Re-oil Coast

An algae-based biofuel production and recreation coastal development

Nan Yang

P4 PRESENTATION

05/20/2016

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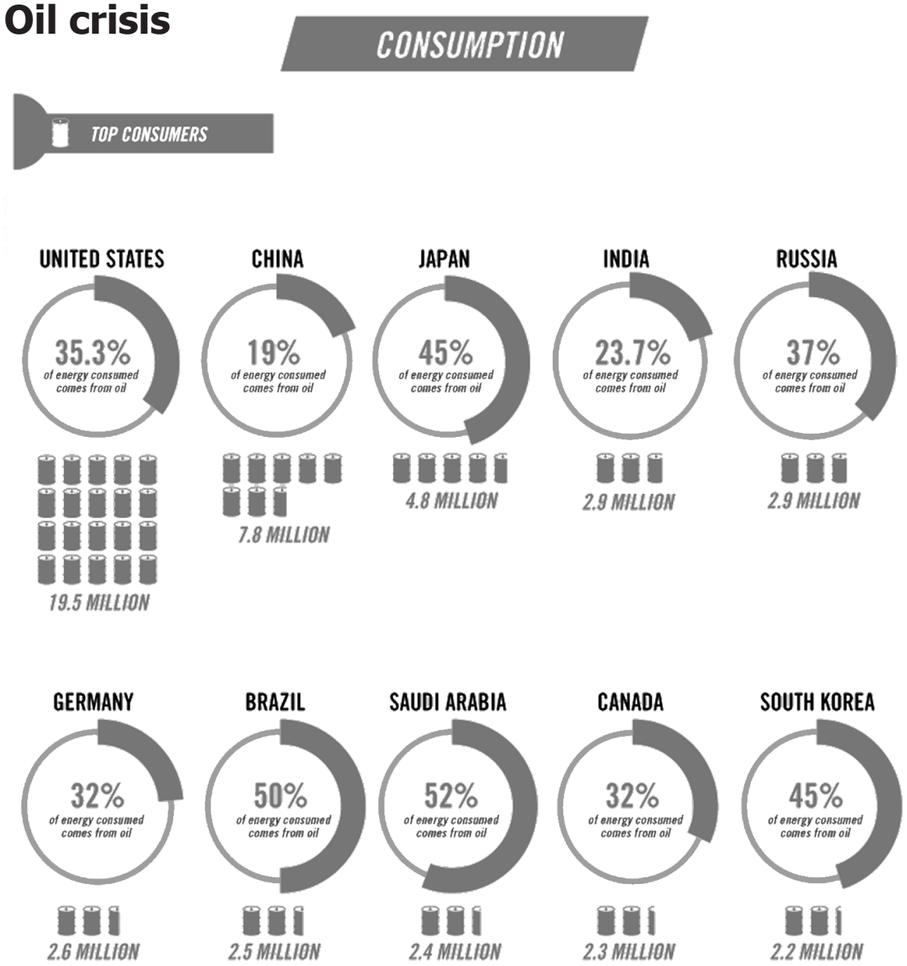
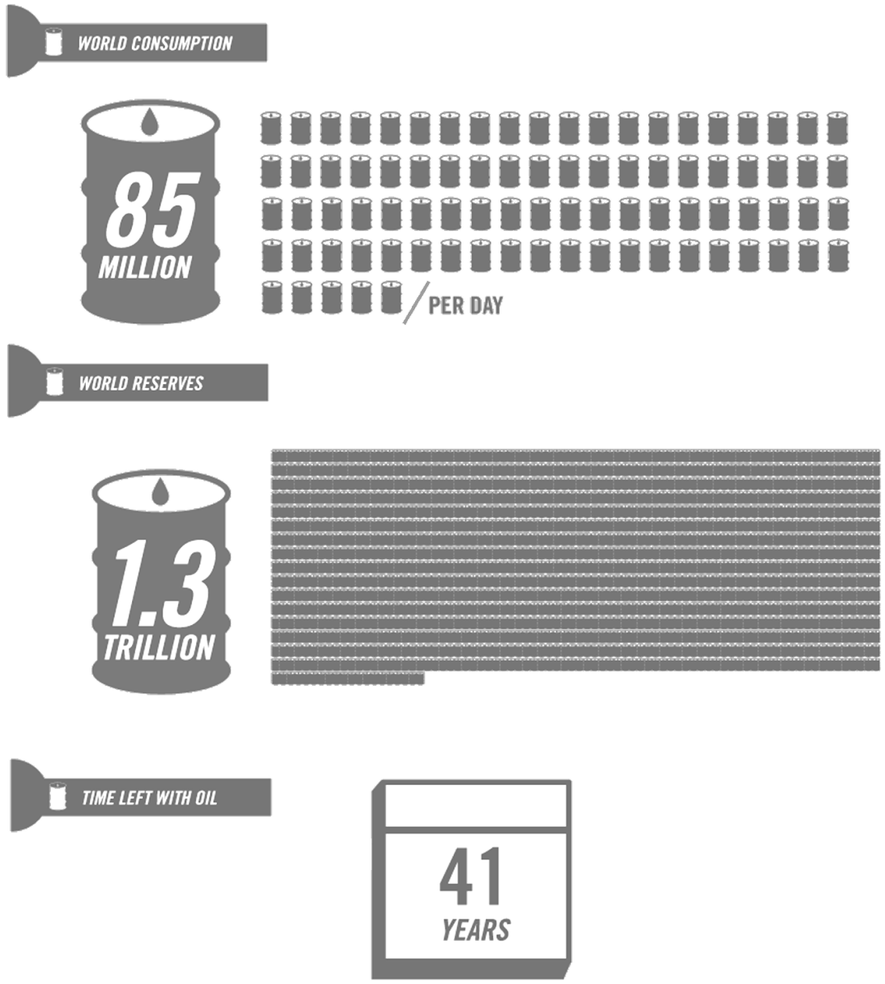
Oil crisis





NL Oil data	1990	2000	2005	2010	2011	2012	2018*
Production (kb/d)	78.7	48.5	46.8	36.0	37.9	51.7	43.0
Demand (kb/d)	734.5	854.5	1 021.4	1 019.8	1 016.4	1 020.8	931.6
Motor gasoline	79.8	93.1	94.8	96.6	98.7	95.6	-
Gas/diesel oil	150.5	177.8	192.1	187.2	186.0	176.6	-
Residual fuel oil	182.1	208.8	275.5	227.7	244.1	219.1	-
Others	322.1	374.8	459.0	508.2	487.6	529.6	-
Net imports (kb/d)	655.8	806.0	974.6	983.8	978.5	969.1	888.6
Import dependency (%)	89.3	94.3	95.4	96.5	96.3	94.9	95
Refining capacity (kb/d)	1 381.0	1 187.8	1 227.5	1 236.4	1 236.4	1 236.4	-

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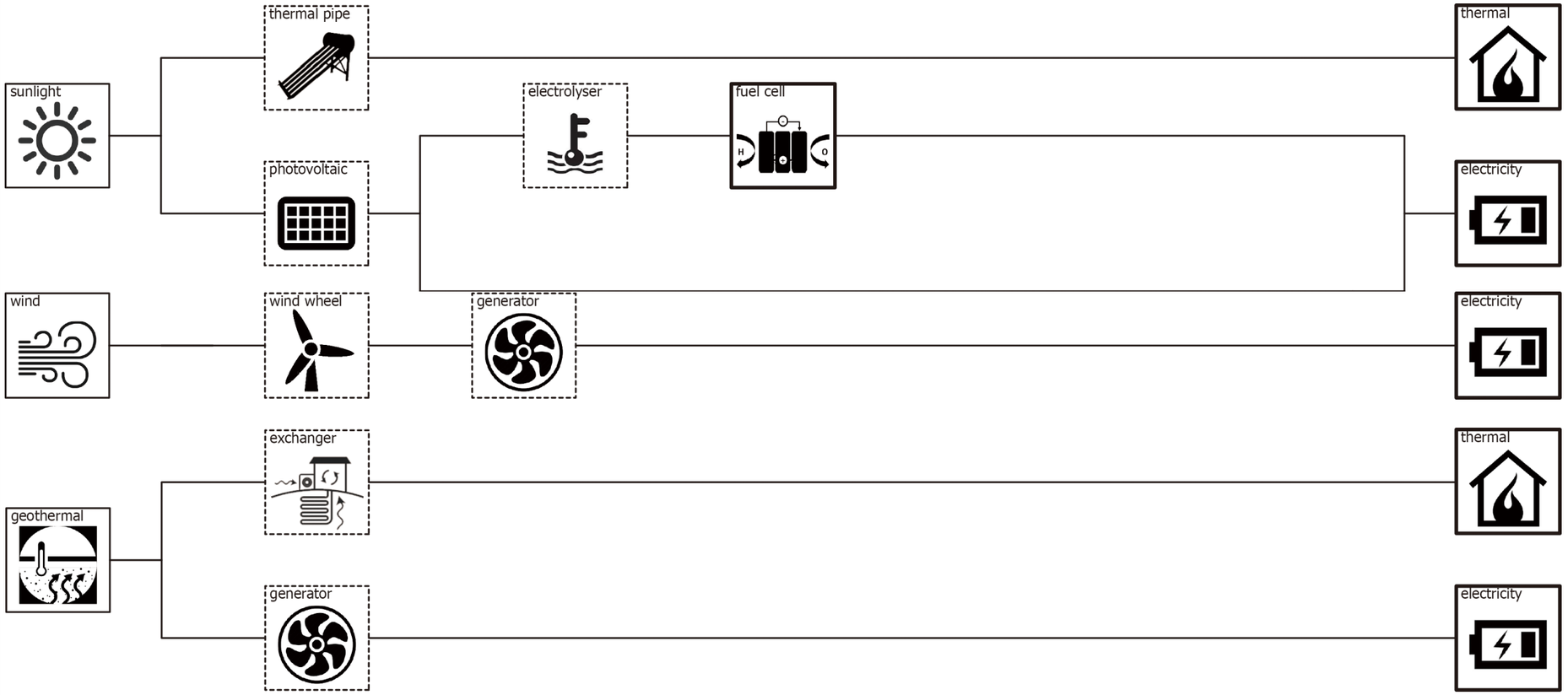
Renewable energy problems



ELECTRICITY

FOSSIL FUEL

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To design an

Architectural Composition

based on **sustainable fuel production**

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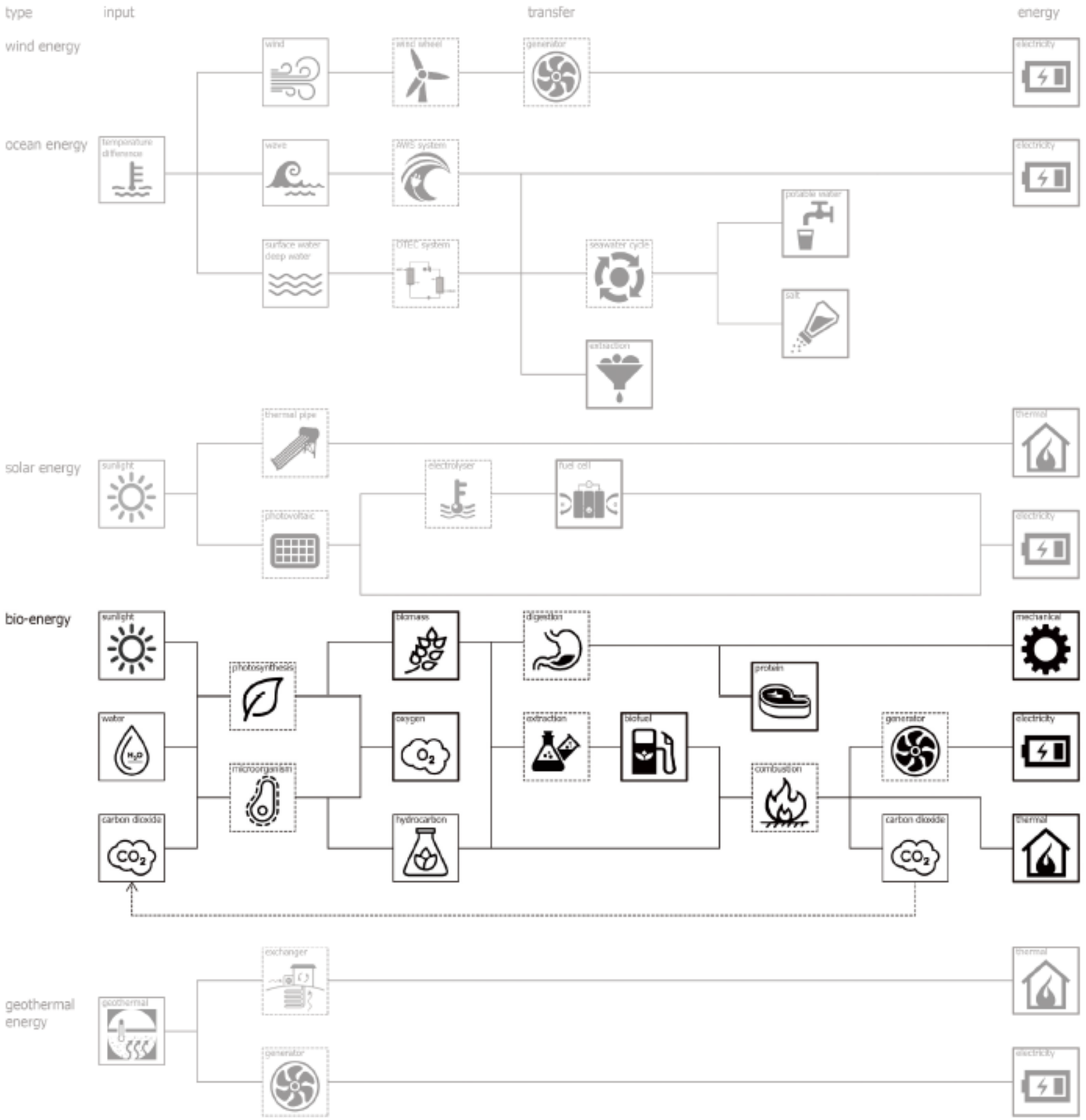

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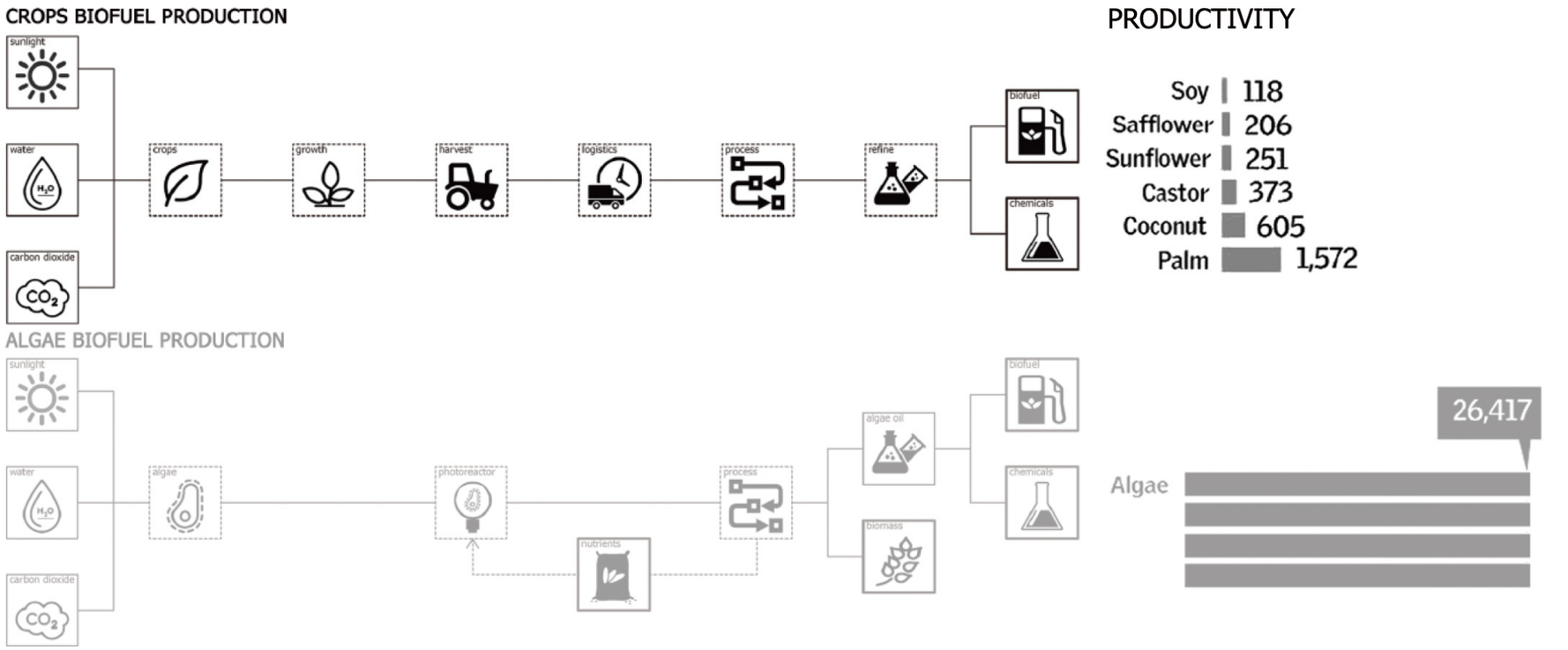
Biomass production comparisons



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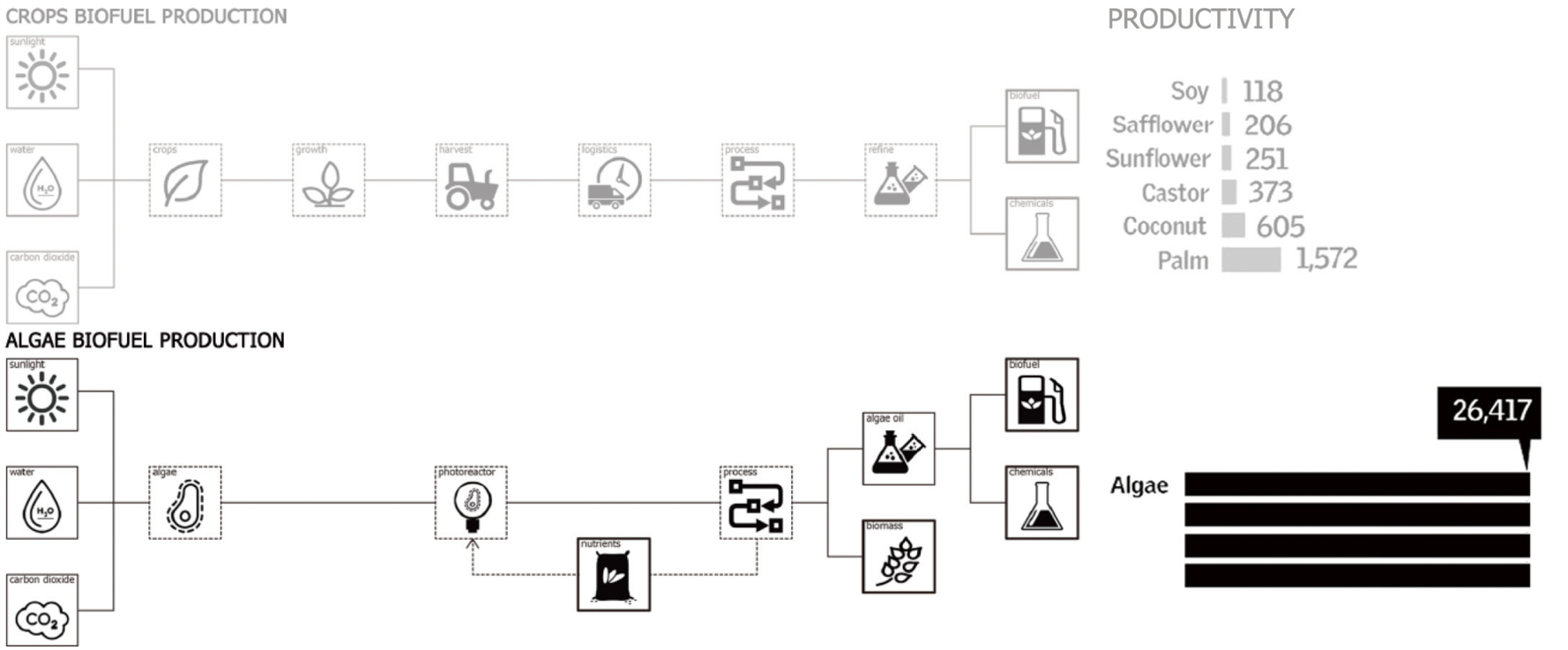
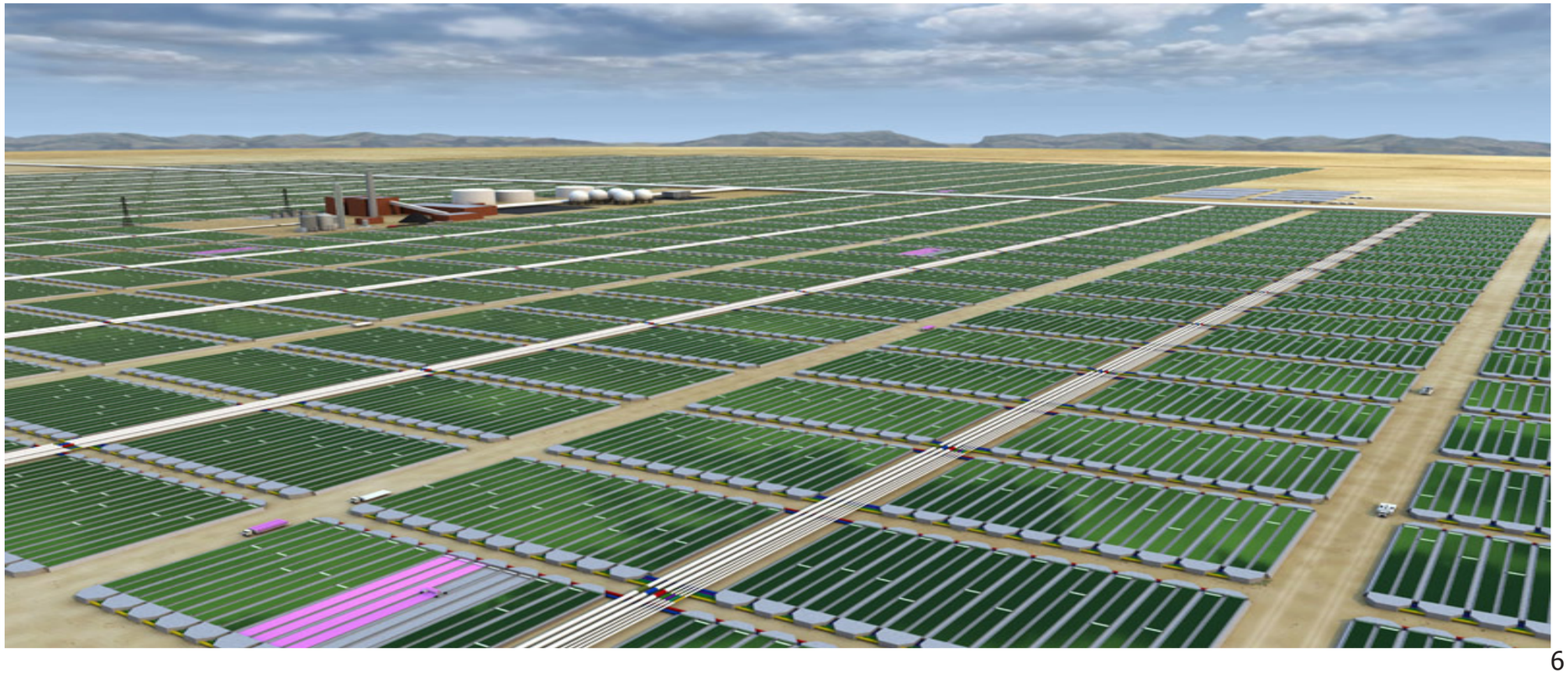
Biomass production comparisons





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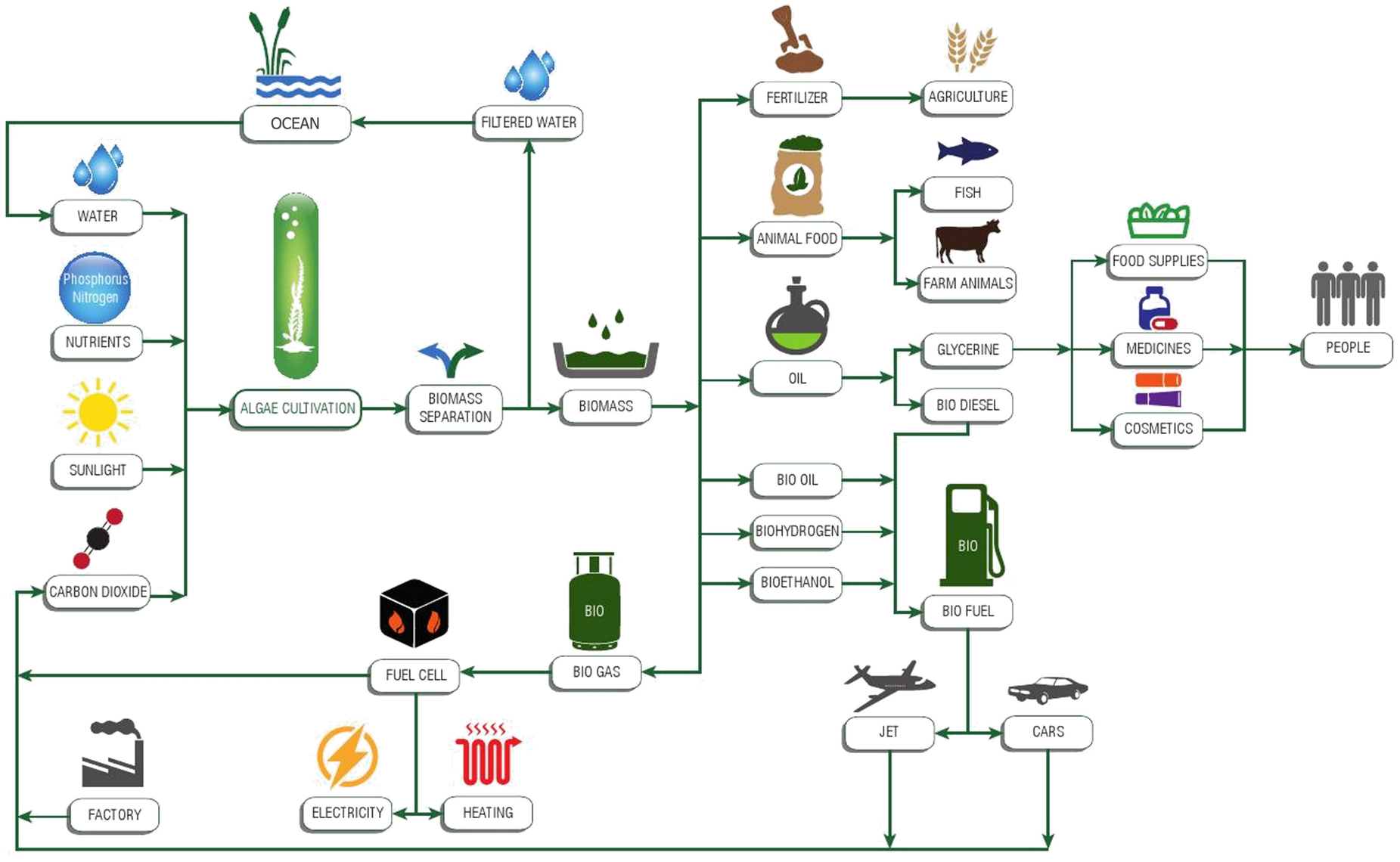
Microalgae products



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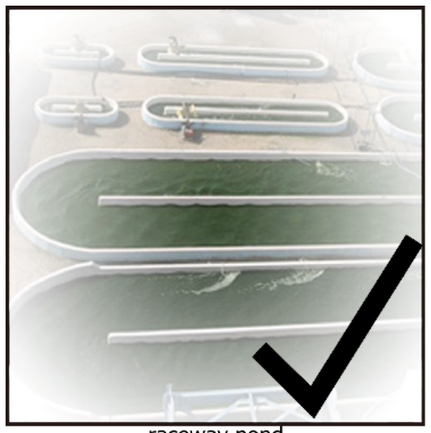
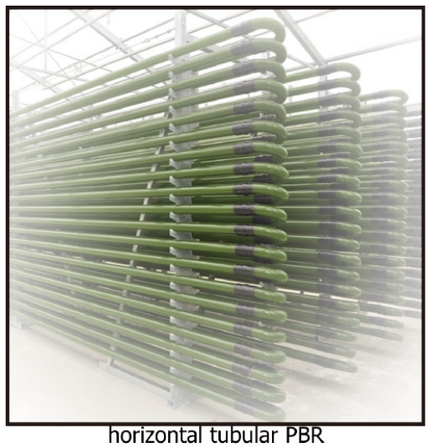
Cultivation systems



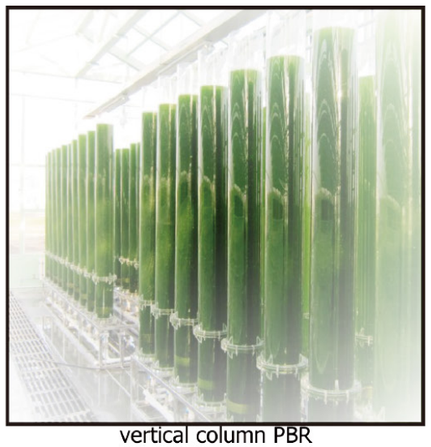
raceway pond

- contamination
- water using
- energy input
- expense
- productivity
- cultivation period



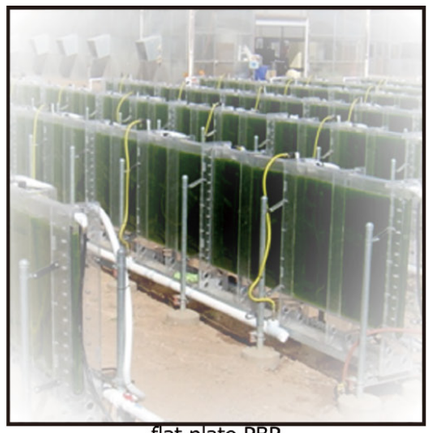
horizontal tubular PBR

- contamination
- water using
- energy input
- expense
- productivity
- cultivation period



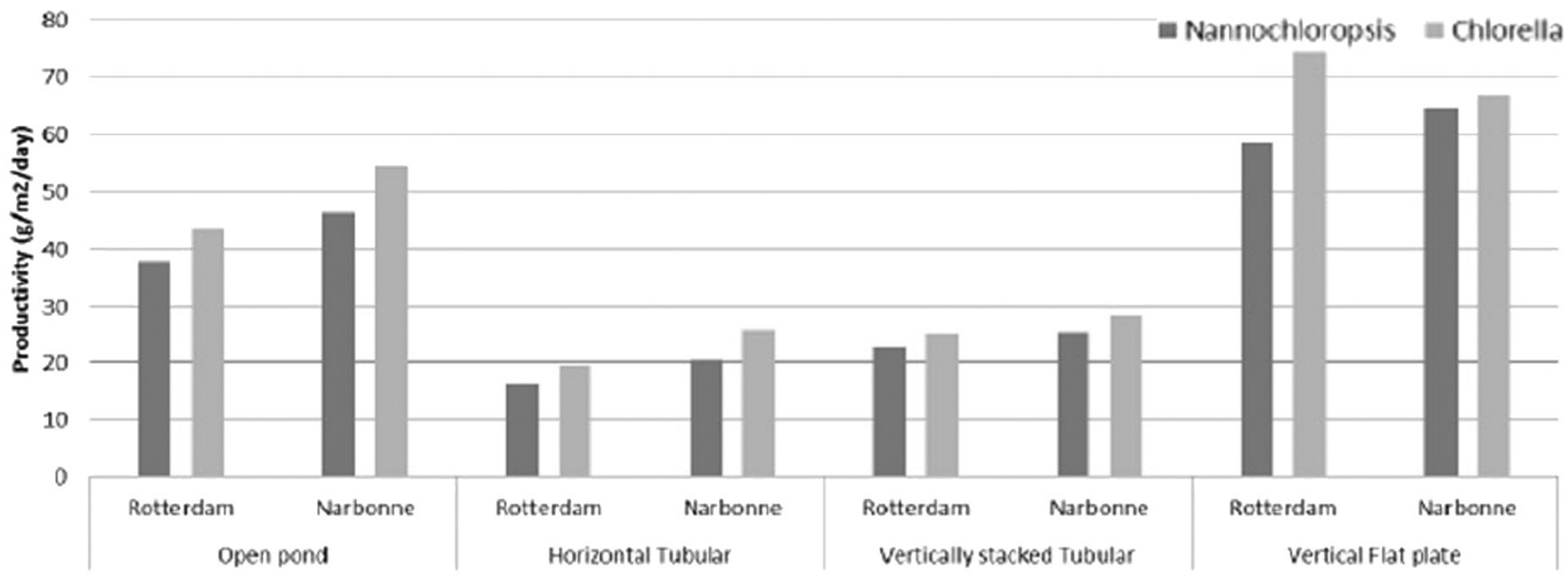
vertical column PBR

- contamination
- water using
- energy input
- expense
- productivity
- cultivation period



flat plate PBR

- contamination
- water using
- energy input
- expense
- productivity
- cultivation period



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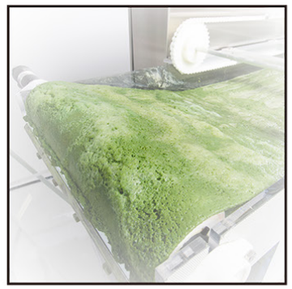
Biofuel production

