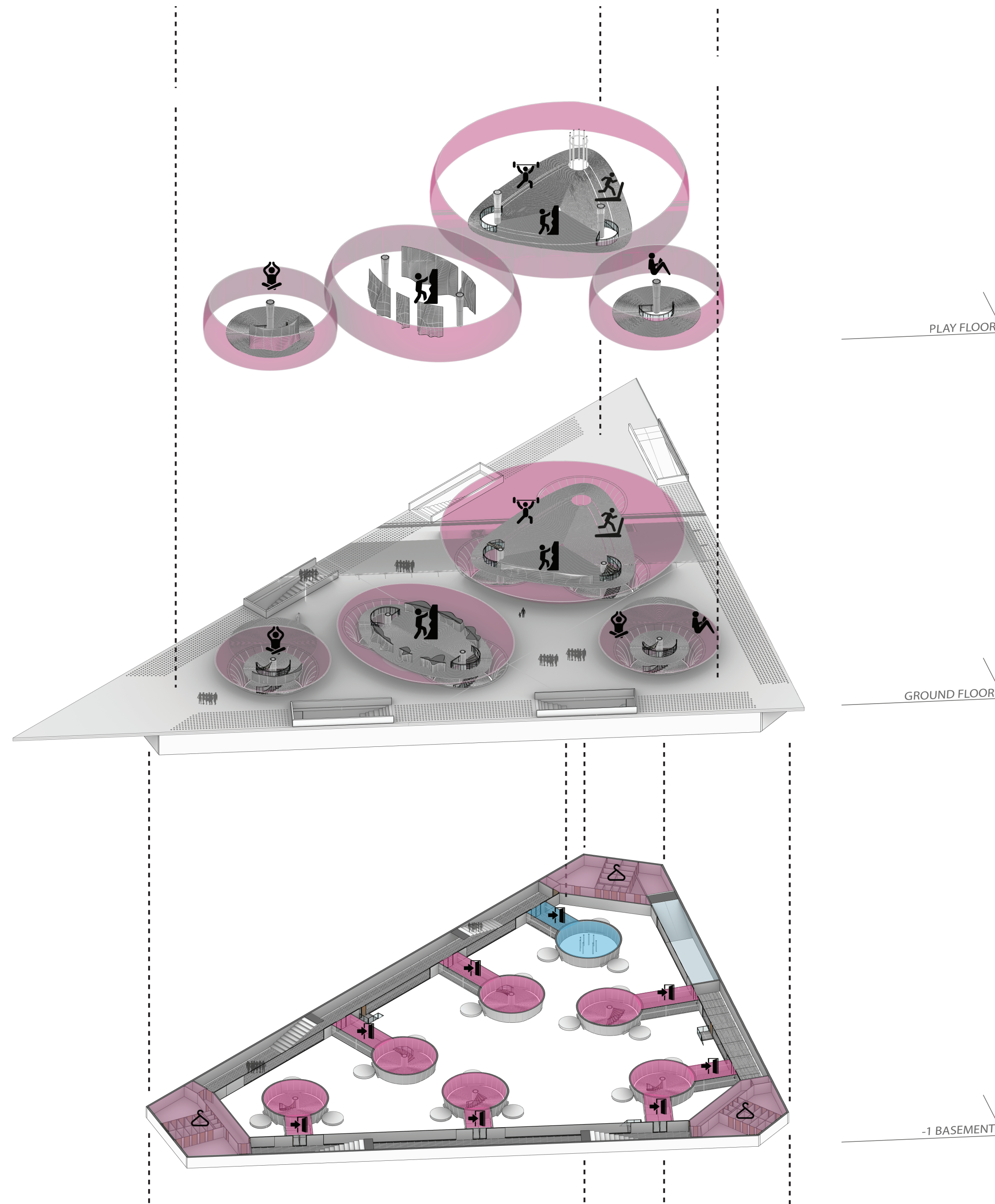


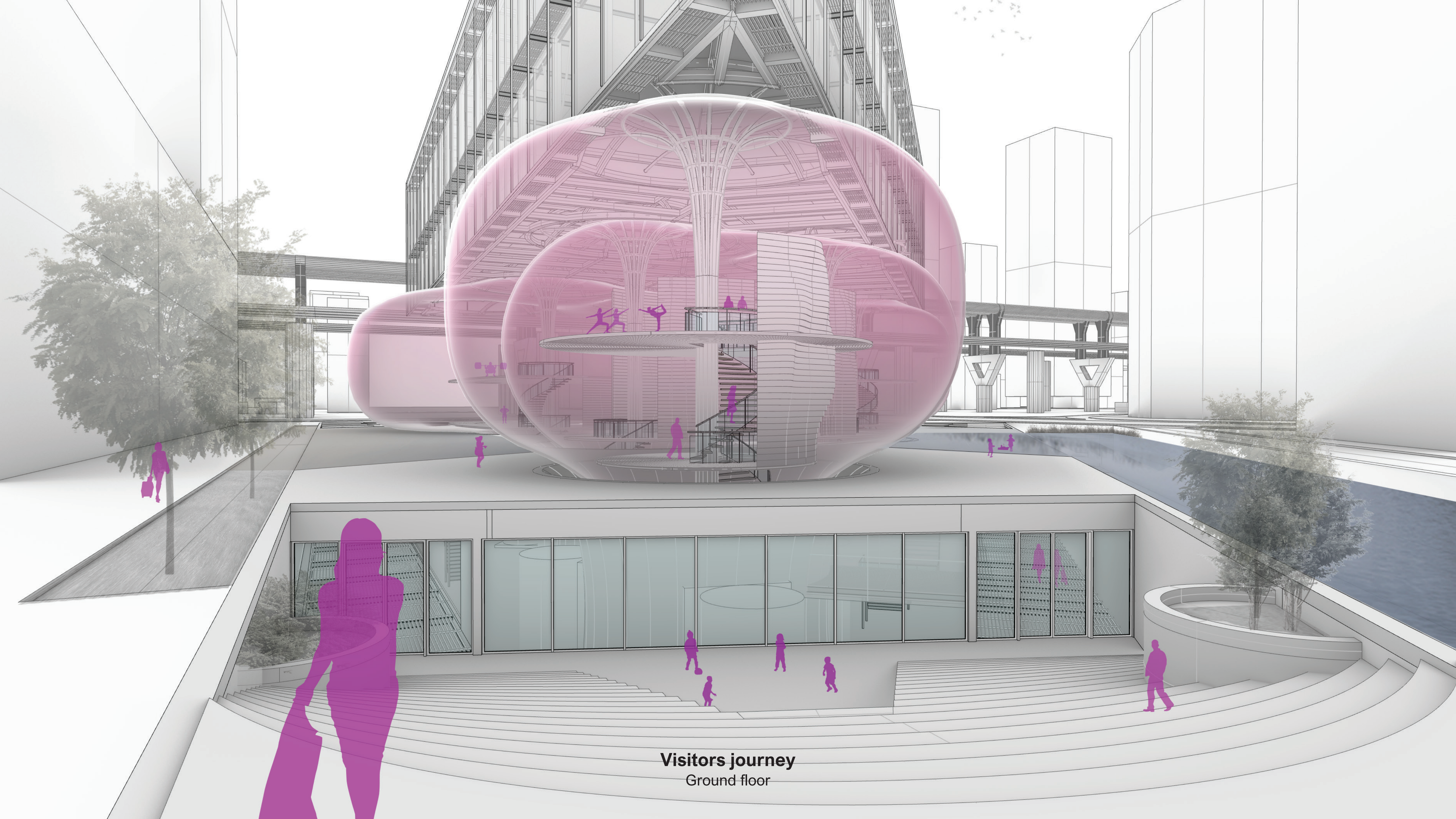
Visitors journey
The Energizer

THE ENERGIZER

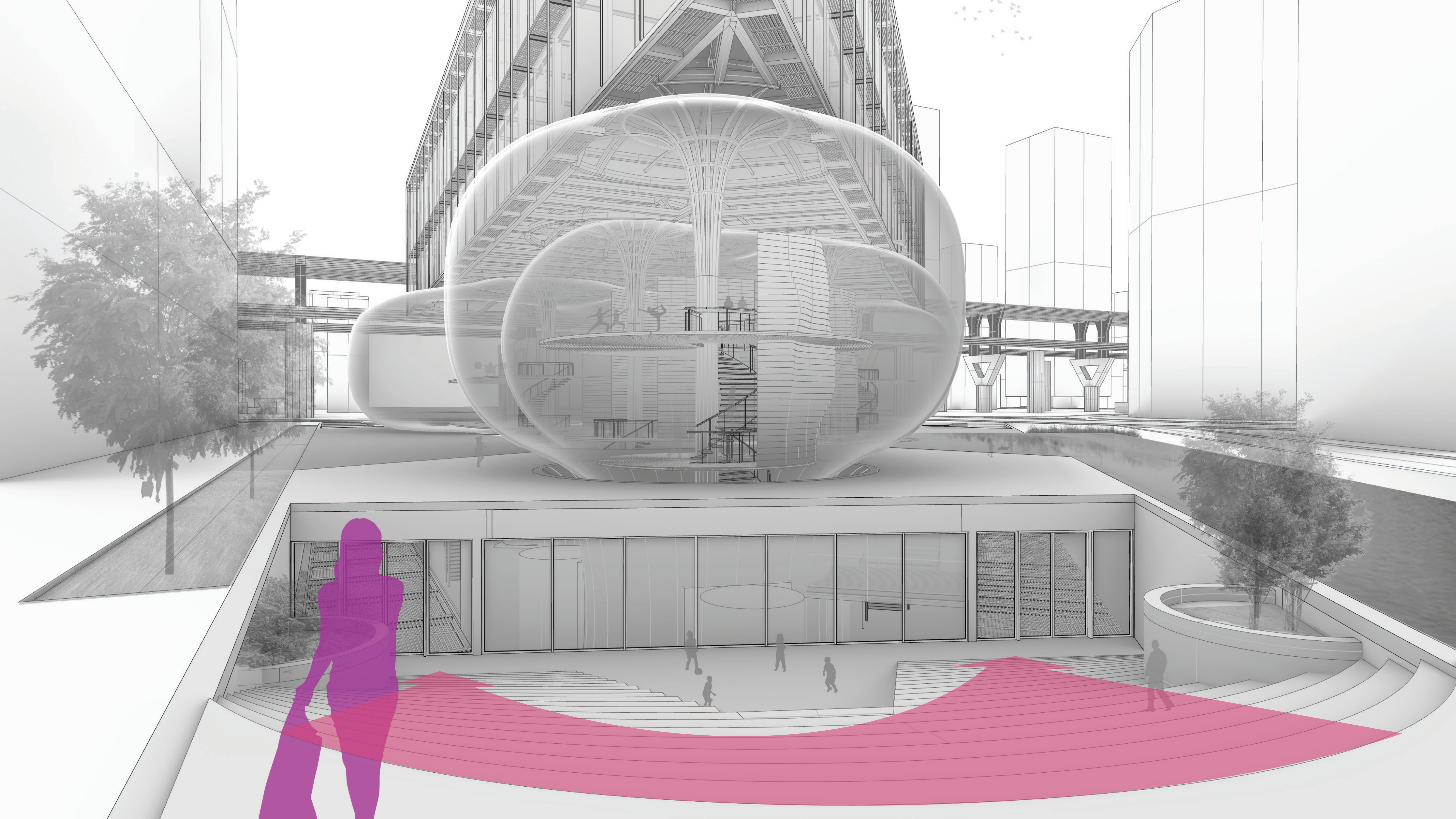


The energy system
The Energizer

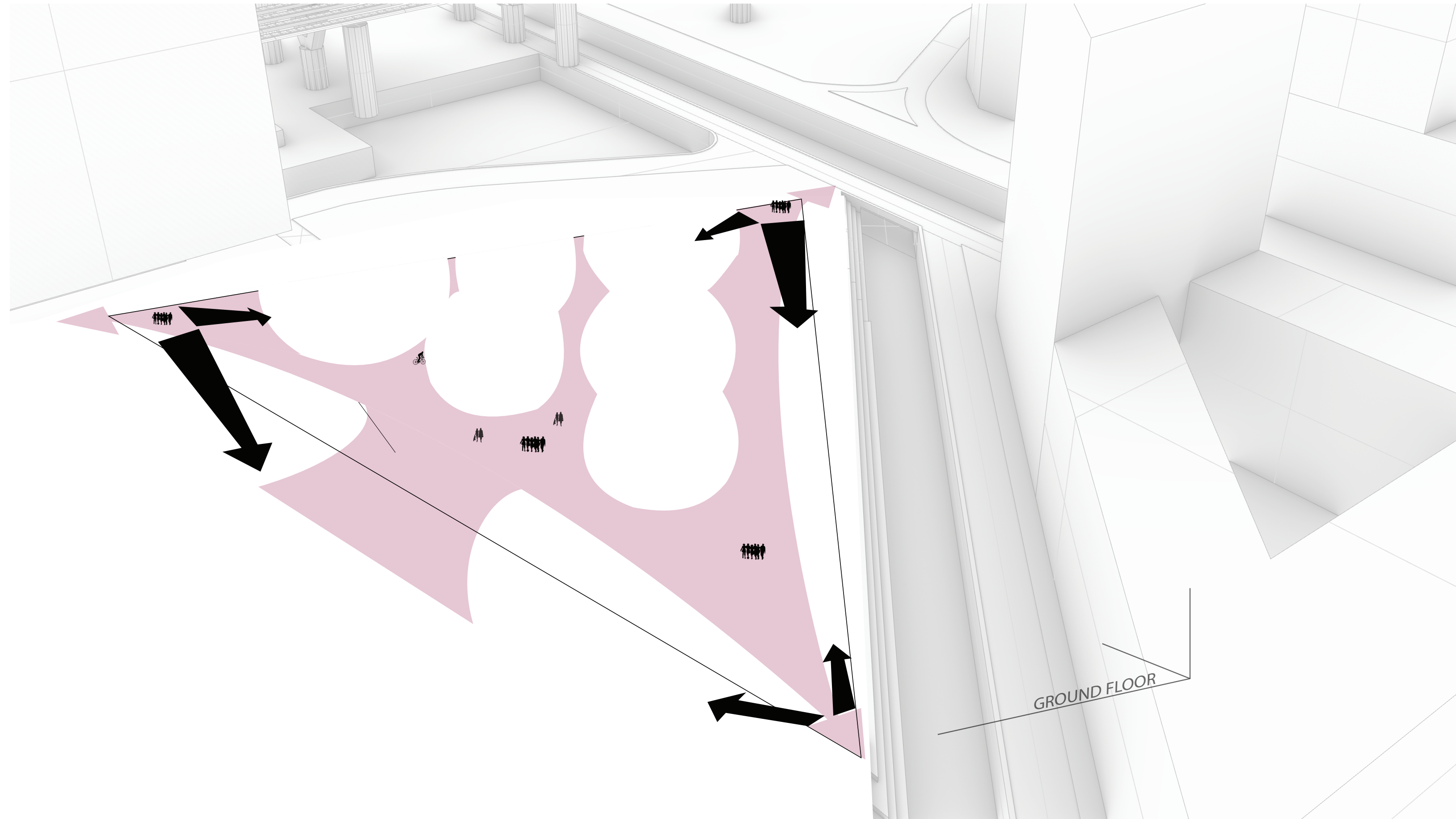




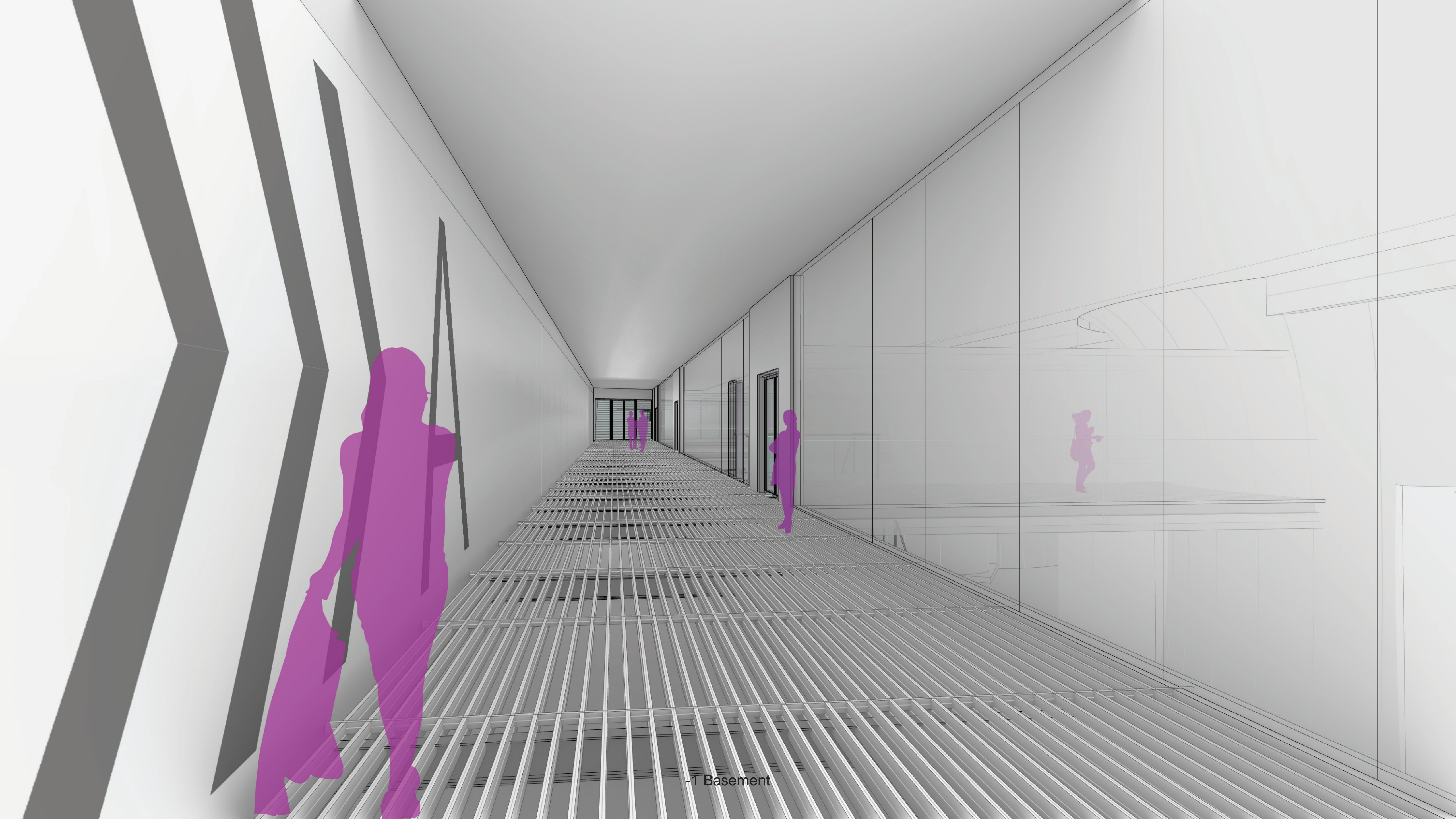
Visitors journey
Ground floor



THE ENERGIZER

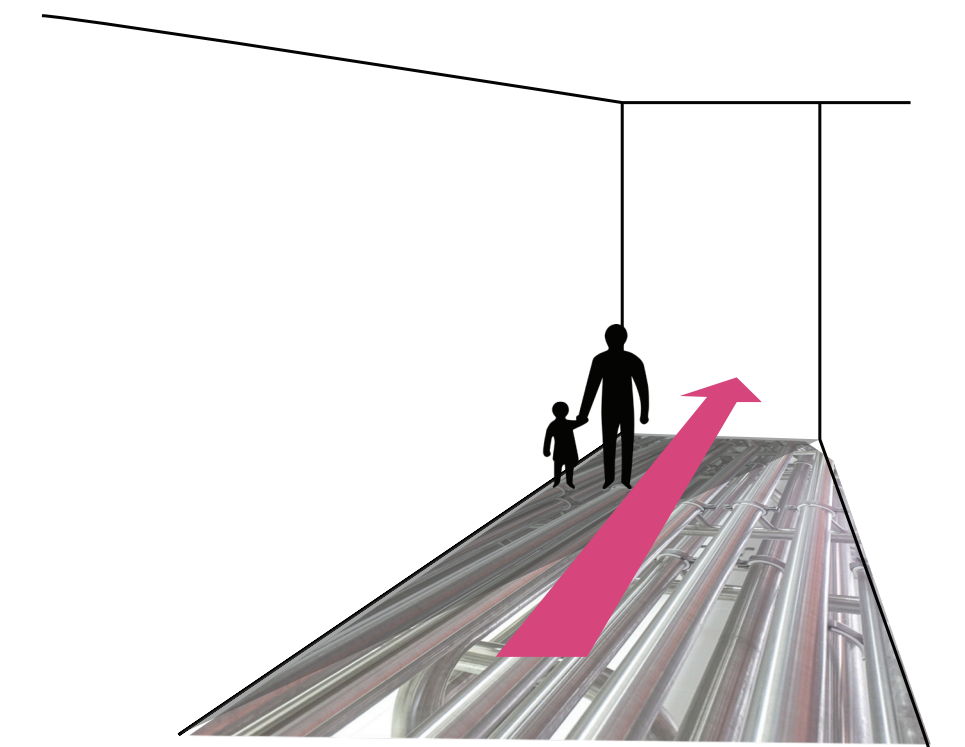
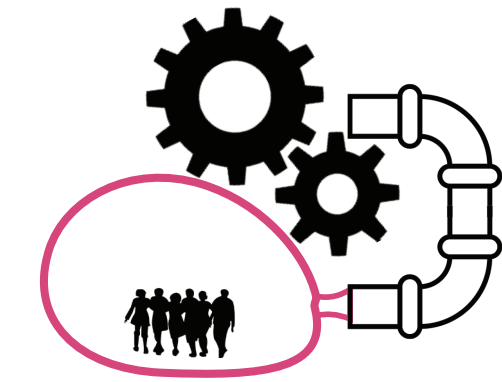
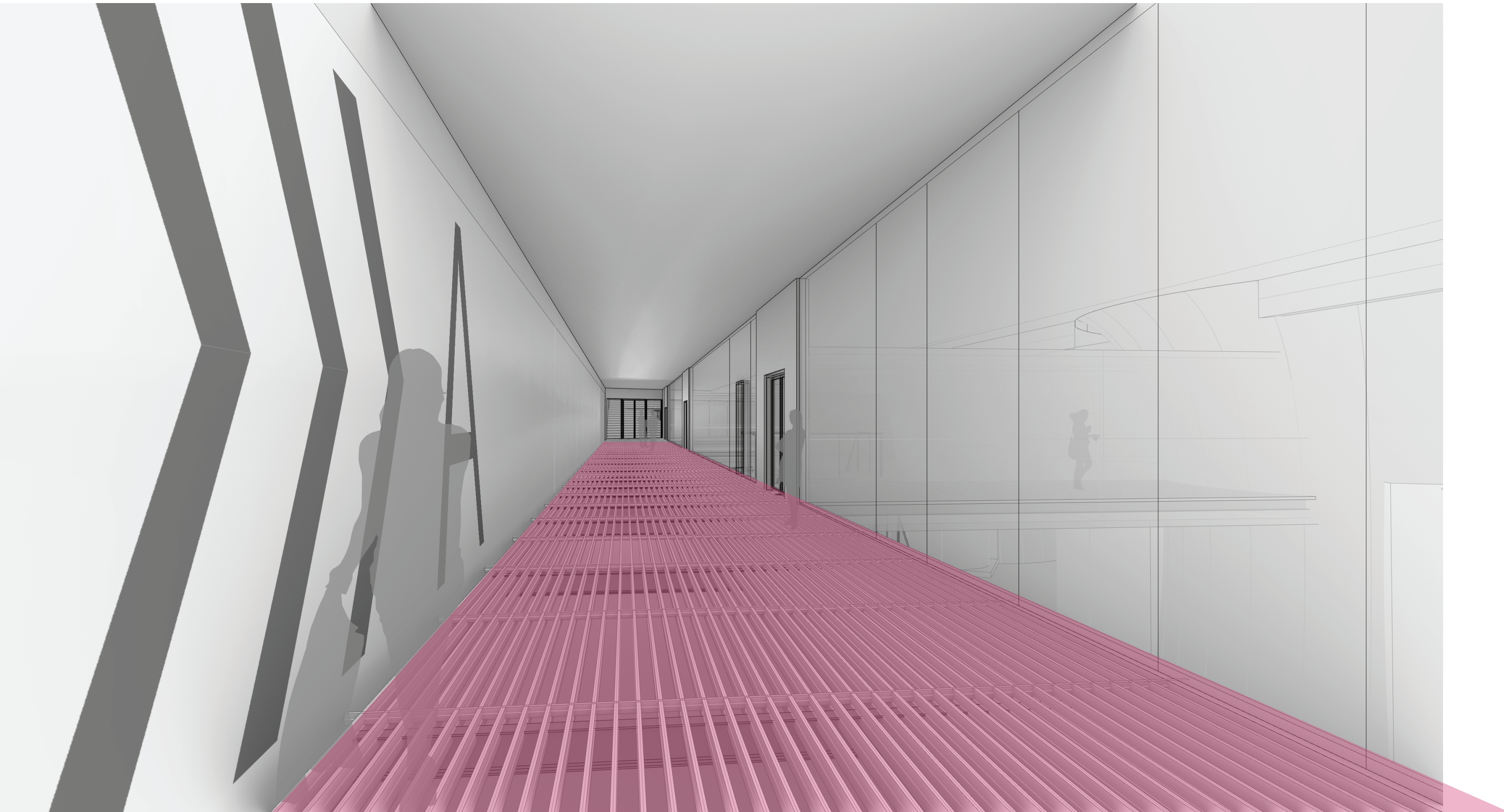


Routing
Ground floor



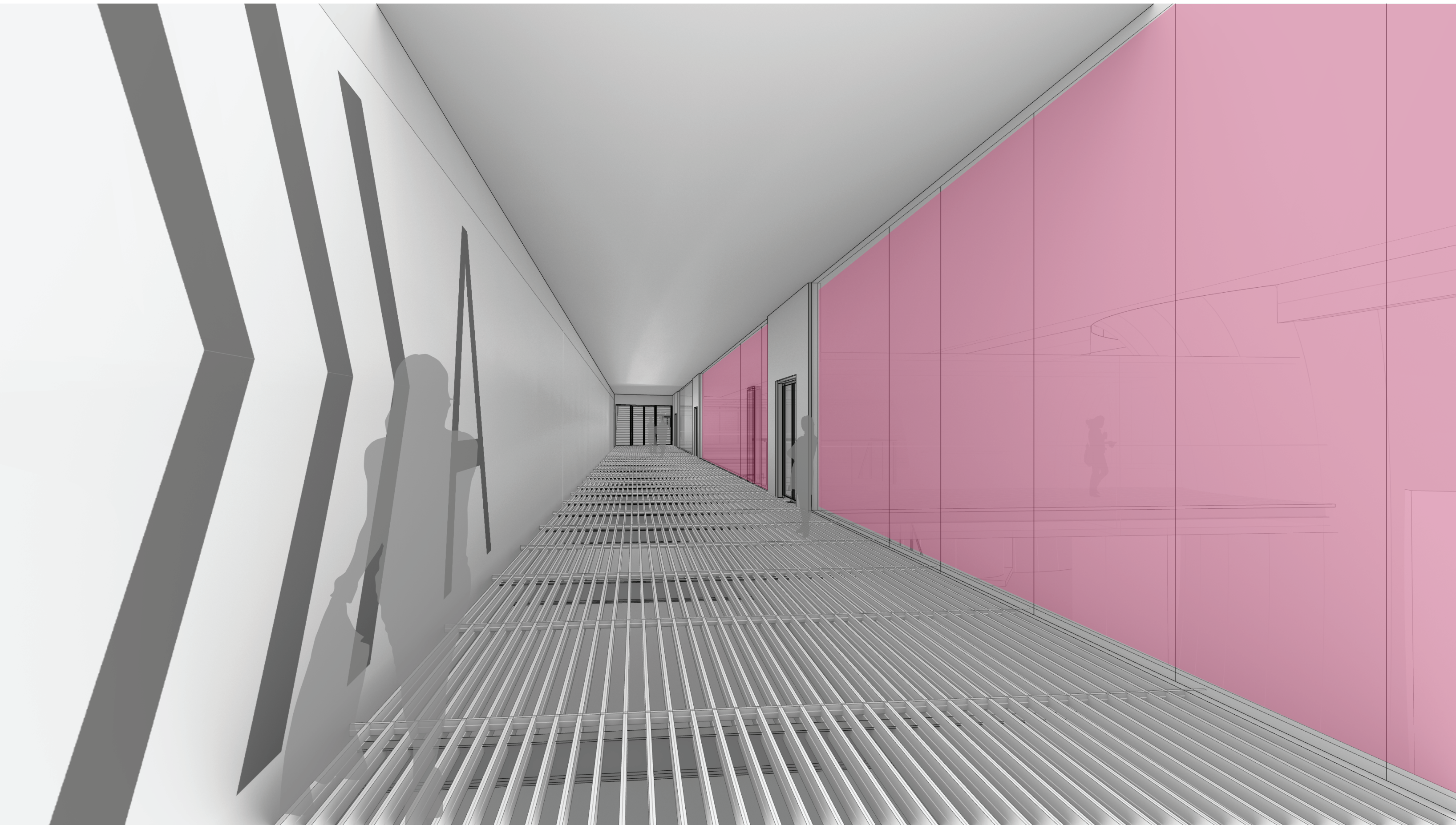
-1 Basement

THE ENERGIZER

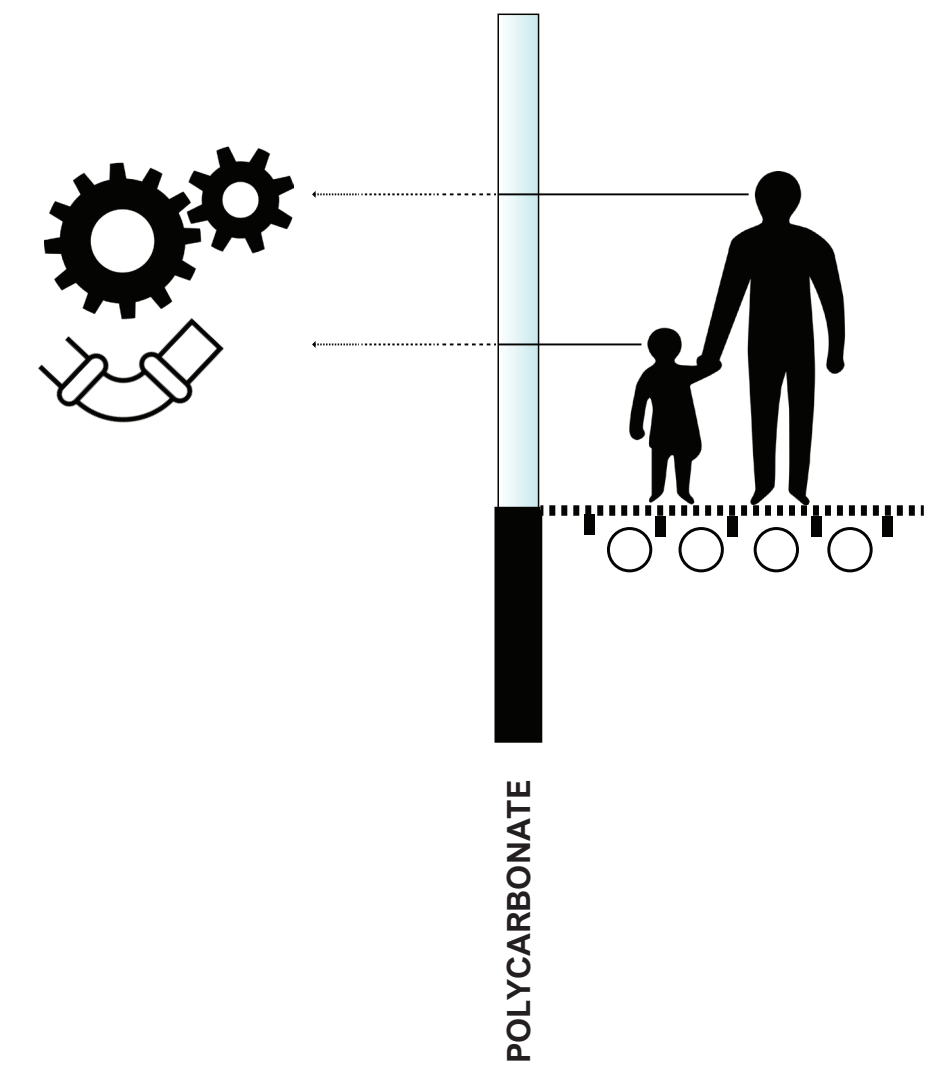


Routing concepts
-1 Basement

THE ENERGIZER



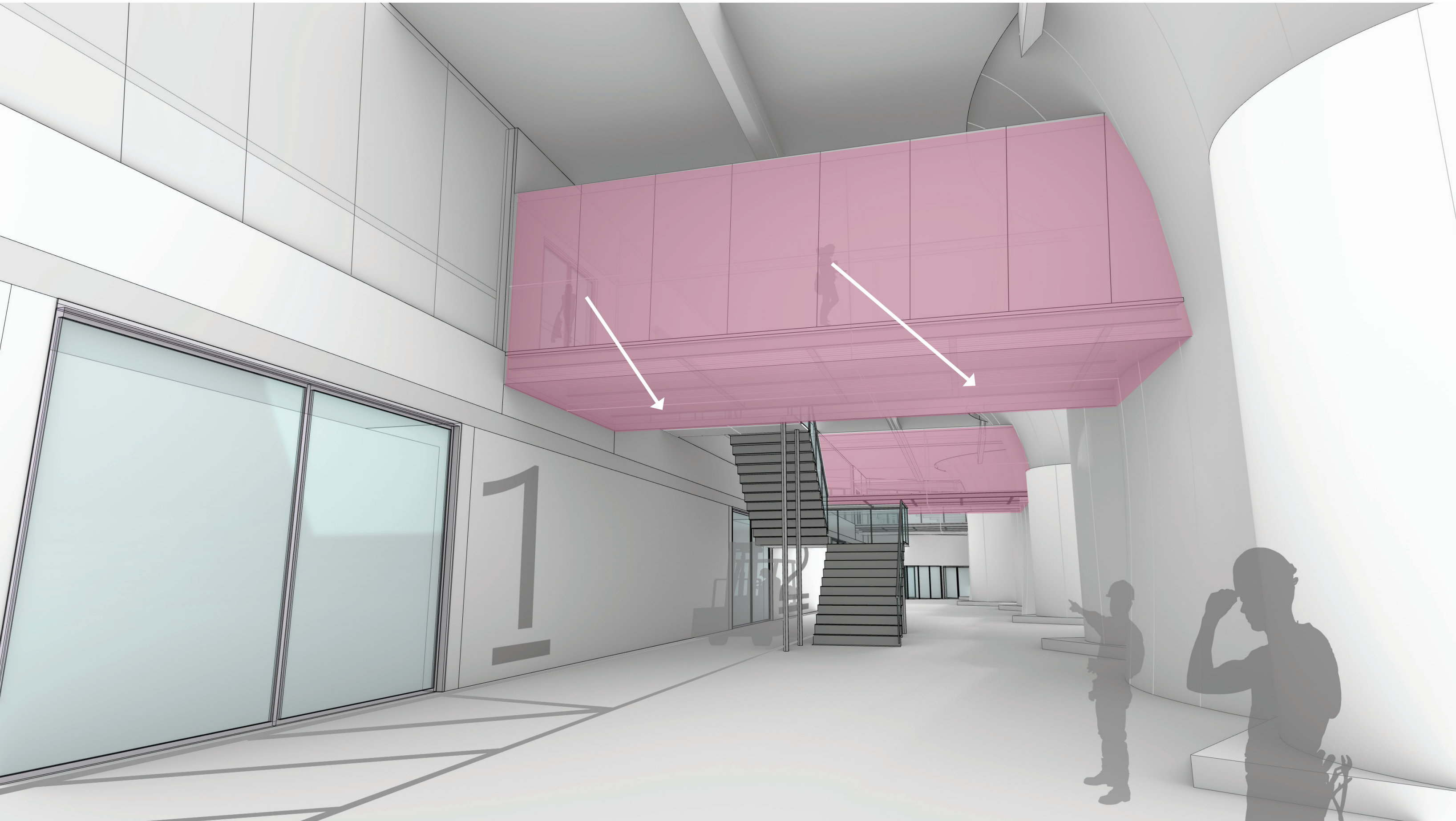
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-1 Basement