Centrifugation

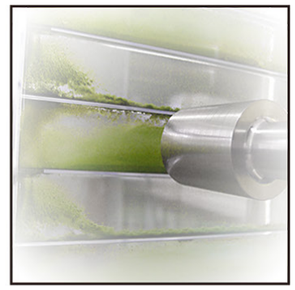
Flocculation

Floatation

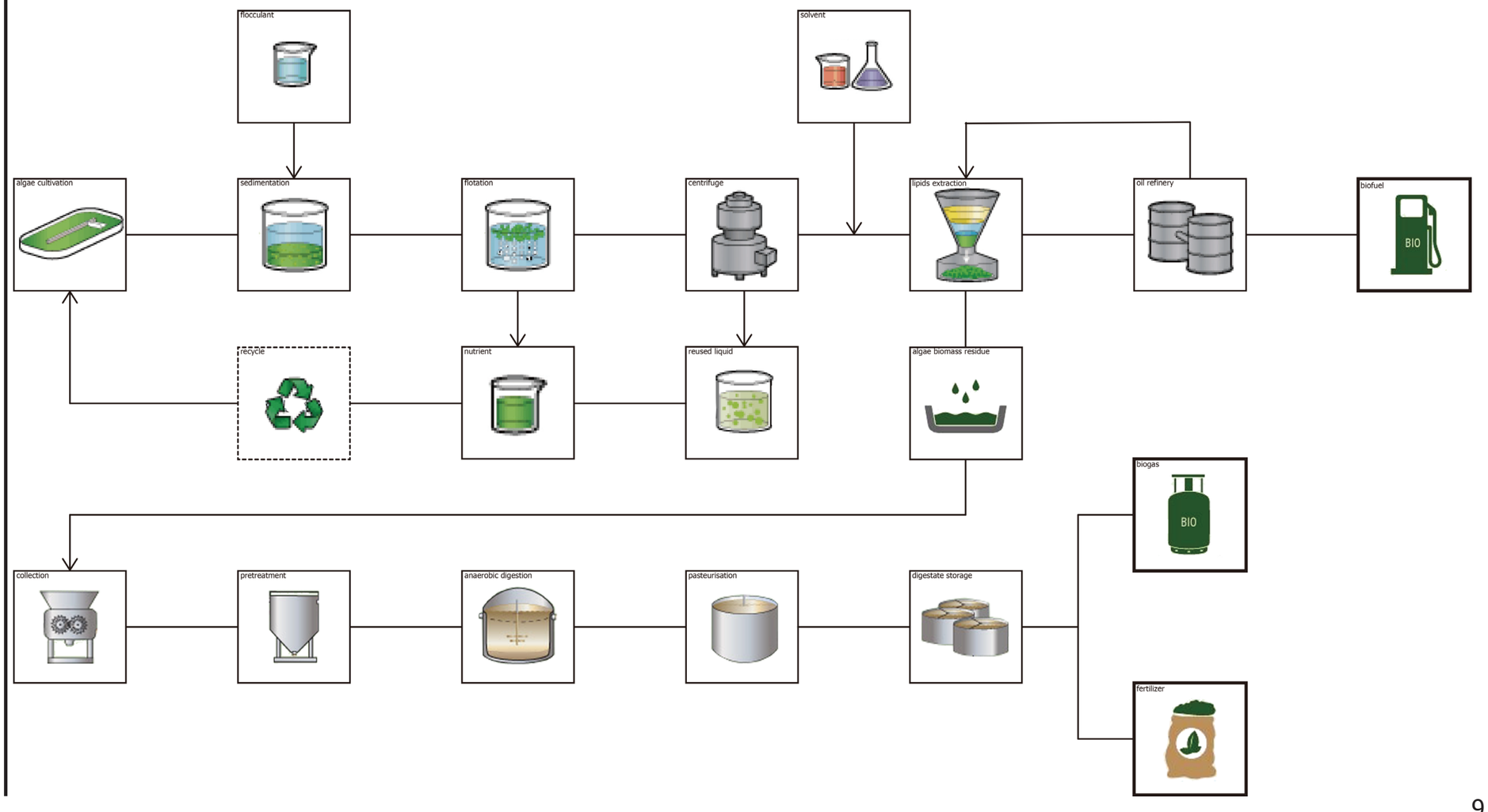
Filtration



Sedimentation



Ultrasonication



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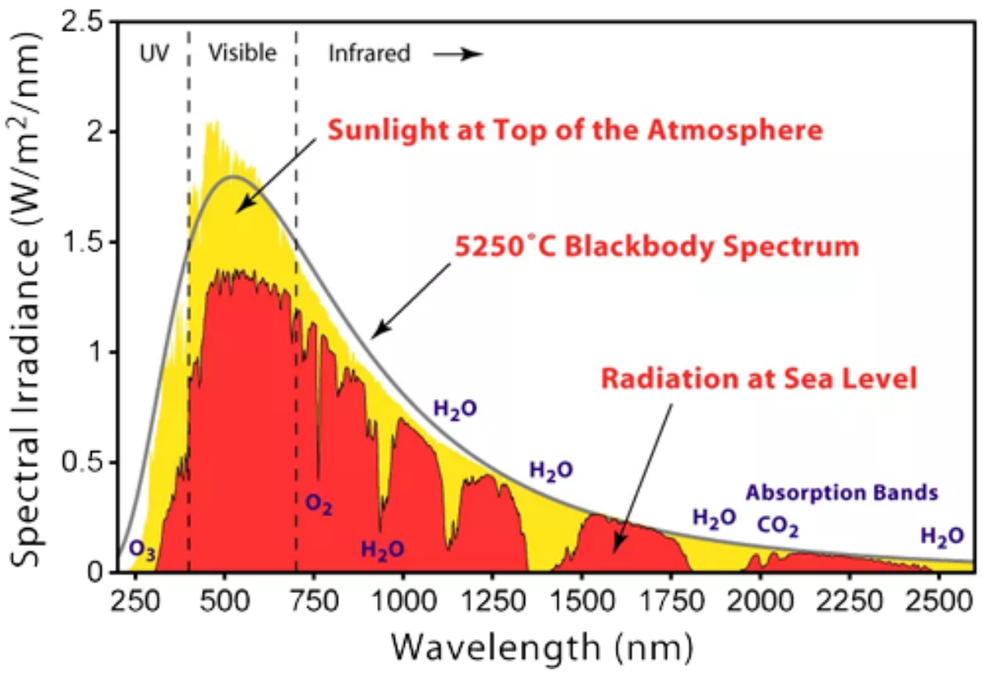
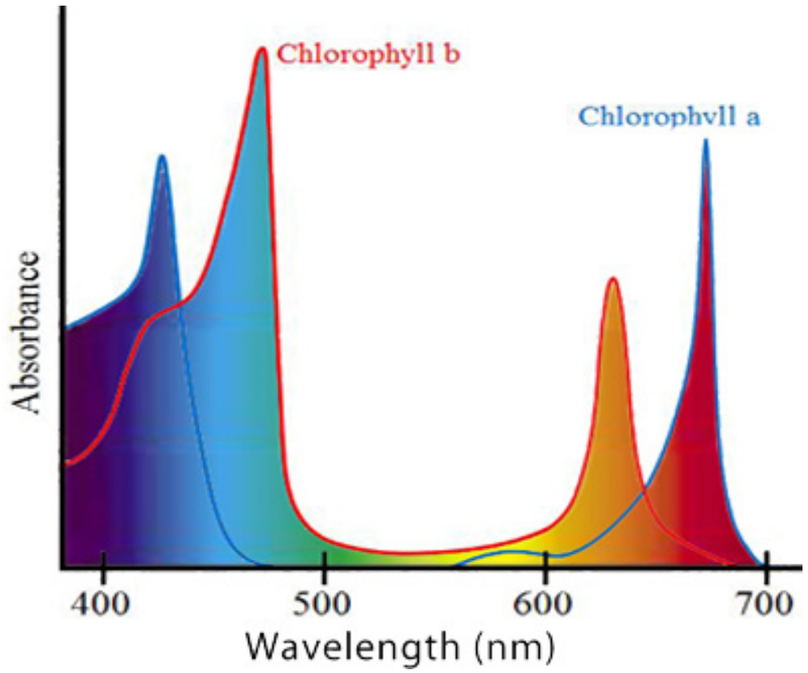
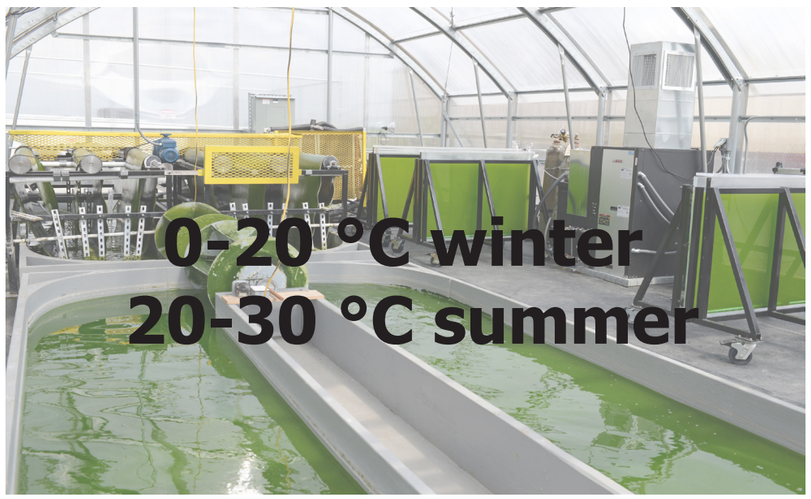
Conditions: light and temperature







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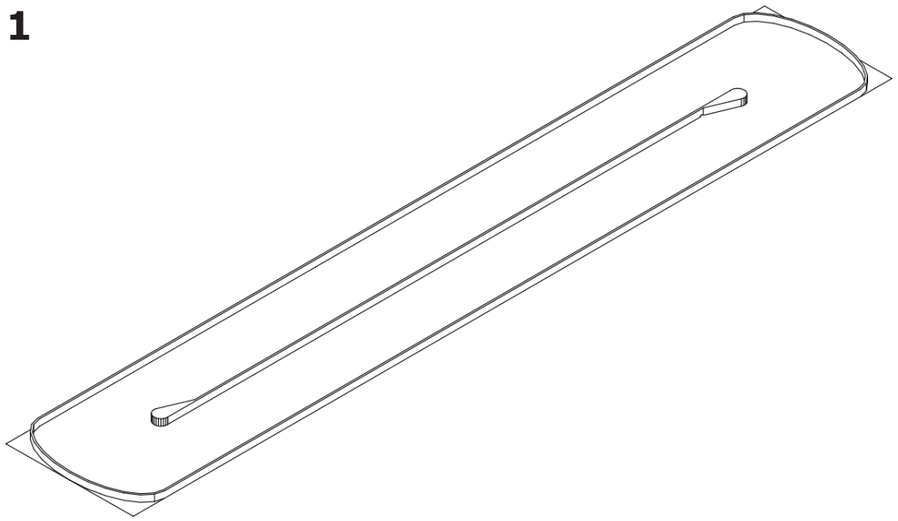
Algae farmhouse design

1



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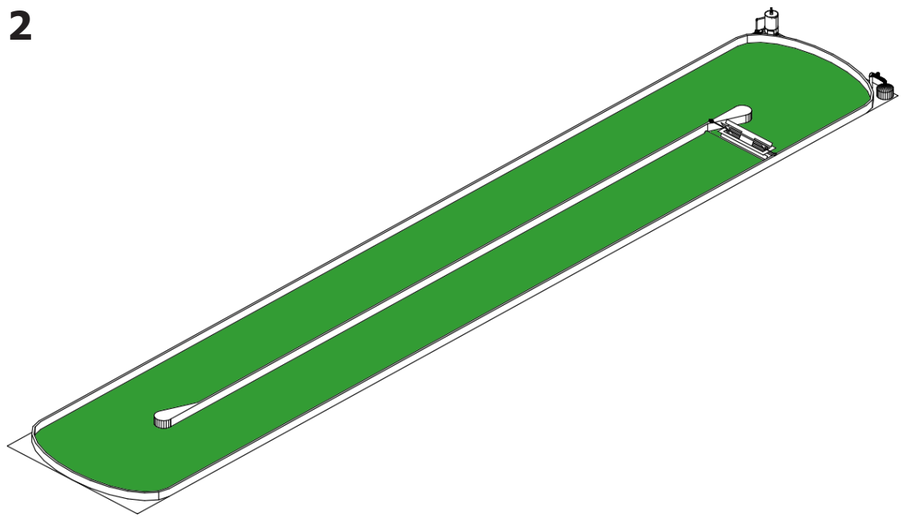

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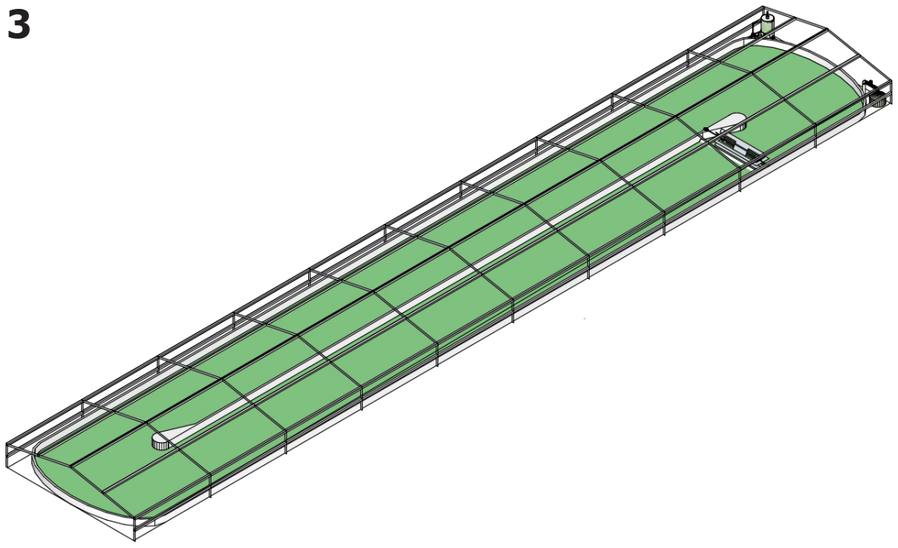

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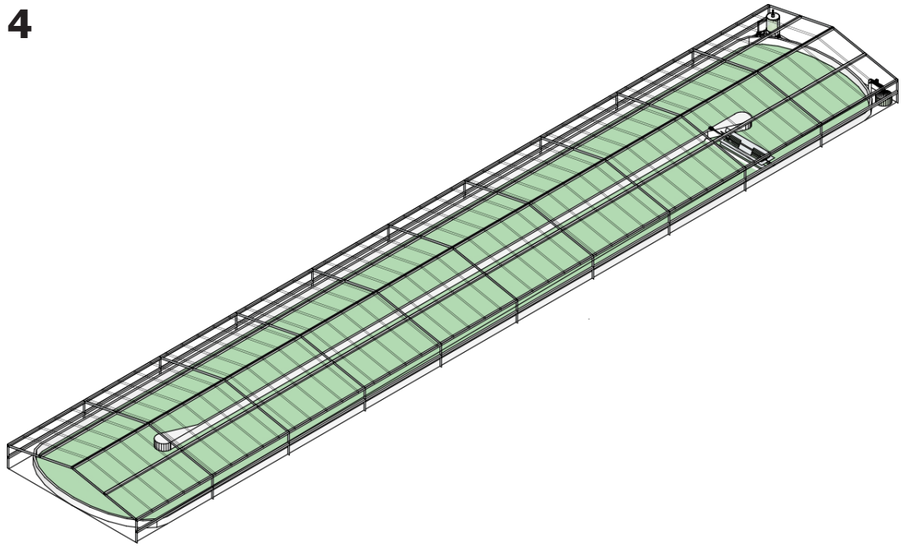

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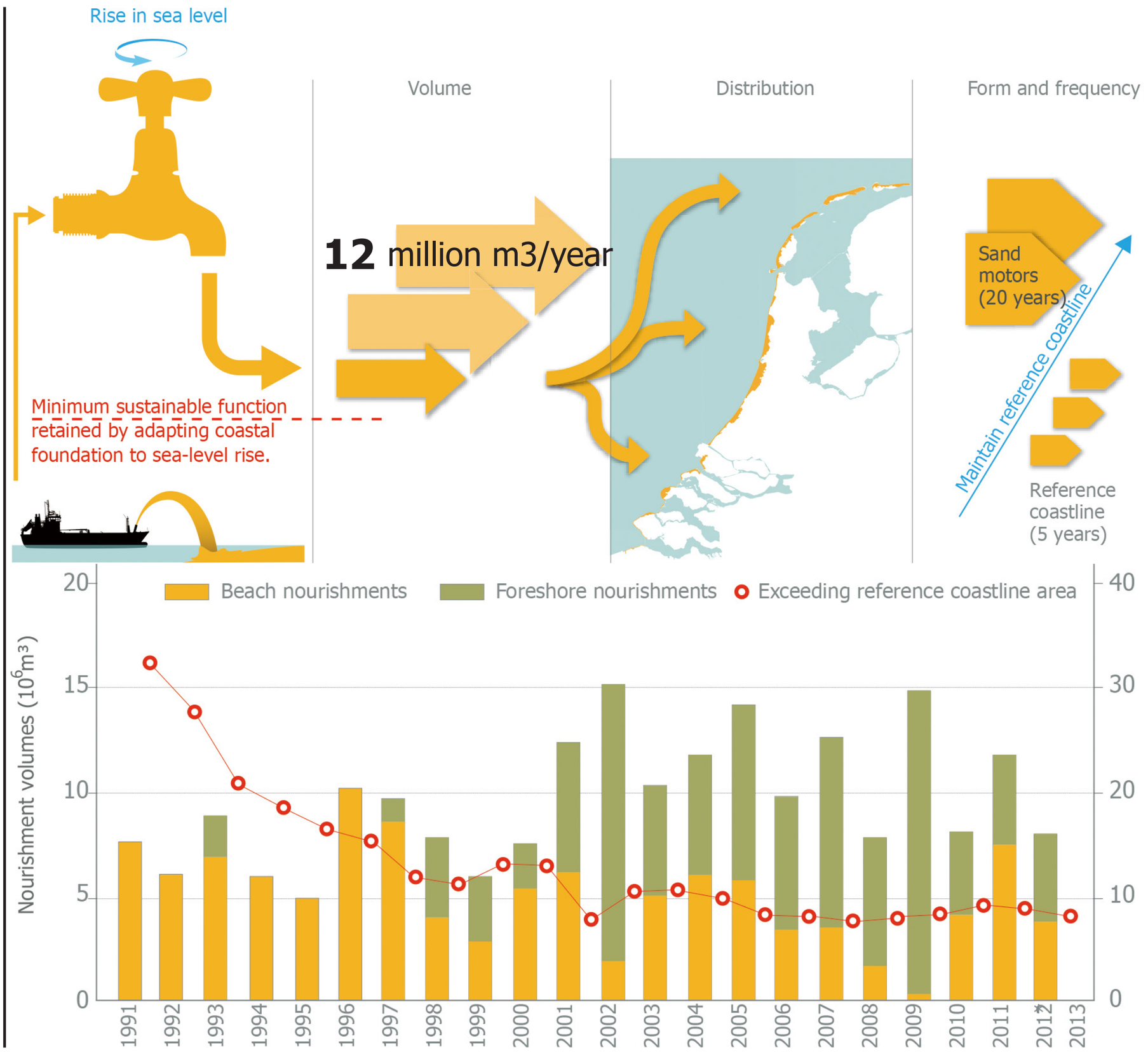

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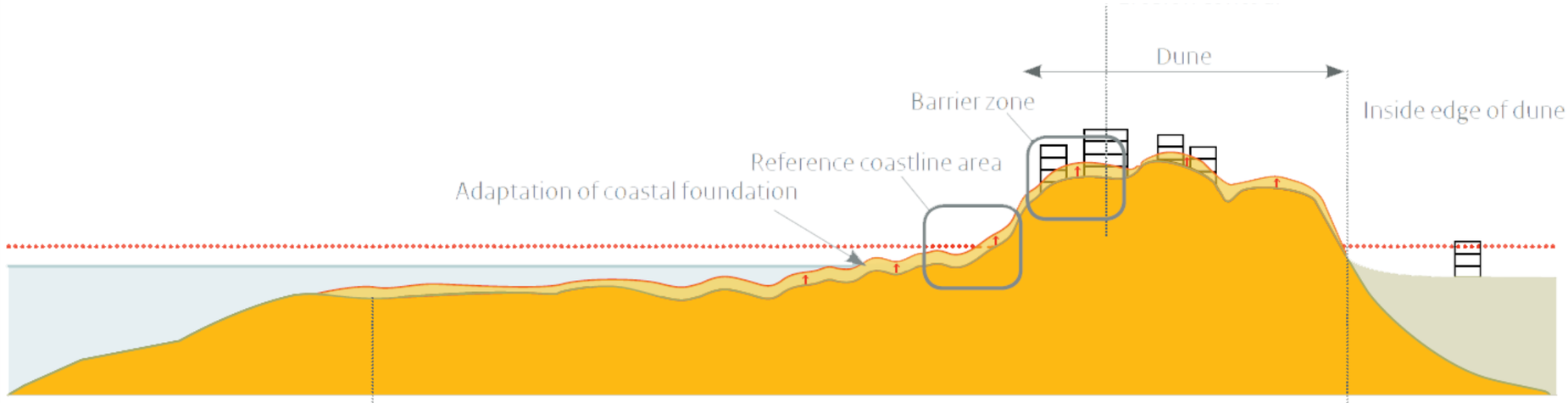
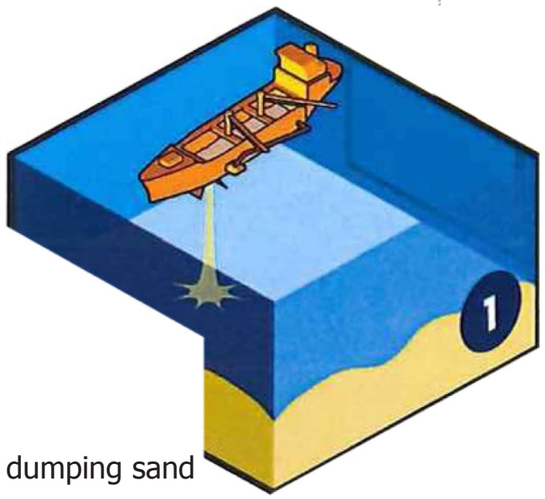
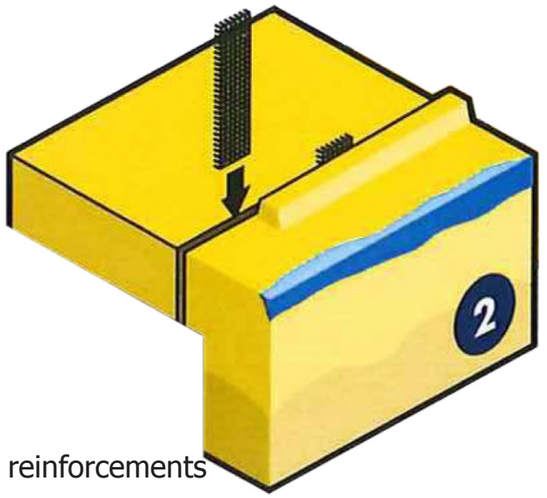
Land construction

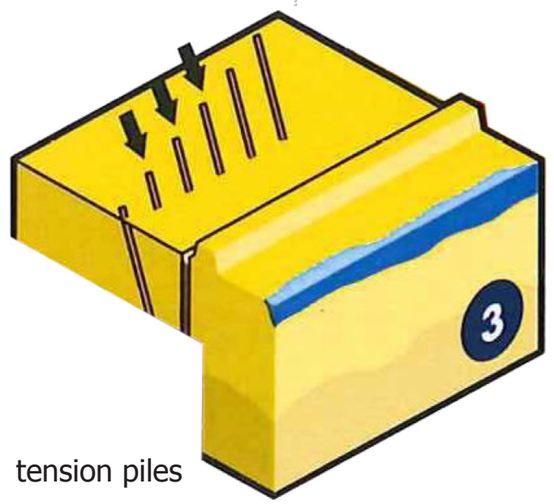




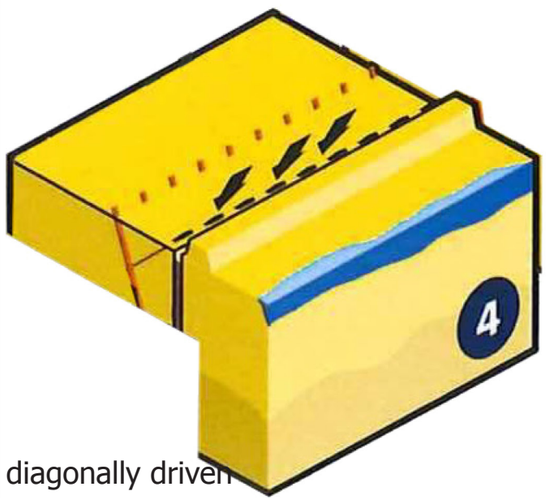
dumping sand



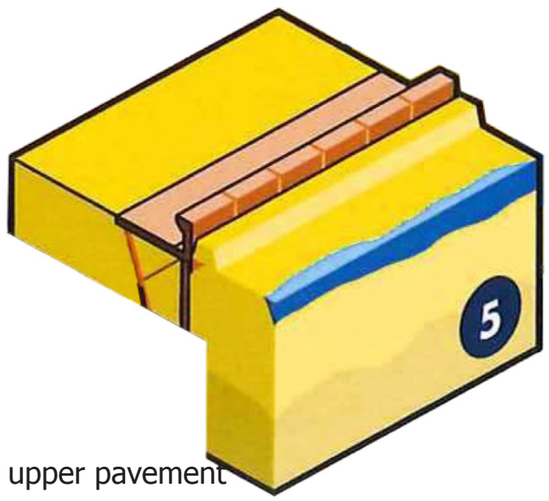
reinforcements



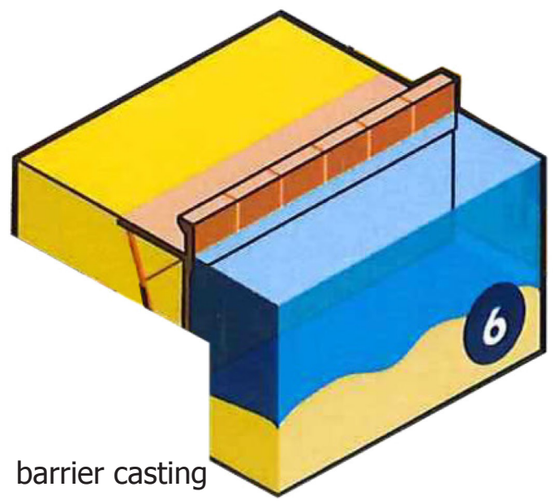
tension piles



diagonally driven



upper pavement



barrier casting

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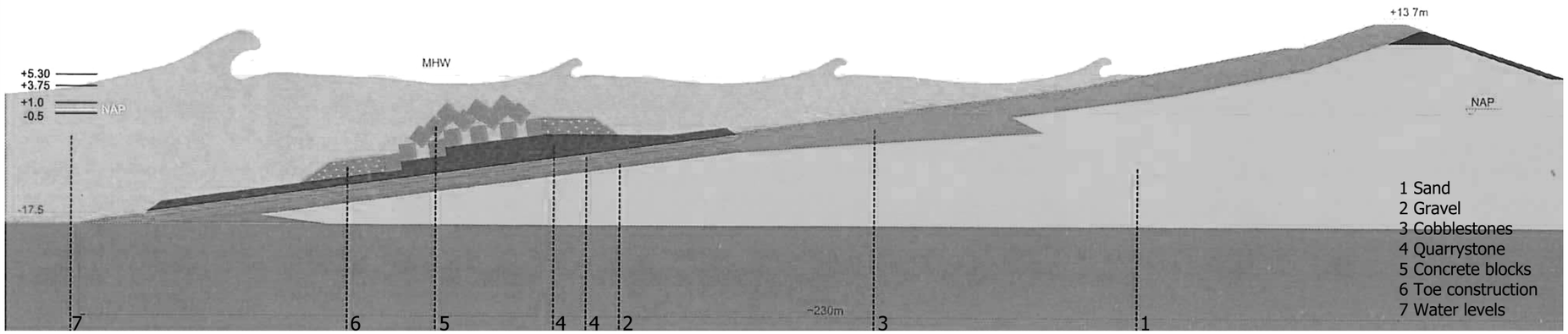
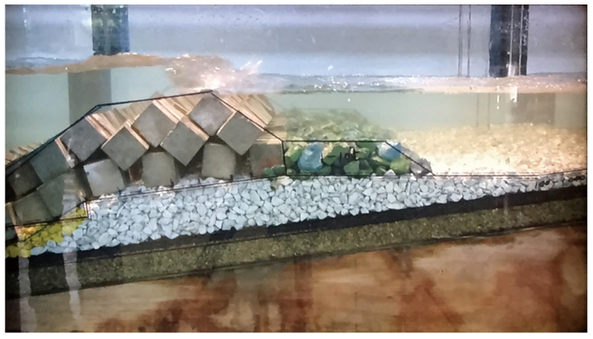
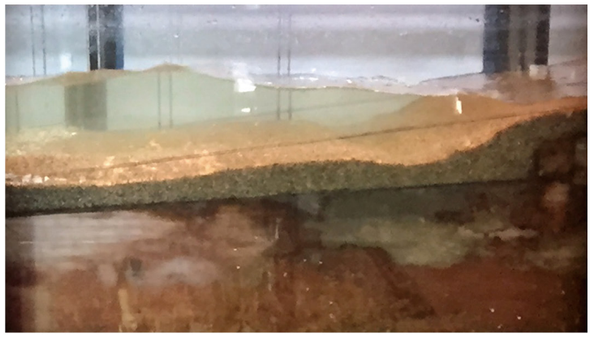
Land protection: seawall



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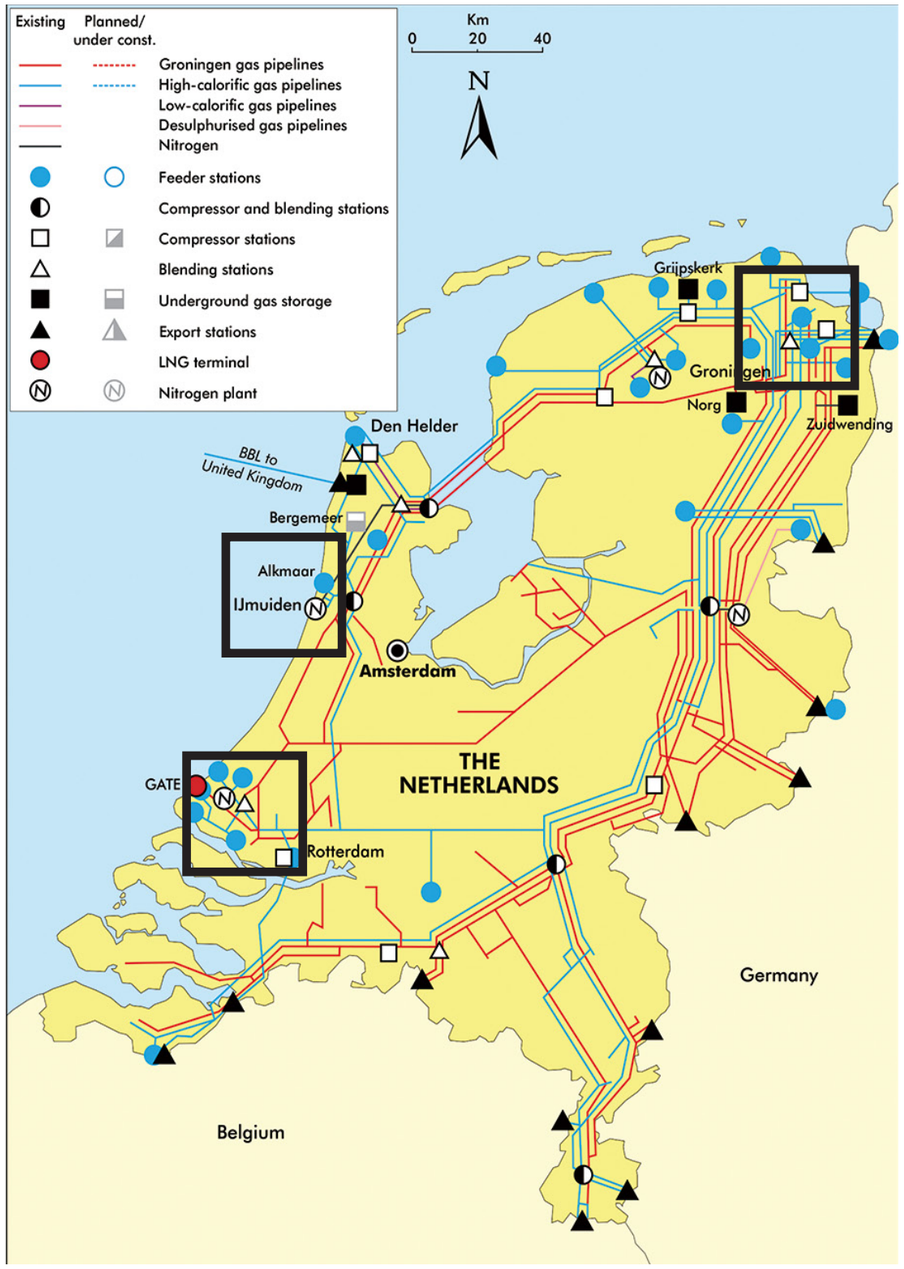
Oil and gas map



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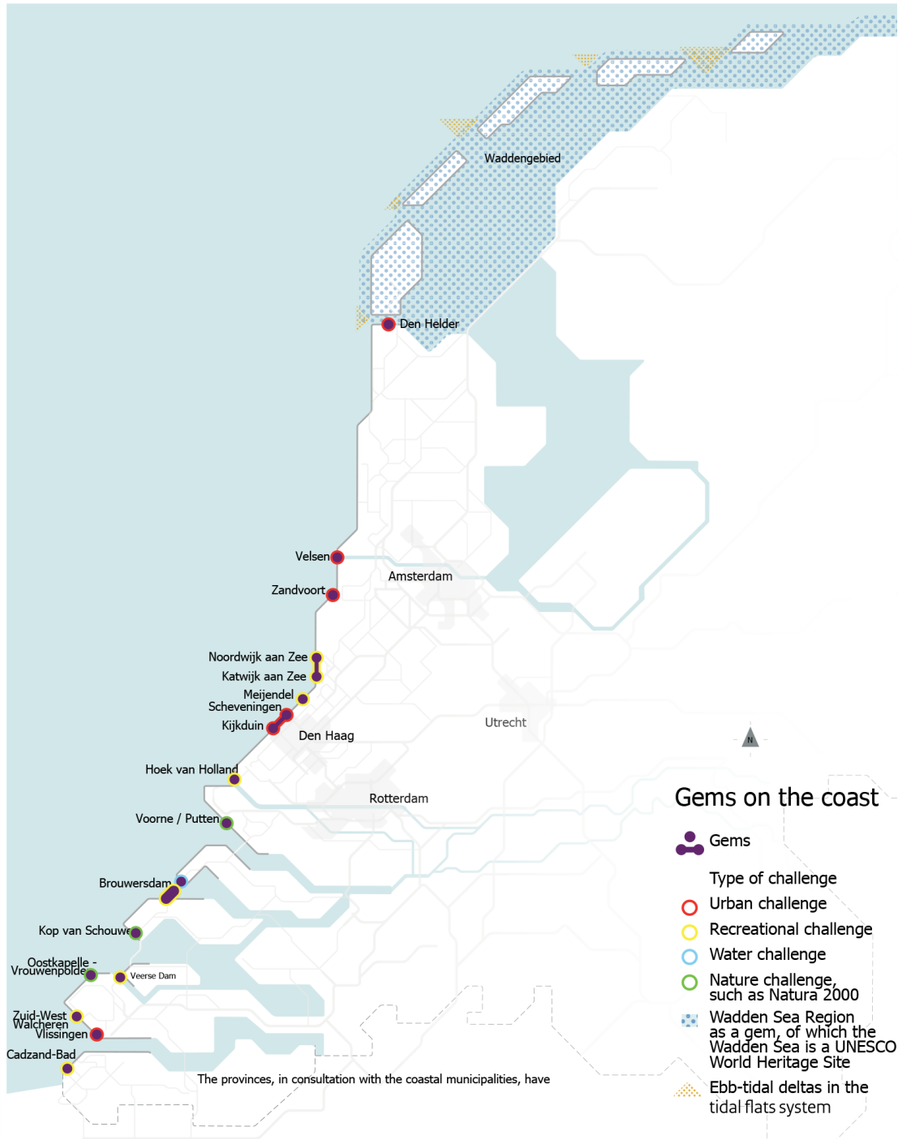
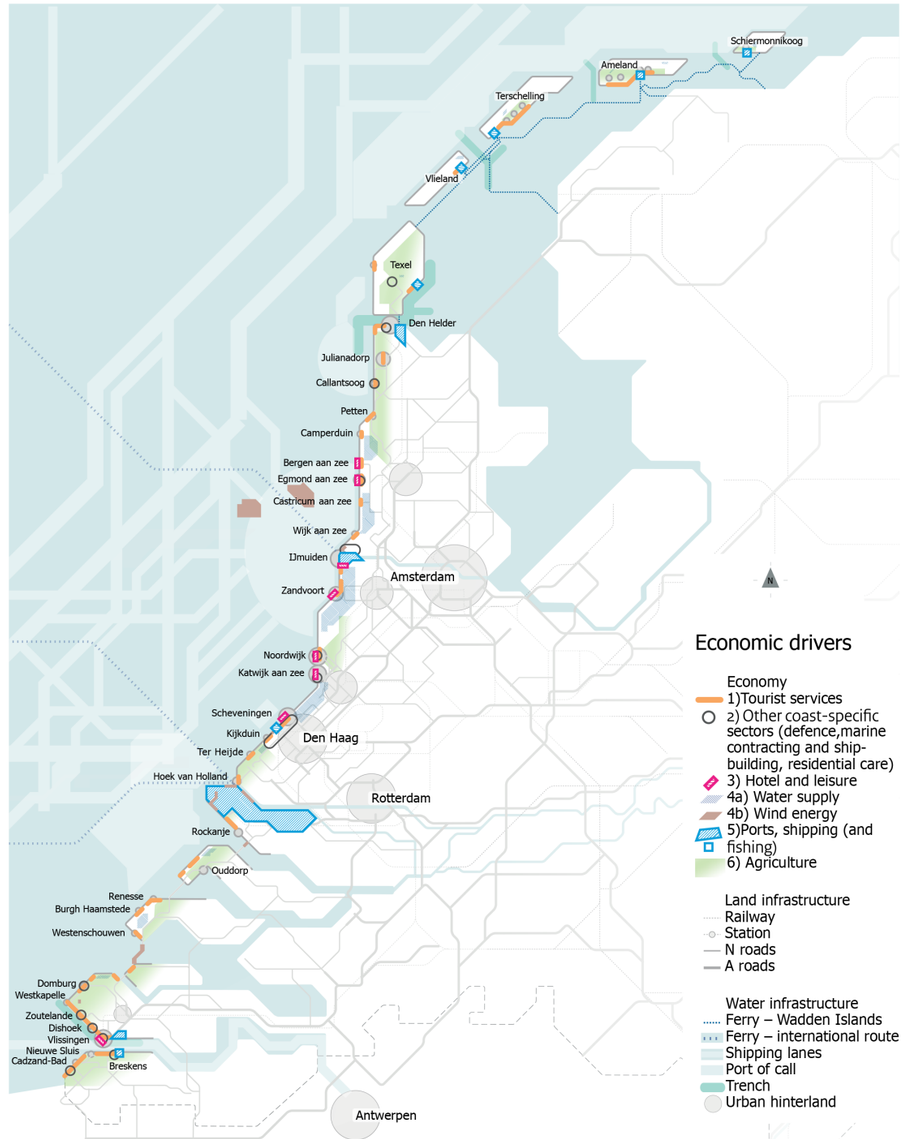
Coastal development





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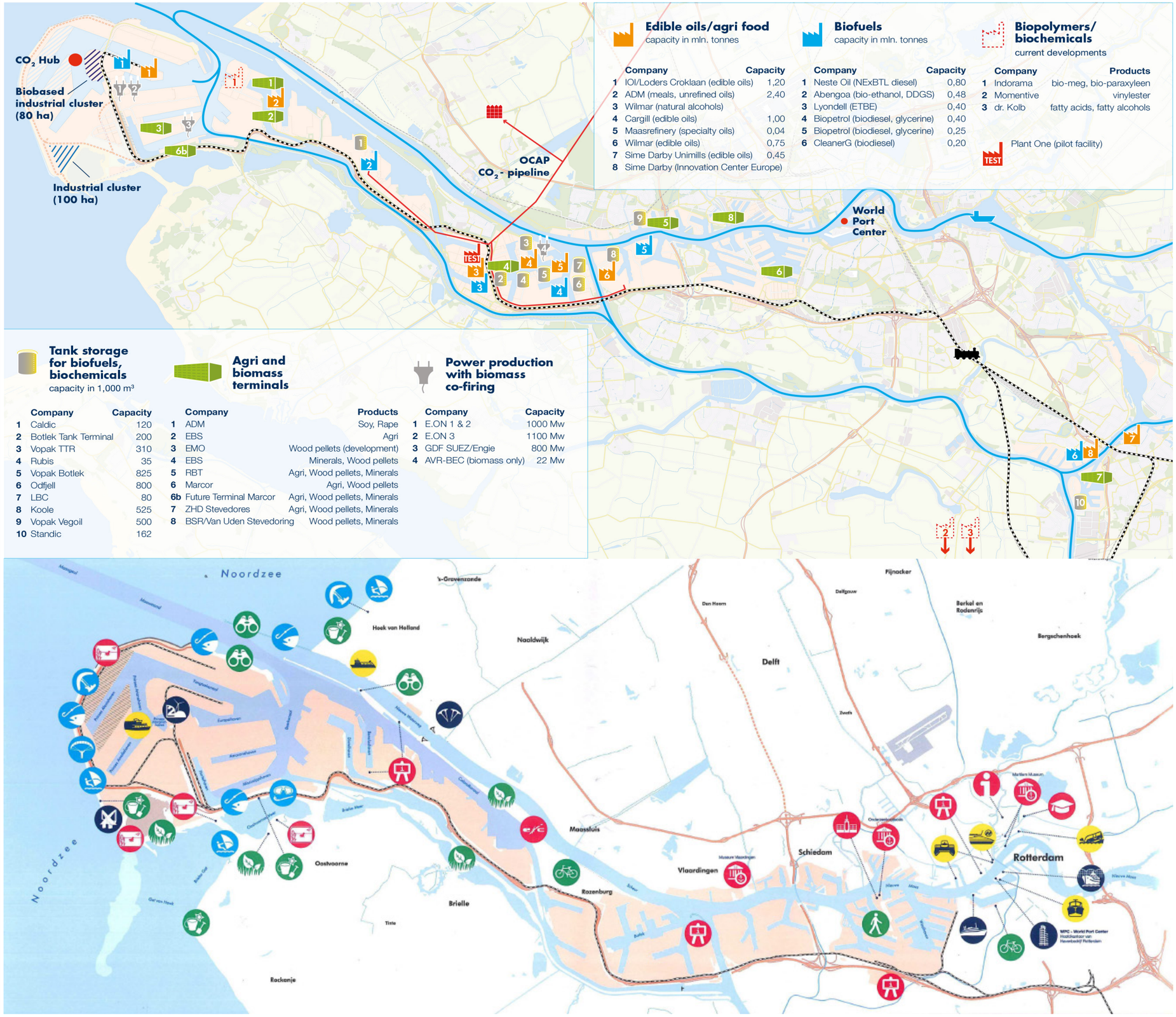
Rotterdam port



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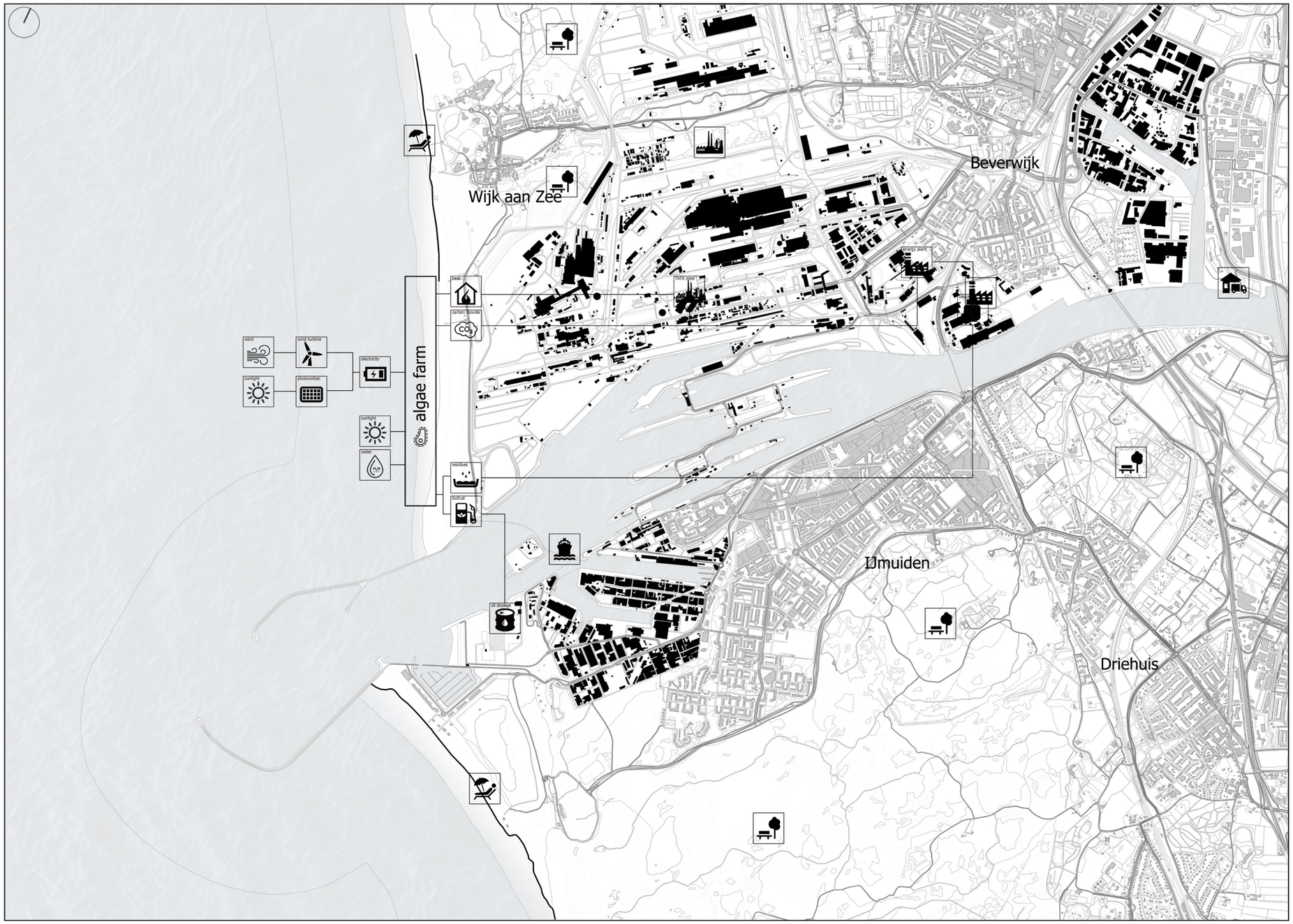
Algae farm context



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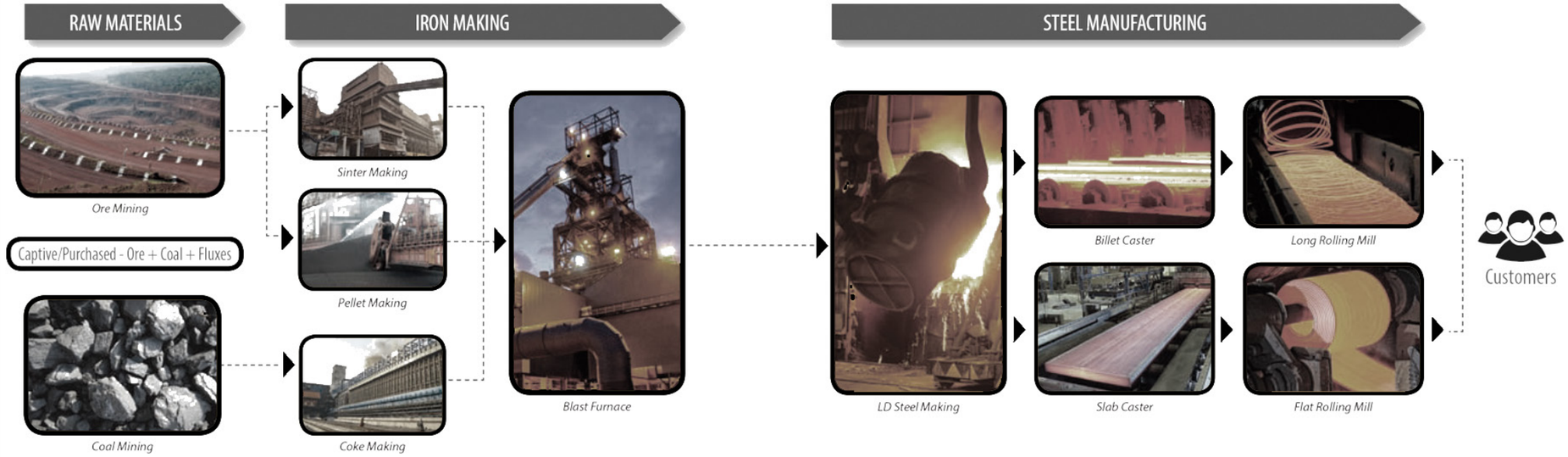
Opportunities: Tata steel

extra heat from manufacture



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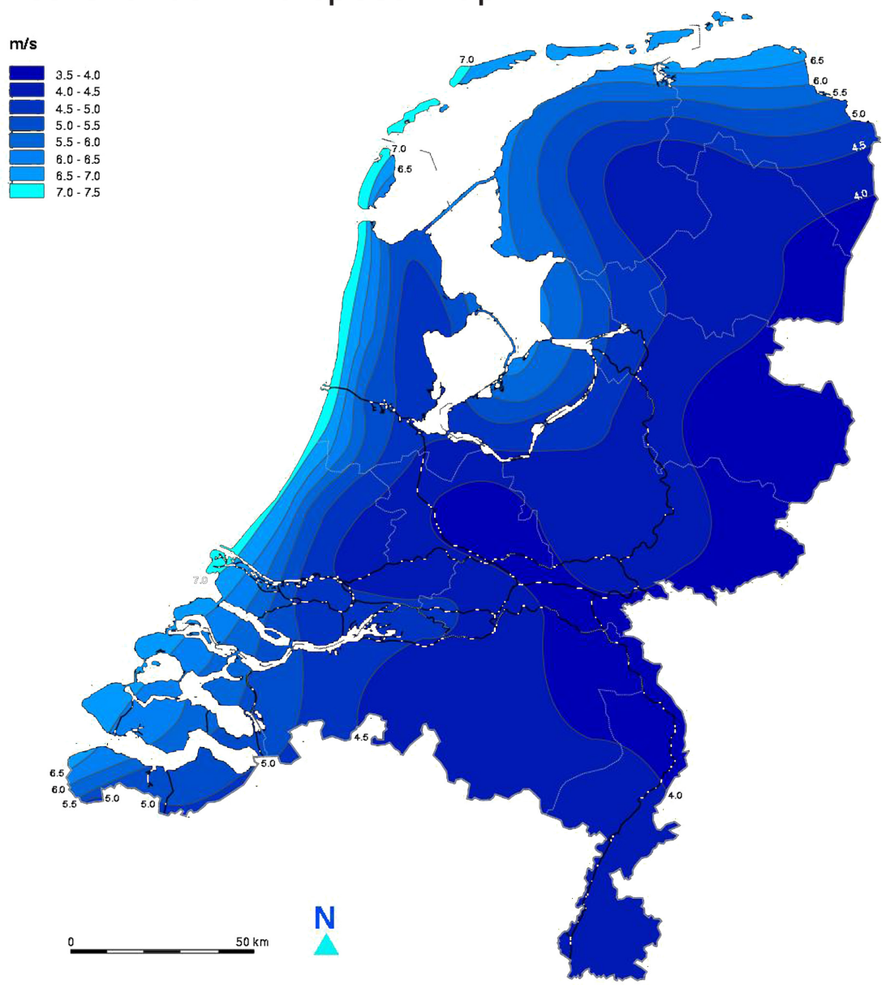
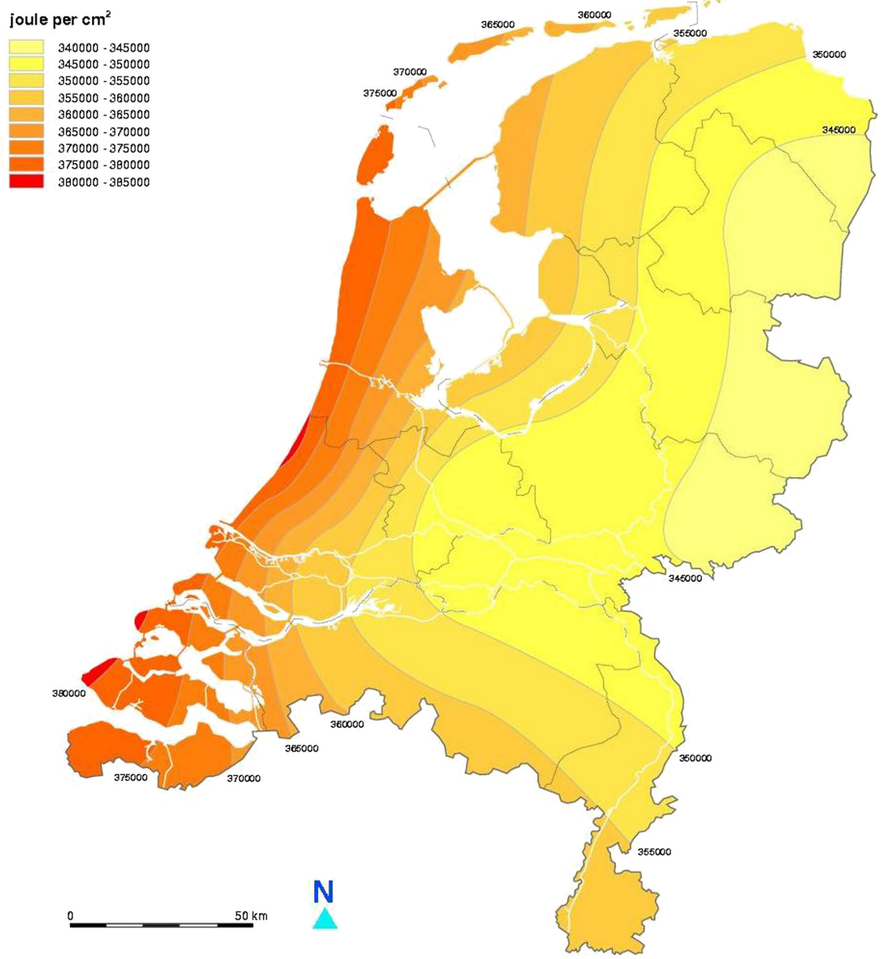
Opportunities: Sustainable energy potentials

Netherlands wind speed map



Netherlands solar radiation map



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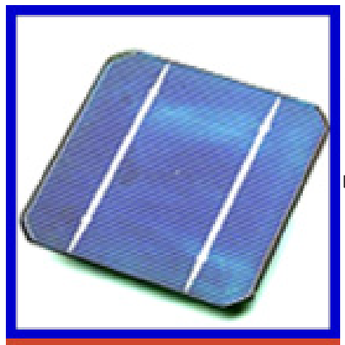
Netherlands average solar radiation: 110W/m2/year

46.0%
50.6W/m2



27.6%
30.36W/m2

23.3%
25.63W/m2

12.6%
13.86W/m2

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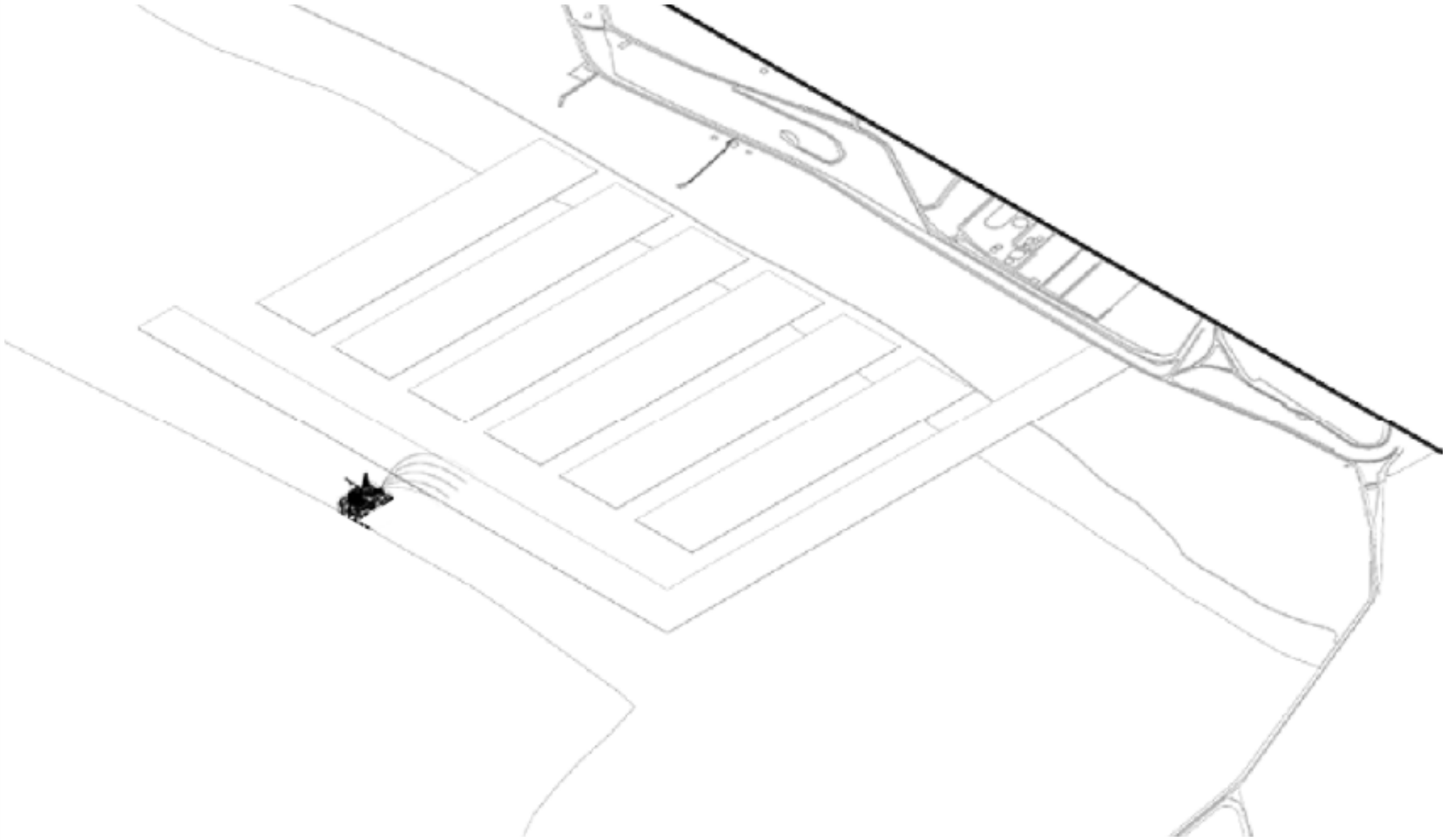
Sand nourishment for land creating



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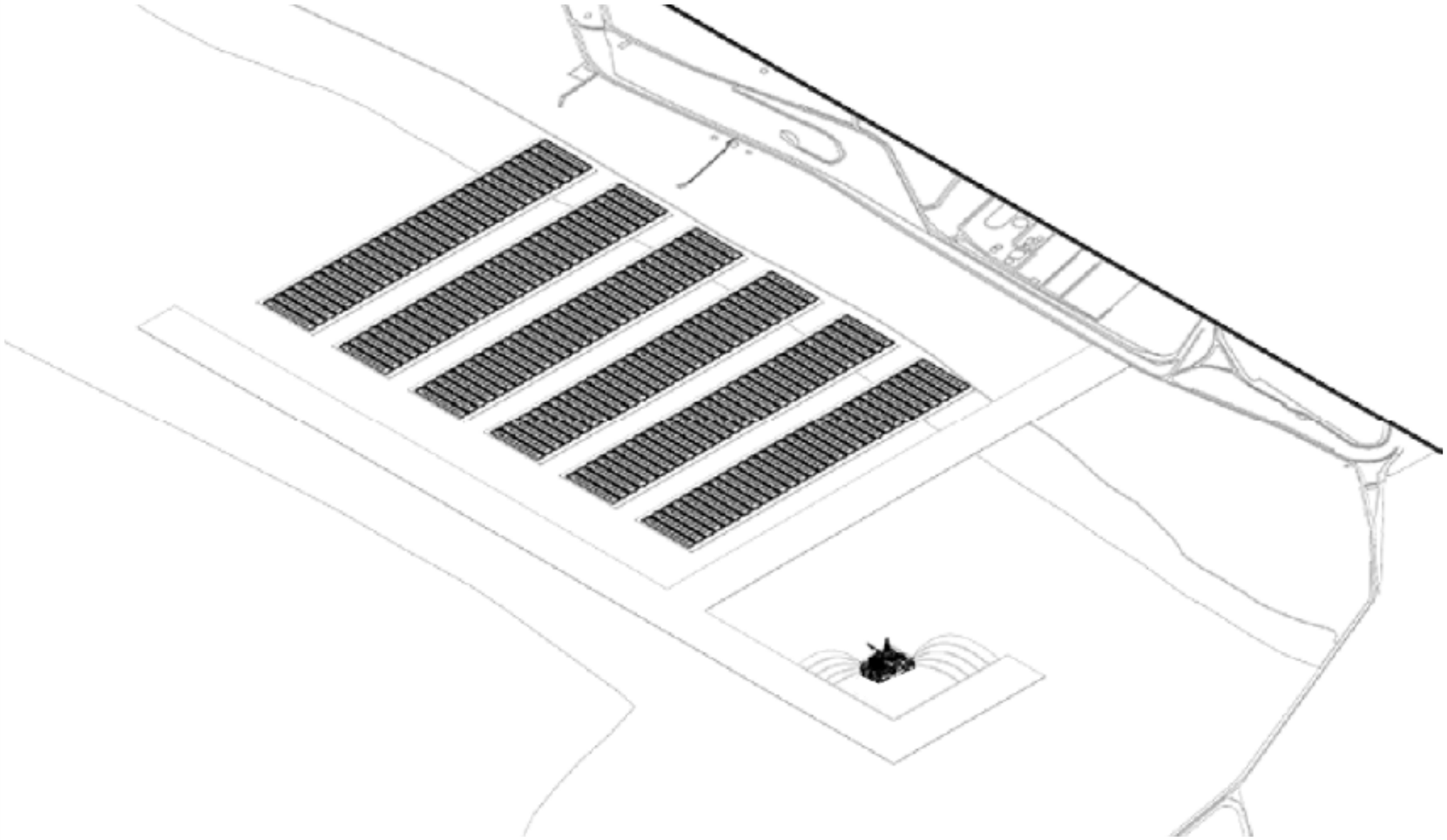
Agae farm and new beach



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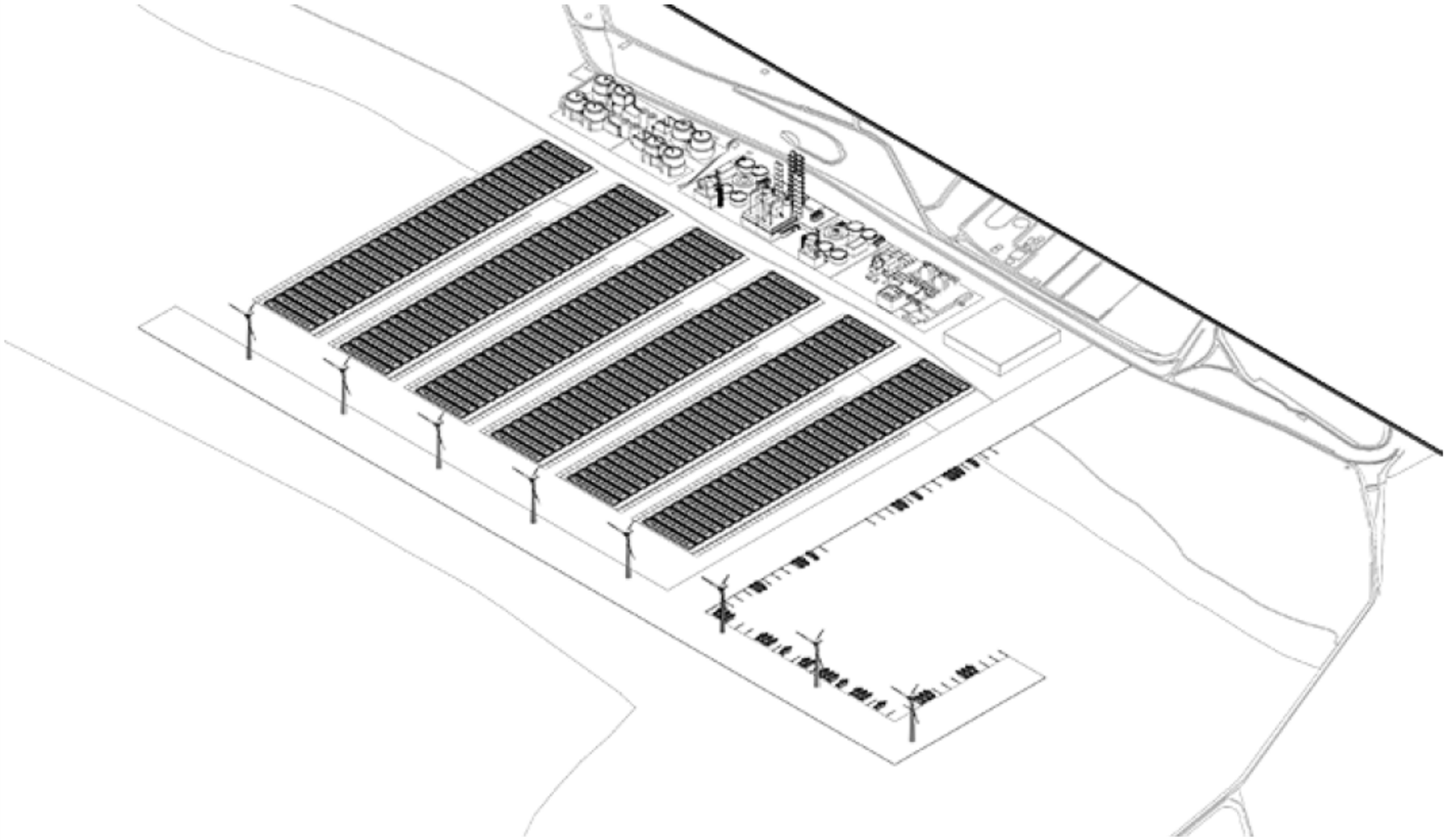
Biofuel infrastructure and new harbour



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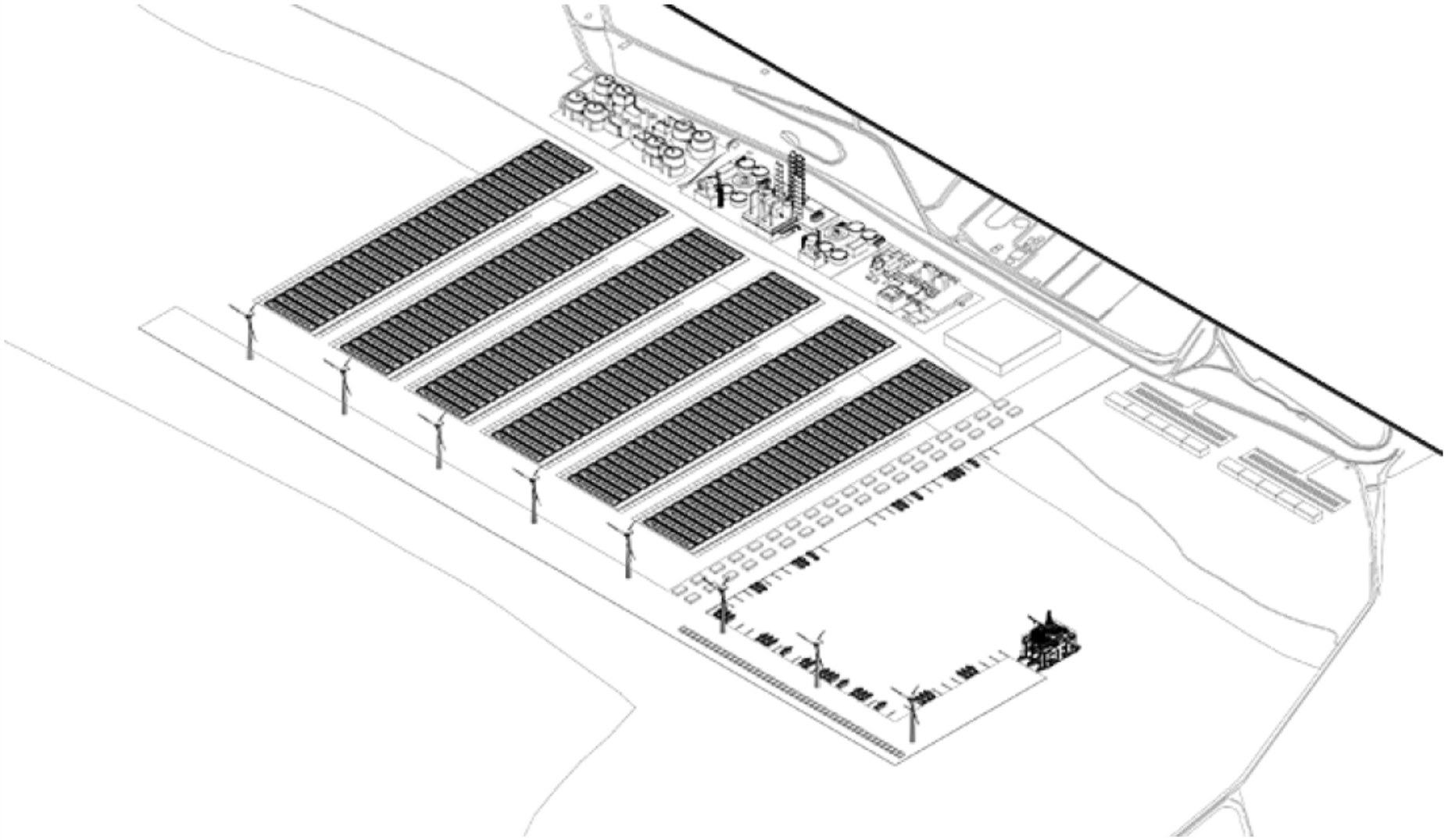
Recreation coast and oil rig transformation