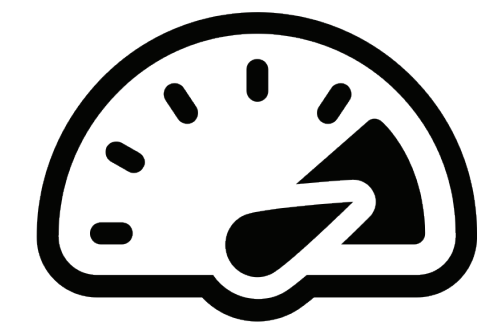


-2 Basement

THE ENERGIZER

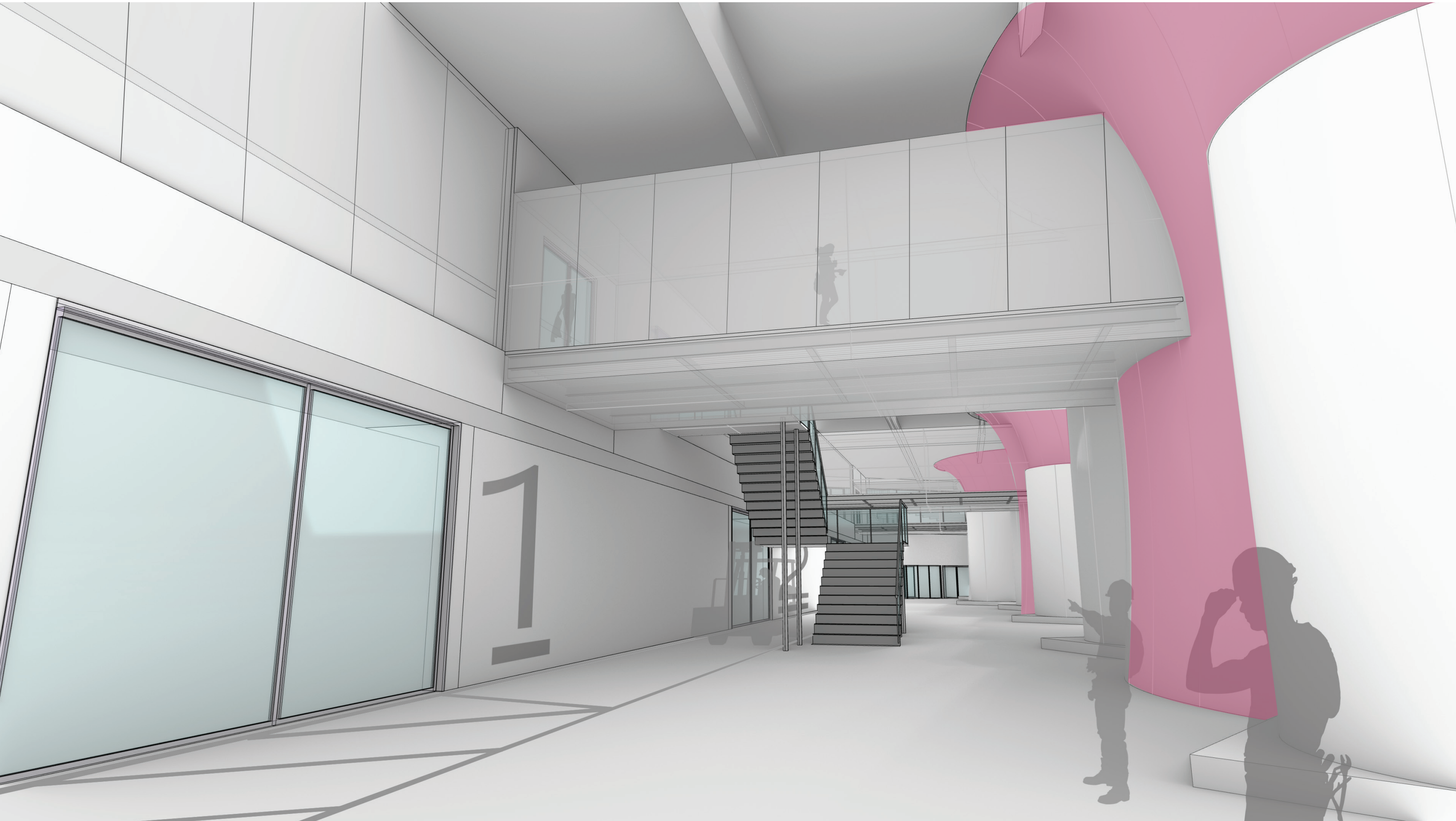


Routing
-2 Basement

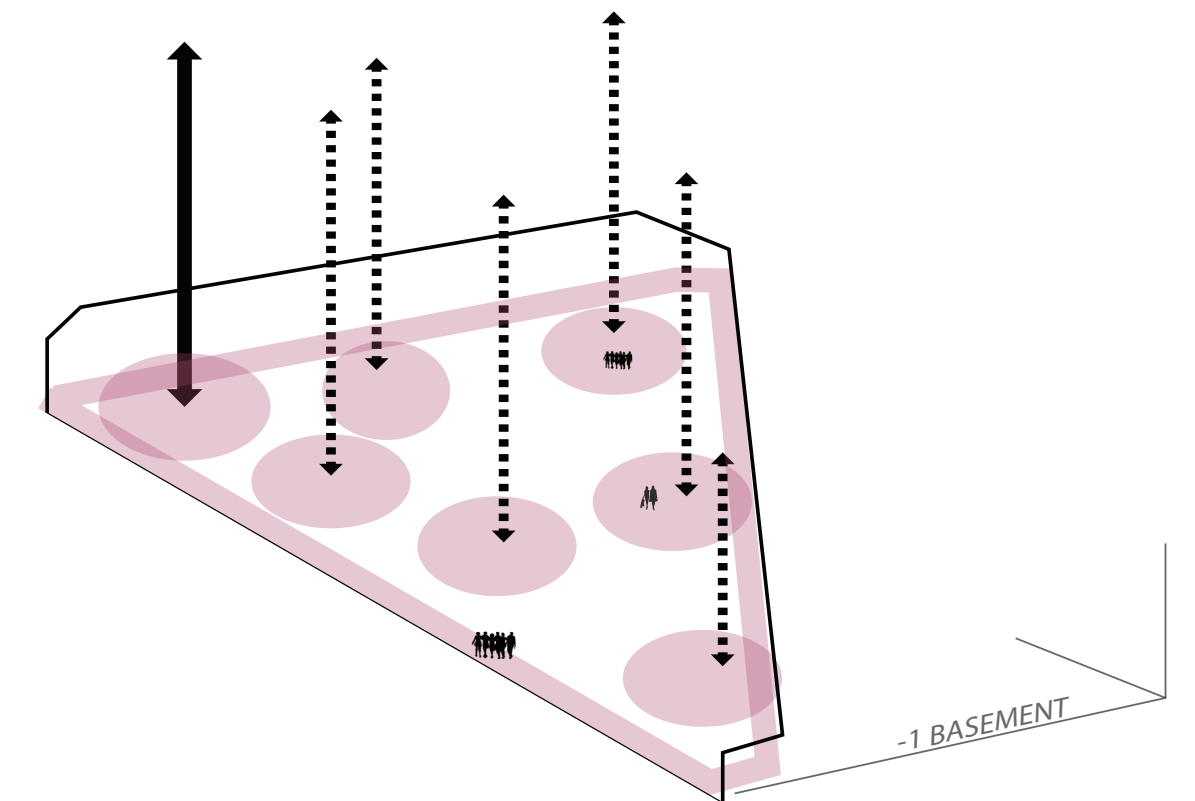


Pressure sluice

THE ENERGIZER



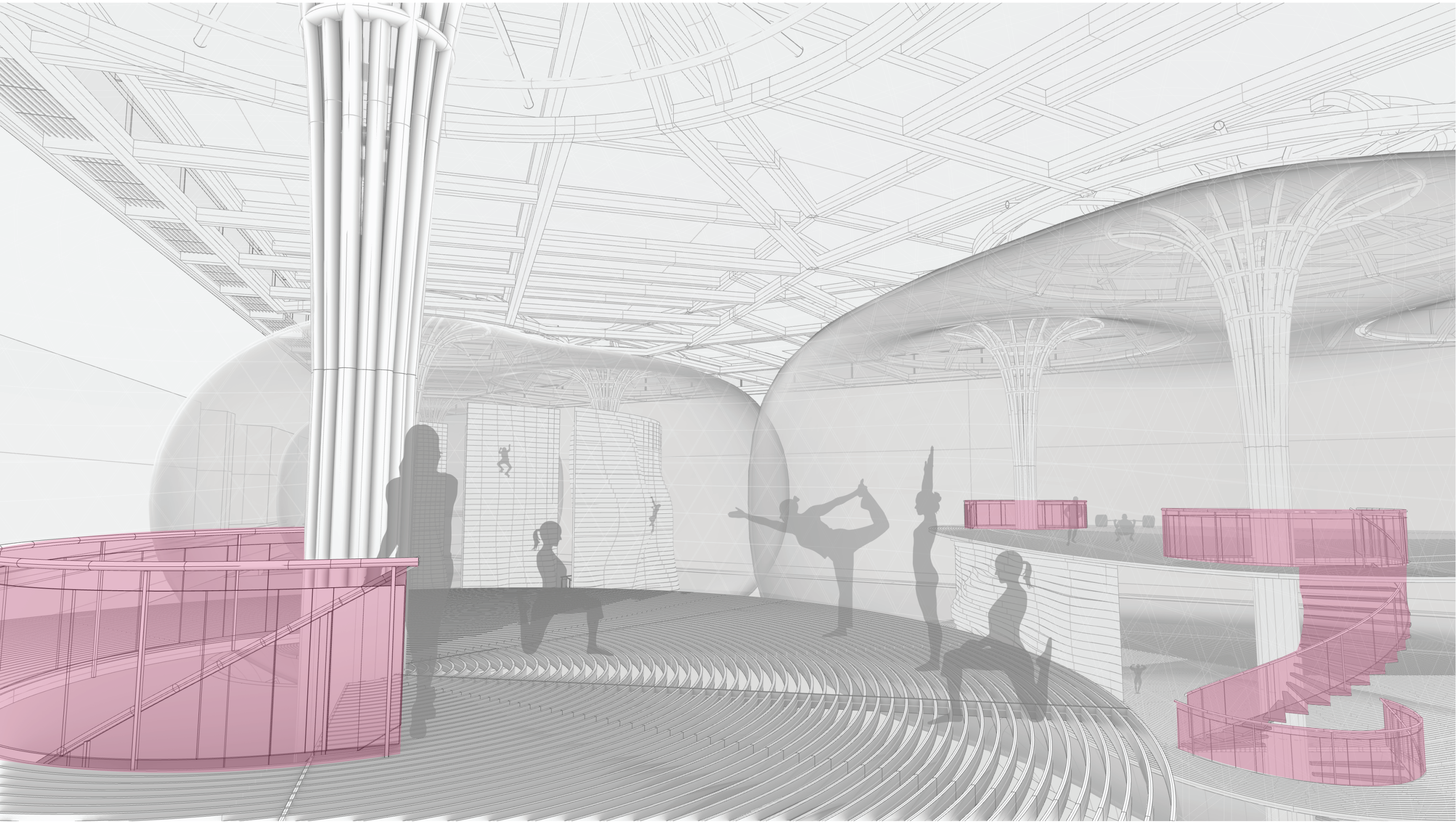
Routing
-2 Basement



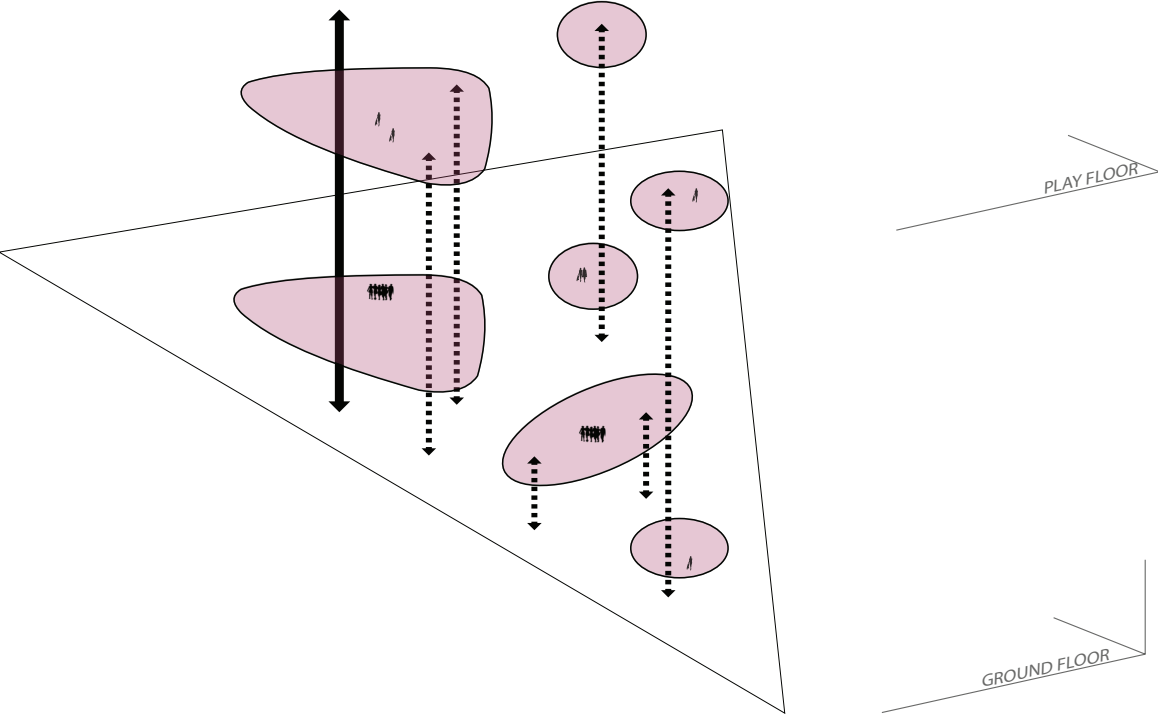


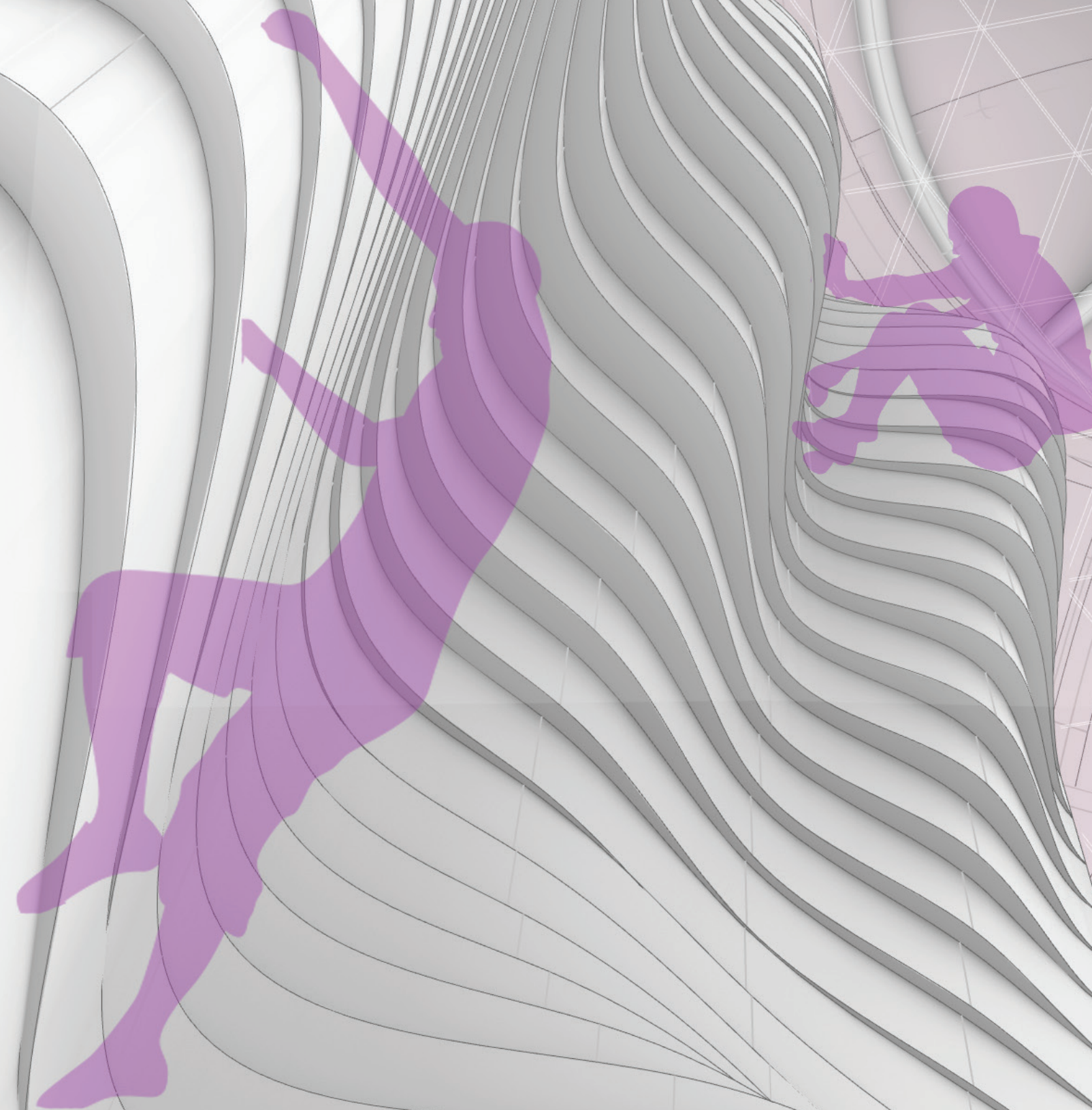
First play floor

THE ENERGIZER

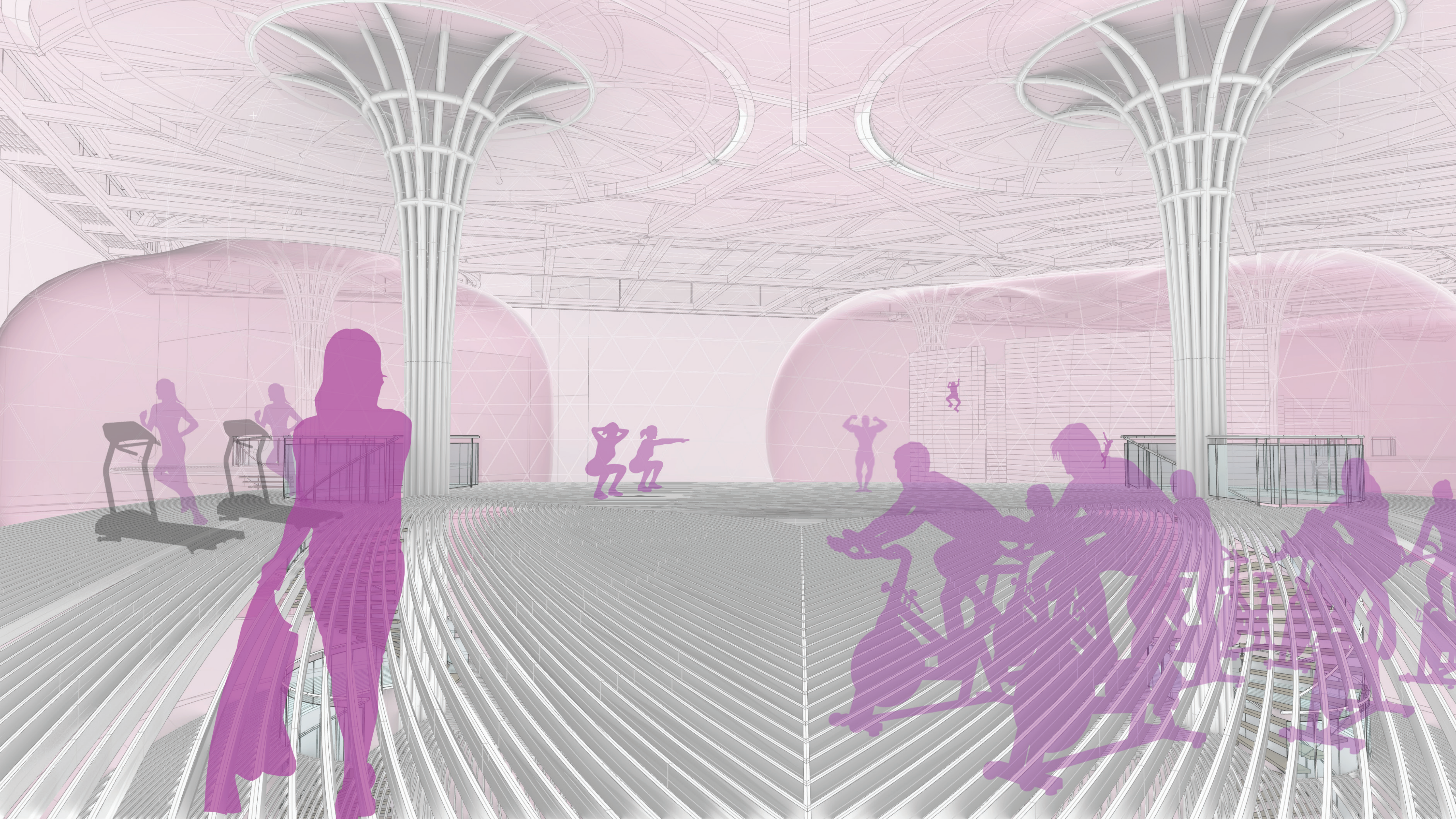


Routing