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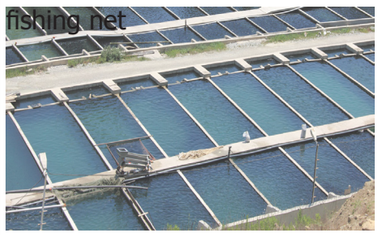
Production area

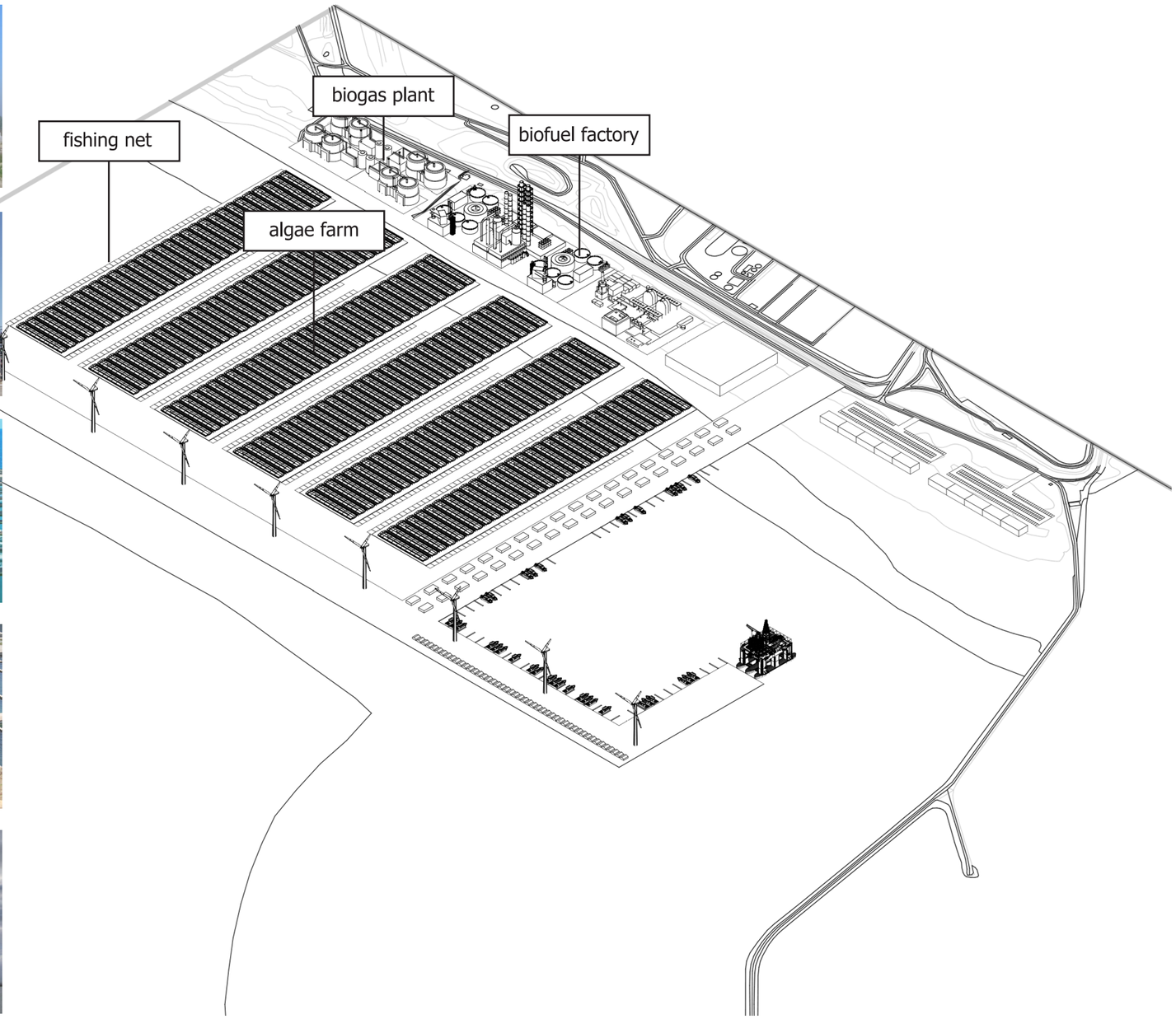
biogas plant

biofuel factory

algae farm


fishing net

wind turbine



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Recreation area

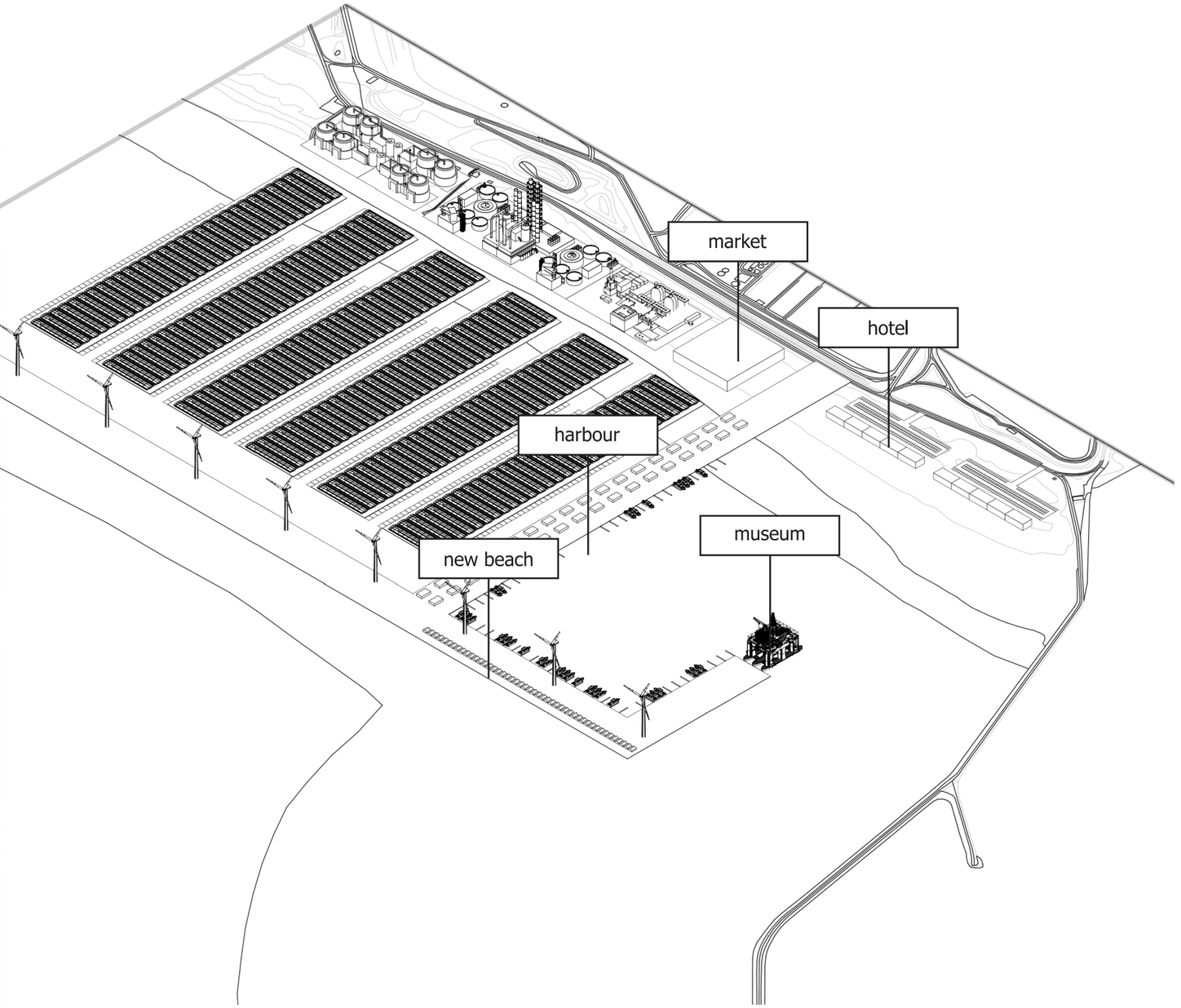
hotel

harbour

market

museum

new beach



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Production

biofuel 9300 b/day

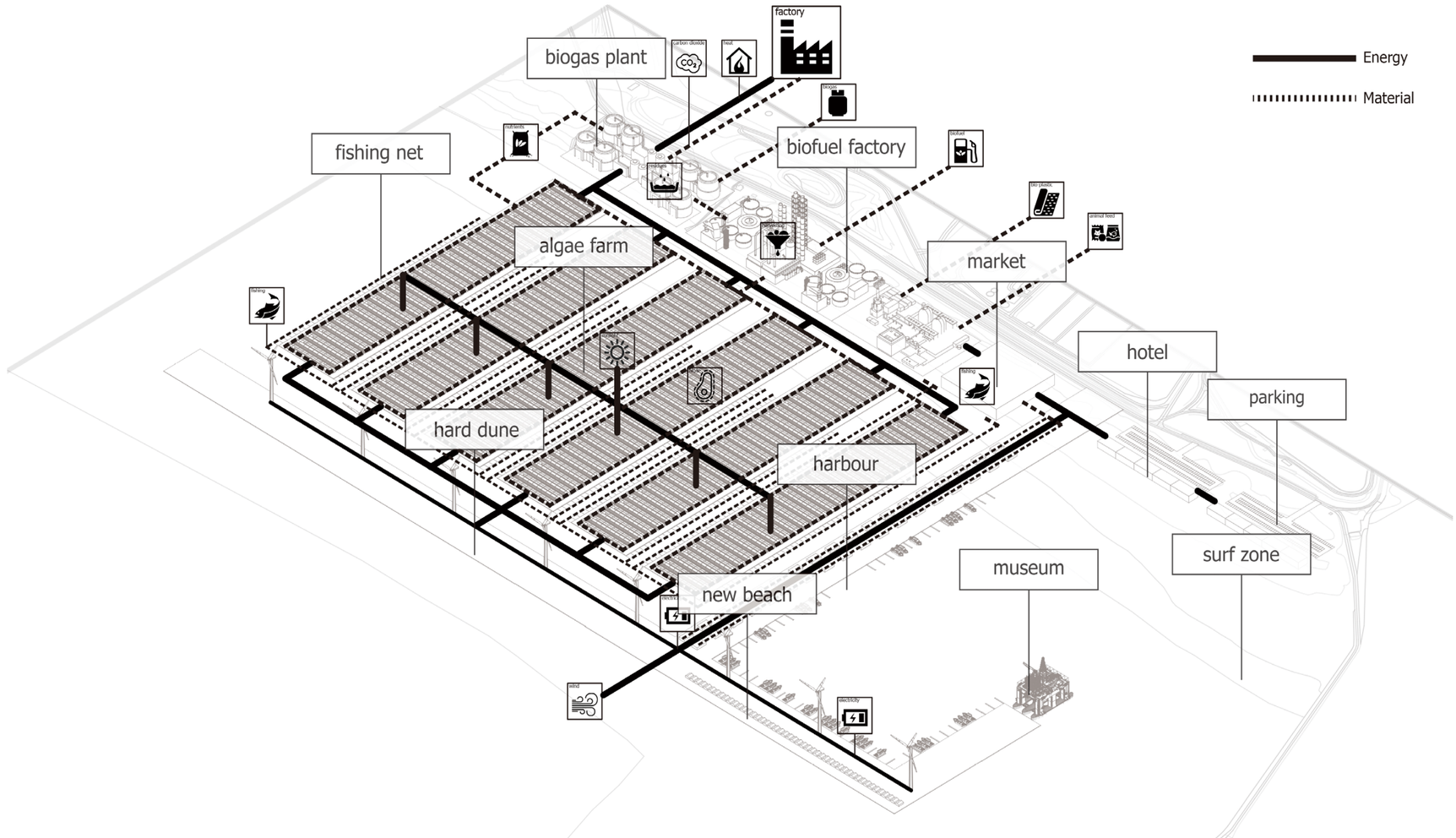
biogas 141050 m3/day

electricity 6MWh

motor gasoline
9.3% consumption

residential gas
0.5% consumption

Housing
525600 m2



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Coastal development

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North sea oil platform

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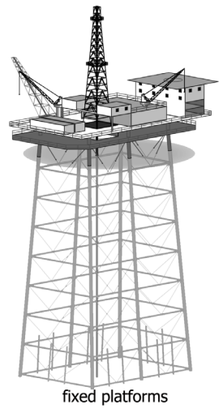
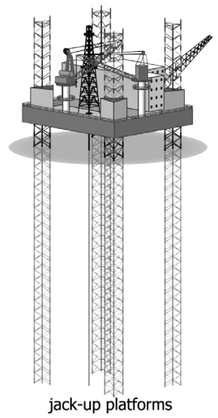
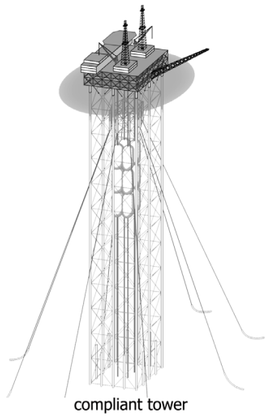
Oil platform



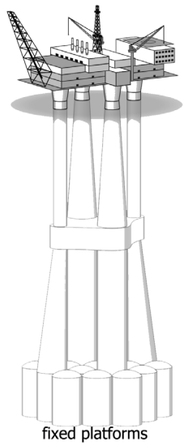
fixed platforms



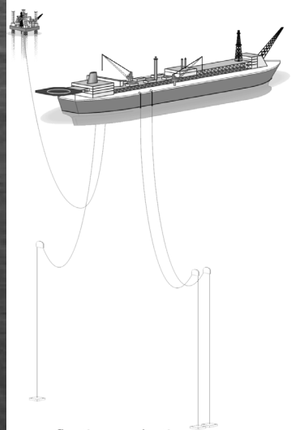
jack-up platforms



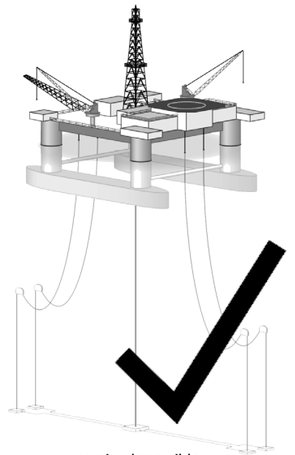
compliant tower



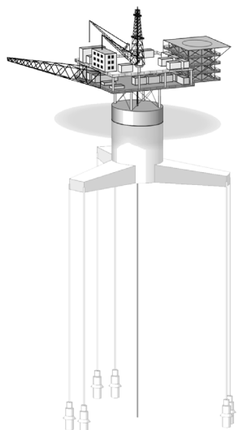
fixed platforms



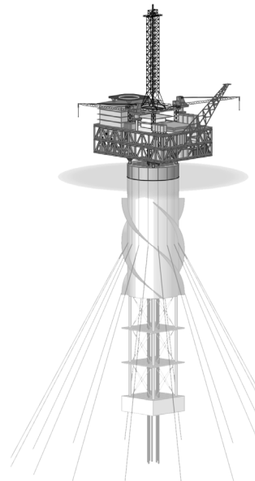
floating production system



semi-submersibles



tension leg platform



spar platform

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Concept collage

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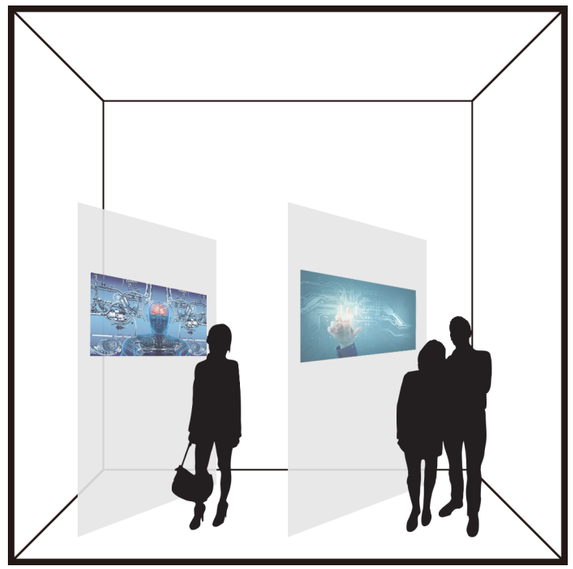
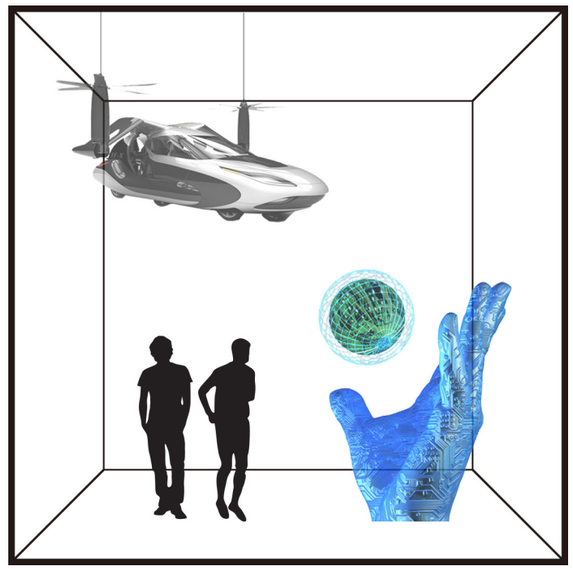
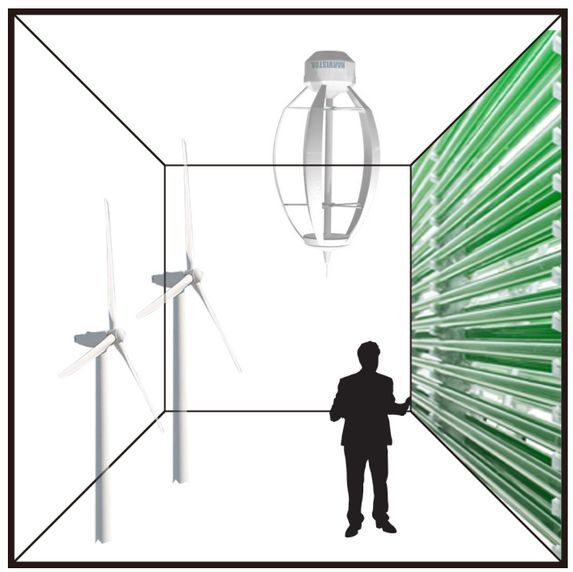
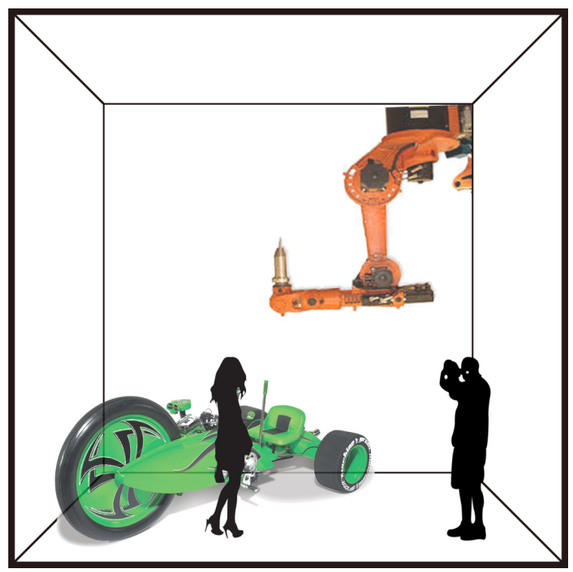
Future technology Expo









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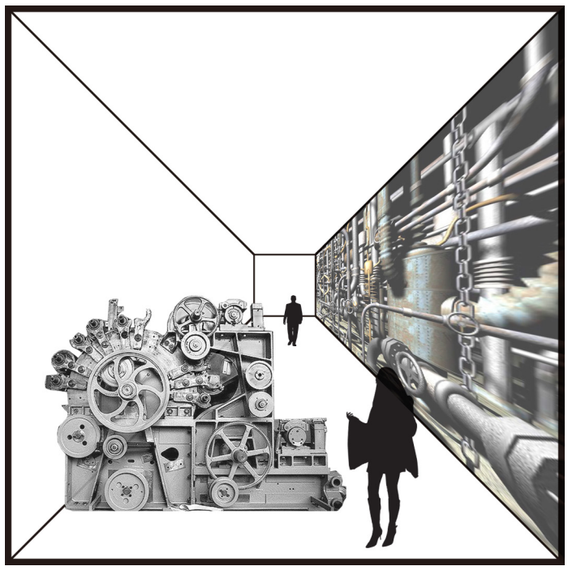
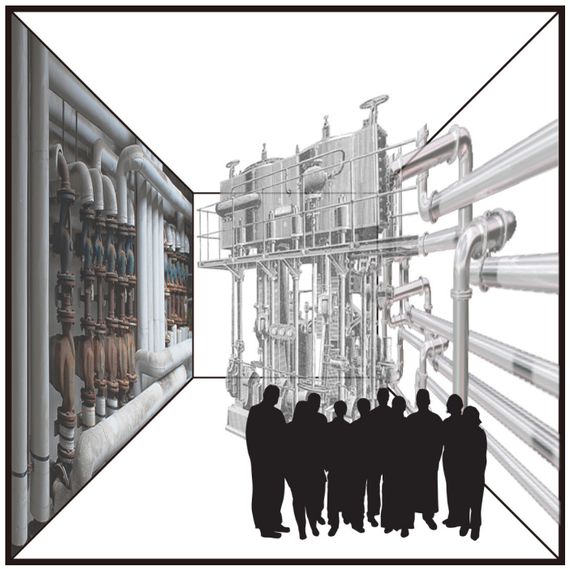
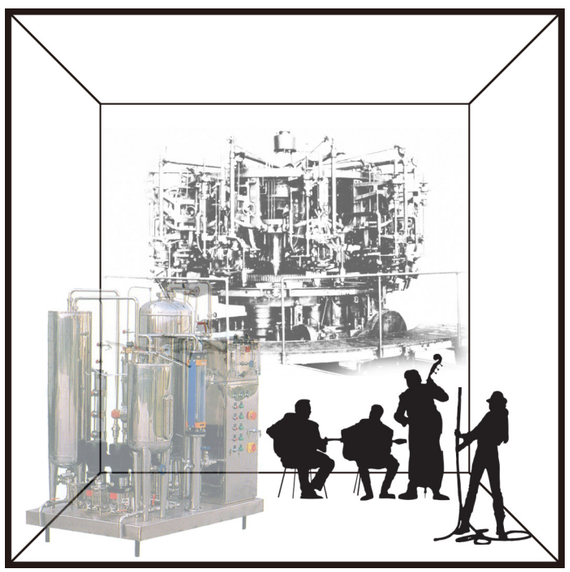
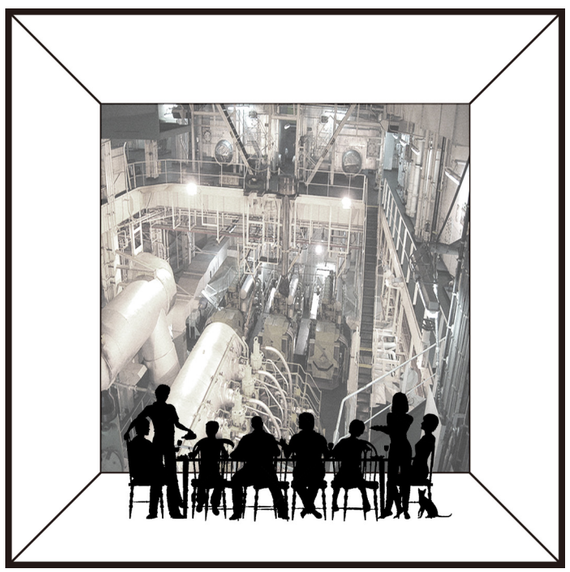
Existing facilities Collection









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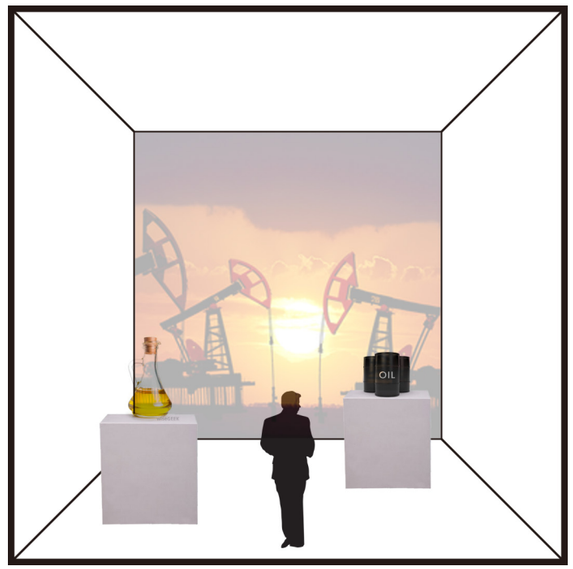
Fossil ages Exhibition



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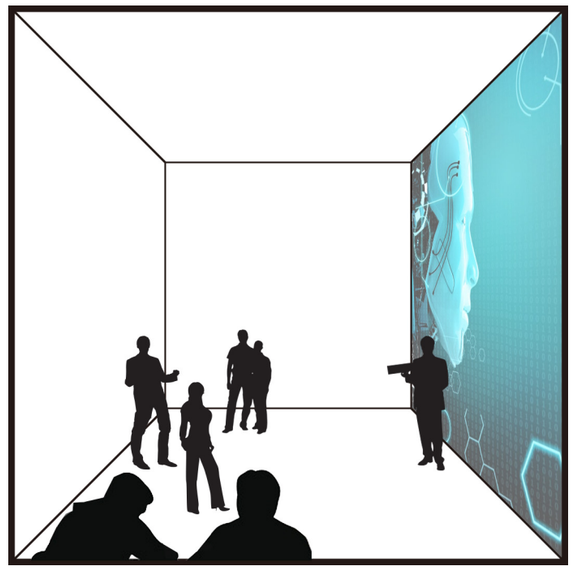
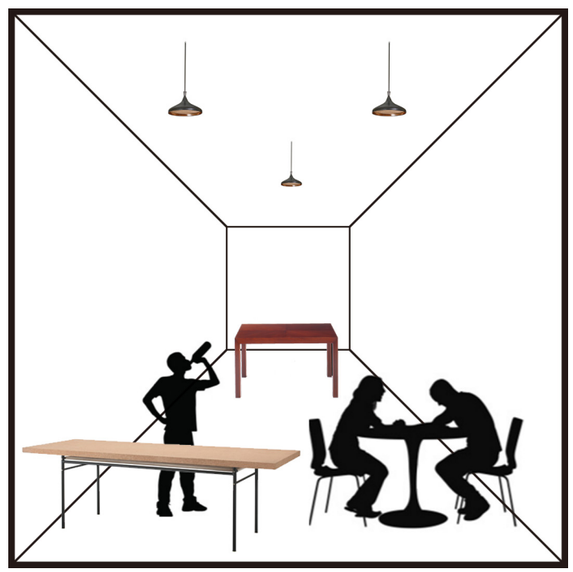
Education and Entertainment





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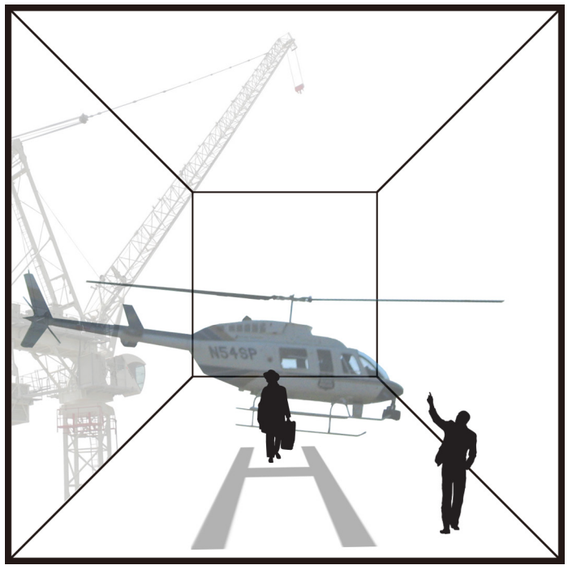
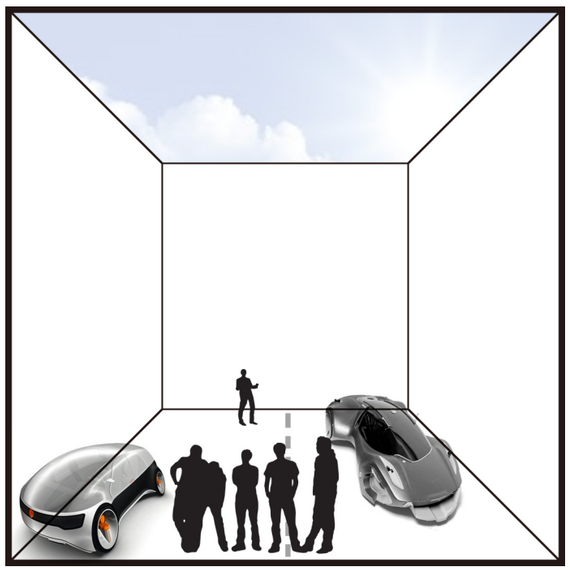
Experience





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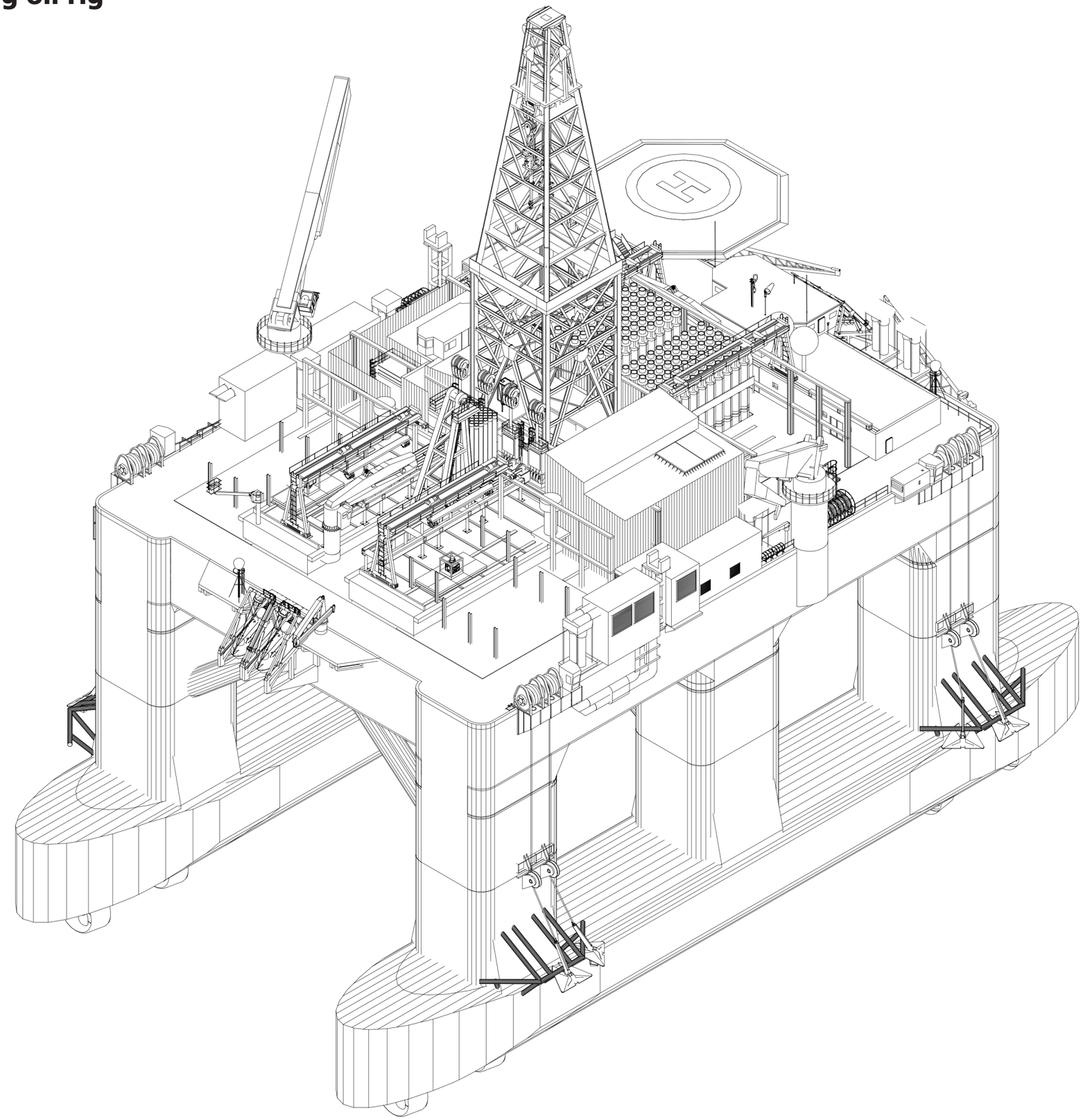
Existing oil rig