First play floor

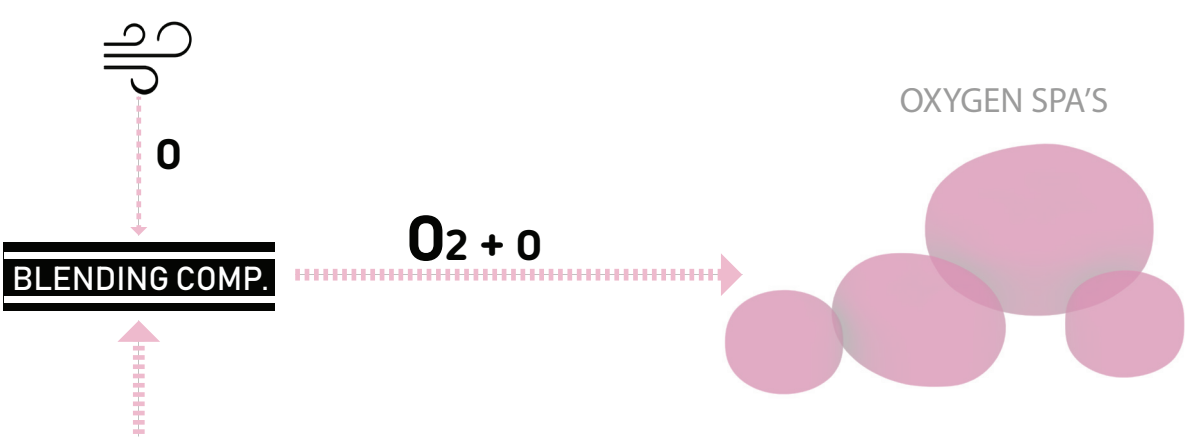
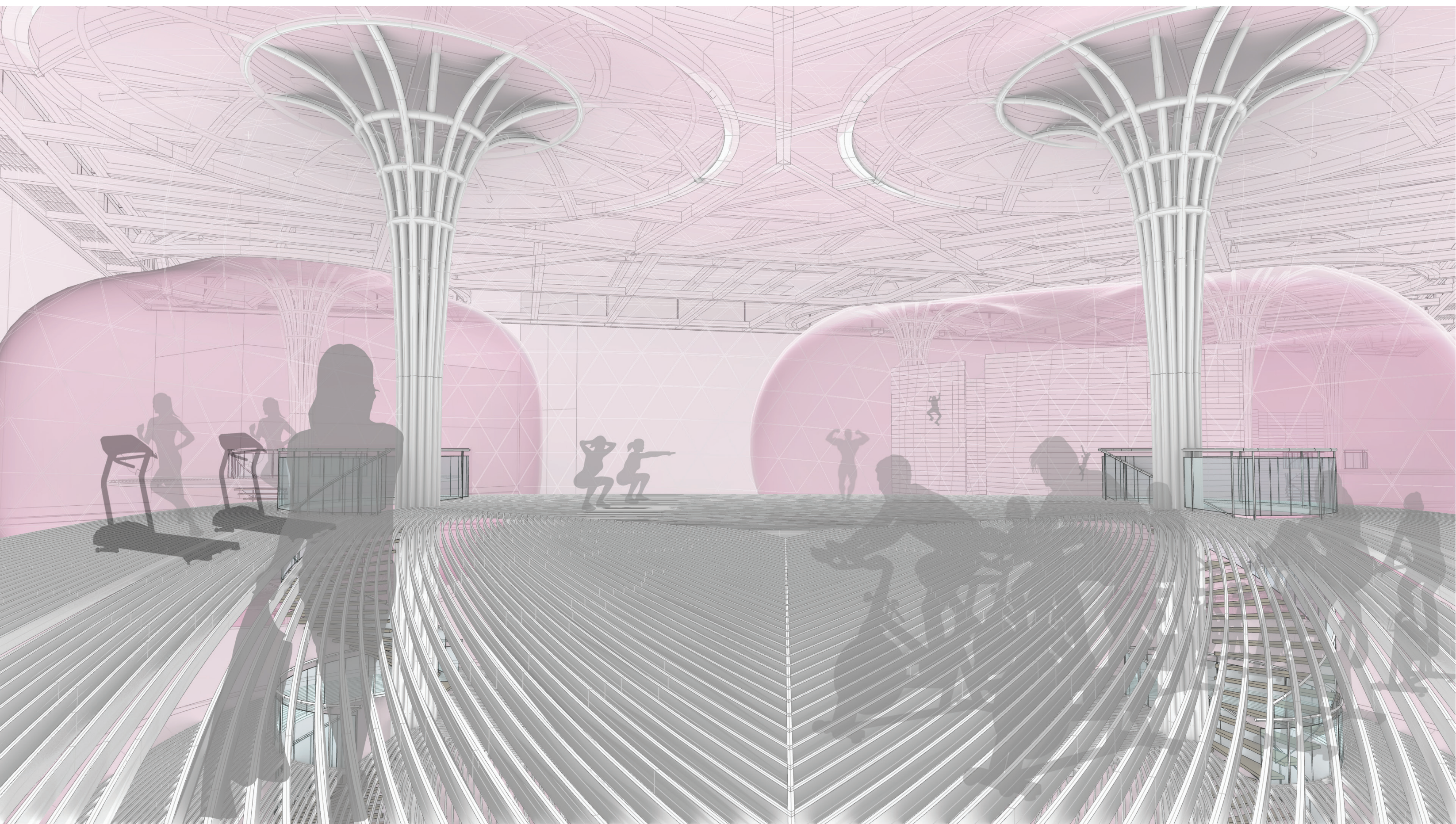




Activities
The Energizer



THE ENERGIZER

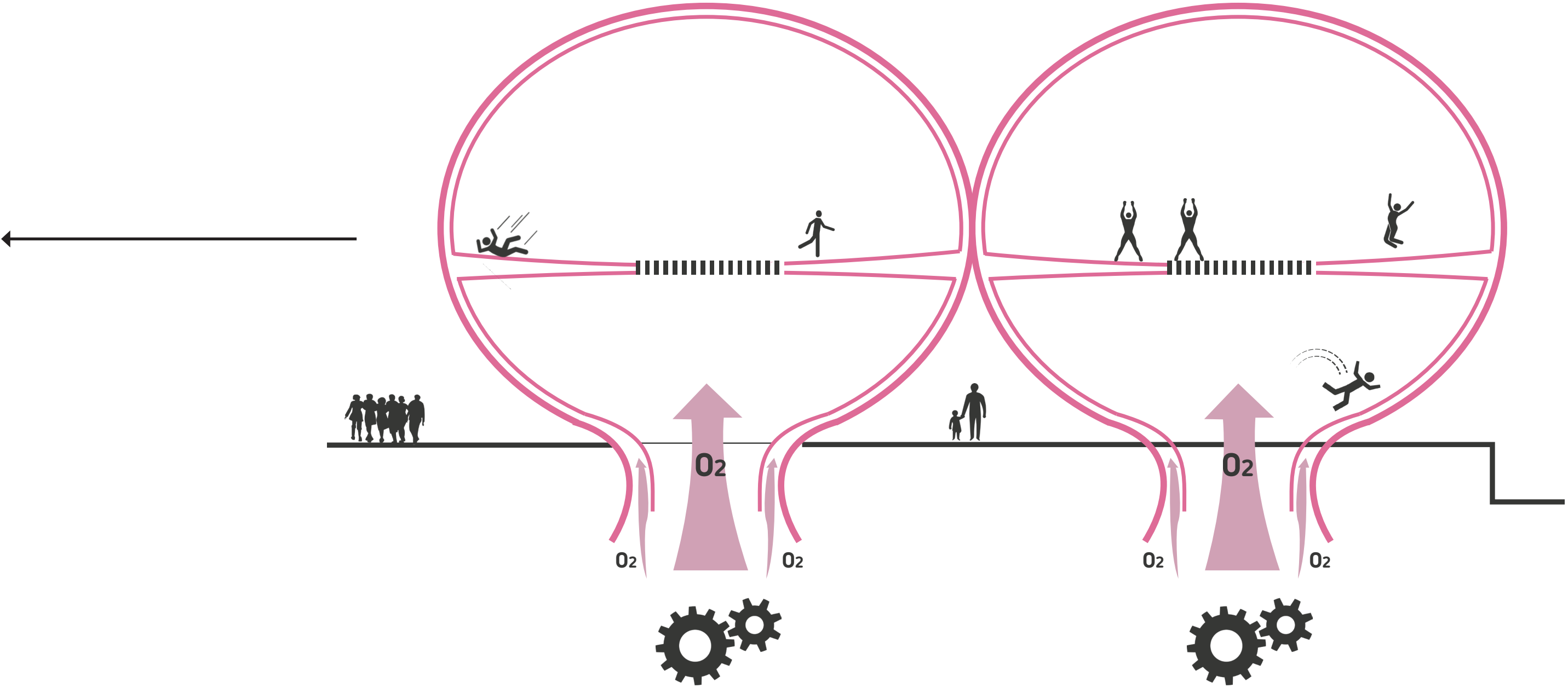
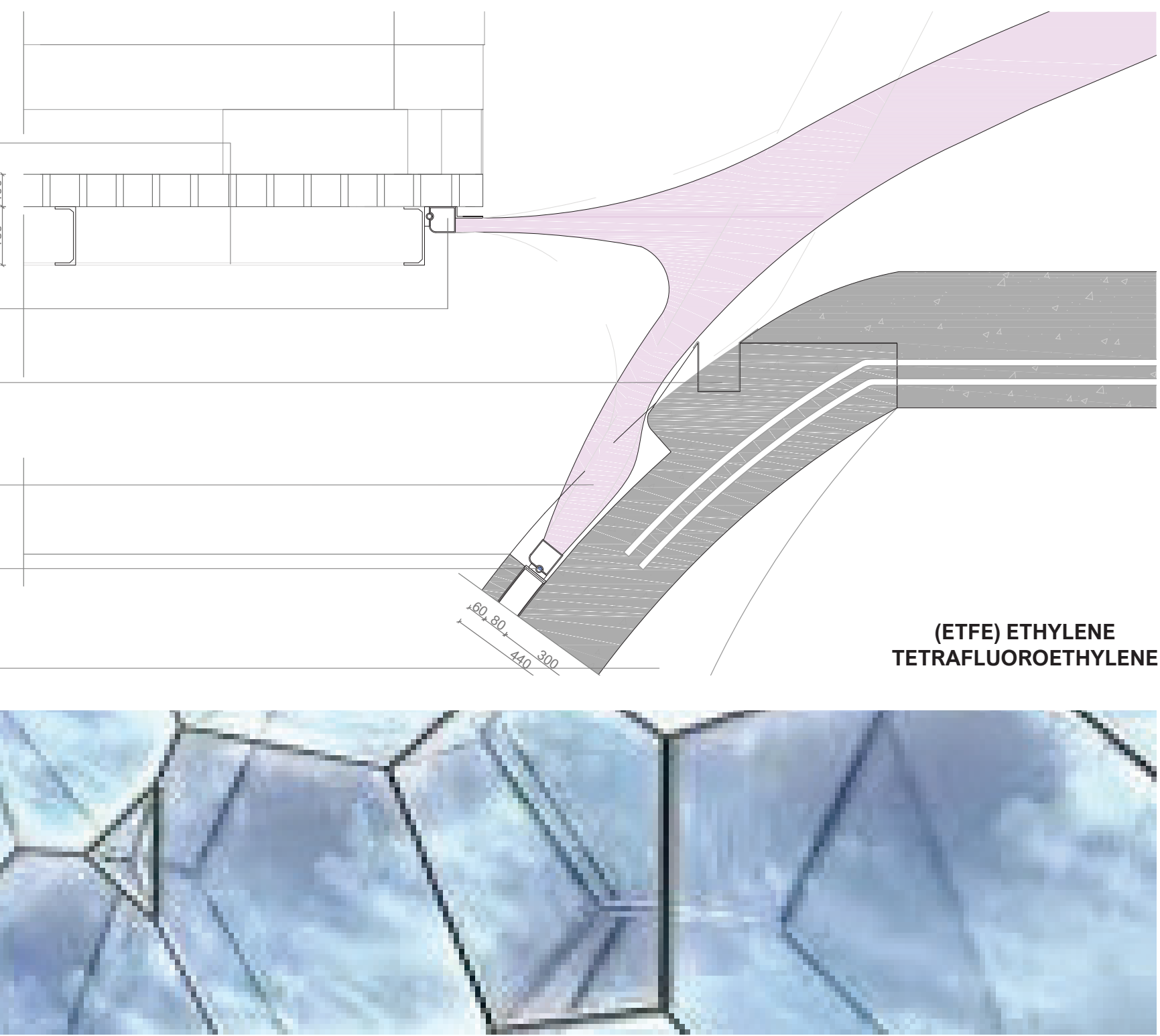


How is the oxygen sport centre created?

Inflatable spaces
The Energizer

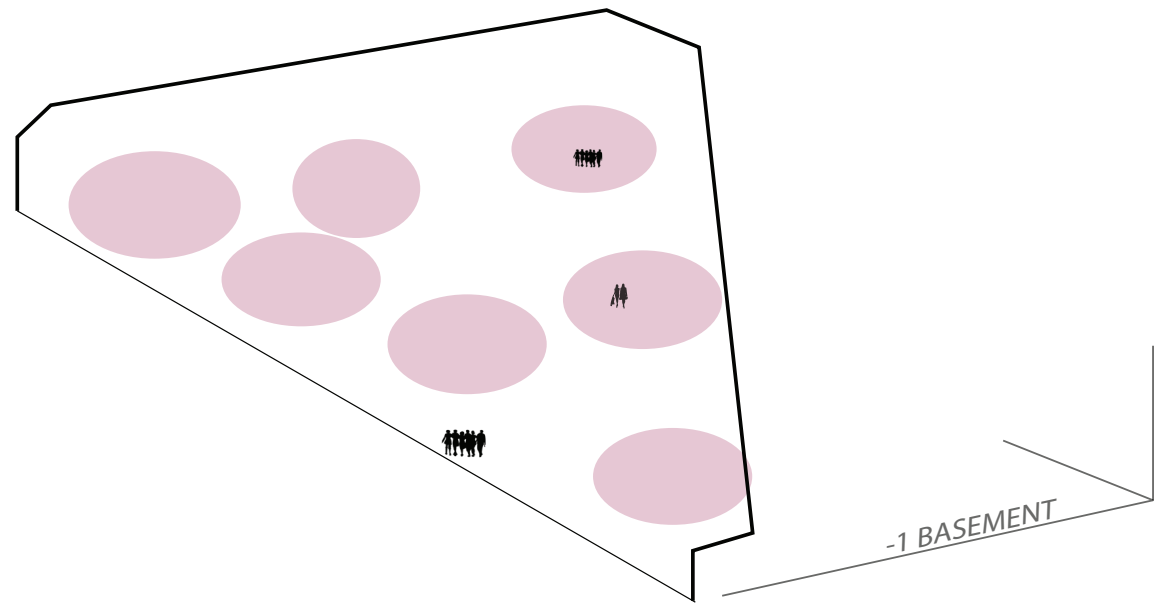
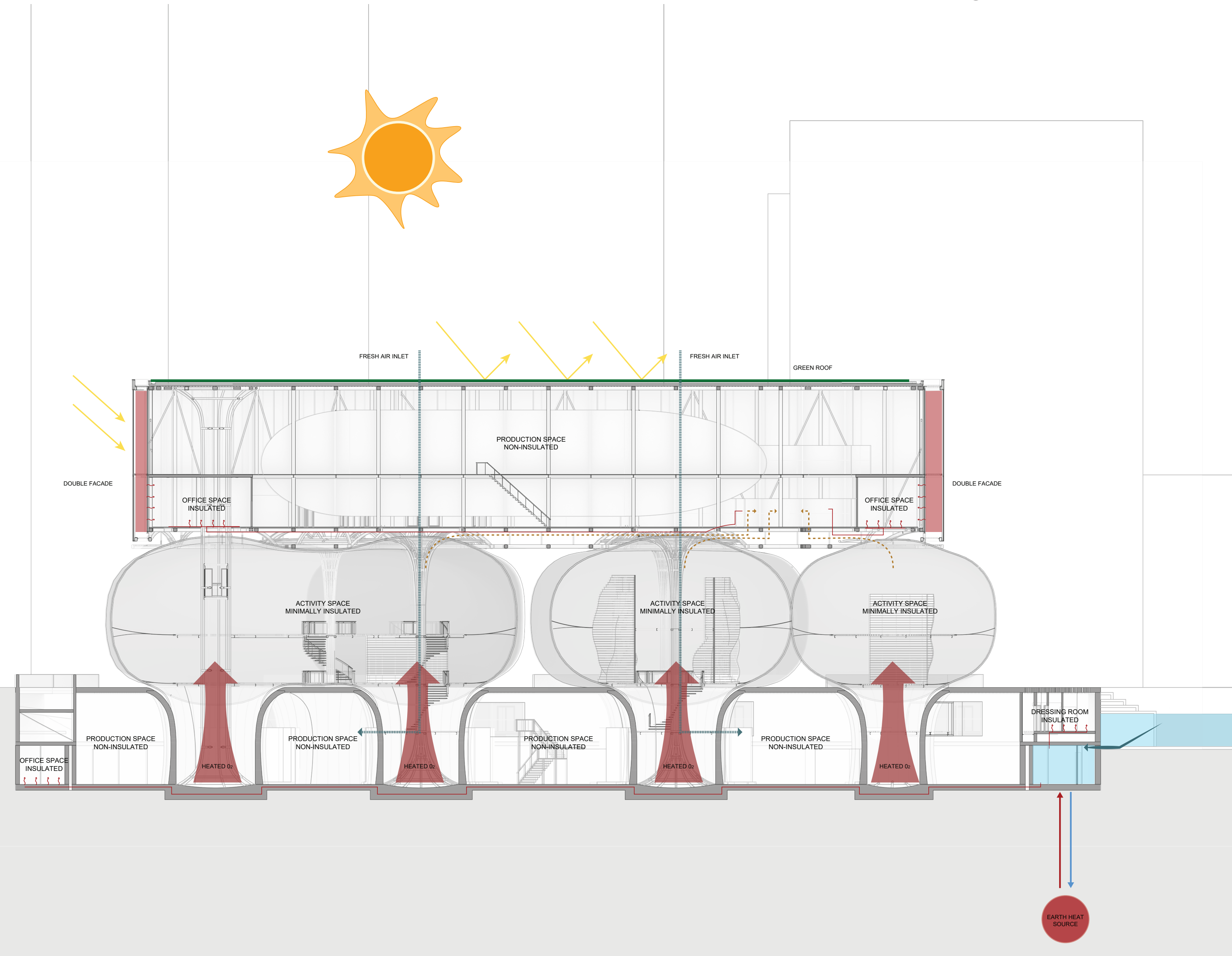
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THE ENERGIZER

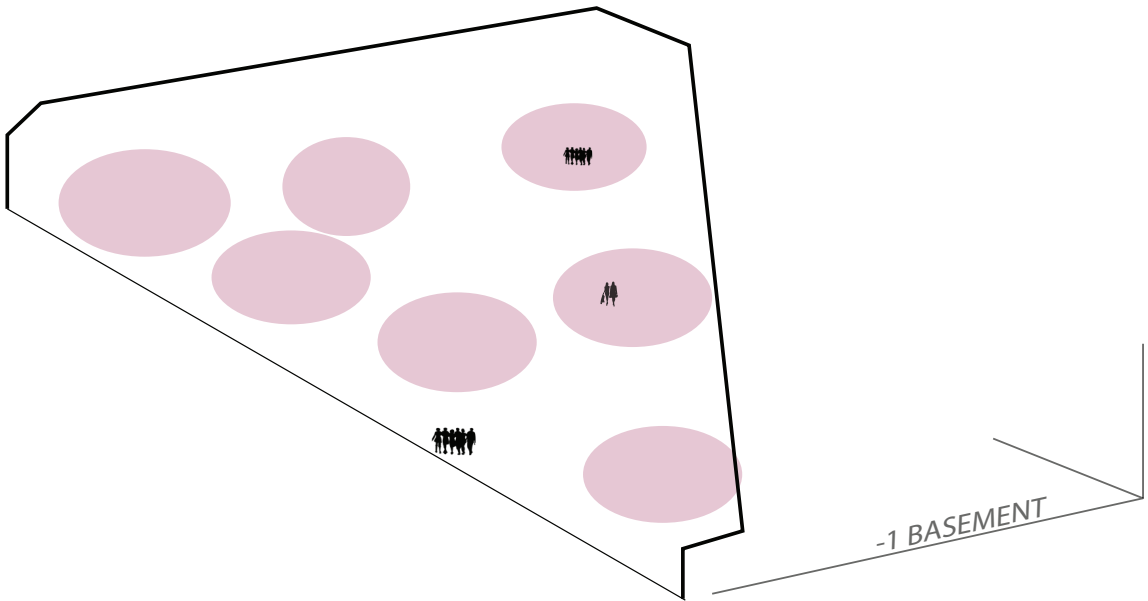
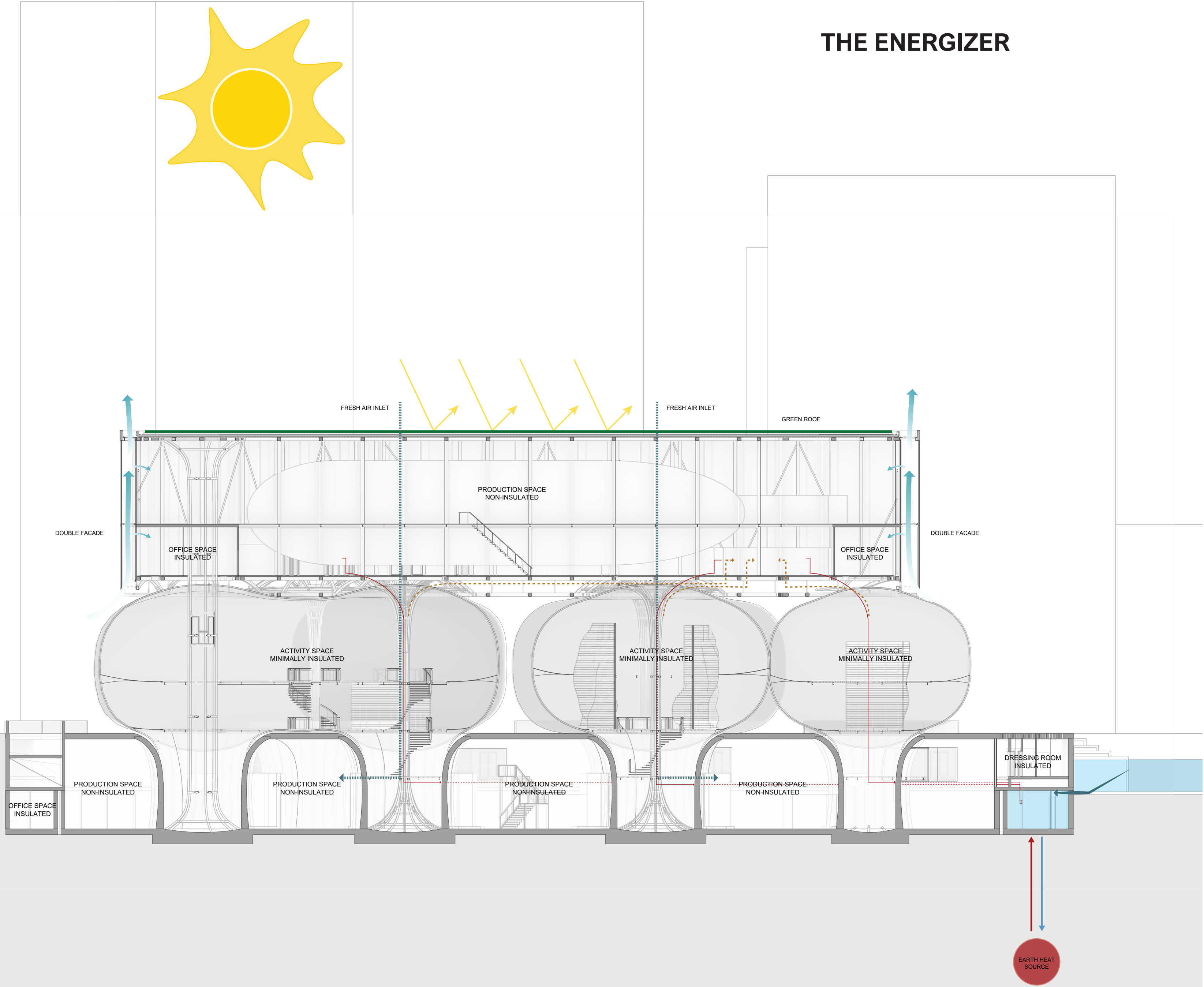


Inflatables principle
The Energizer

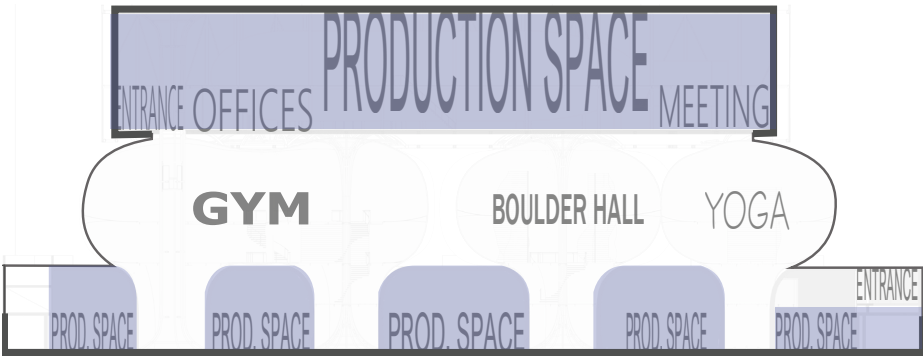
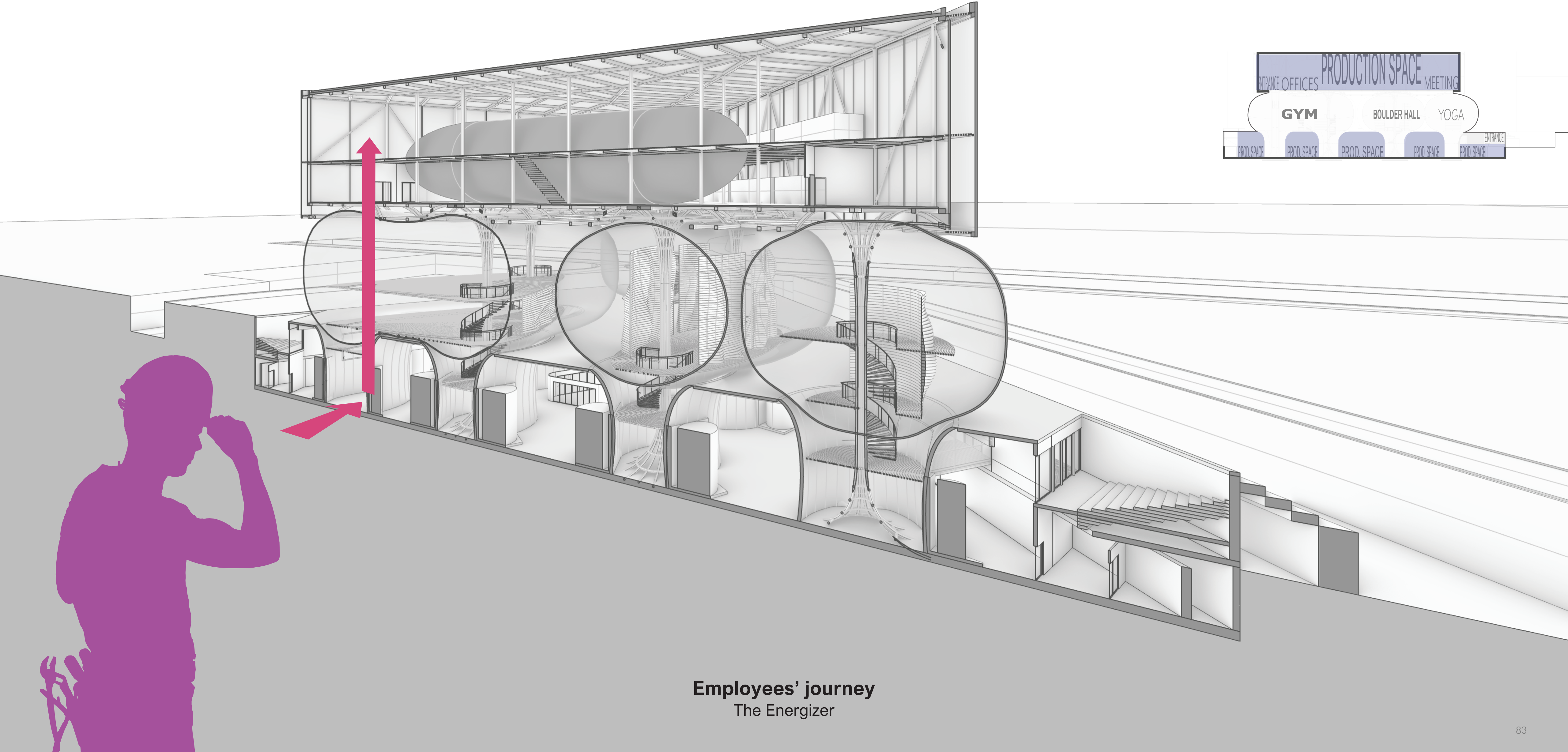
THE ENERGIZER



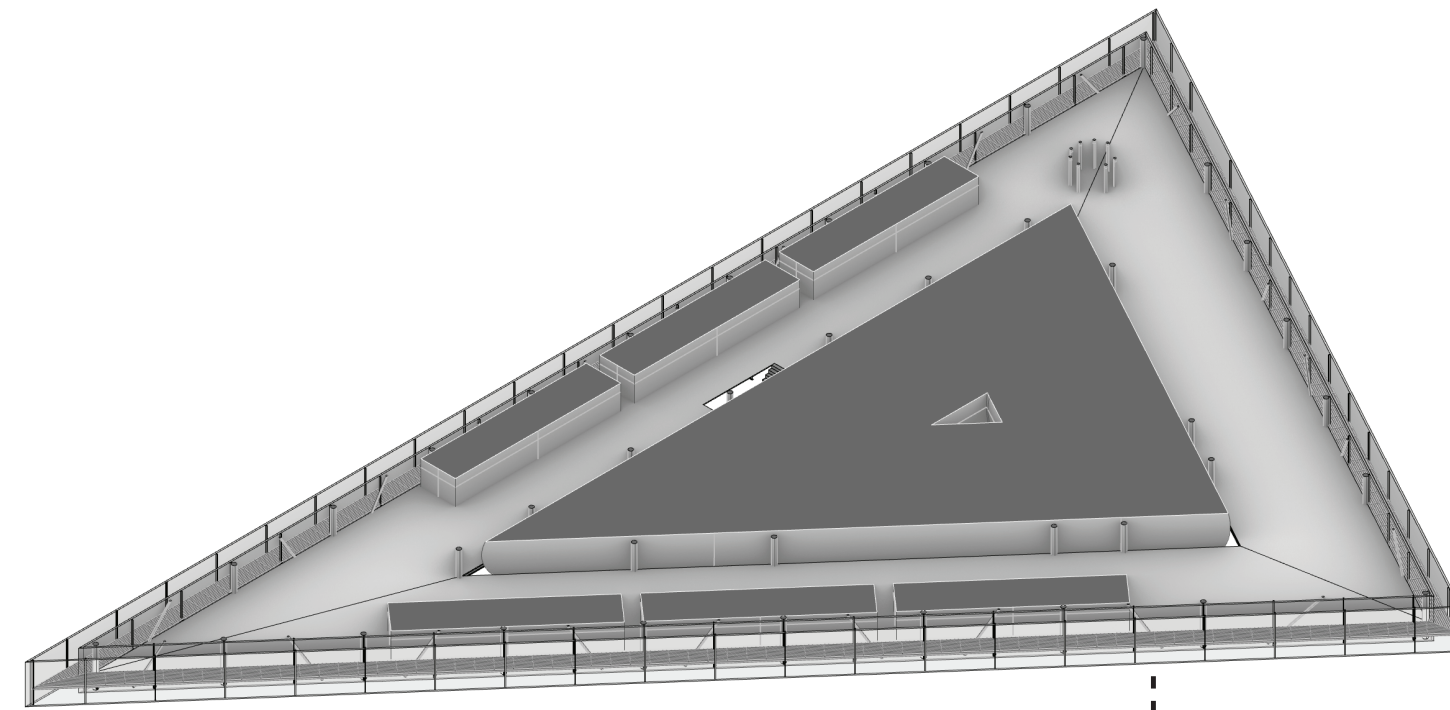
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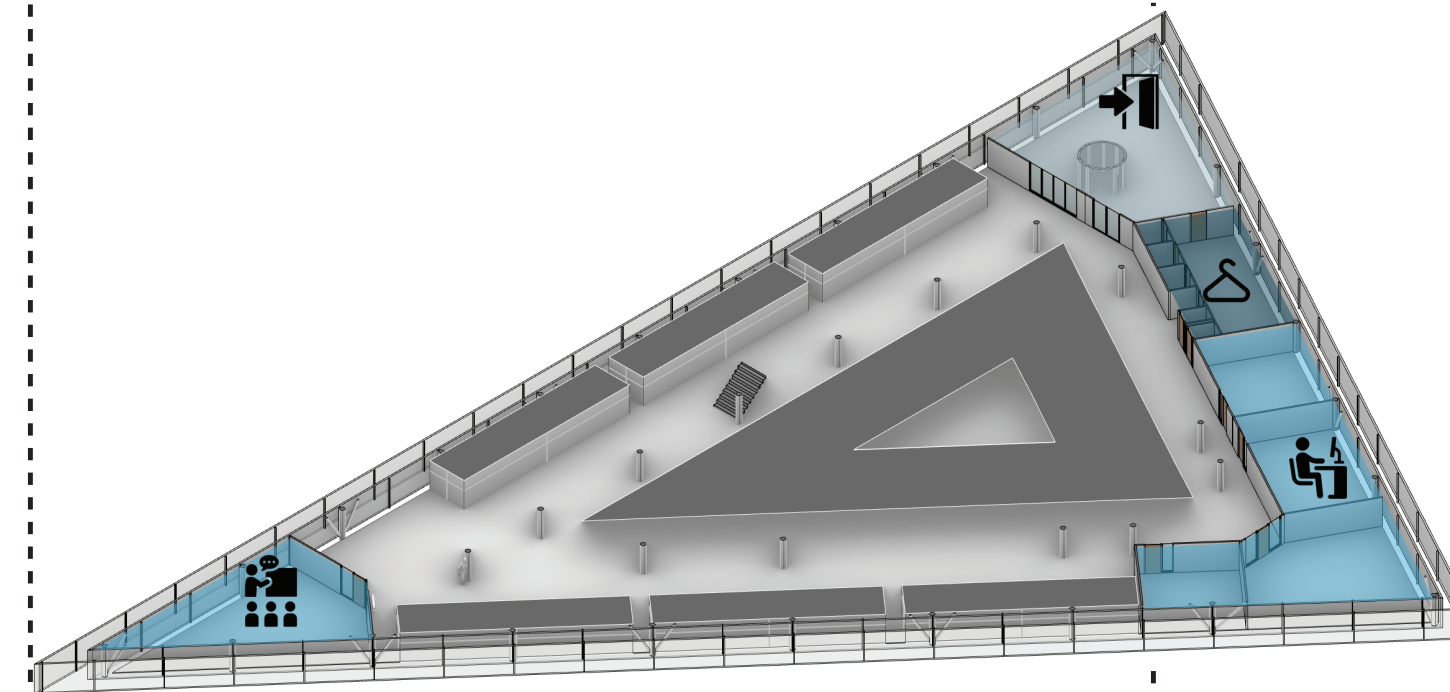
THE ENERGIZER