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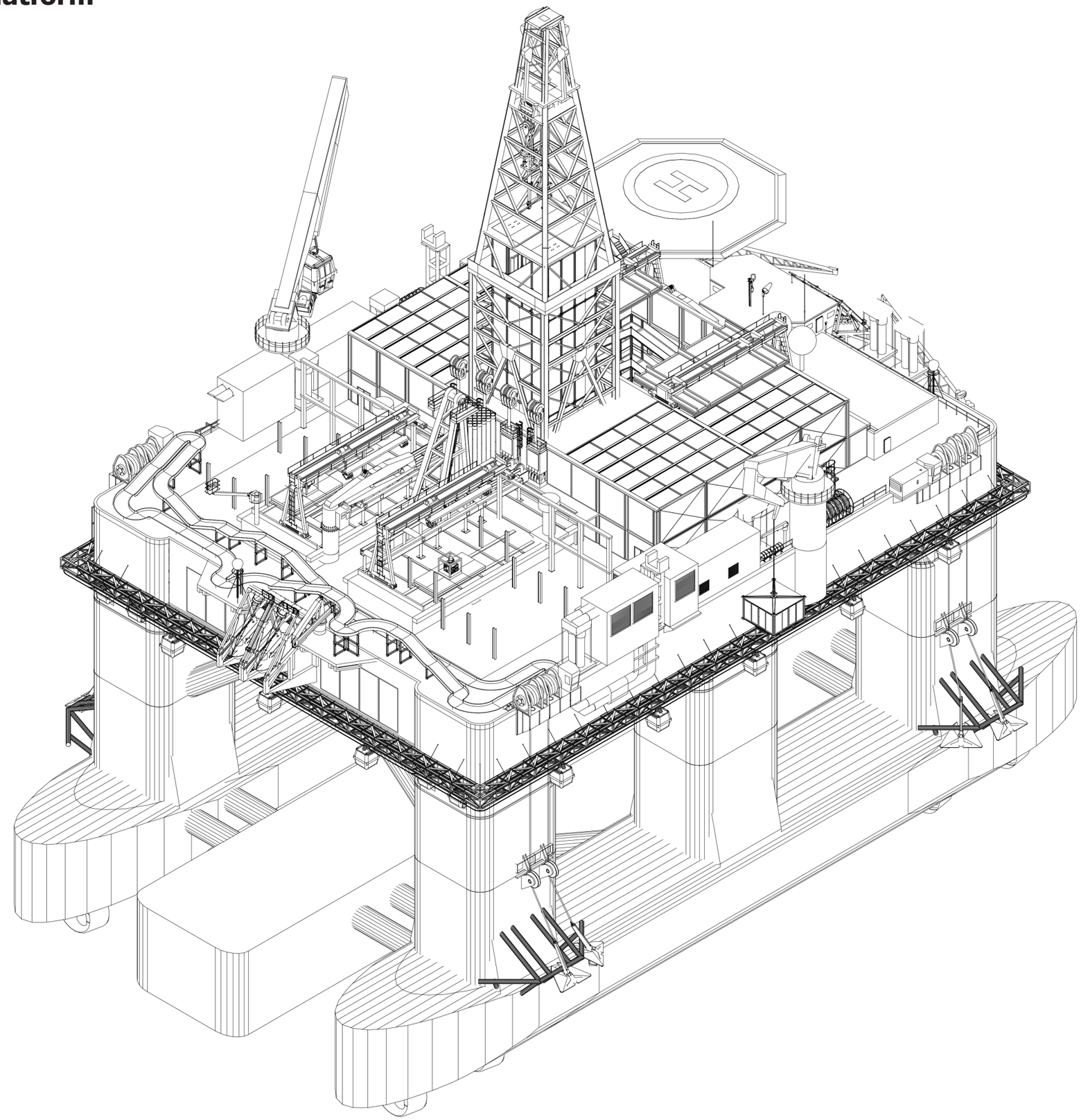
New platform



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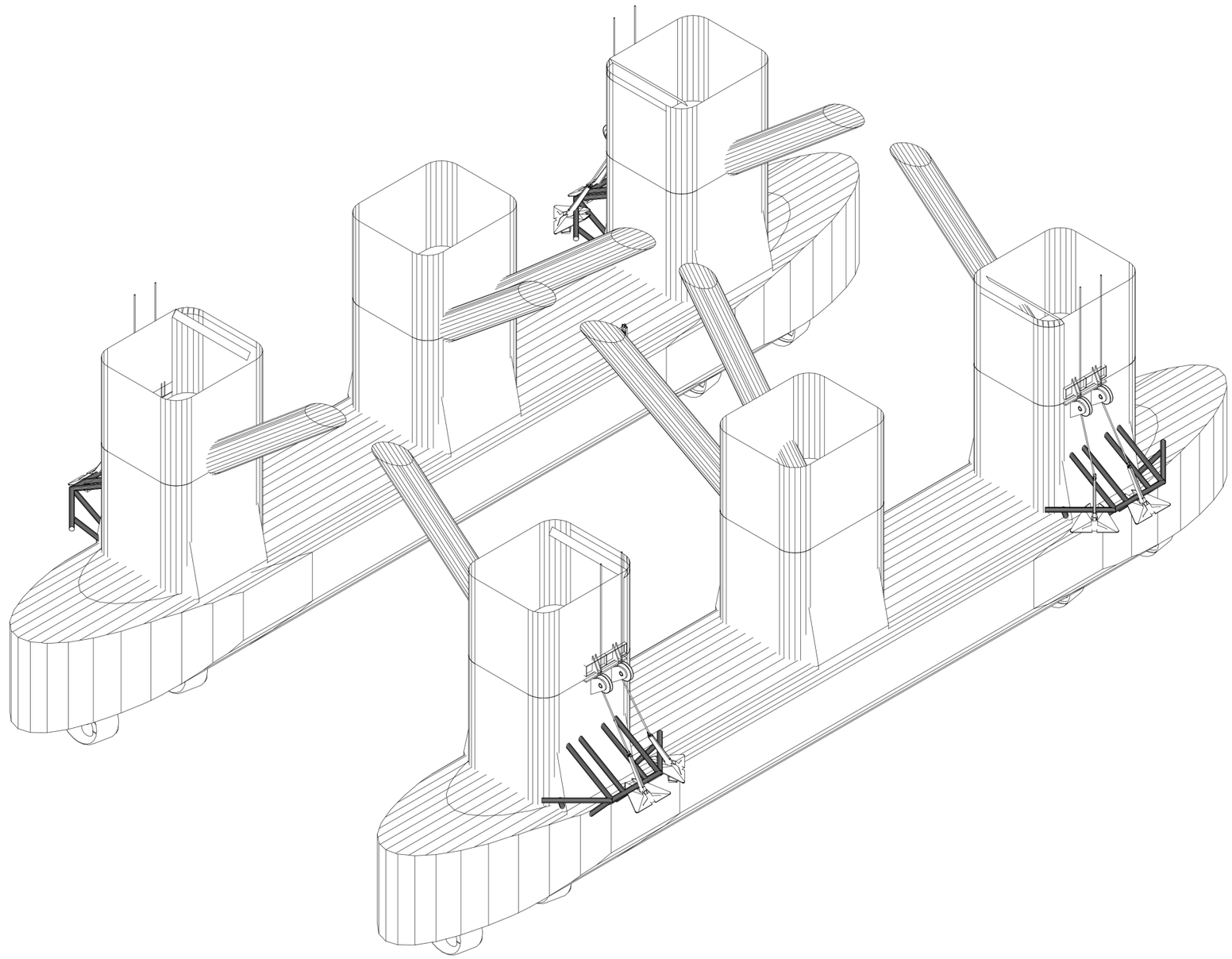
Floating boat and support structure



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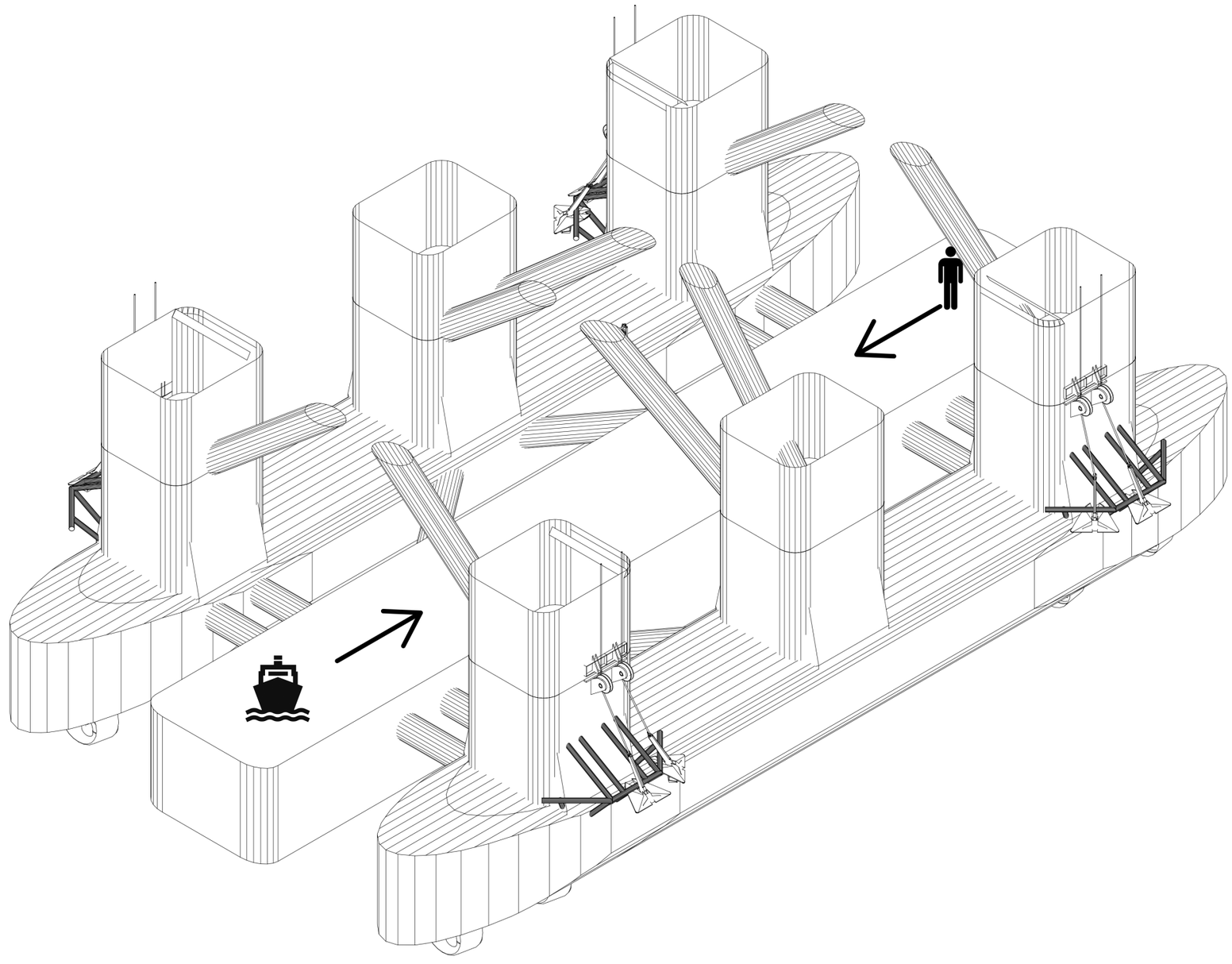
Floating deck as entrance



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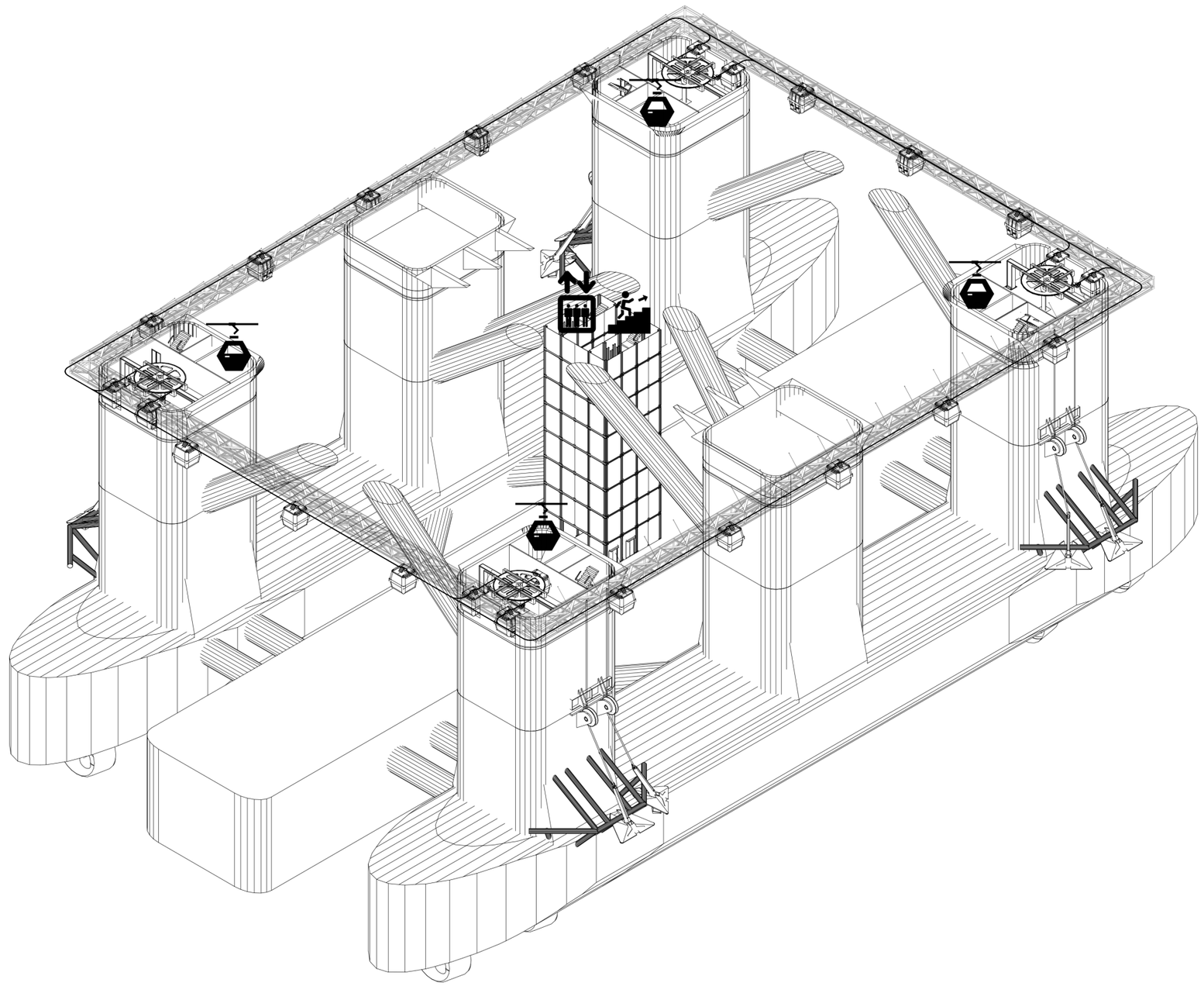
Vertical circulation and horizontal movements



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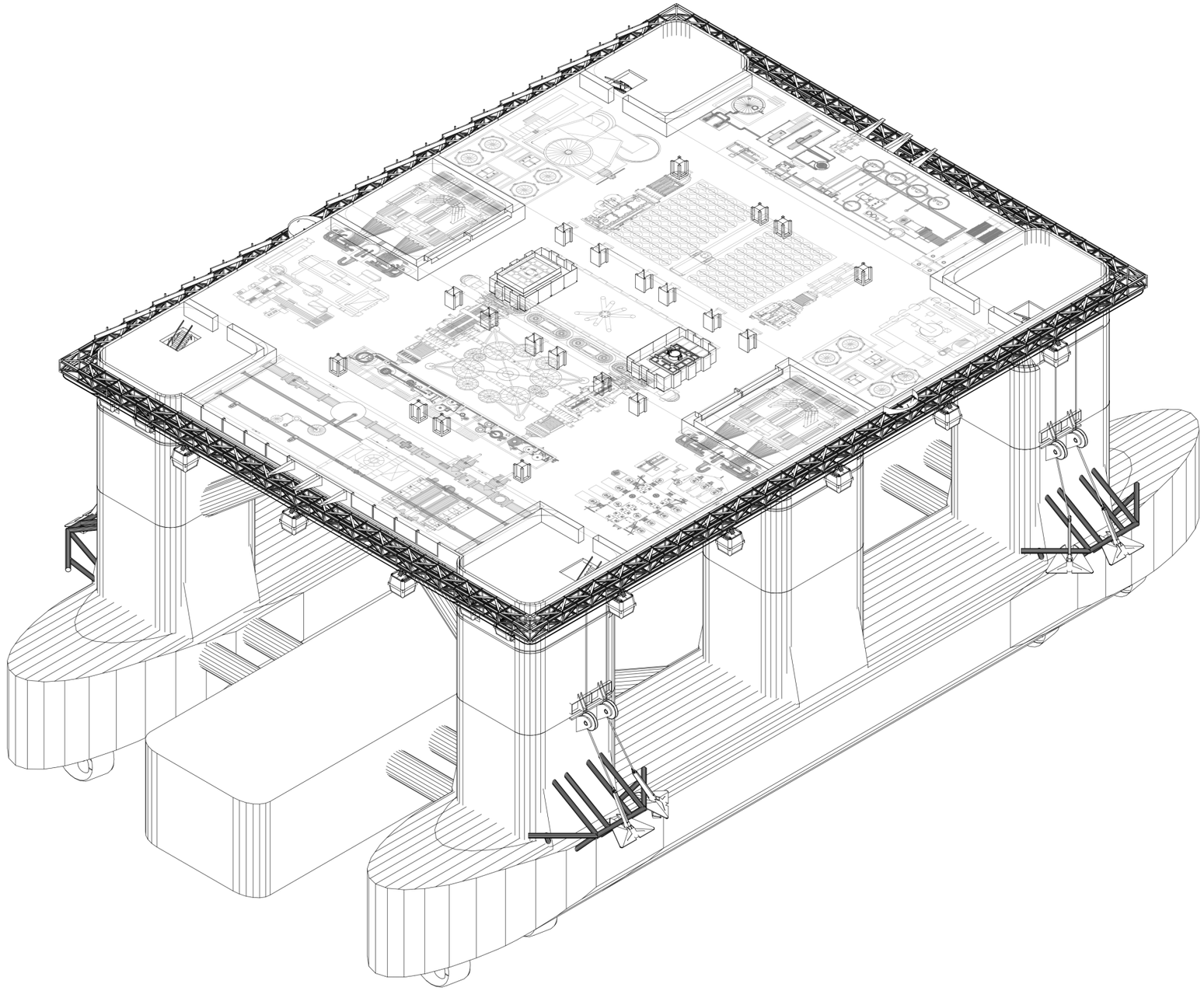
Existing interior



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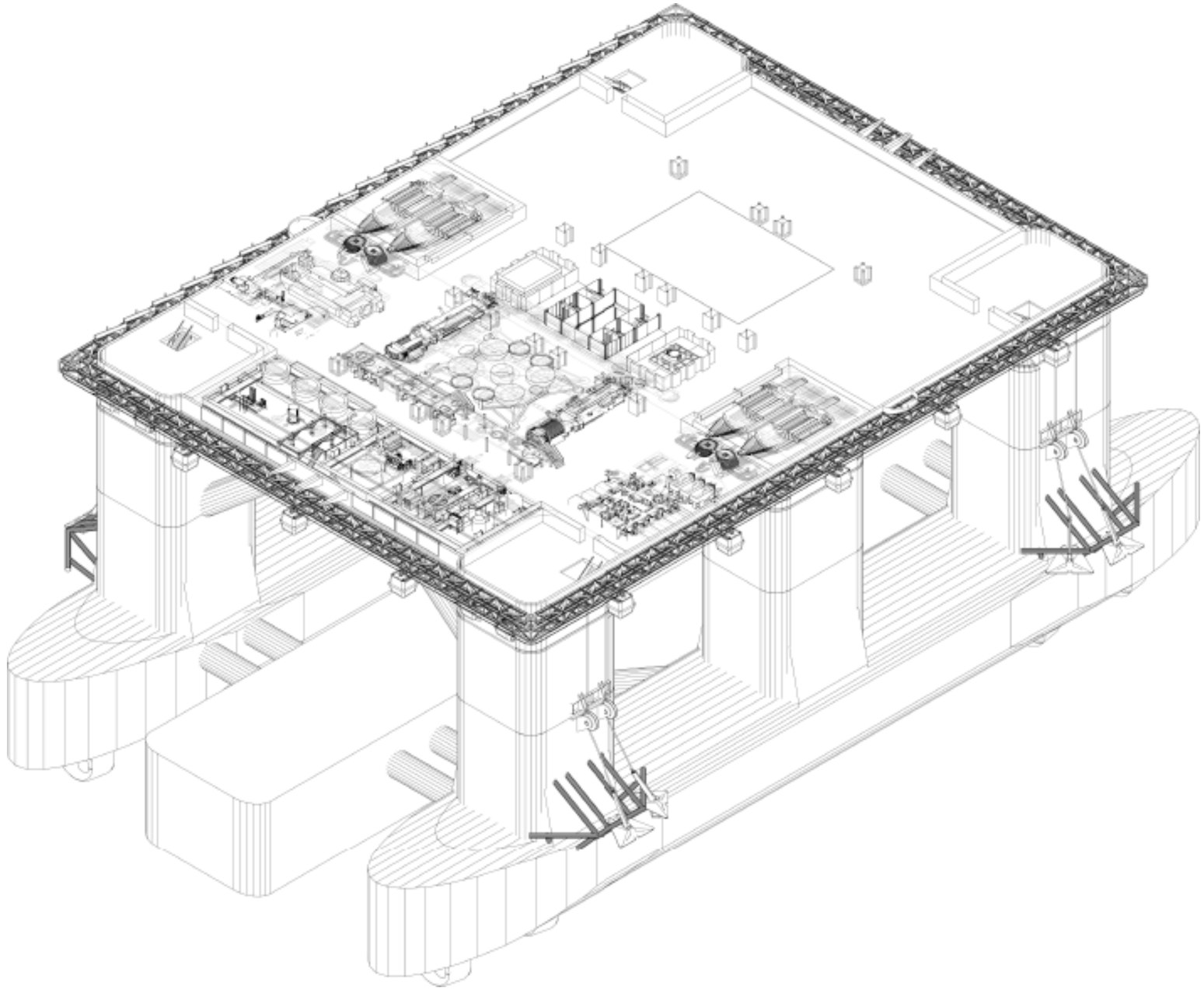
Remove living support parts and drilling pipes



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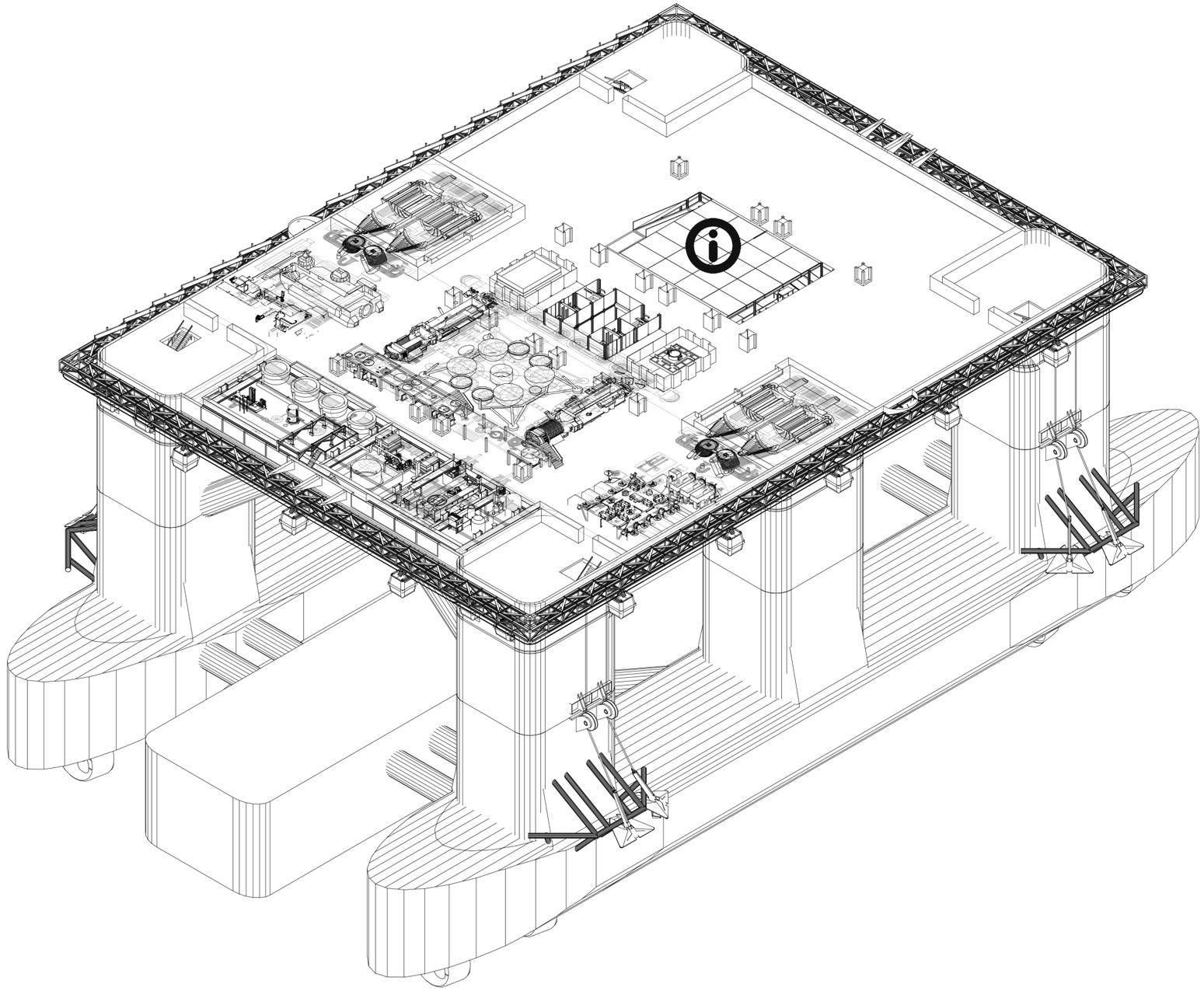
Meeting point



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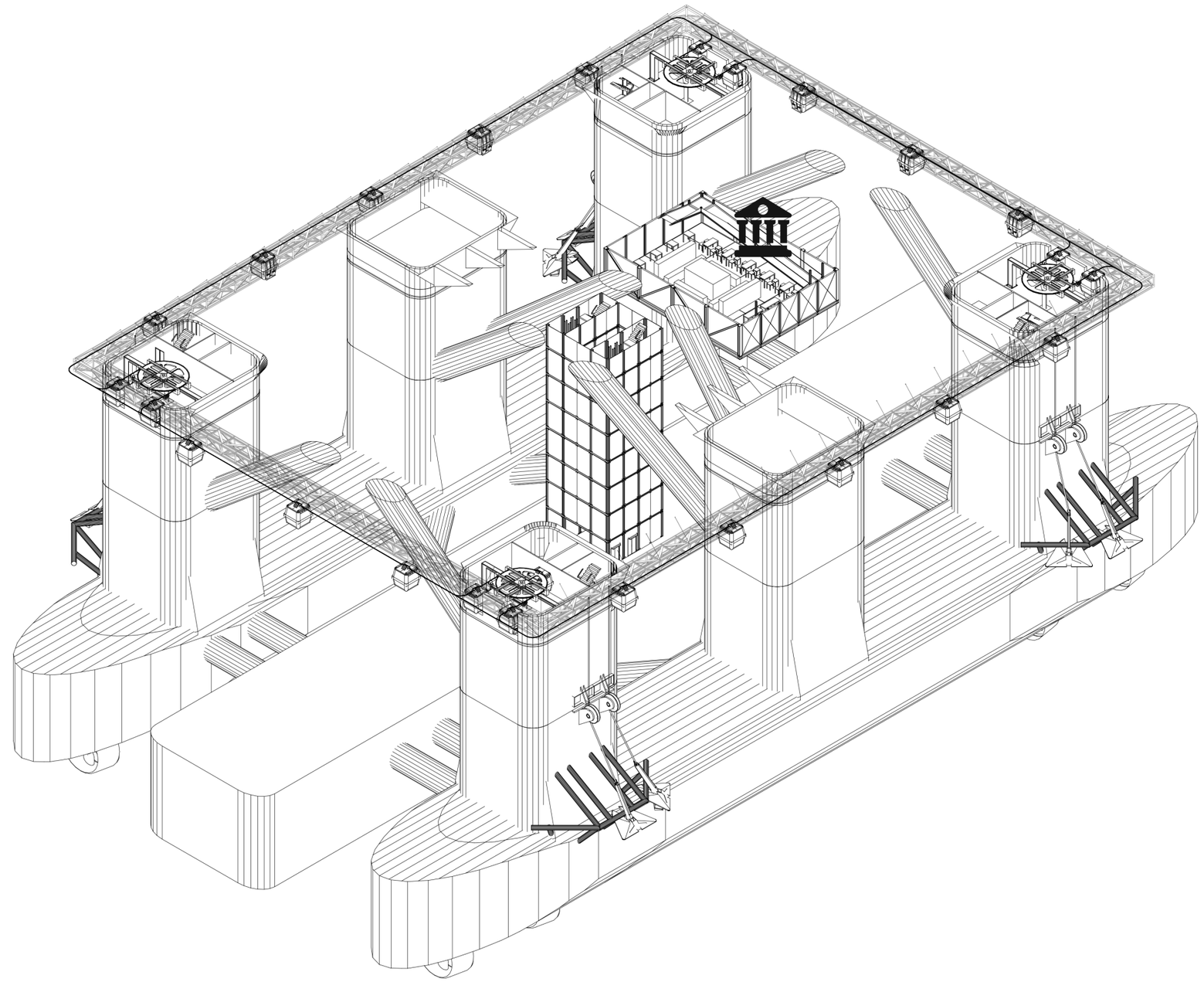
Hanging library



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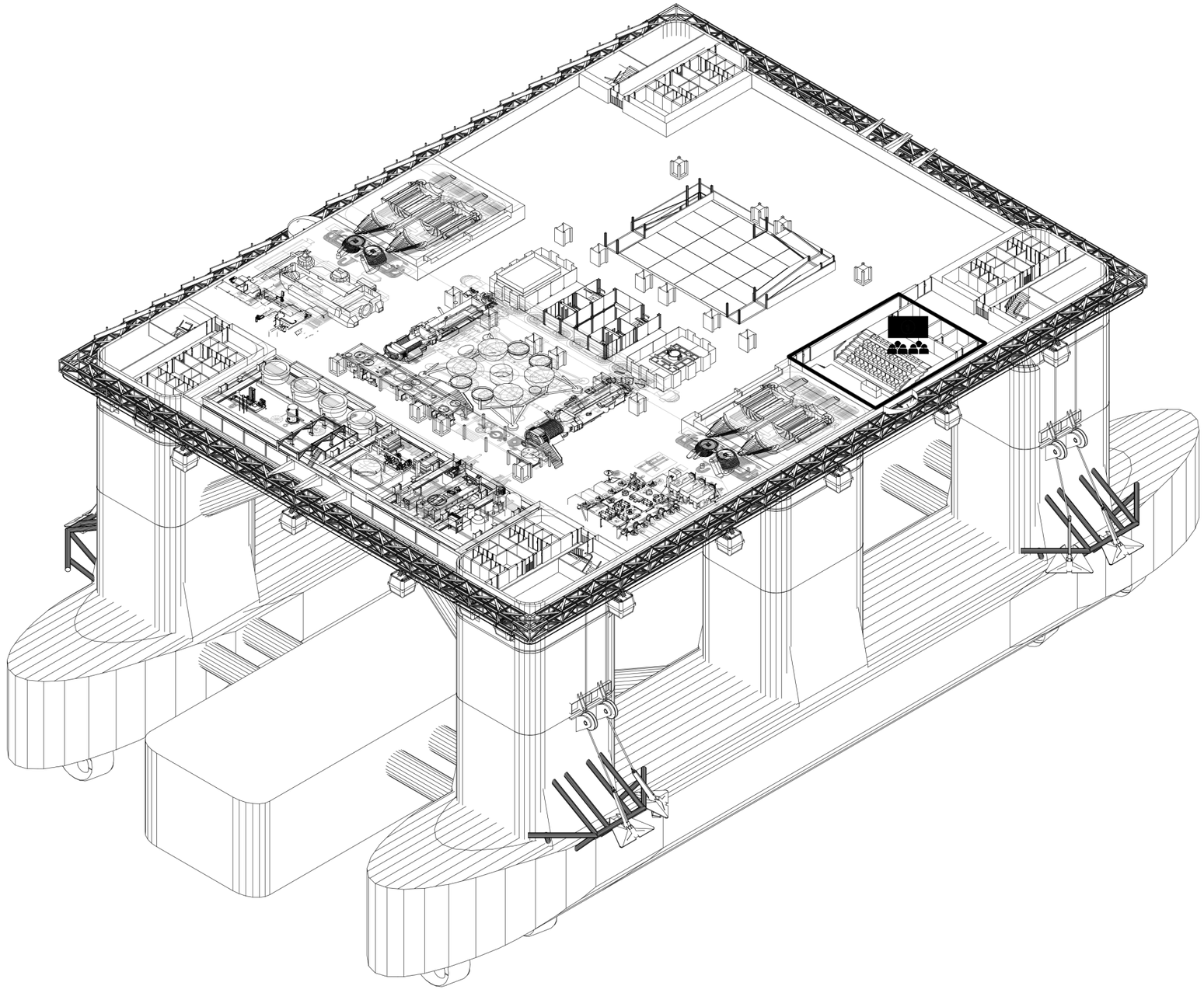
Theatre