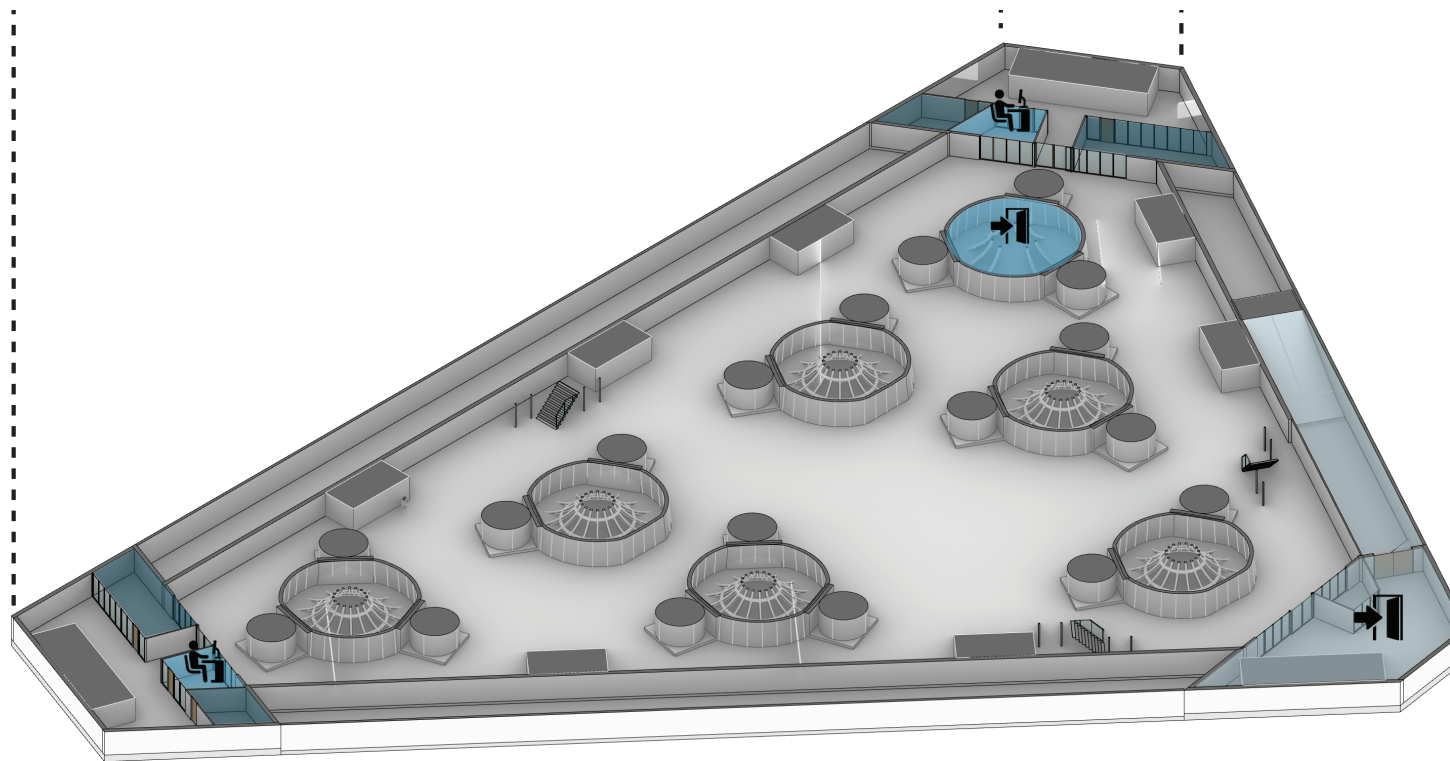
Employees' journey
The Energizer



THIRD FLOOR



SECOND FLOOR

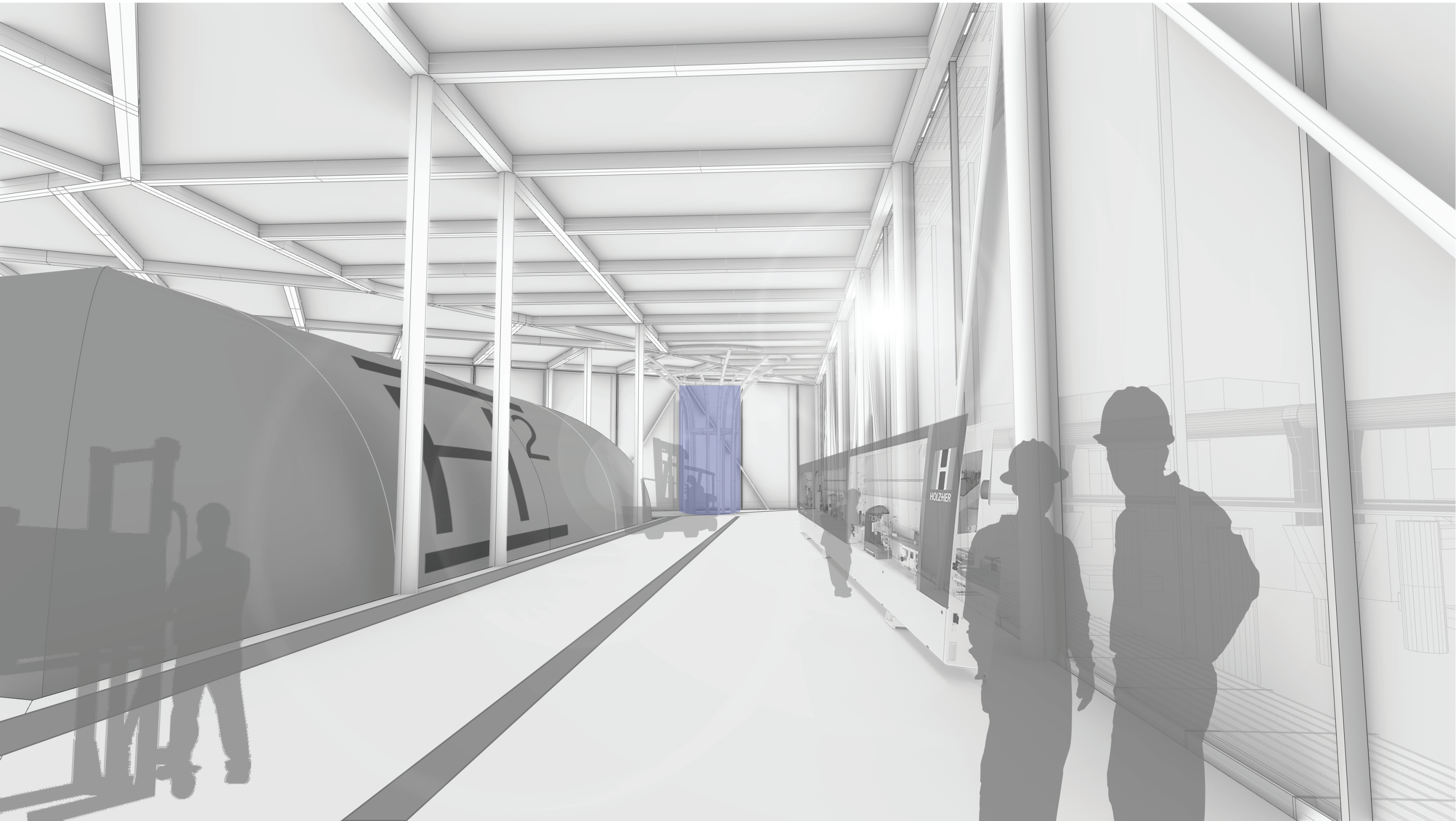


-2 BASEMENT

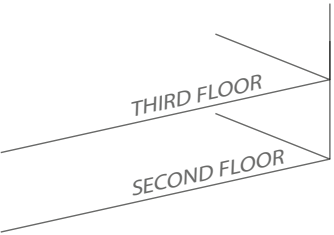
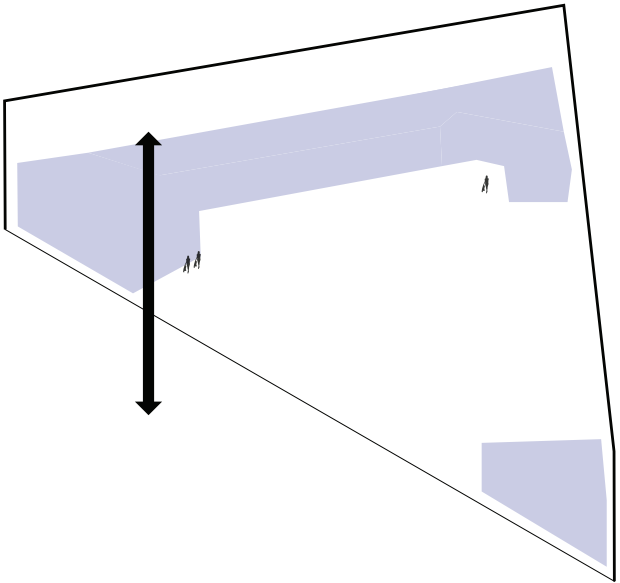


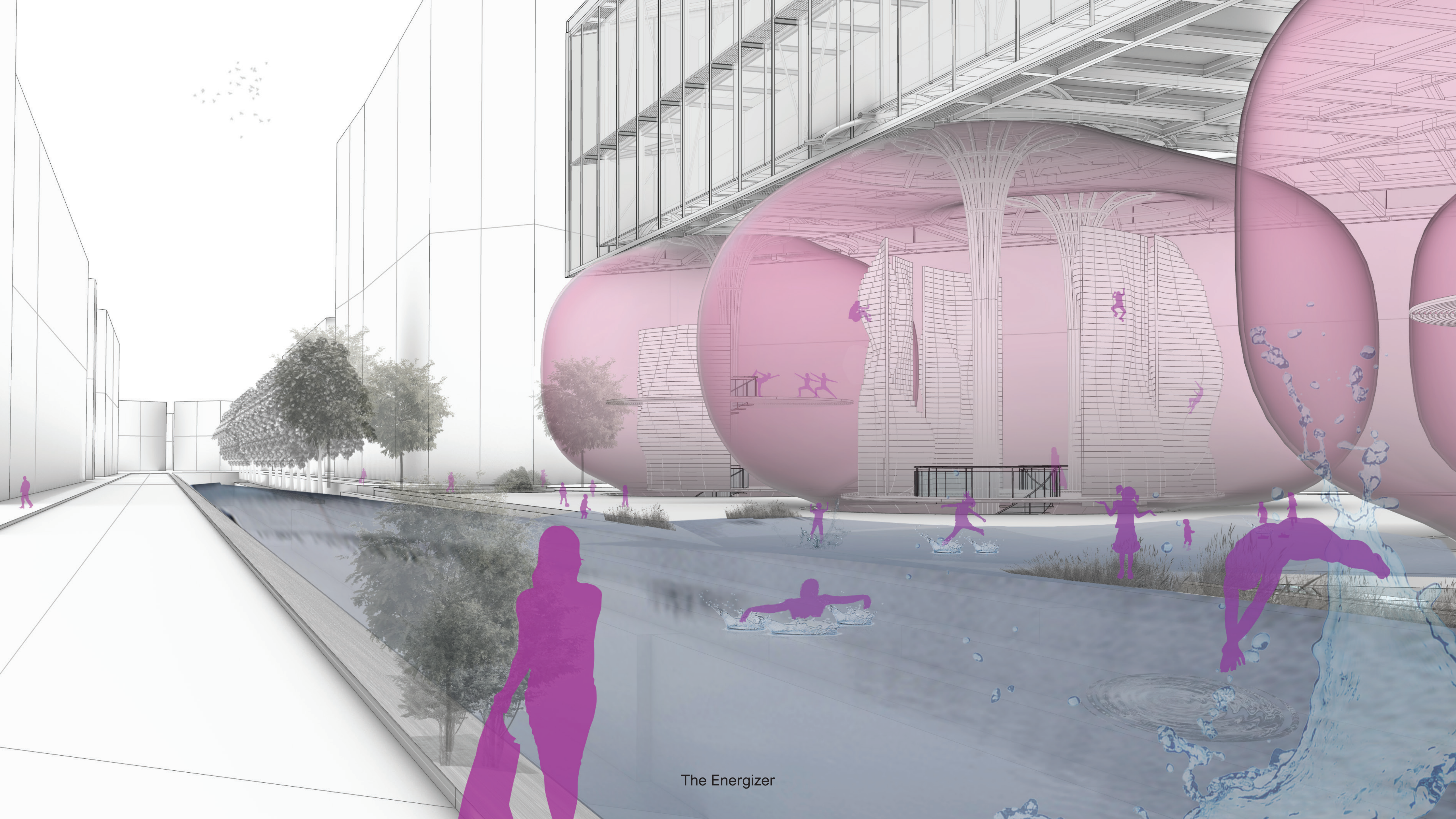
Second floor

THE ENERGIZER



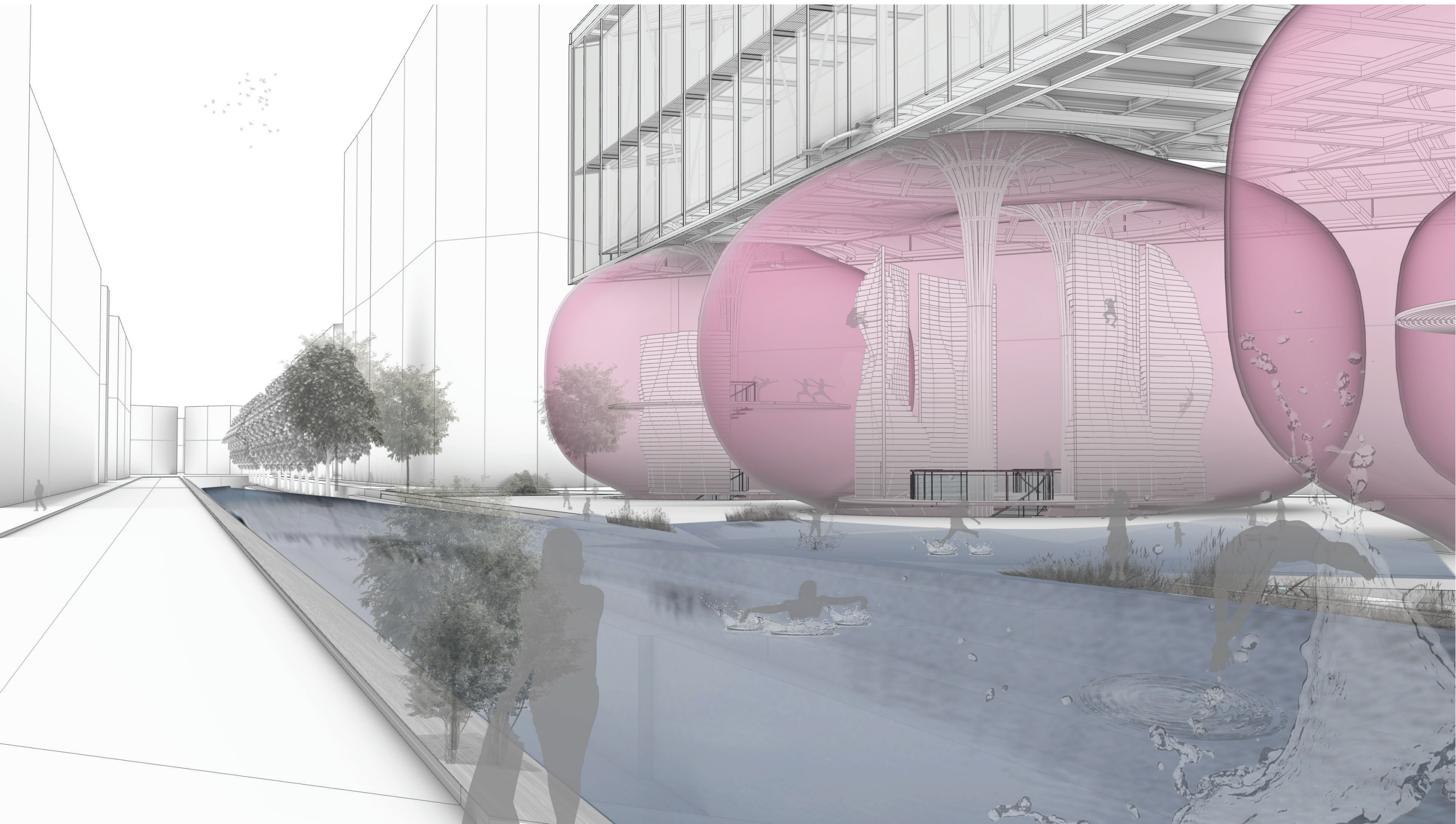
Routing
Third floor



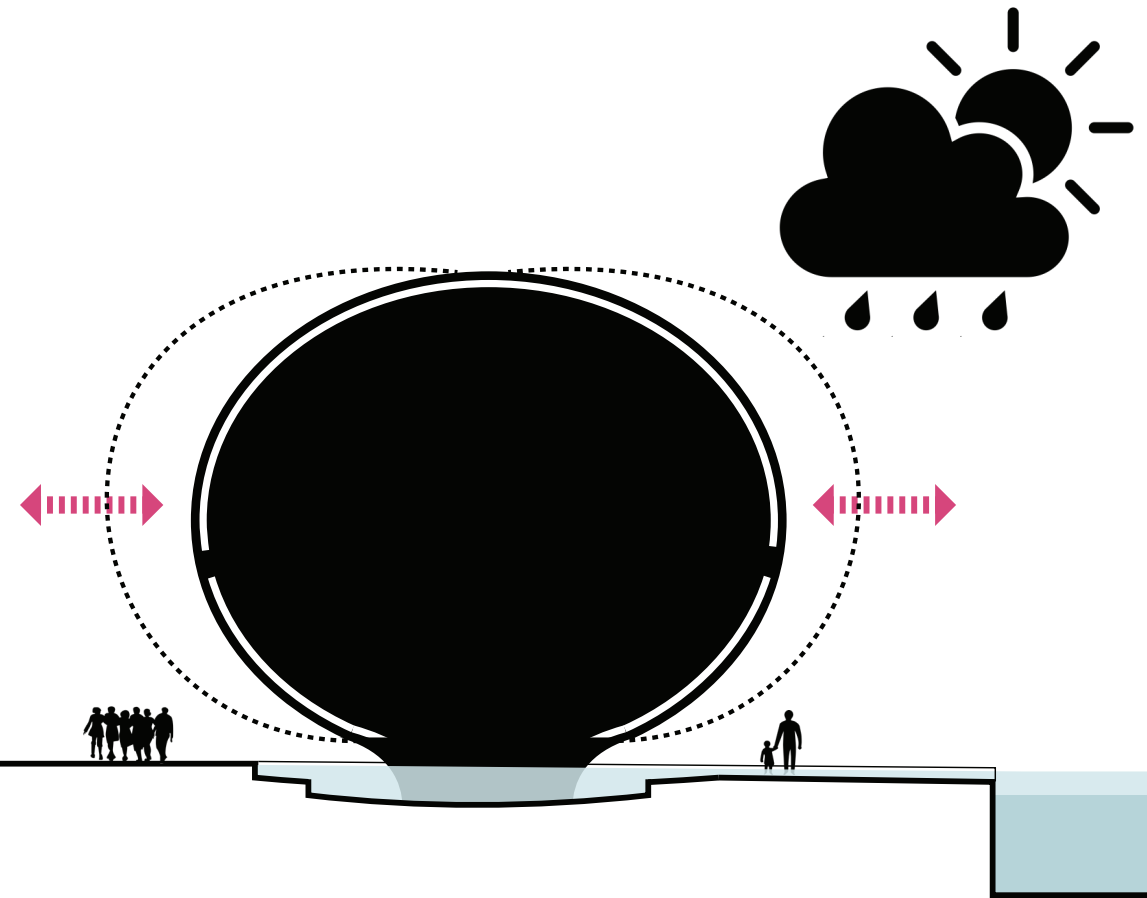


The Energizer

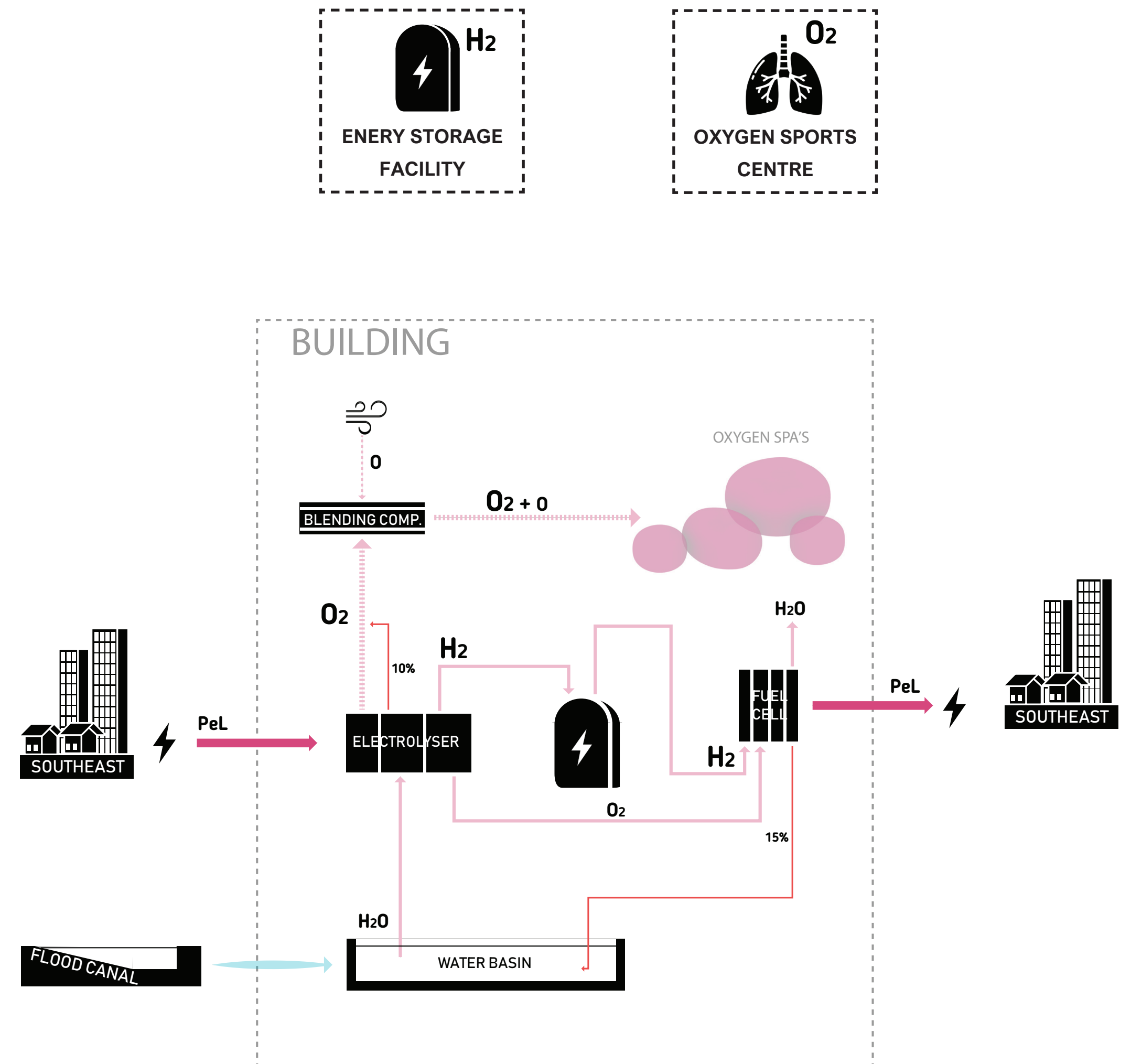
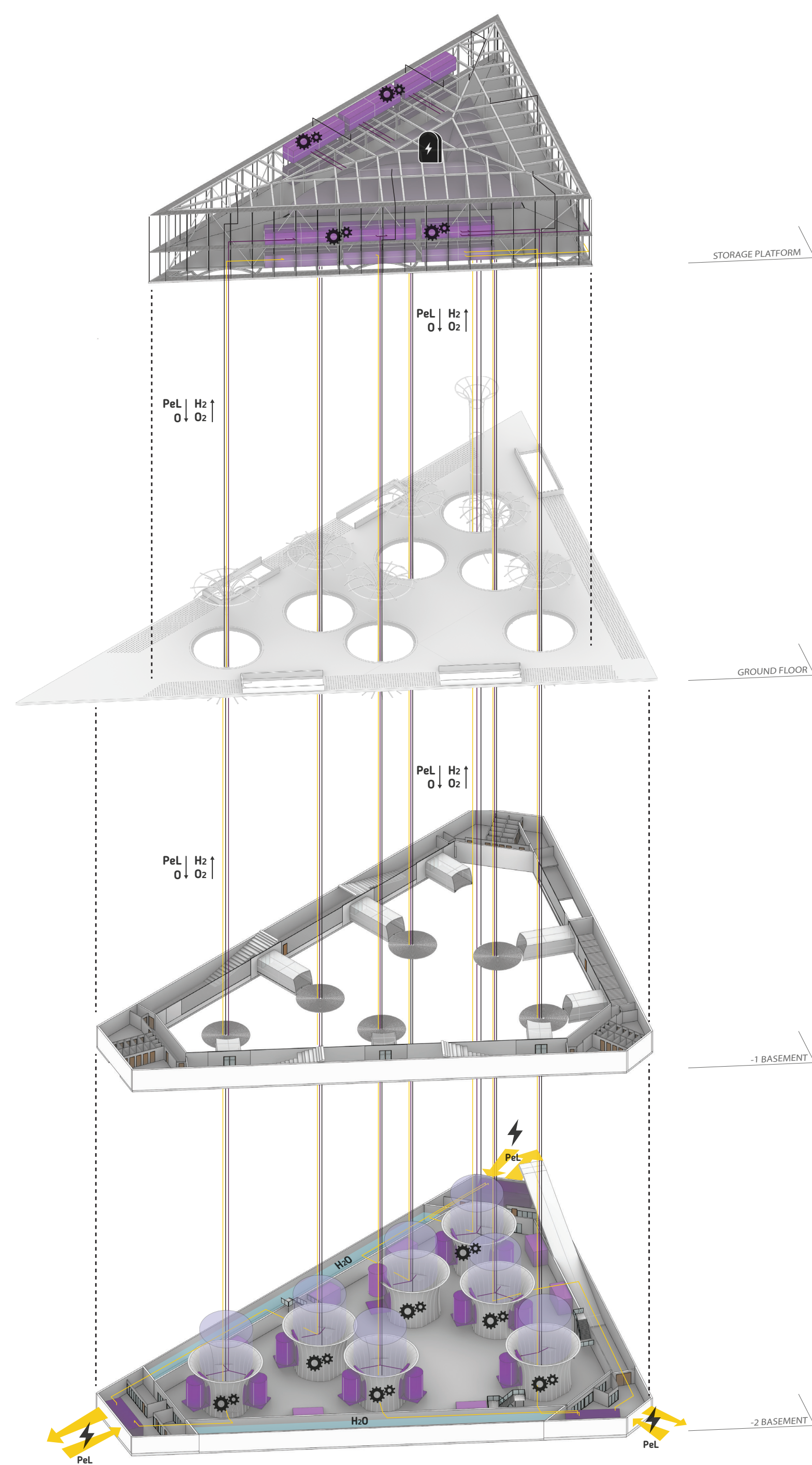
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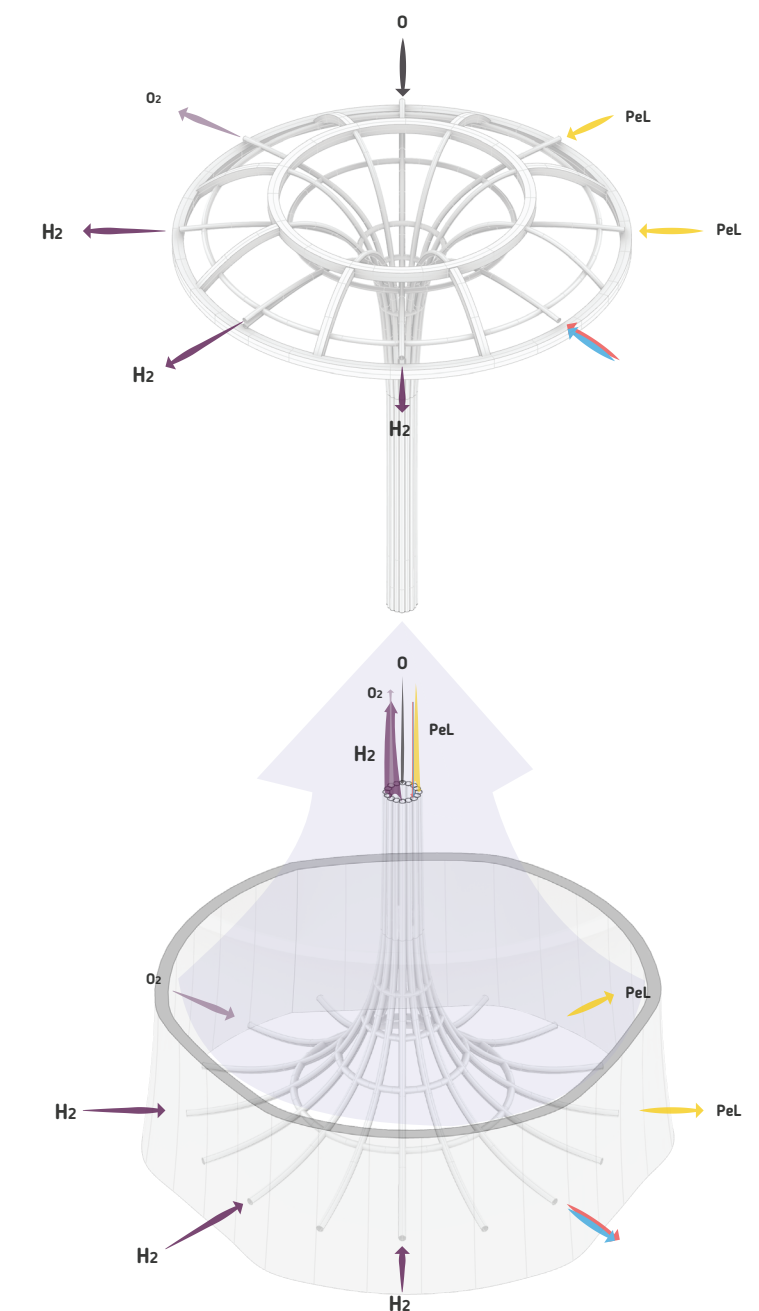
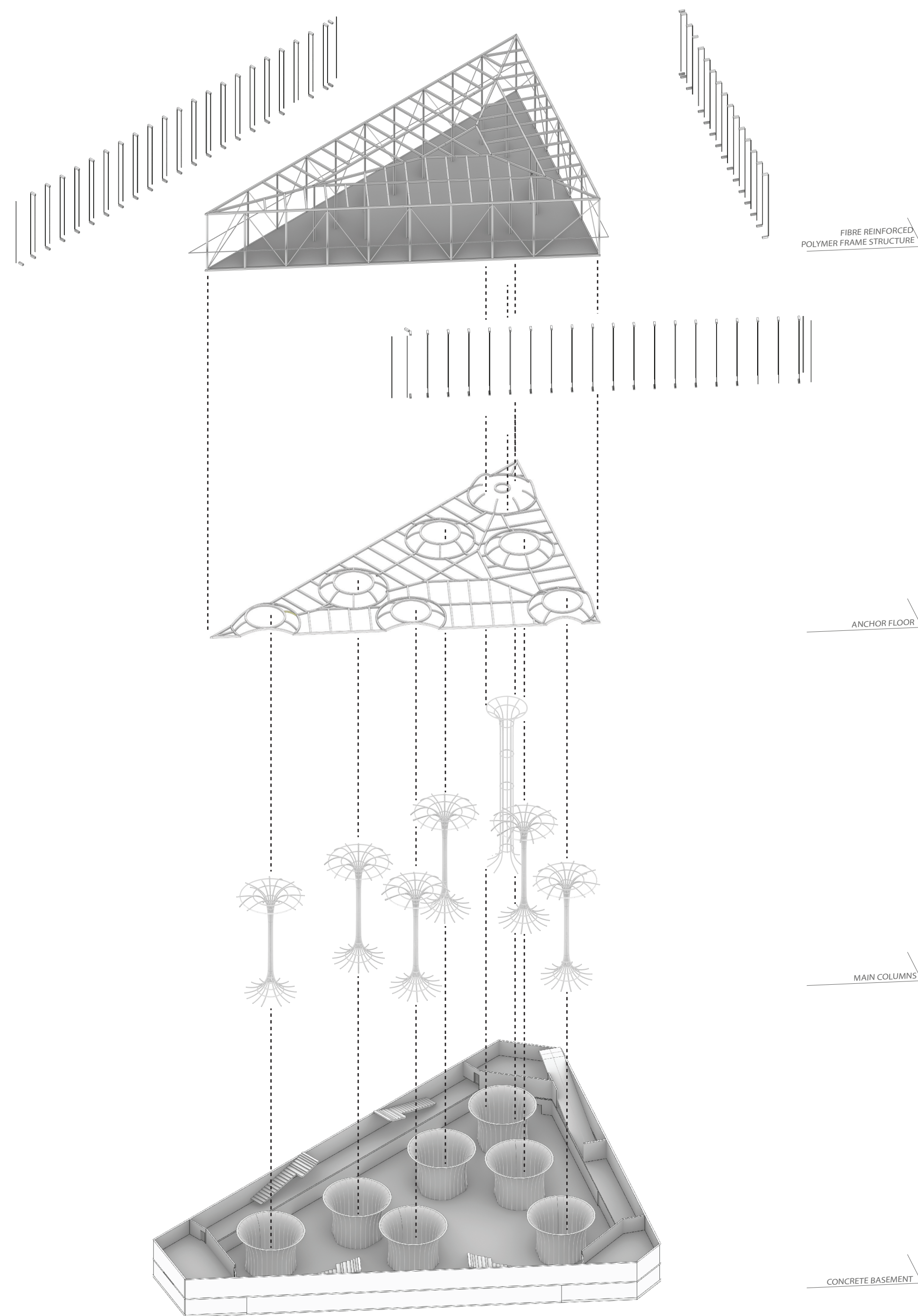


Water squares
The Energizer



Dynamic public spaces





Multi purpose column

ENERGIZERS

Essence of air
Amsterdam Zuidoost



H2



ENERGY STORAGE
FACILITY




O2




OXYGEN SPORTS
CENTRE



Water squares



Biodiversity
roof

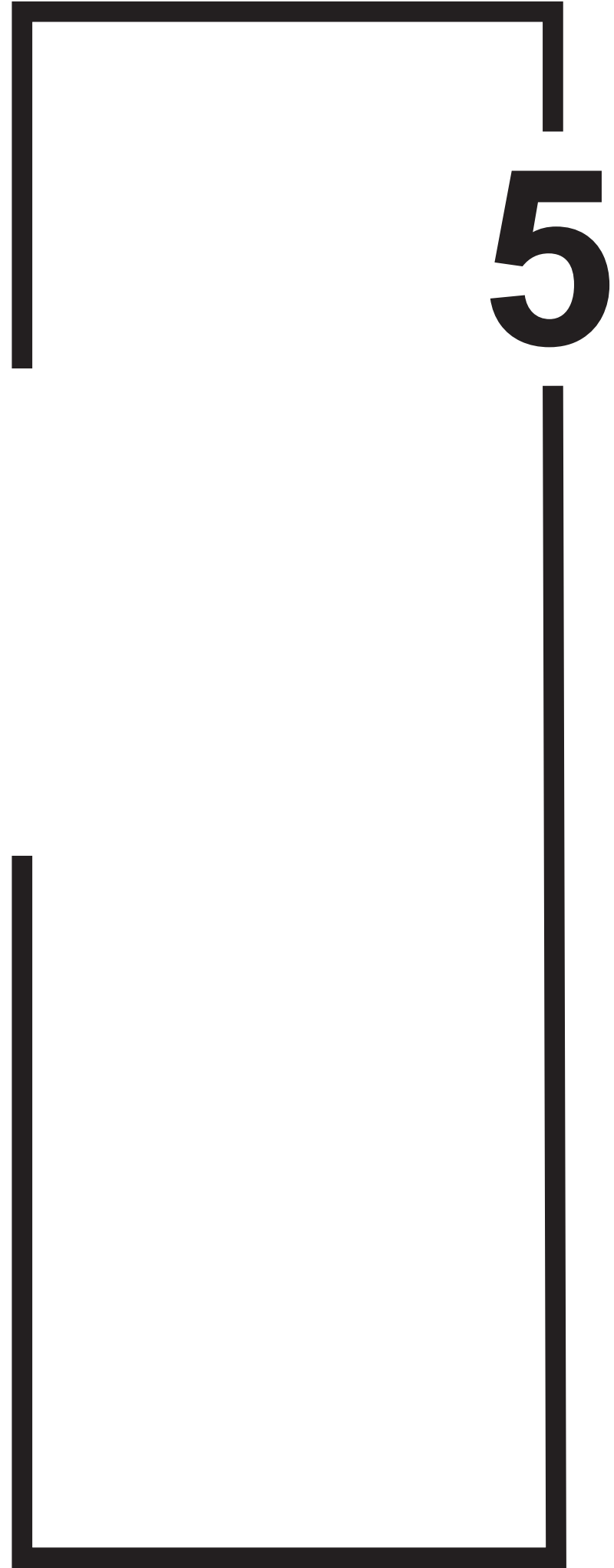


Dynamic public
square

THANK YOU.



The Energizer



5

APPENDIX

APPENDIX

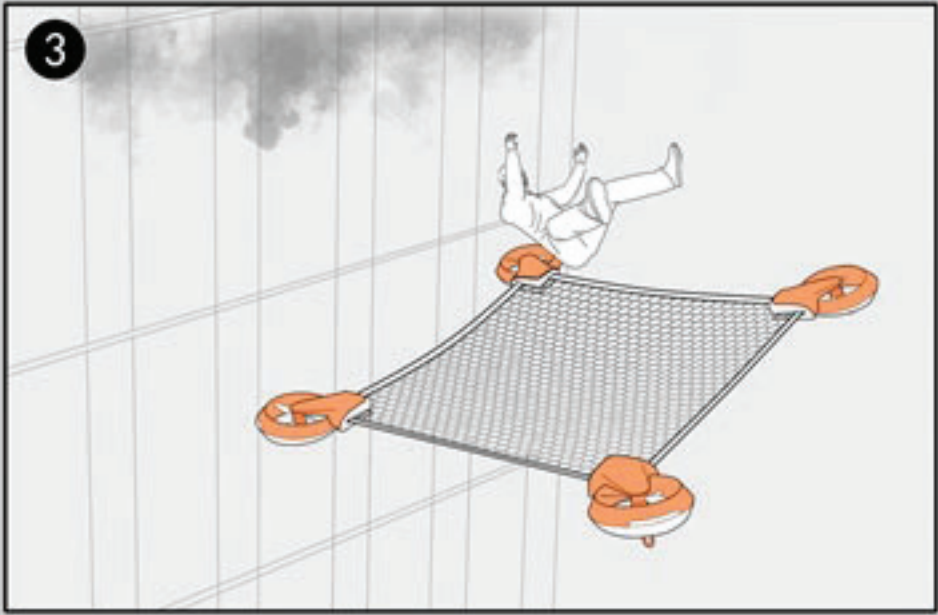
HOW TO USE



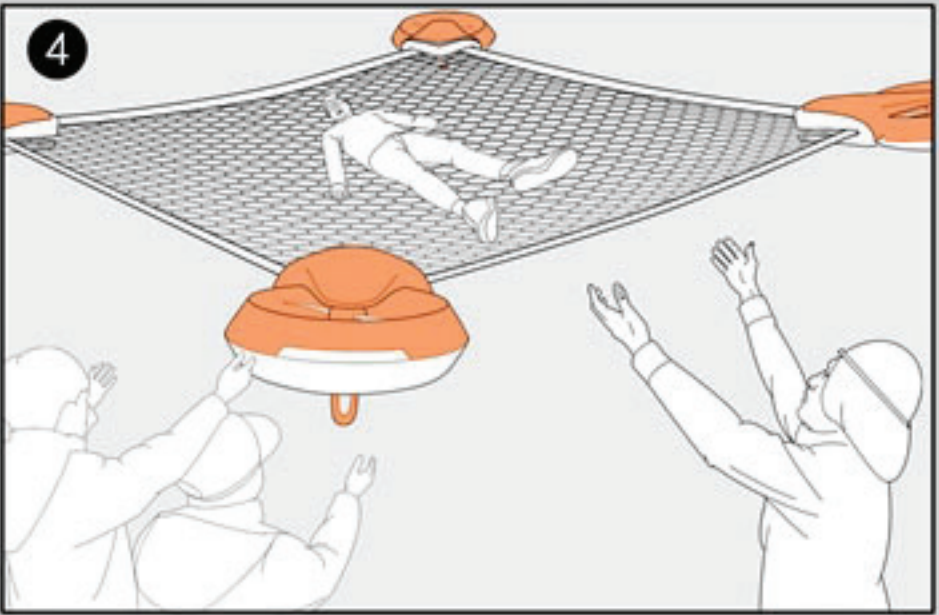
Net Guard flew immediately to the scene of the accident when the victim called for help.