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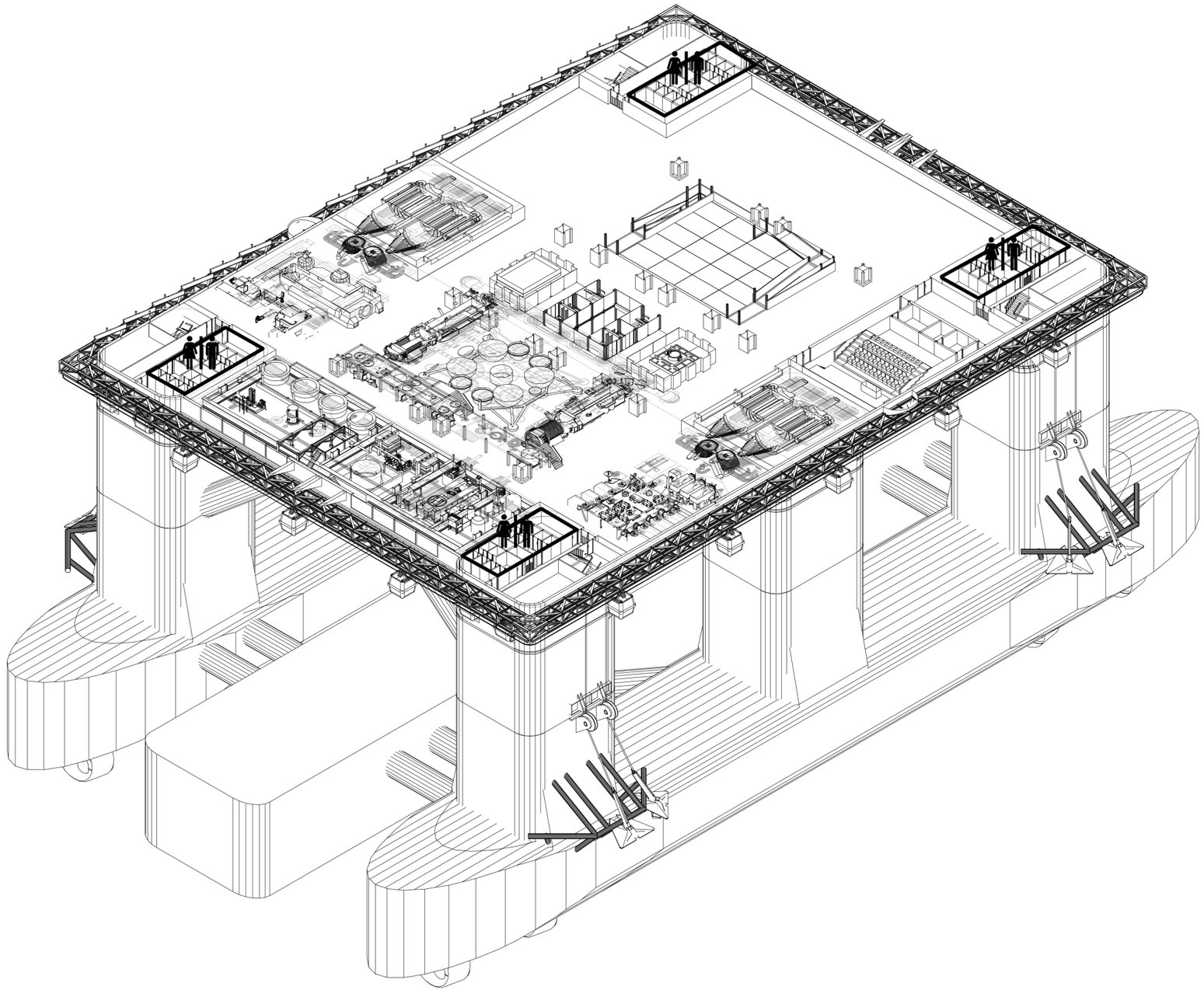
Servant spaces



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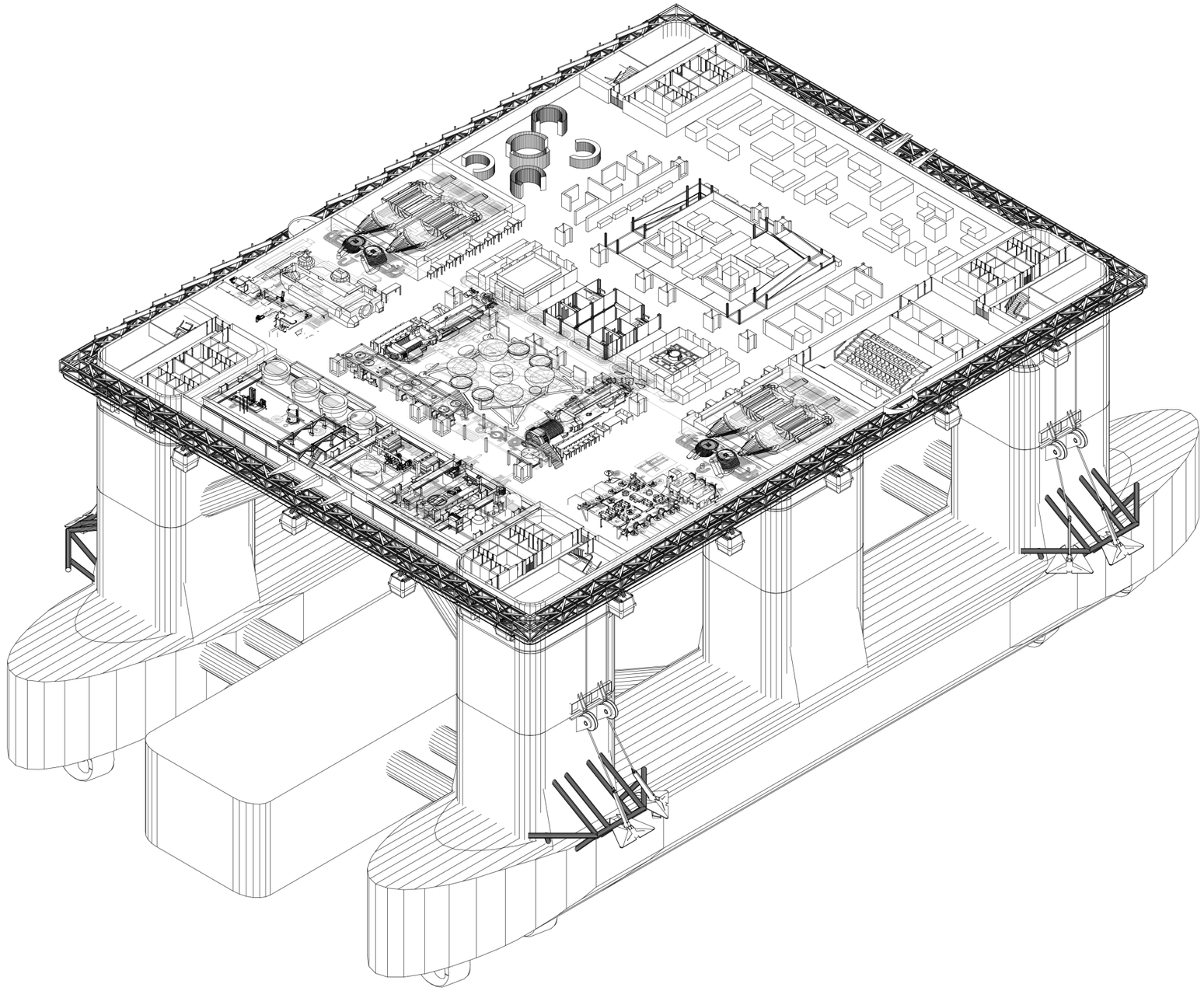
1st Exhibition level



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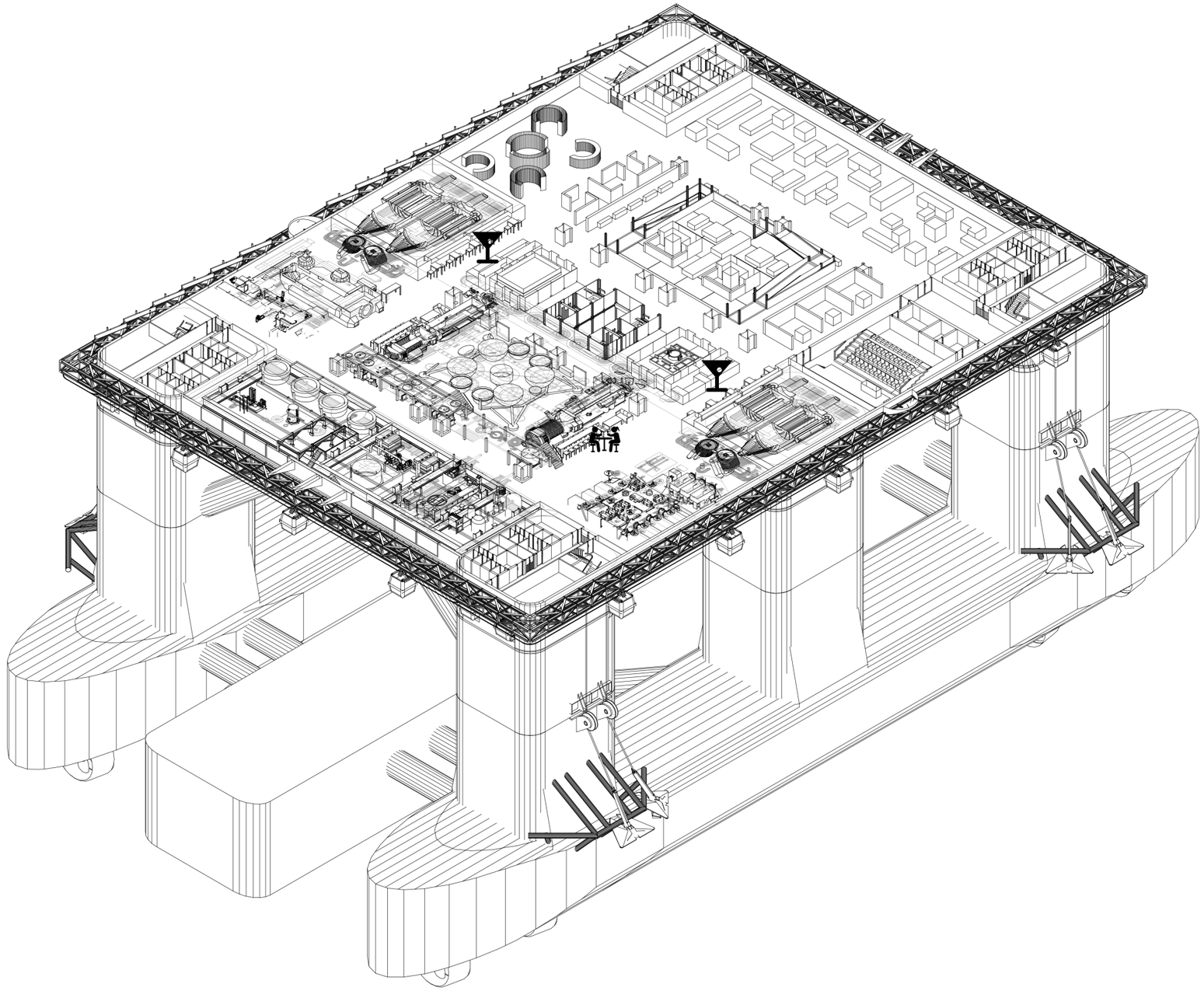
Bar



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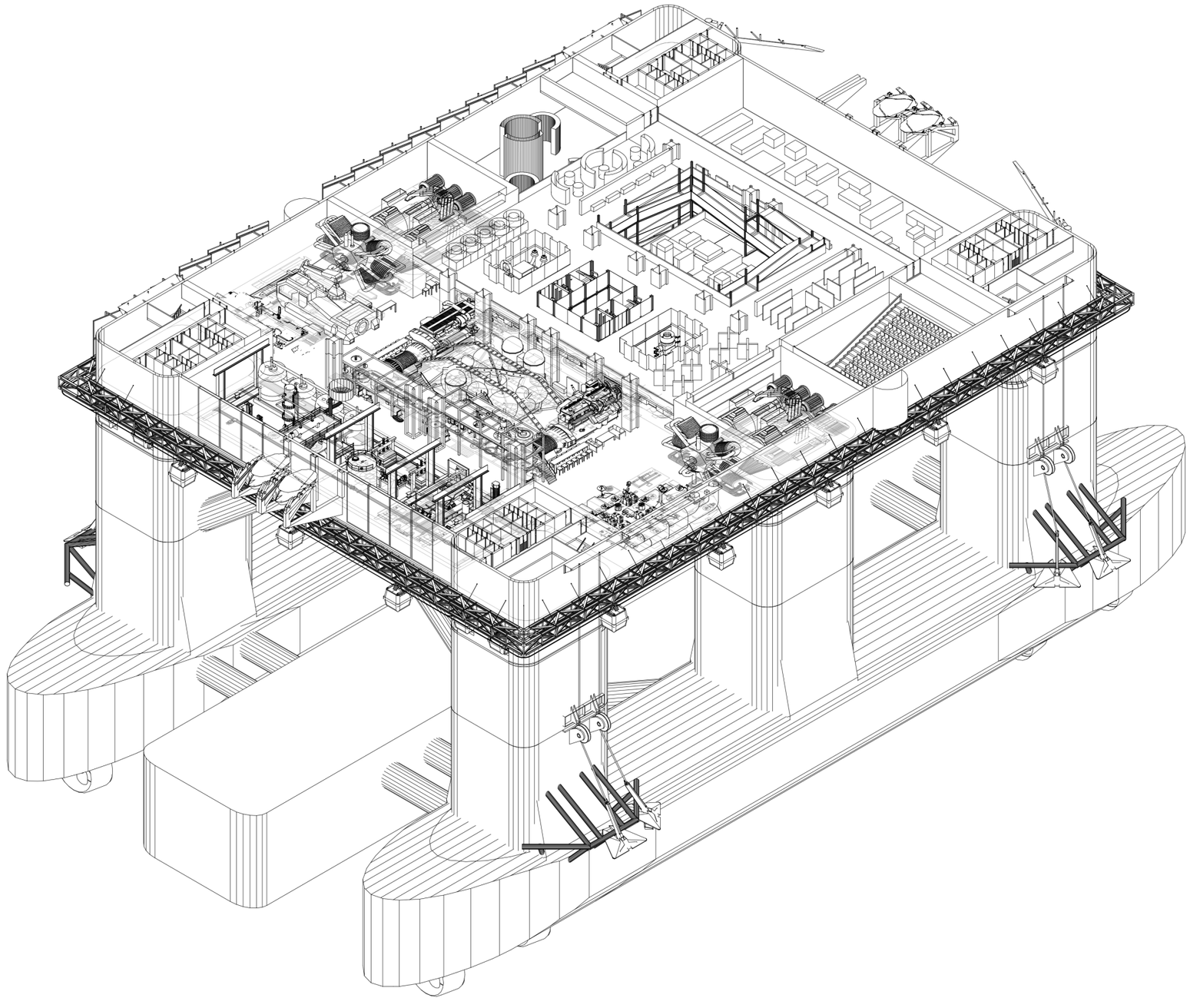
2nd Exhibition level



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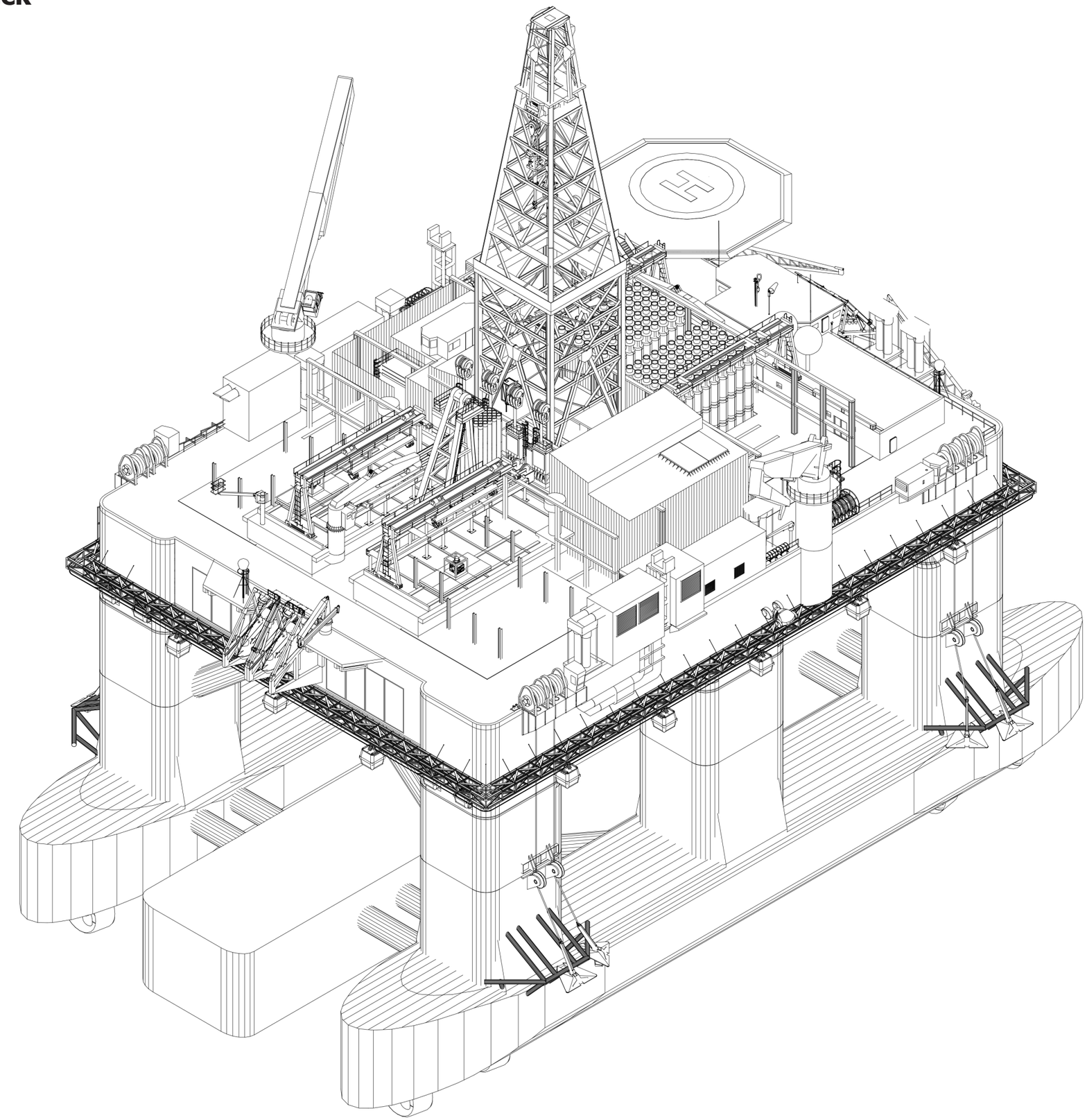
Old deck



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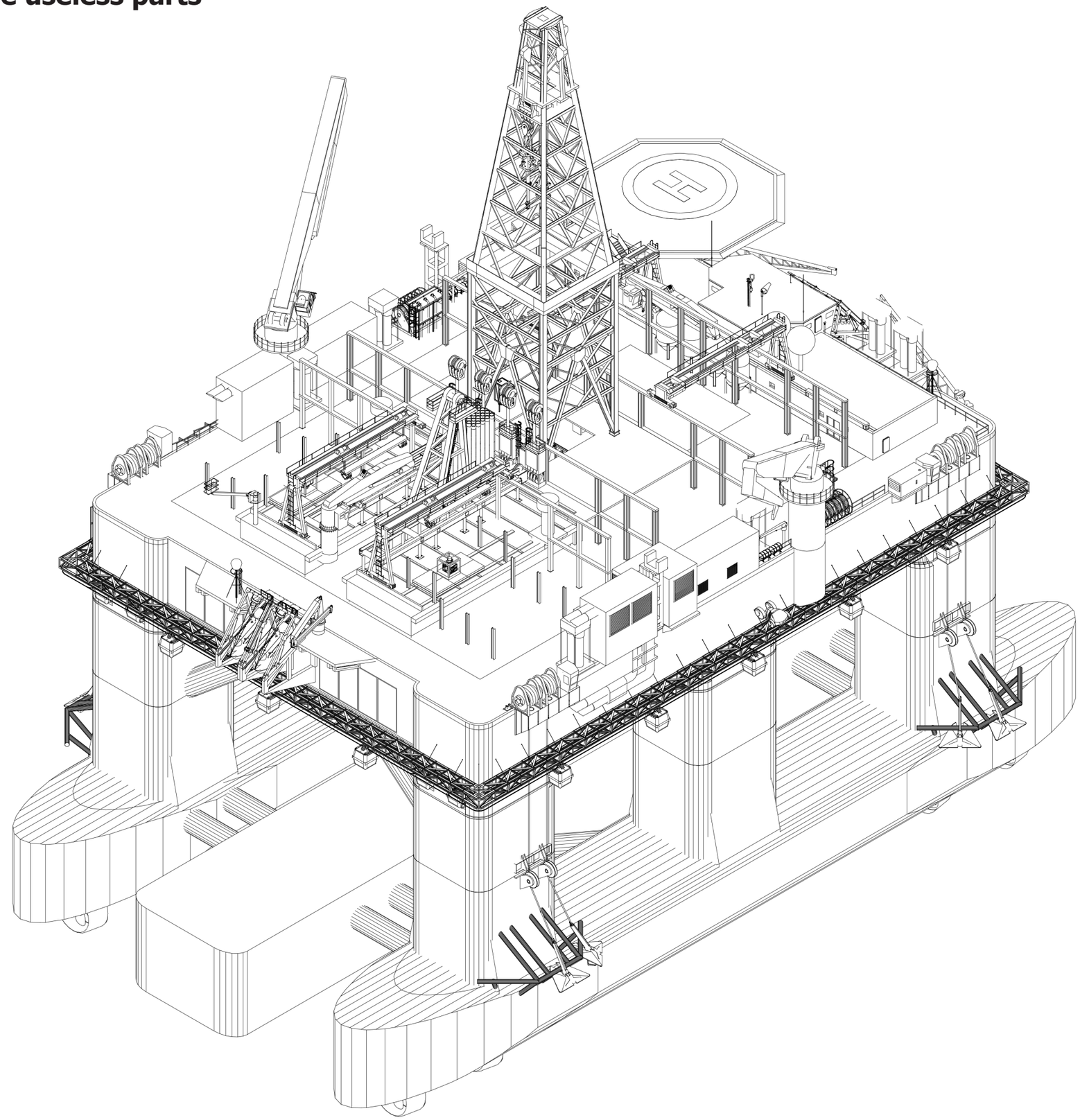
Remove useless parts



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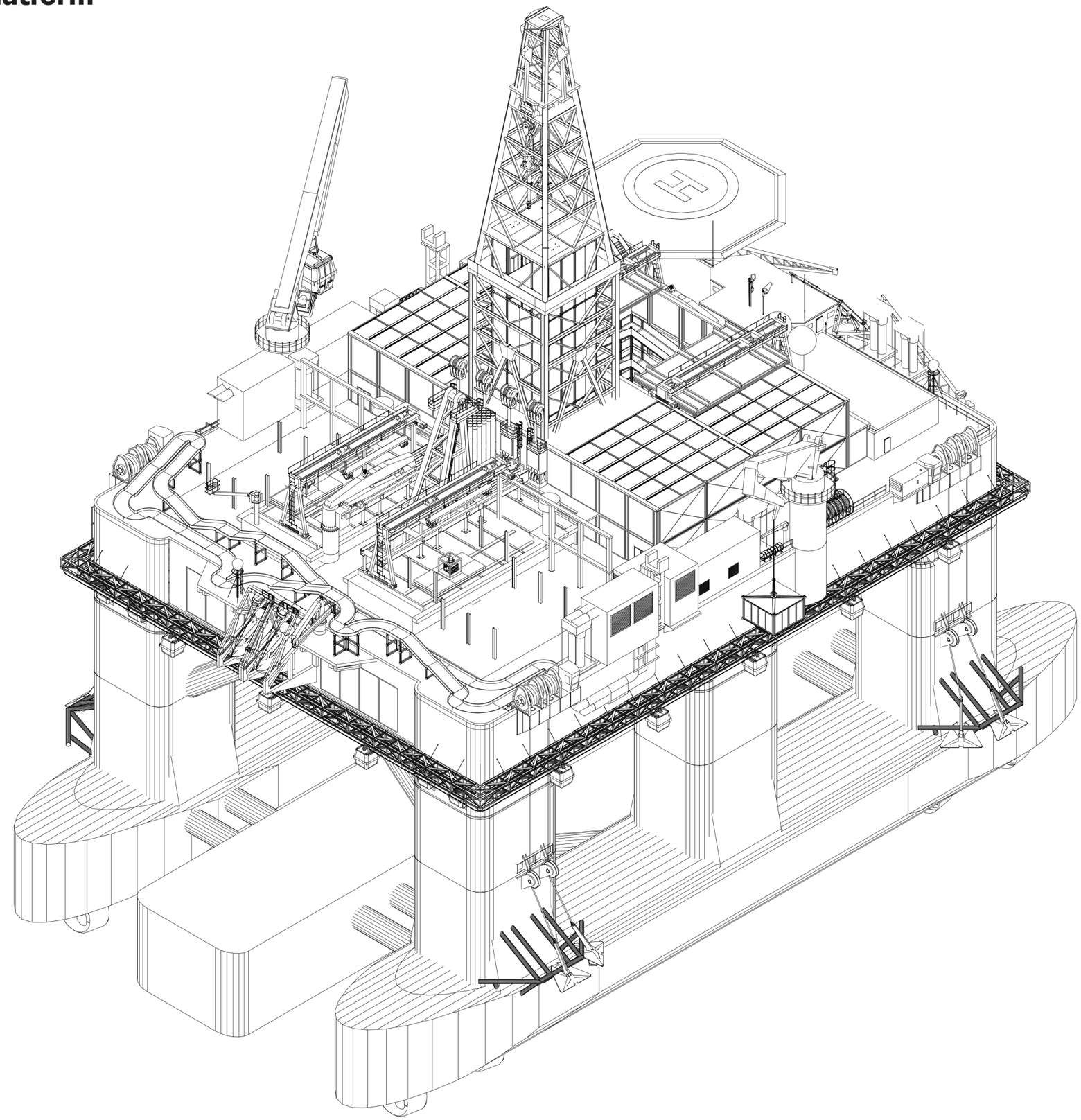
New platform



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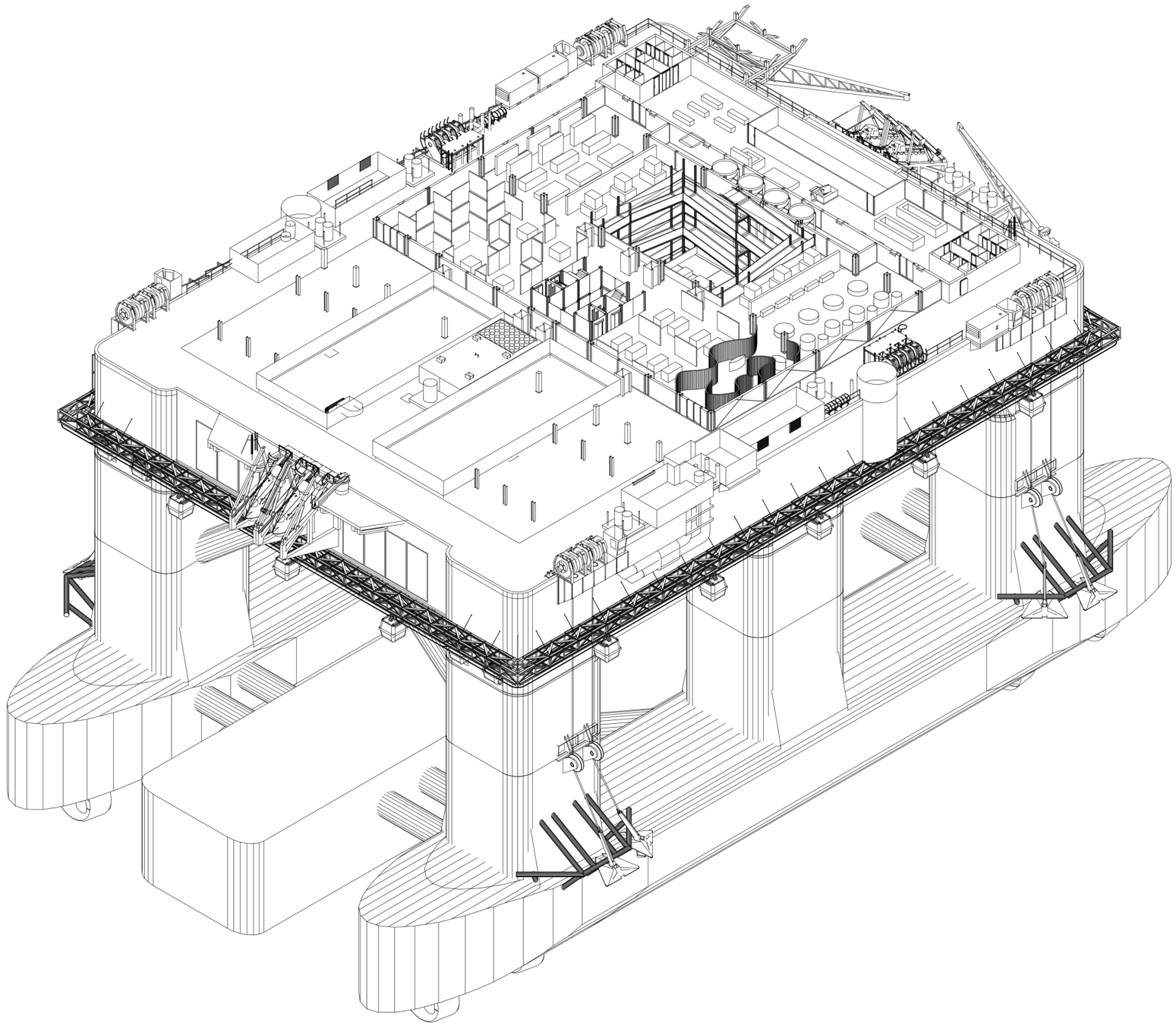
3rd Exhibition level



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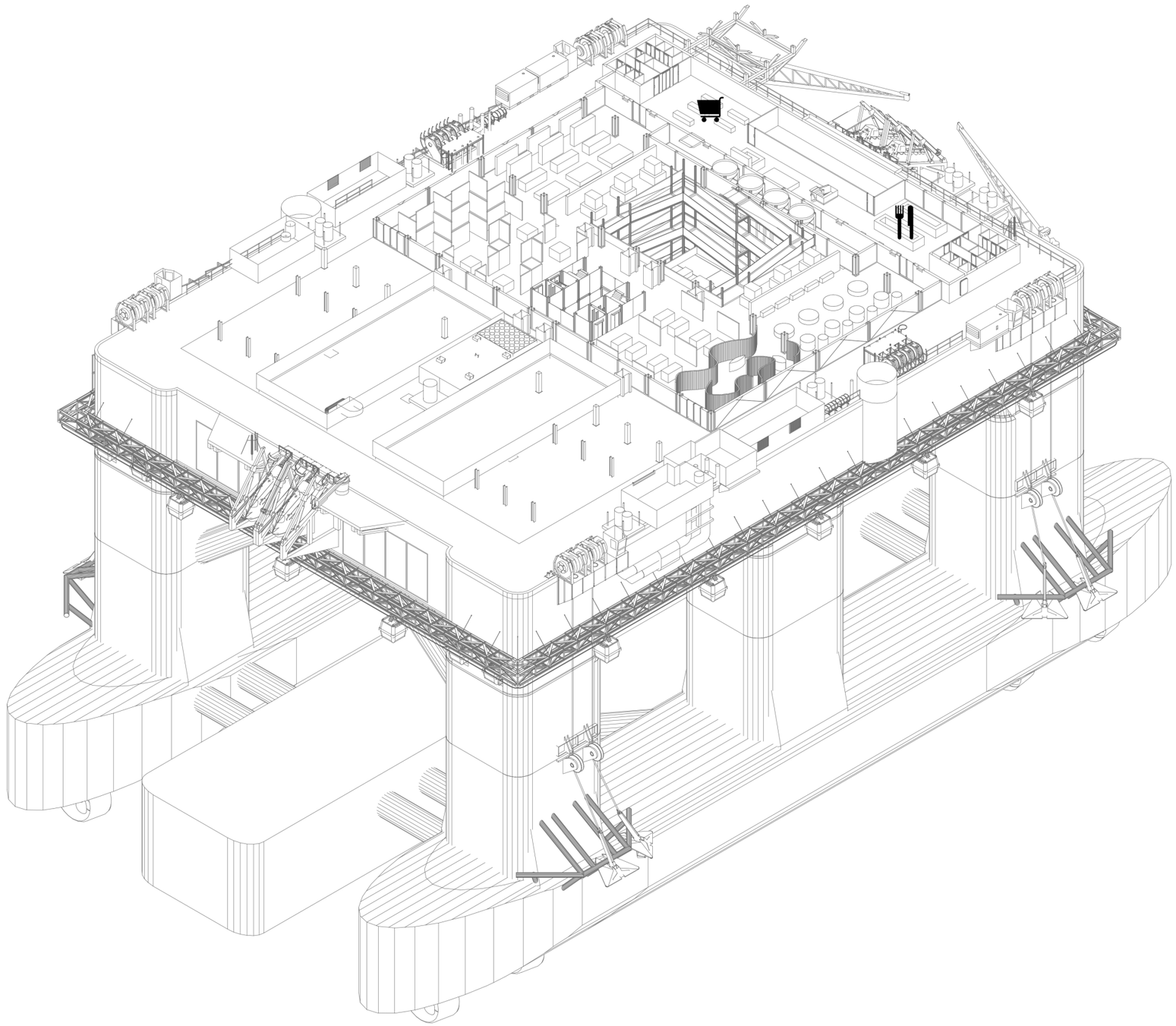
Store and restaurant



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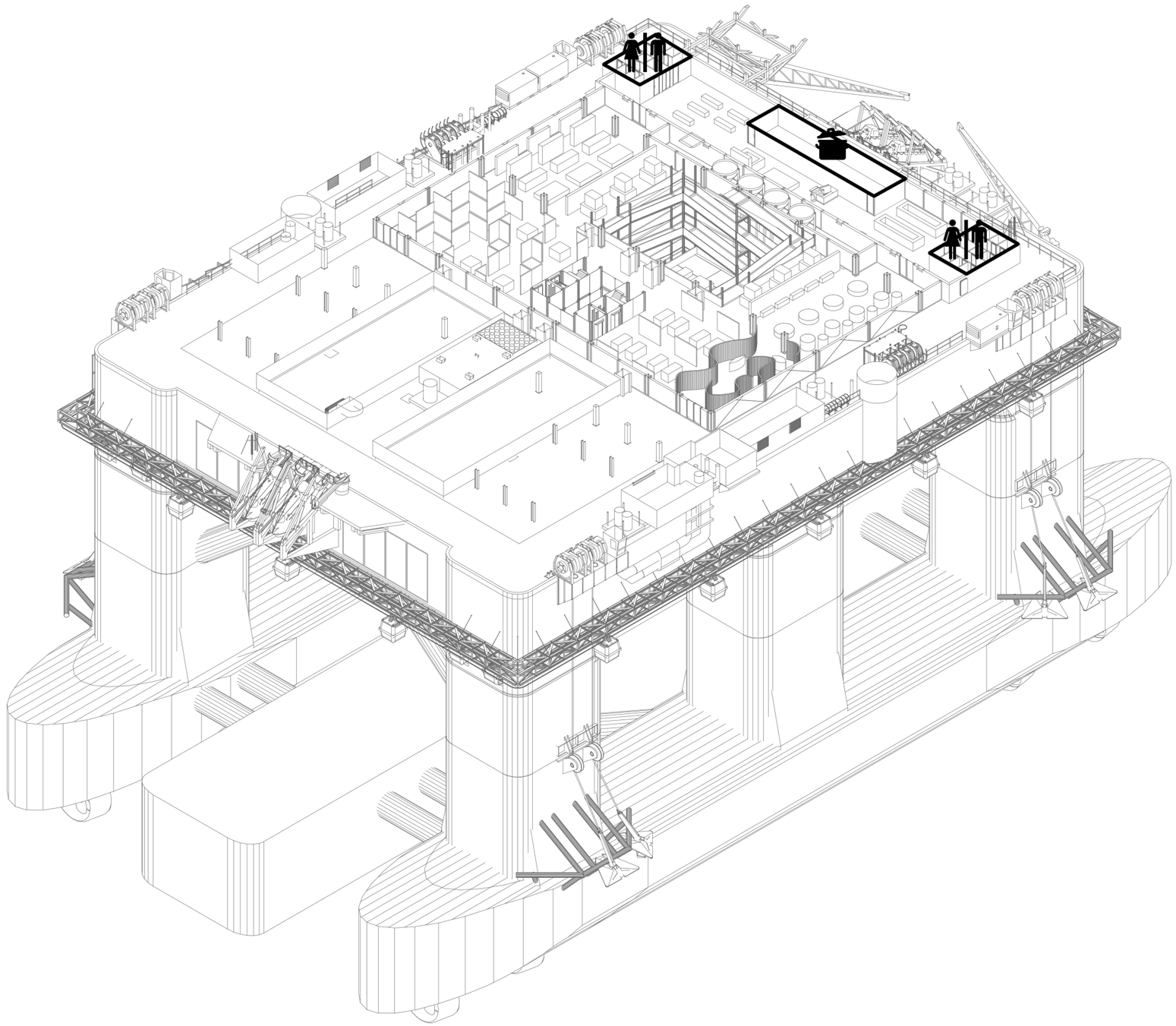
Kitchen and toilet



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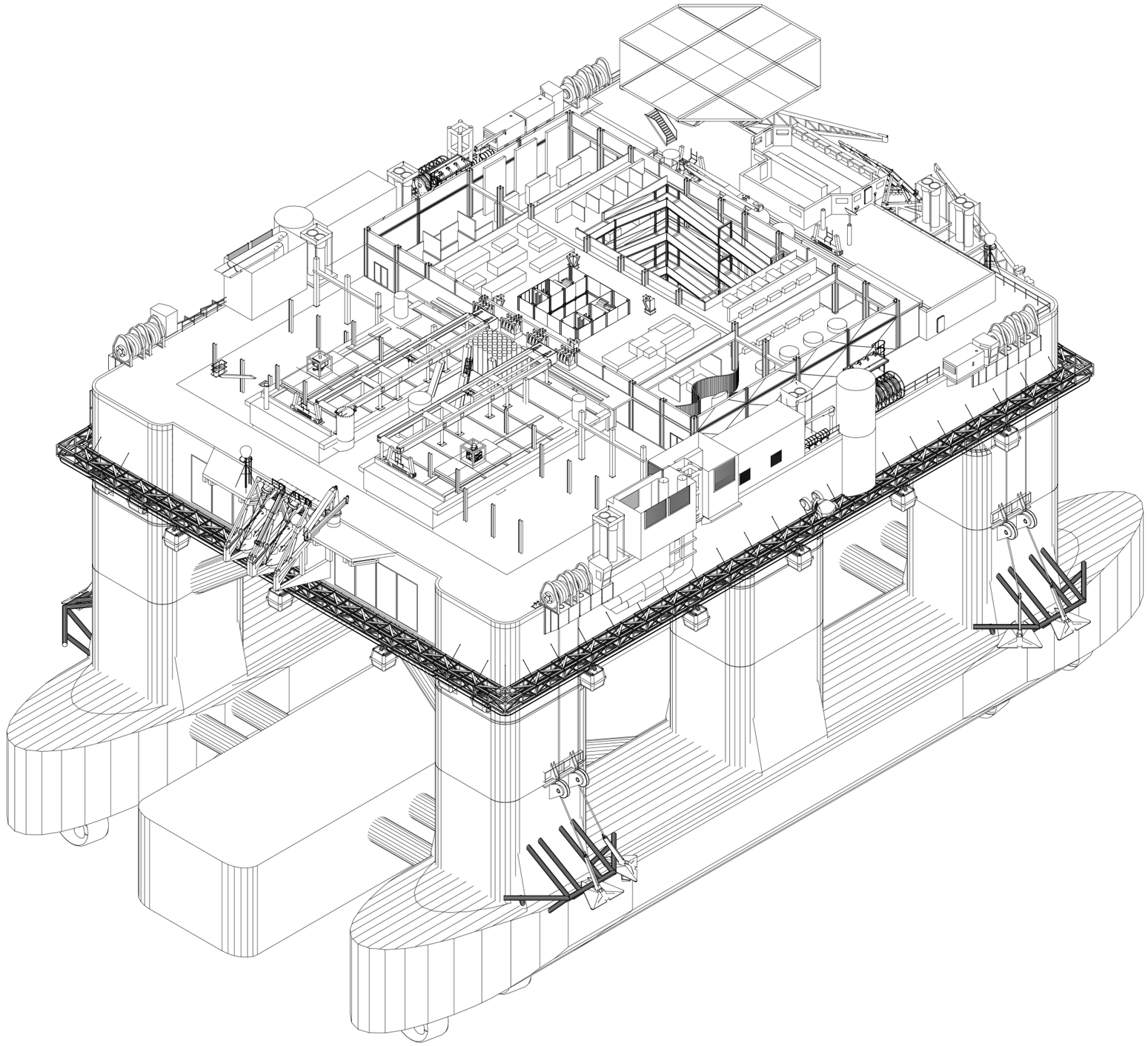
4th Exhibition level



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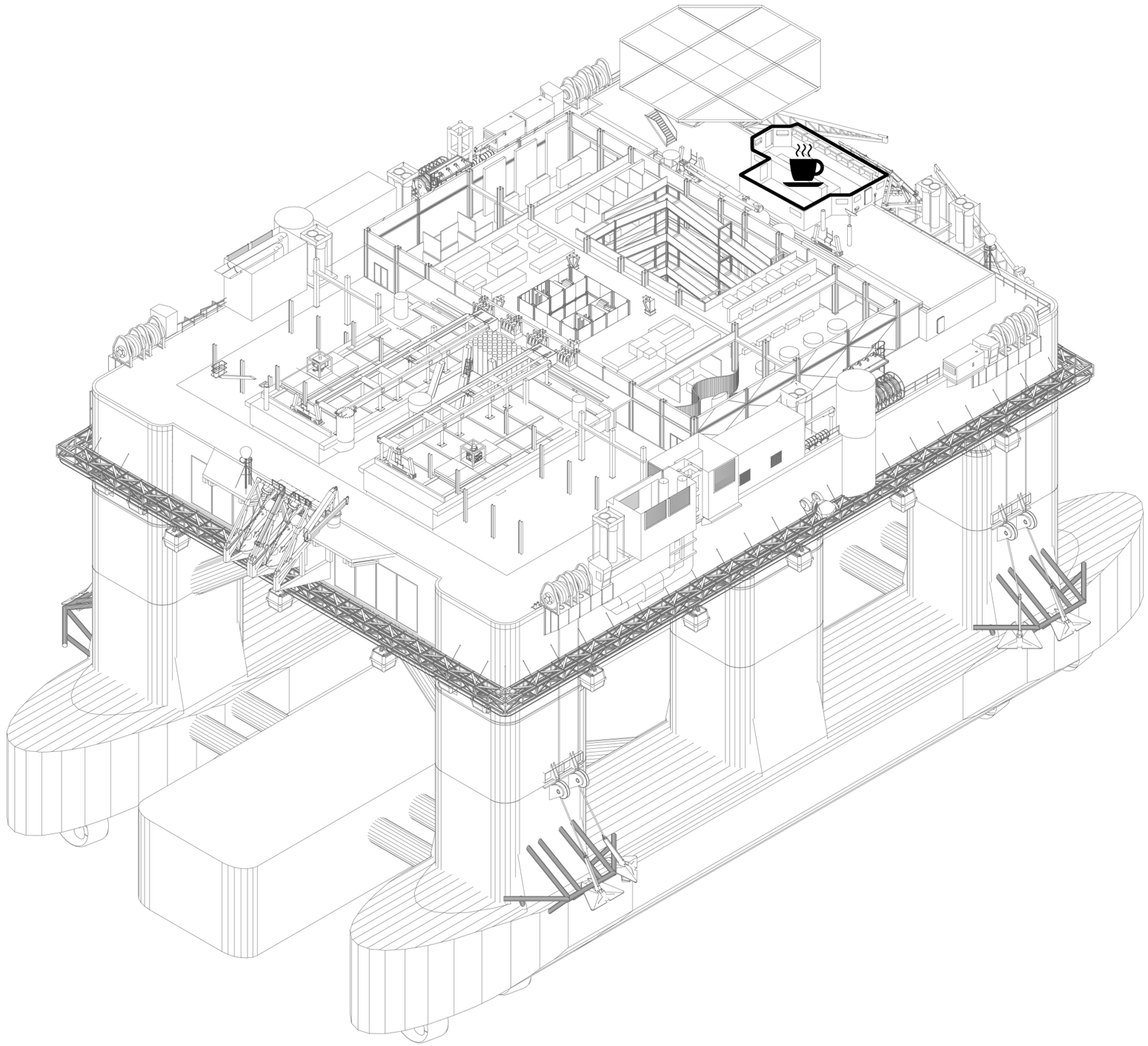
Cafe



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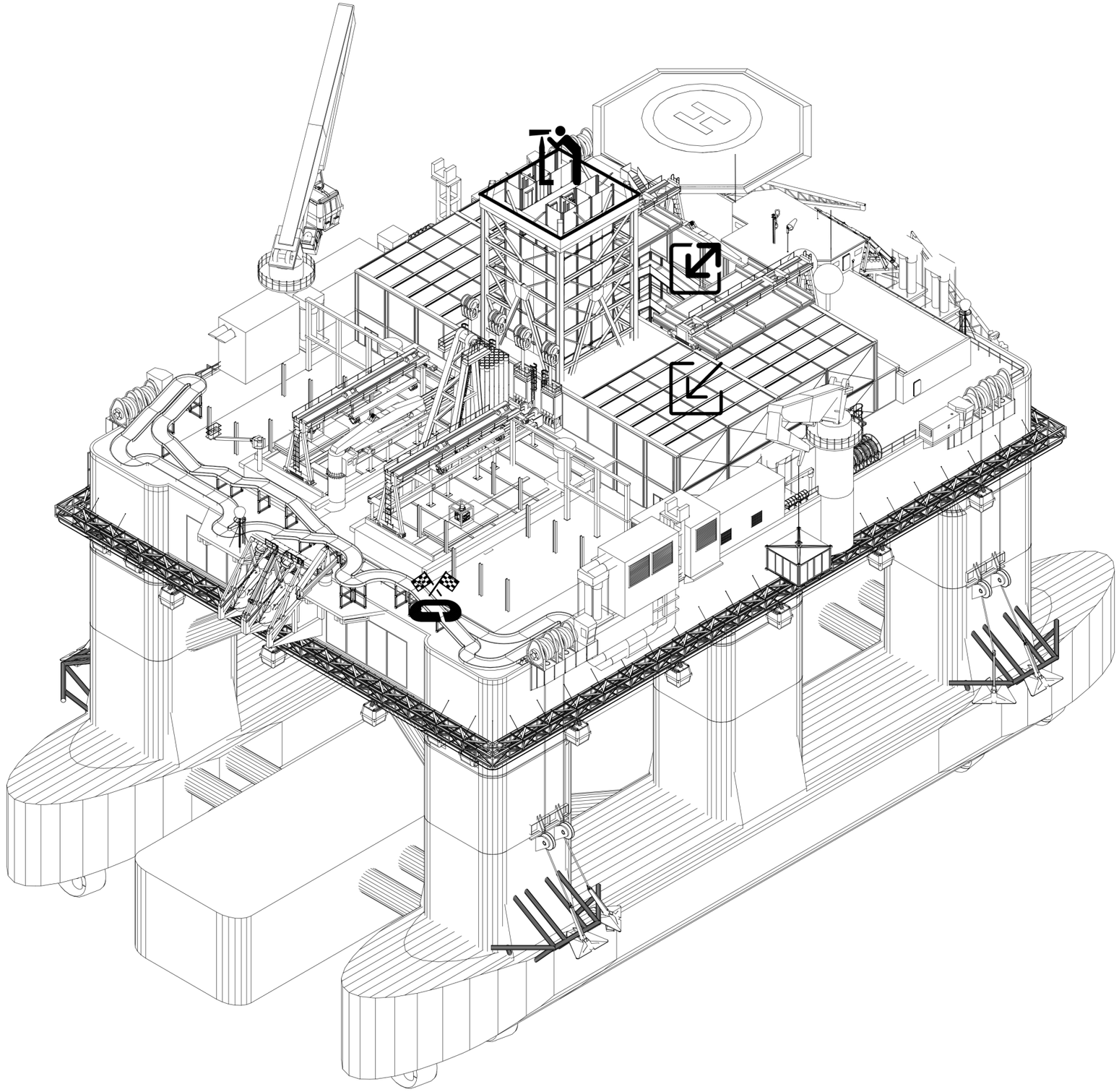
Viewing deck, test raceway, openable roof



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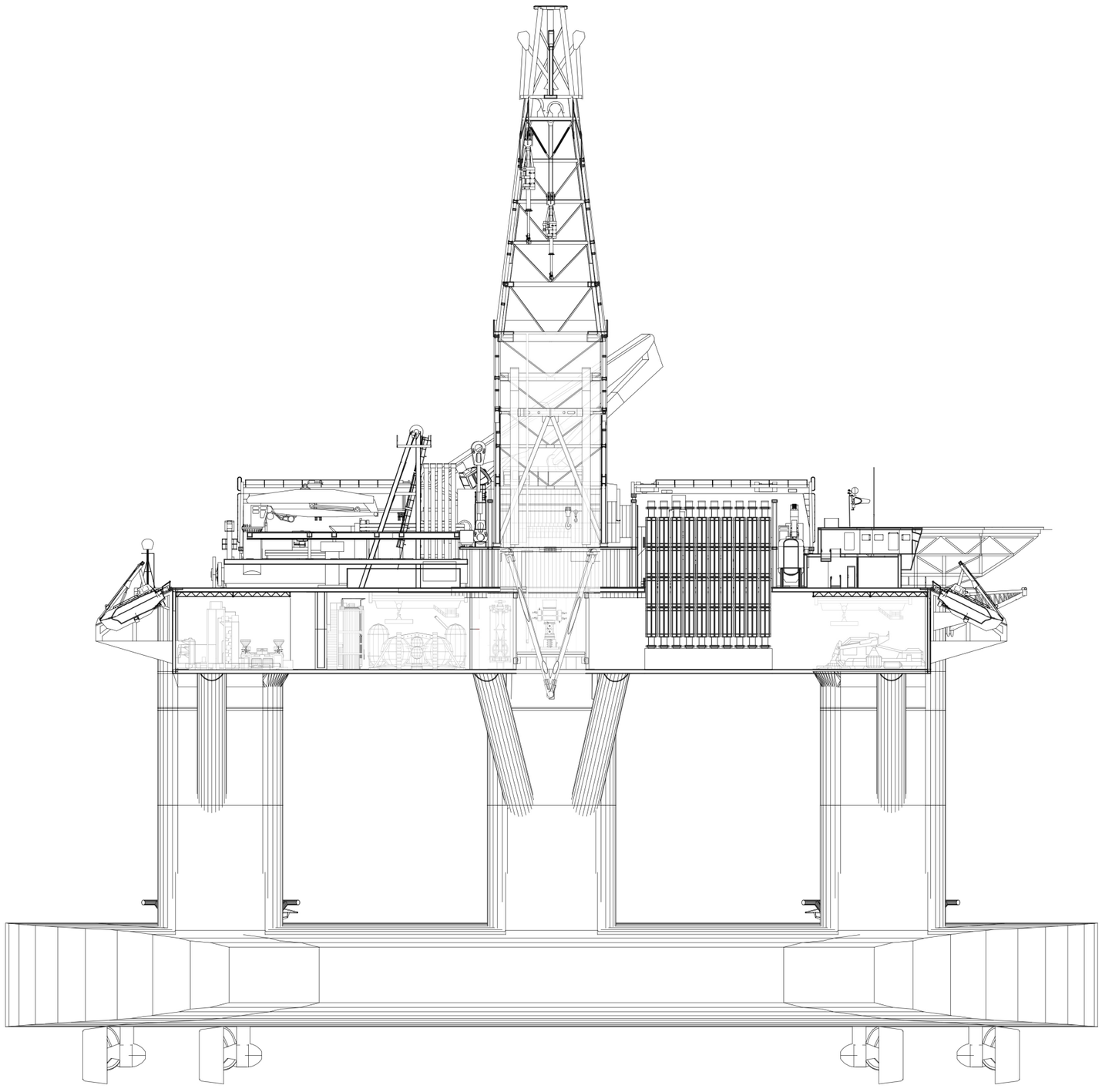
Old section



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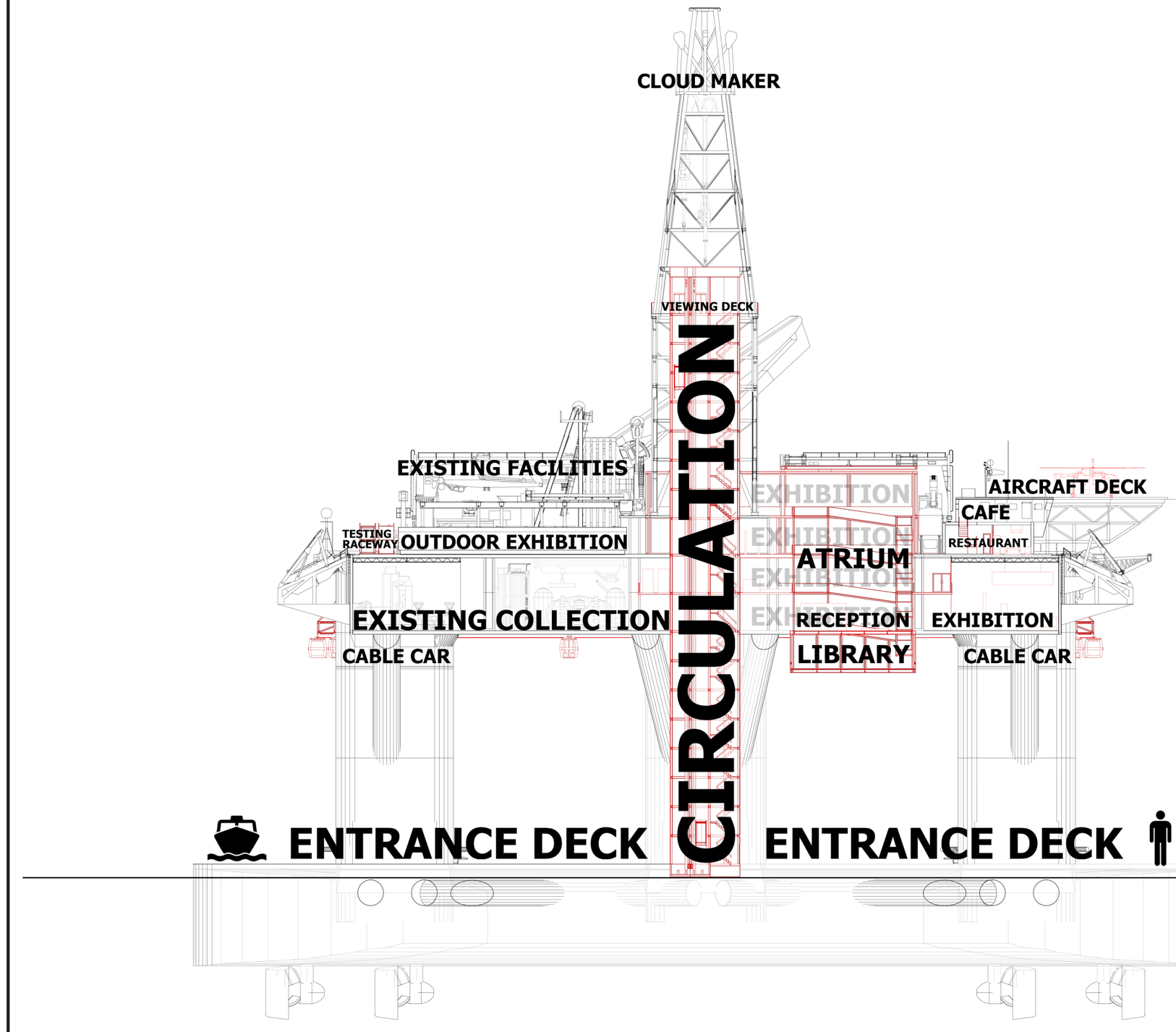
Renovated functions



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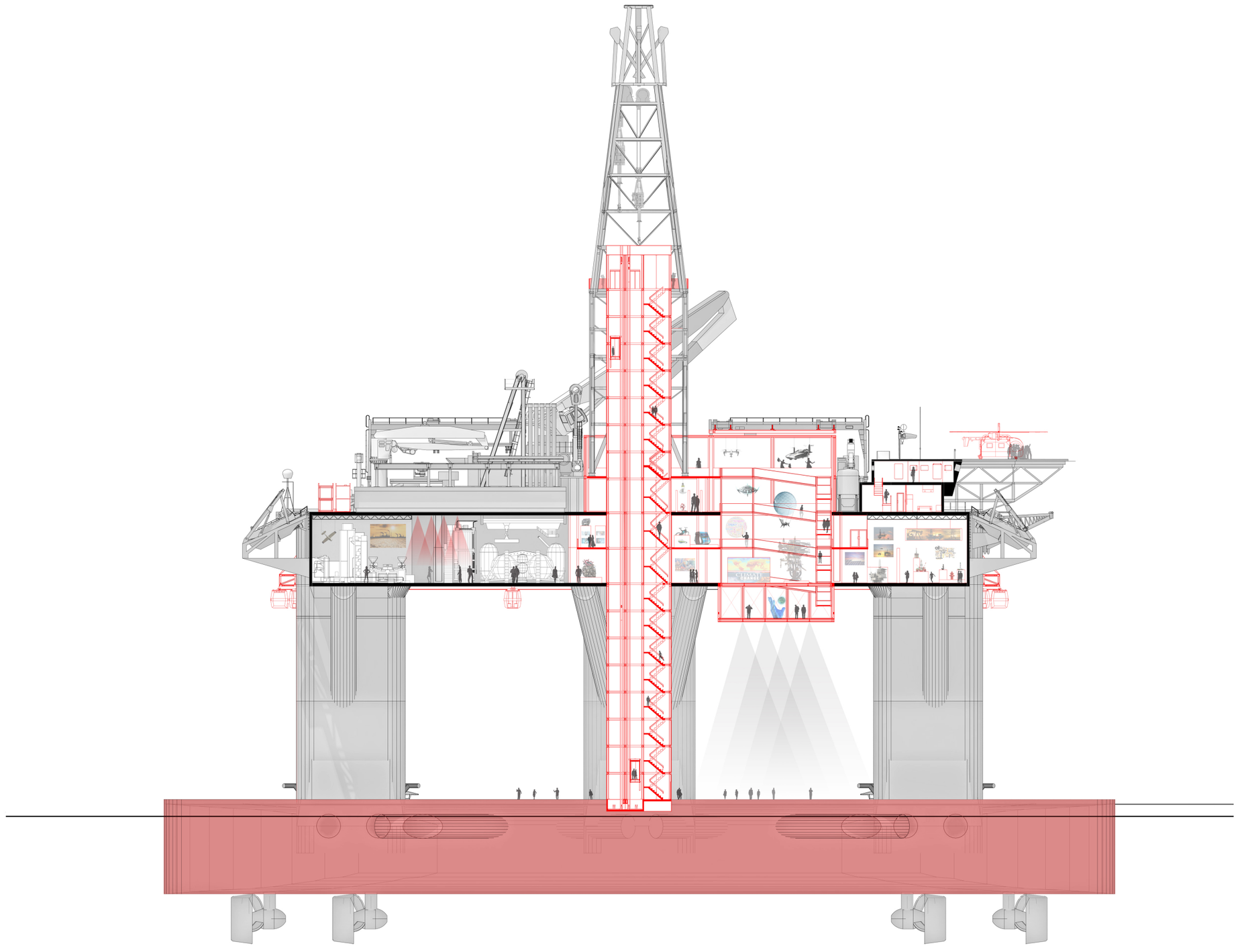
New section



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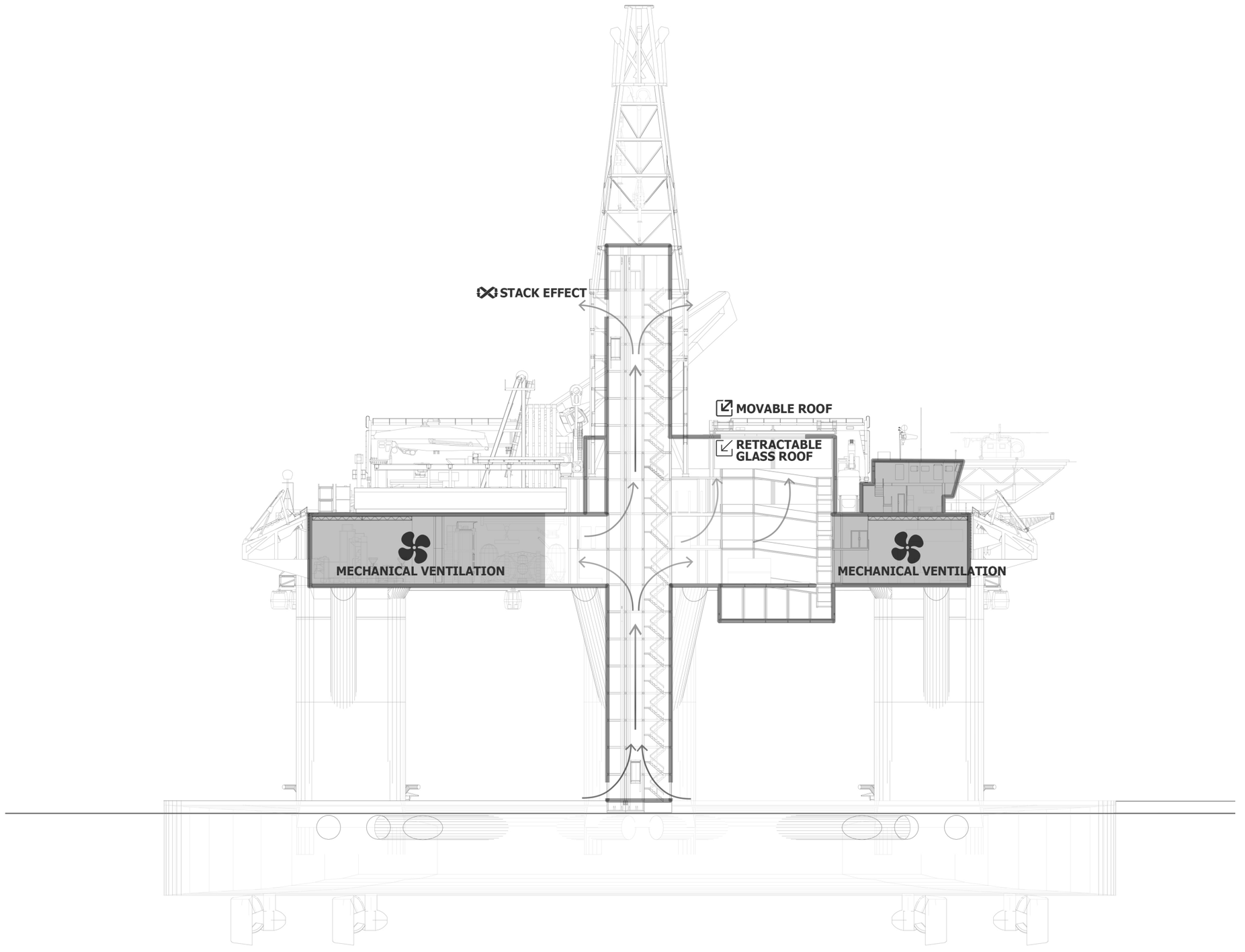
Story

Ventilation system



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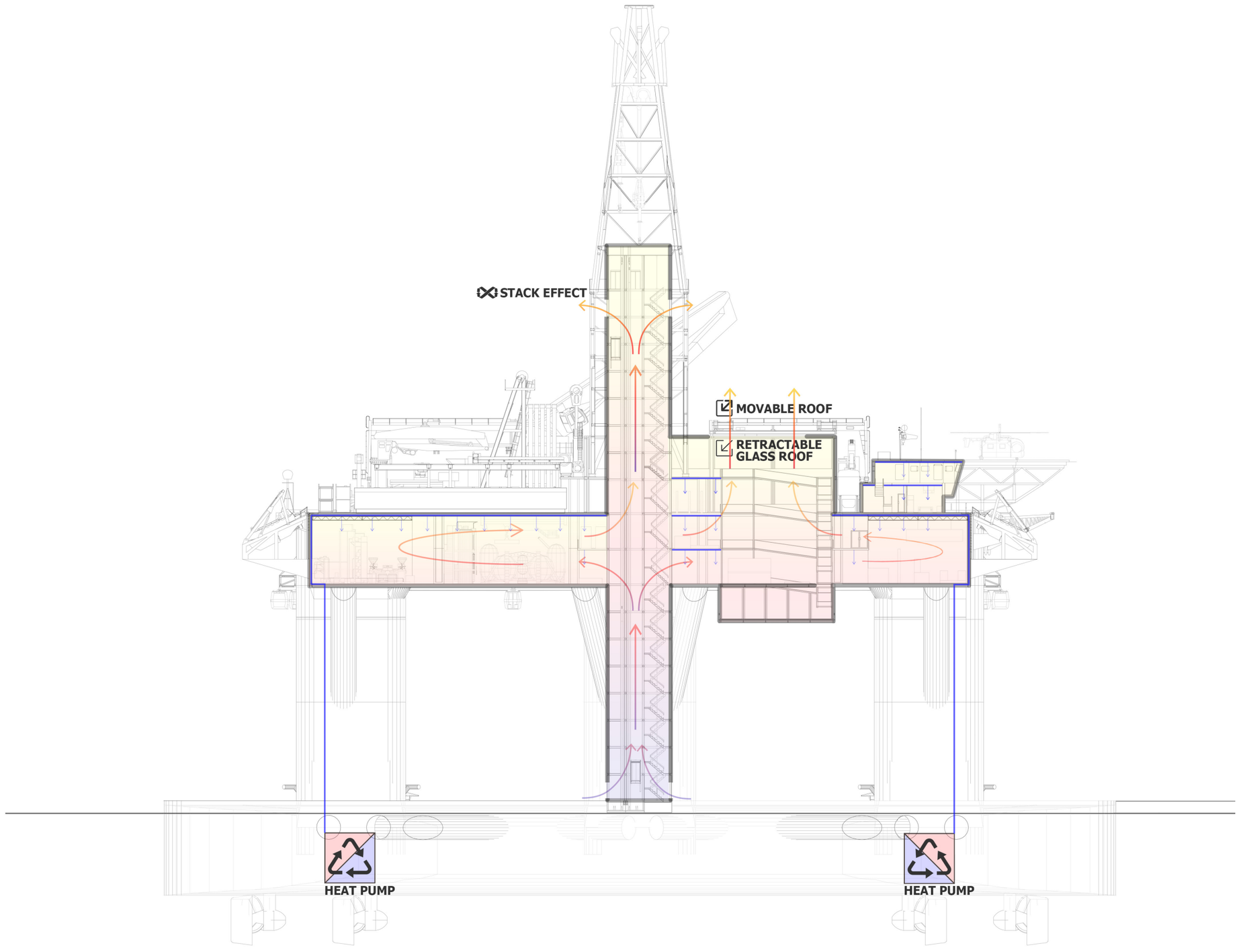
Summer situation



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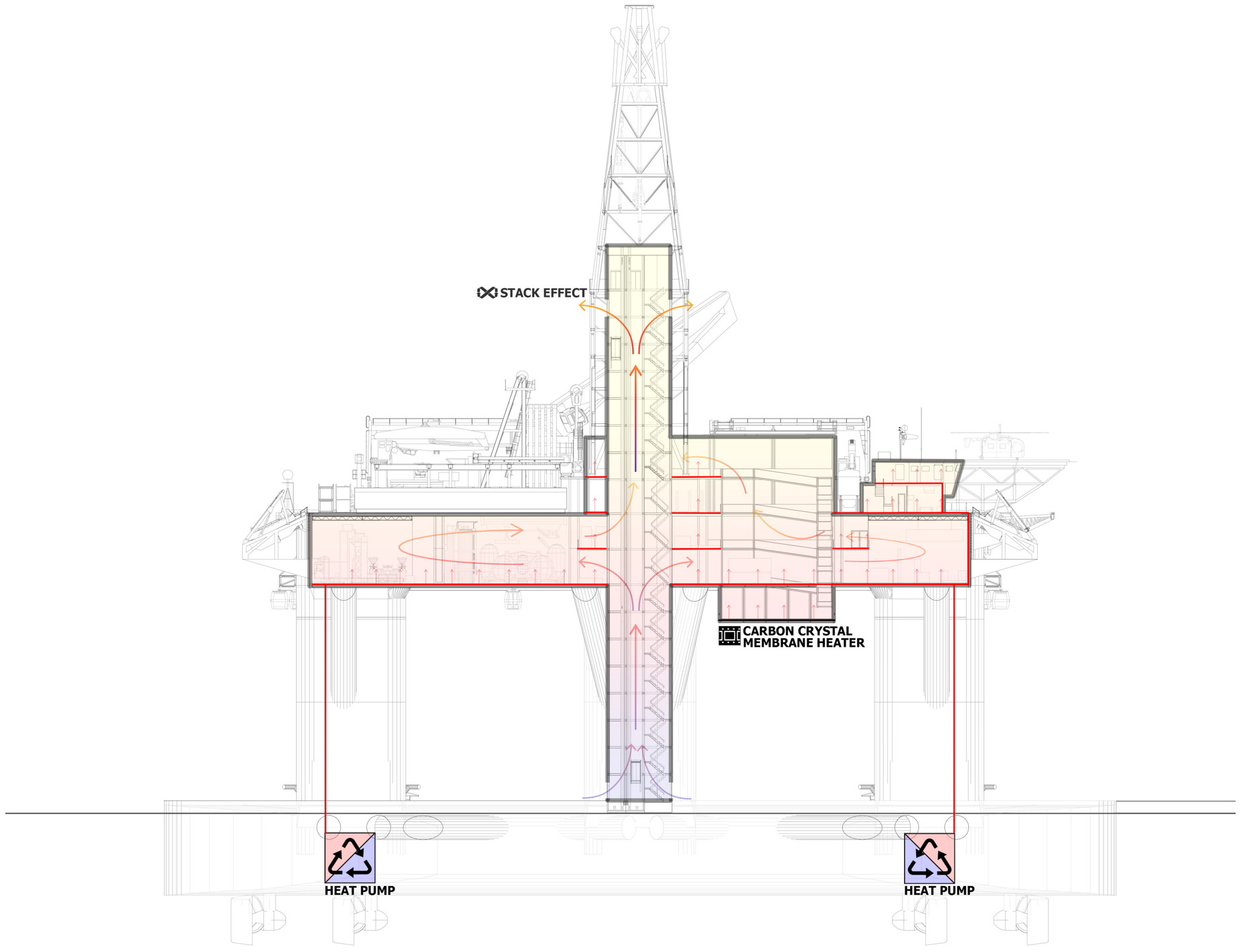
Winter situation