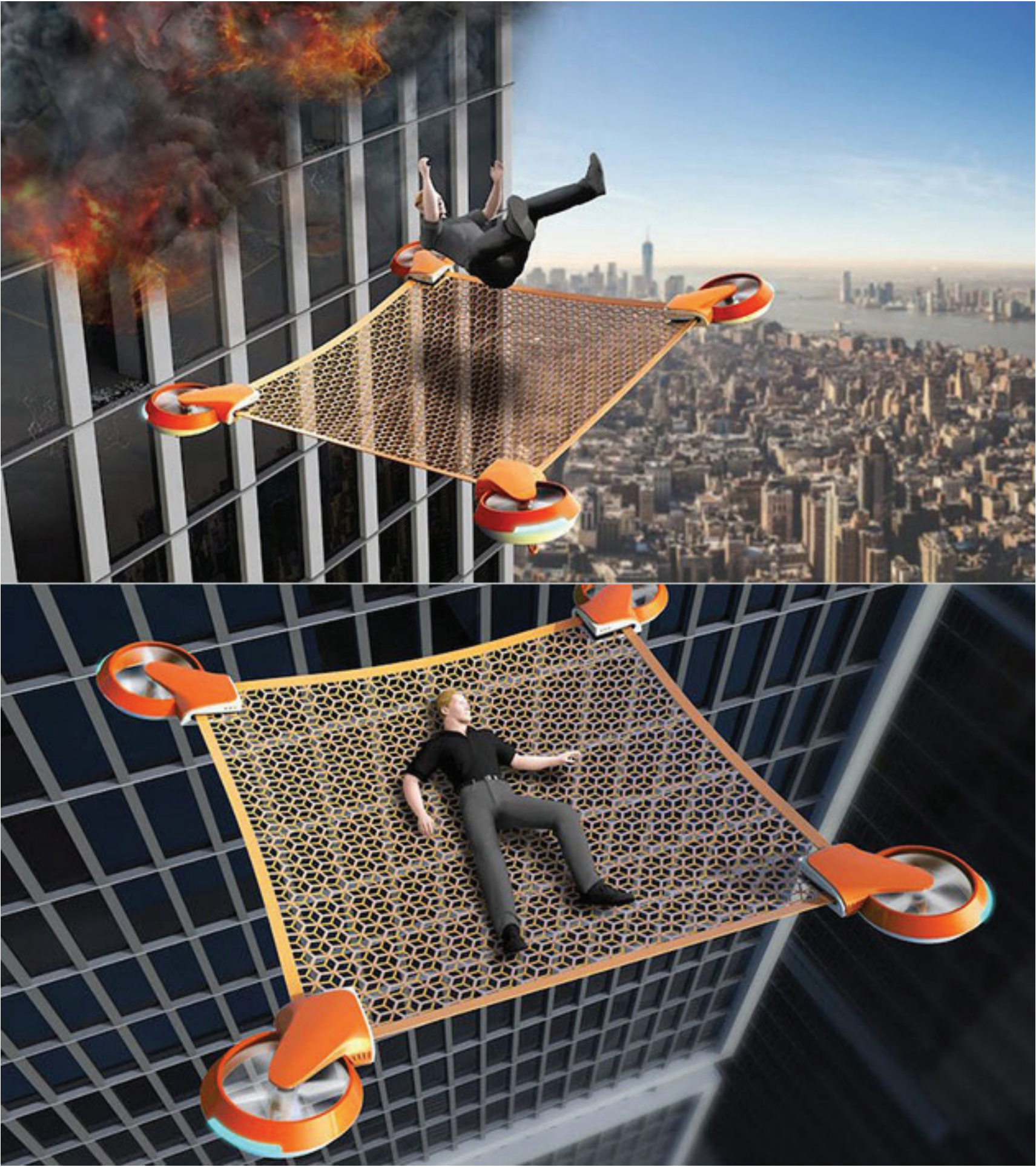
Net Guard arrives at the scene of the fire.



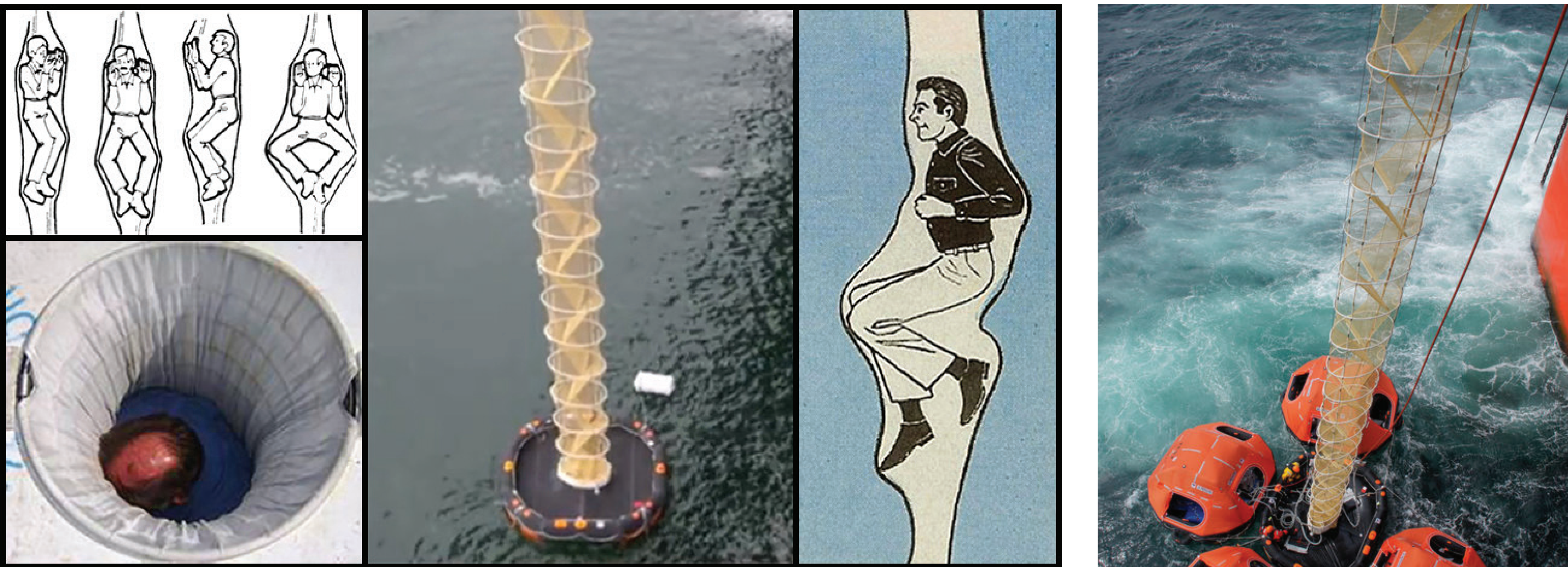
The Net Guard breaks down from a whole into four parts and then forms a net in order to catch the victims.



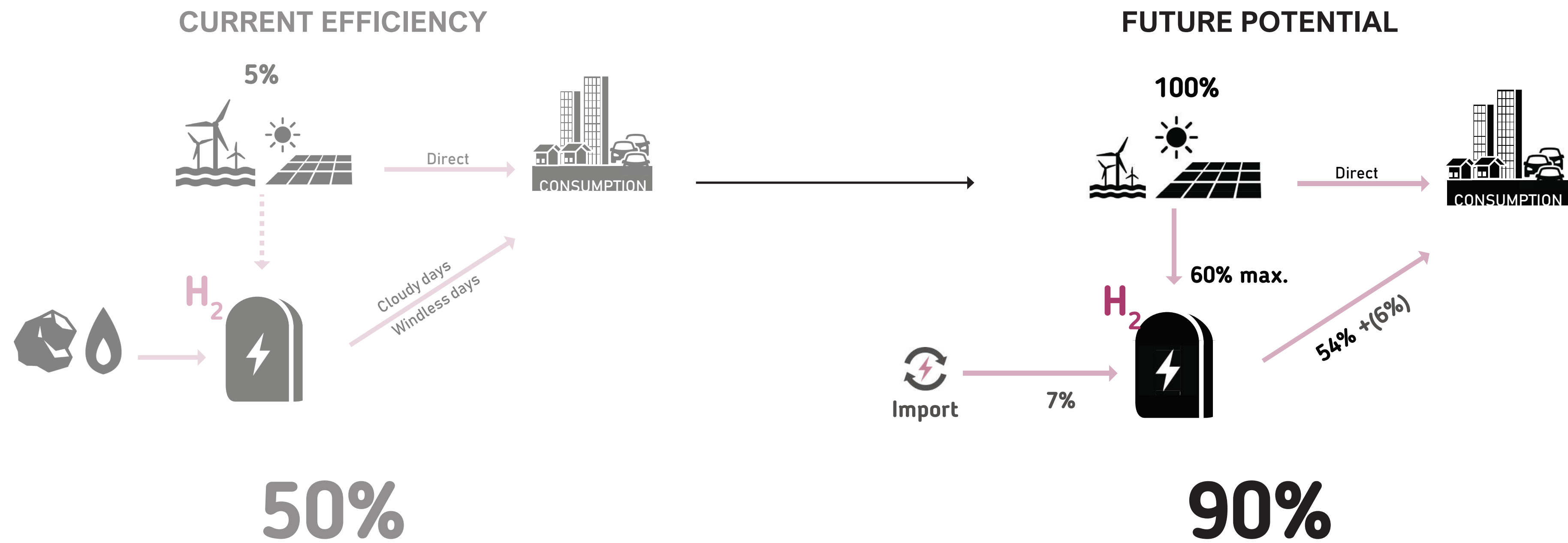
The victims will be safely sent to the ground and handed over to rescue workers.



APPENDIX

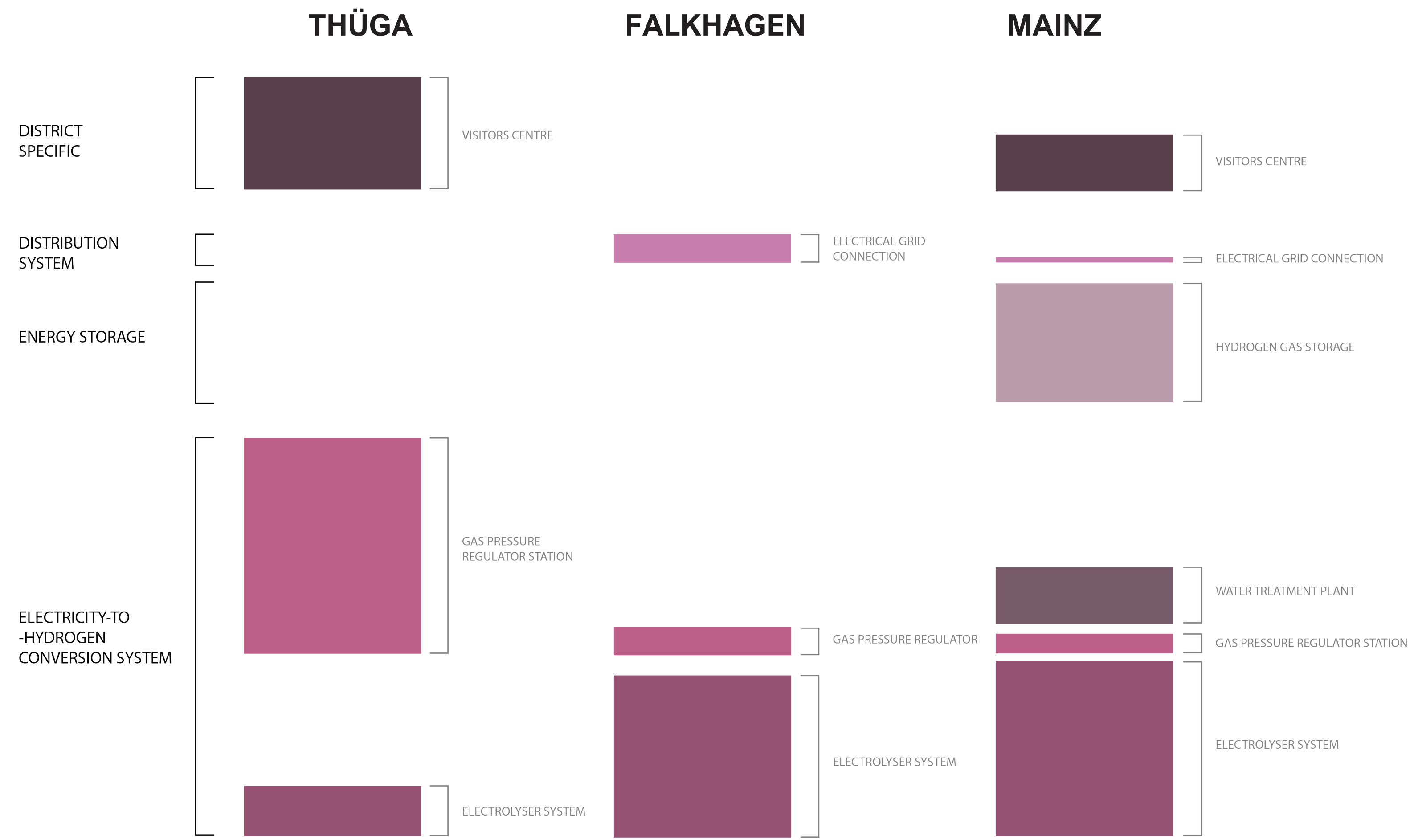


APPENDIX



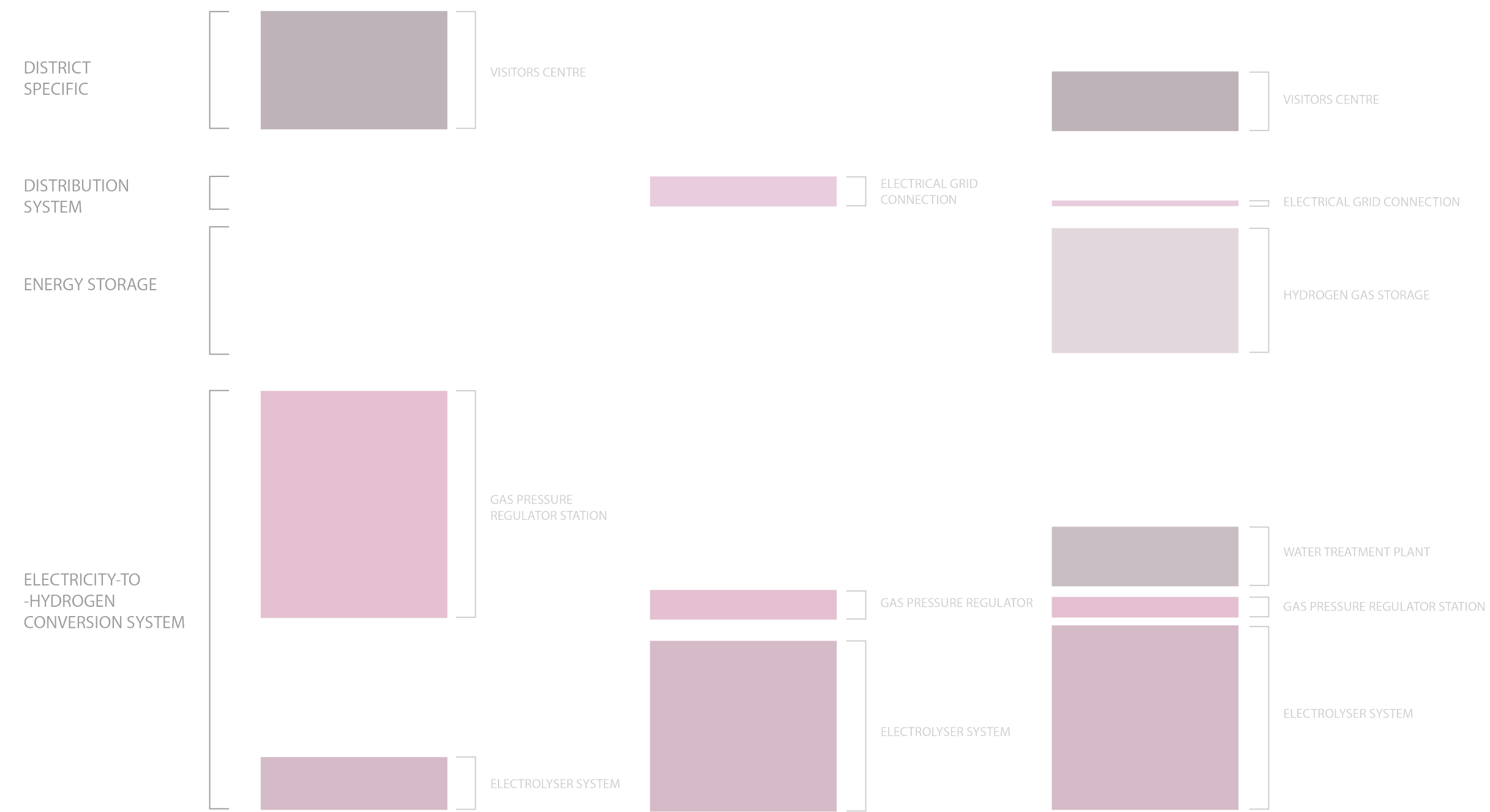
Hydrogen gas storage efficiency Issue
Appendix

THE ENERGIZER



Case study program bars
The Energizer

THE ENERGIZER



SOUTHEAST SQUARE ENERGIZER