Introduction
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Context
Masterplan
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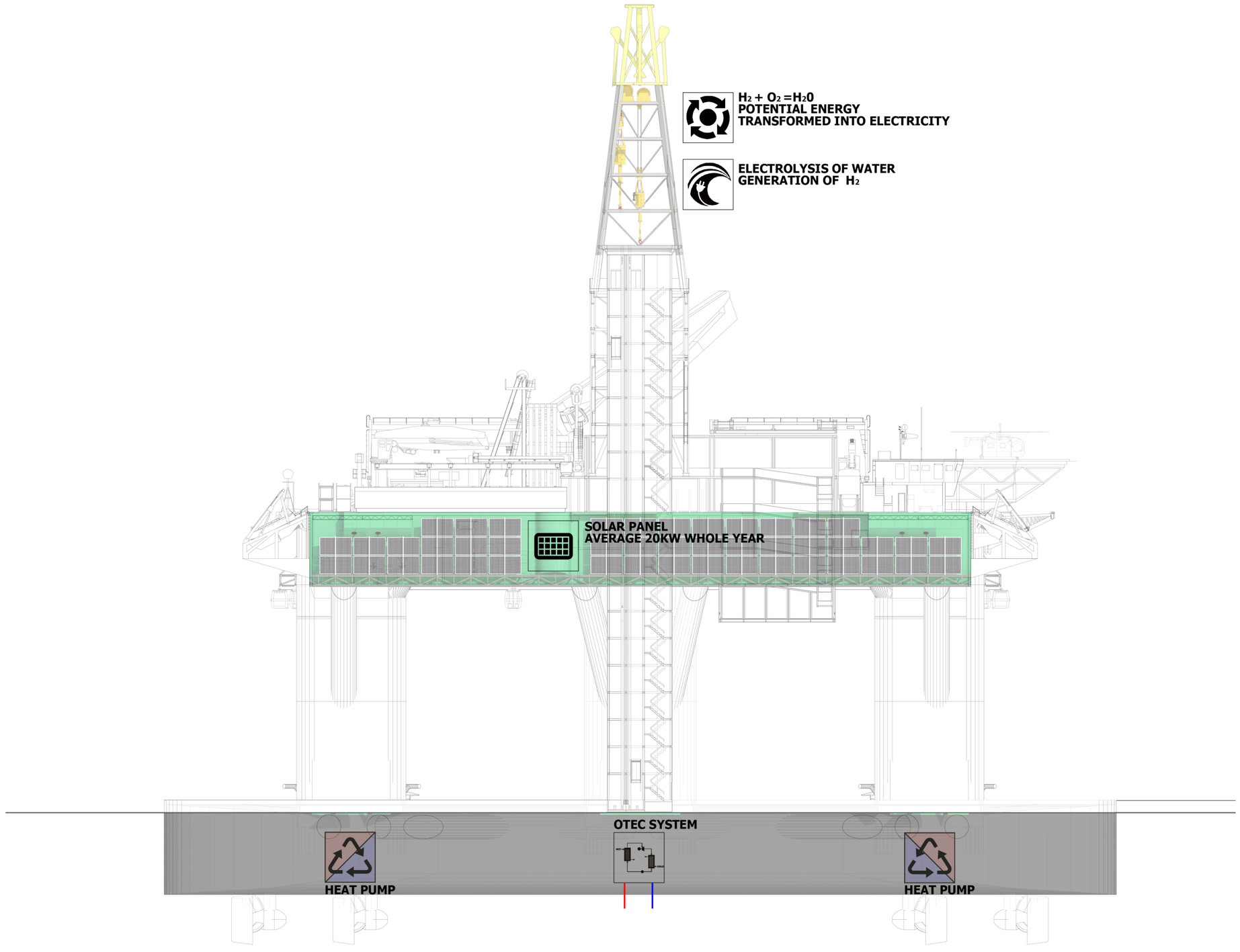
Story

Energy production system



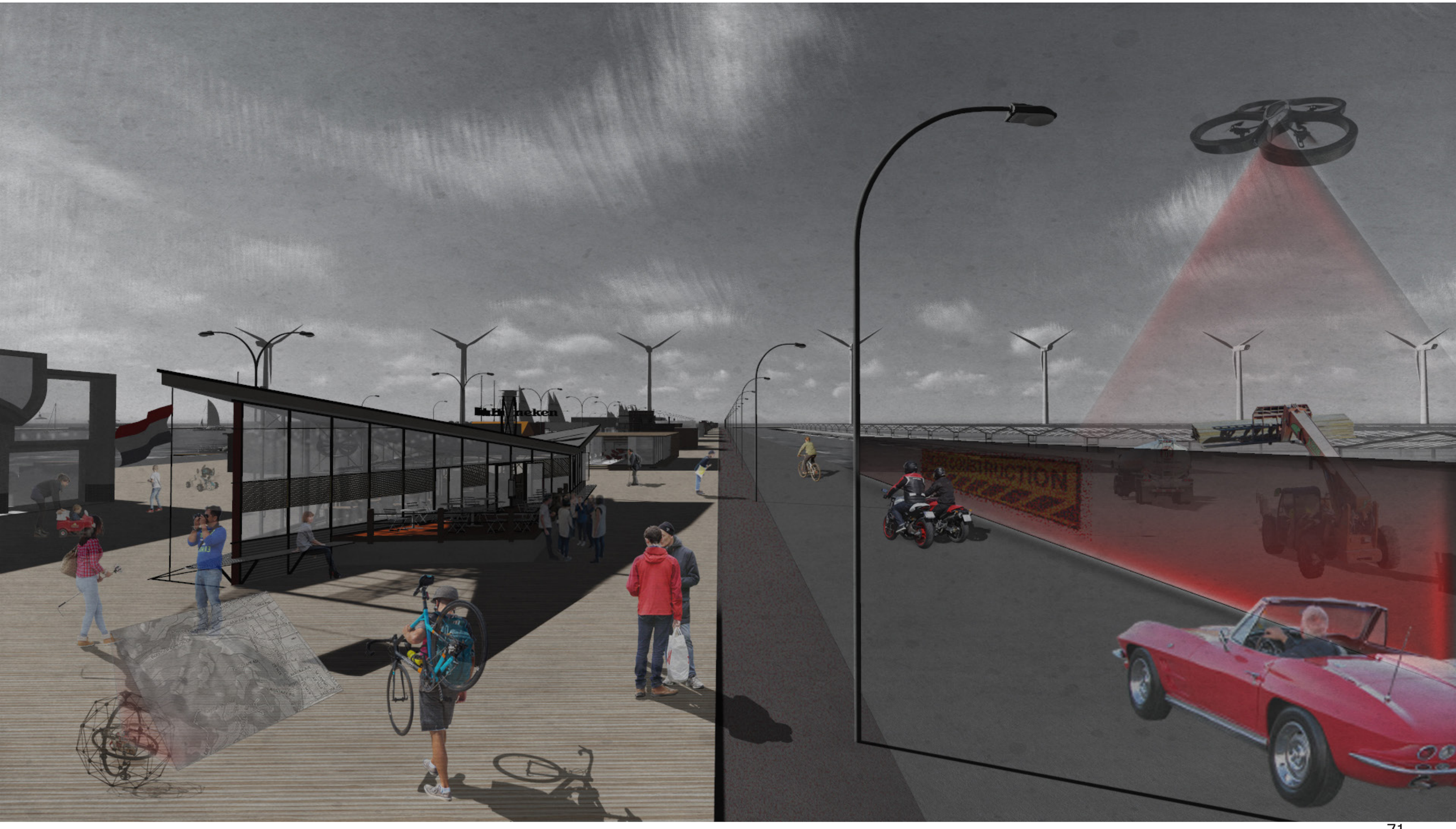
Introduction
Research
Context
Masterplan
Design
Story

In 2026,
this project will be realized,
then...

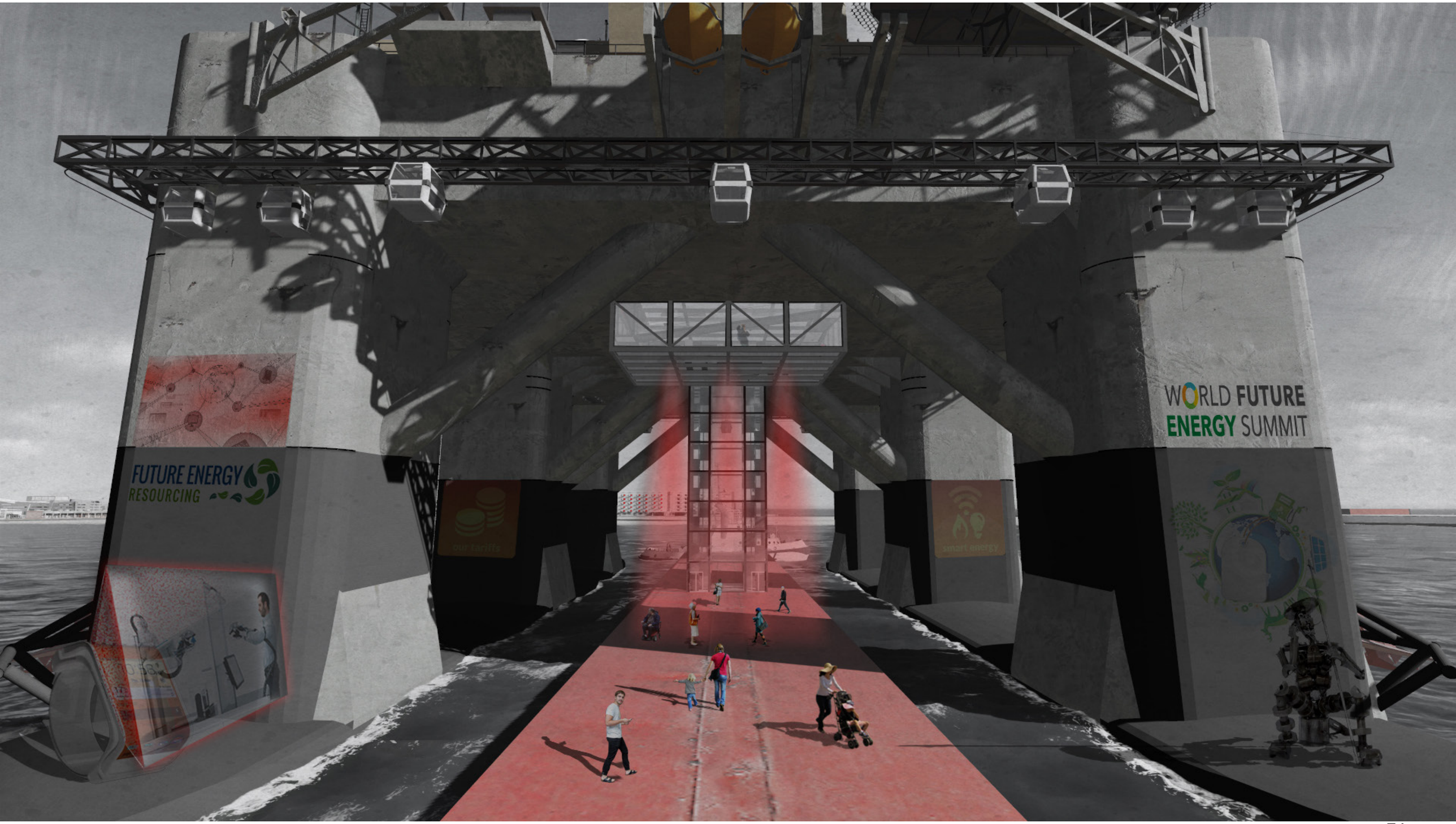
Story

Story

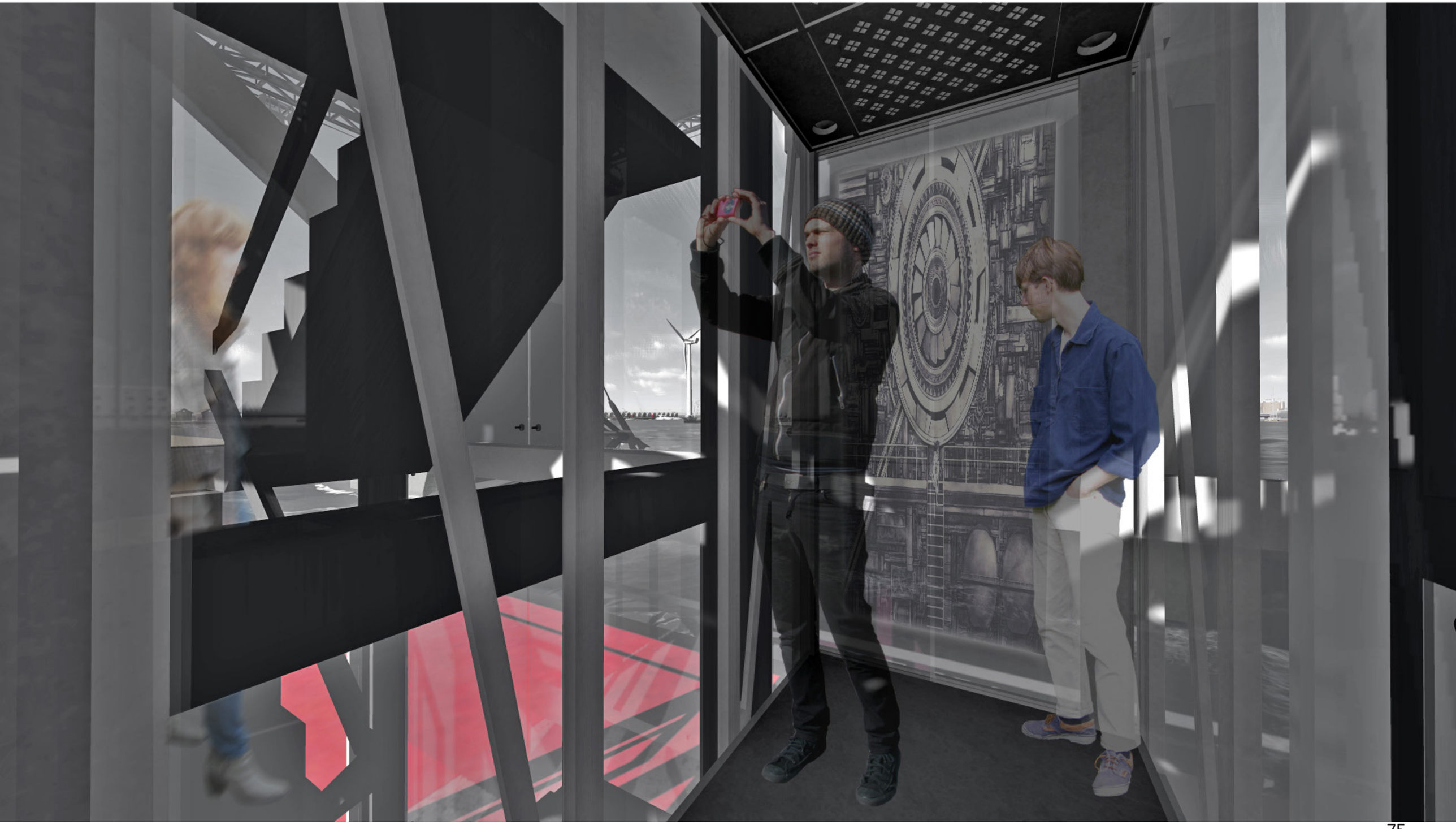
Story



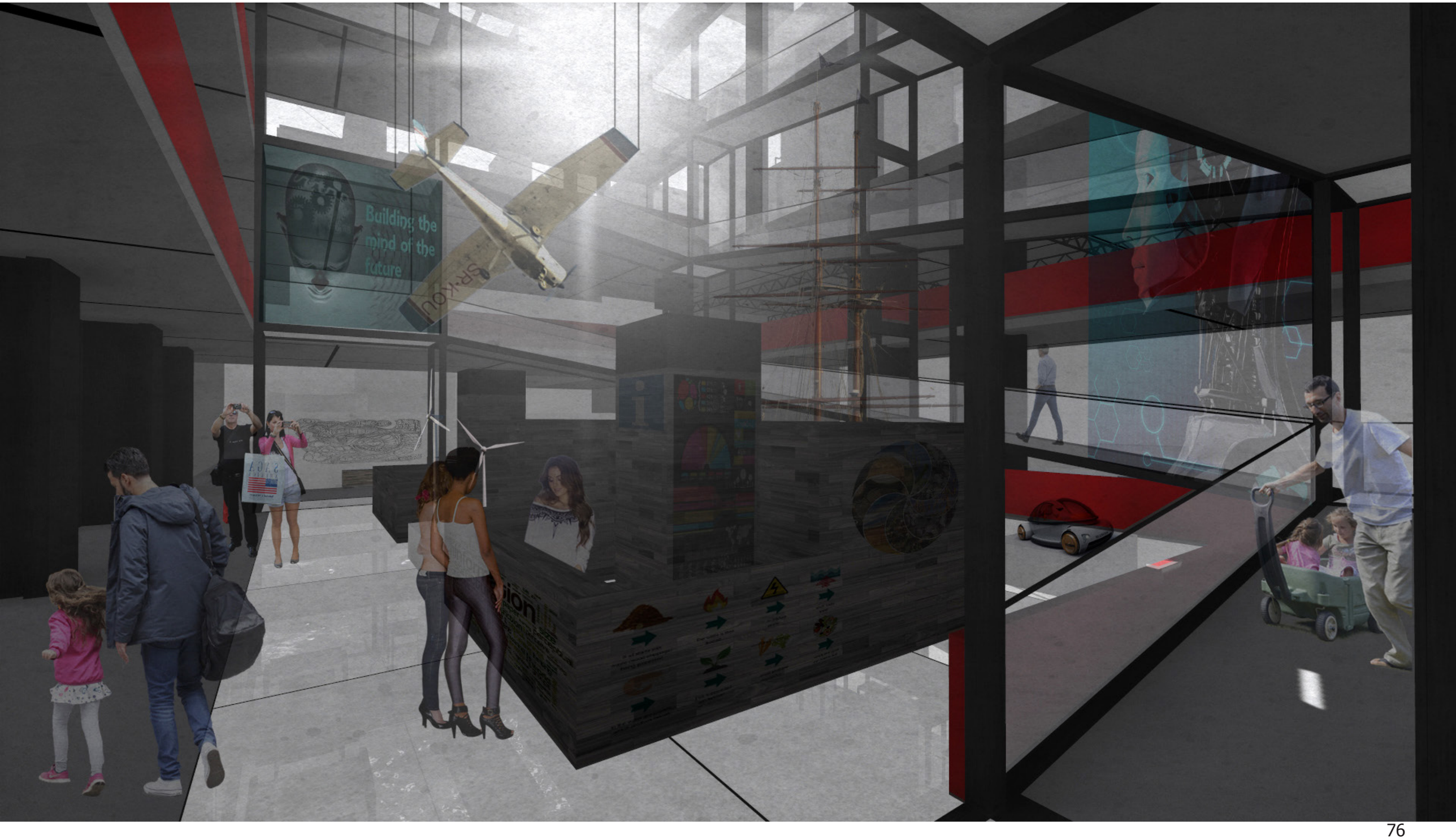
Story



Story



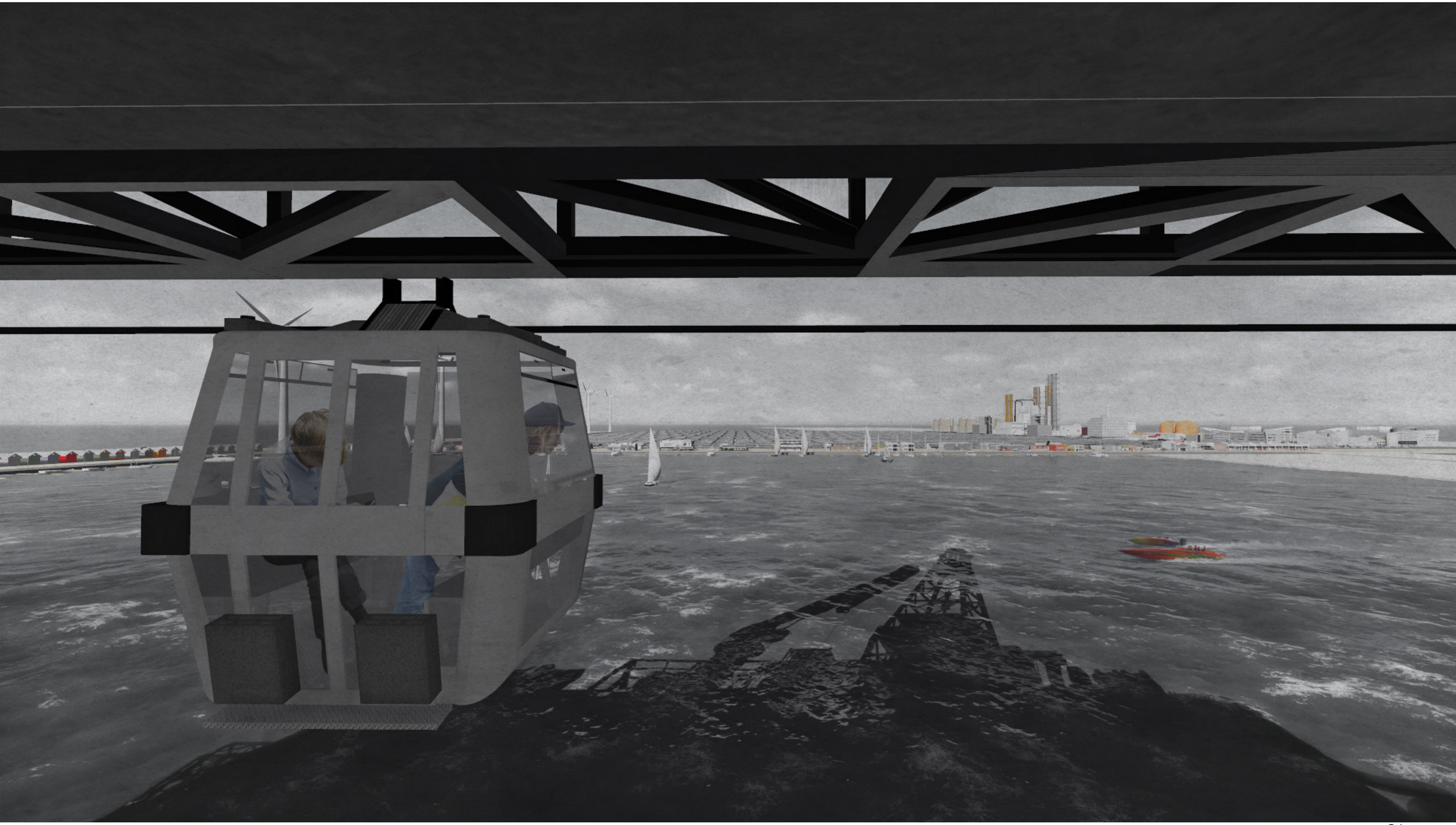
Story

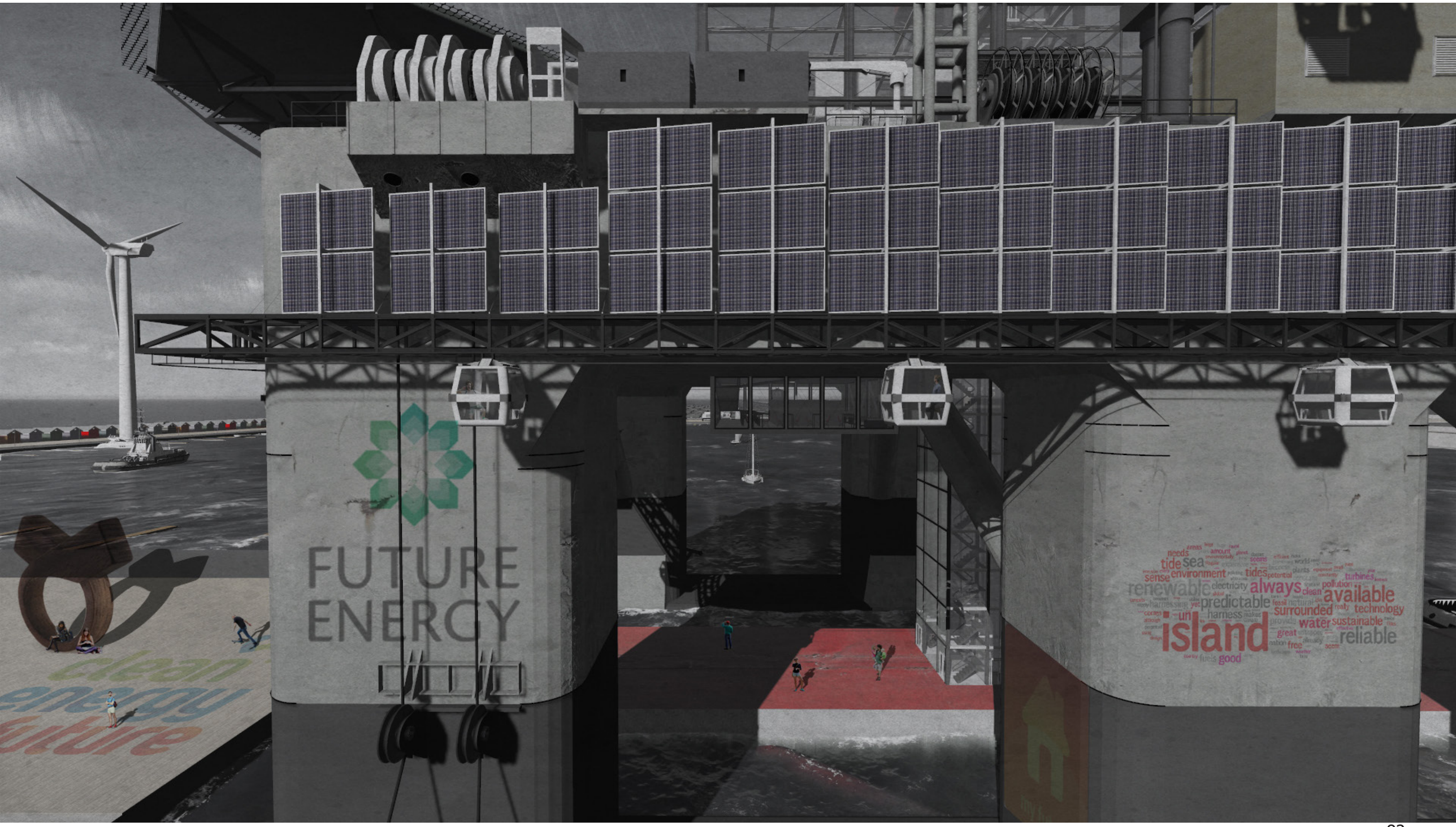


Story

ENERGY
HISTORICAL
TIME LINE
1 MILLION B.C.
PRESENT
ZERO
EMISSIONS
HYDRO
POWER
WIND
POWER
RENEWABLE
ENERGY
SOLAR
POWER
GEOTHERMAL
POWER
HYDROGEN
FUEL
H2

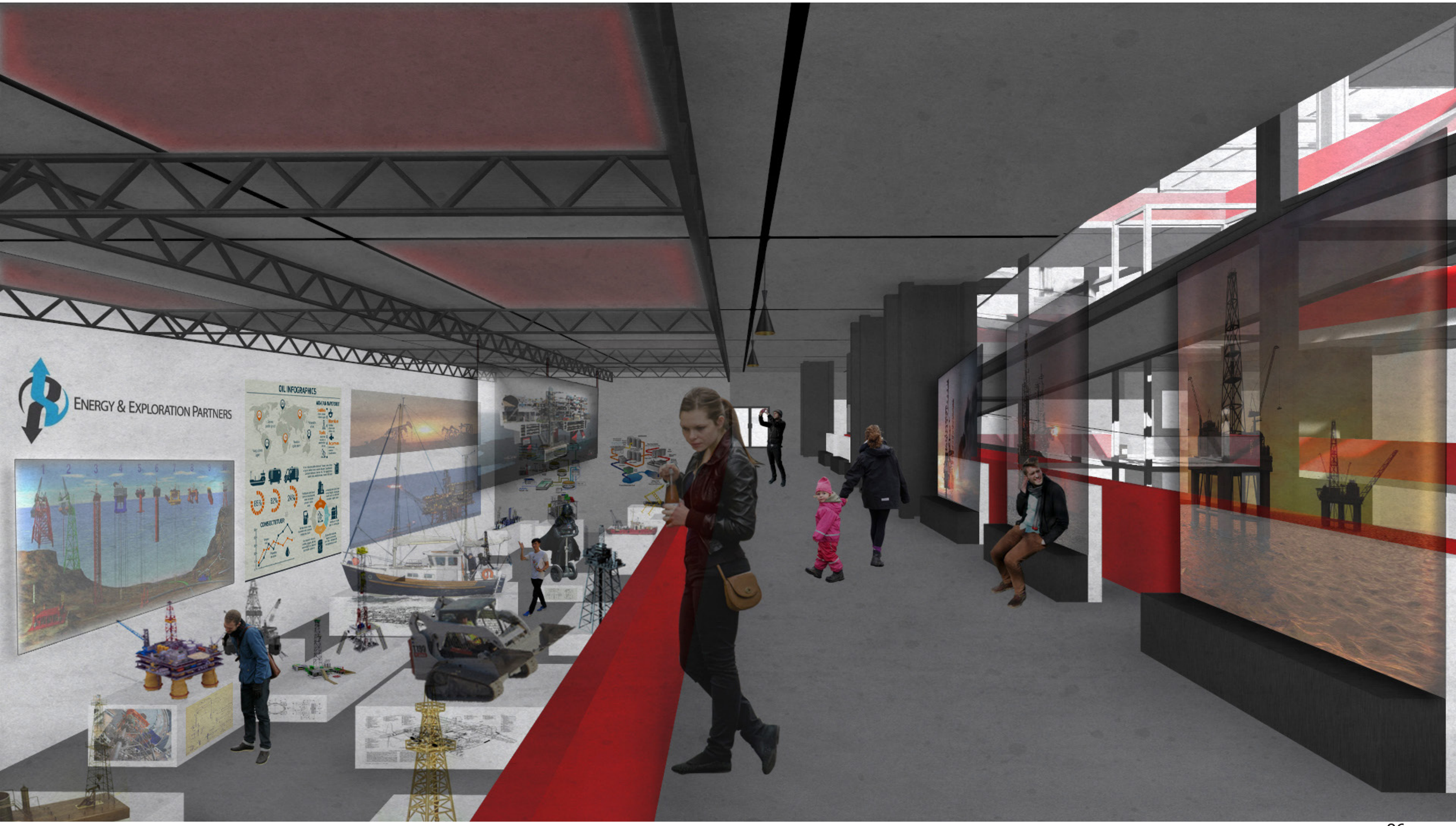
Story



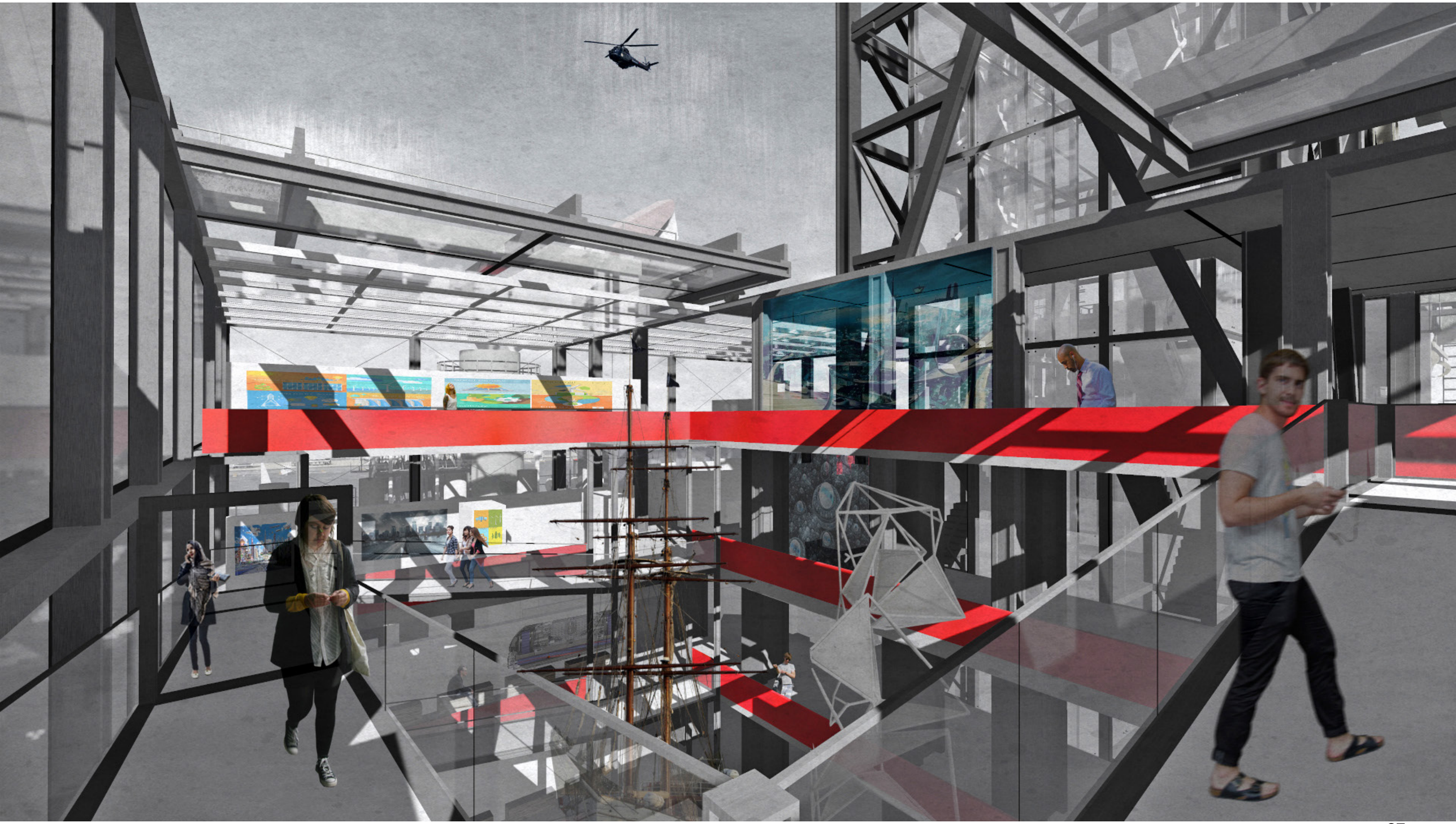

FUTURE
ENERGY
clean
energy
future
needs
tide
sea
sense
environment
tides
renewable
electricity
always
clean
available
predictable
surrounded
technology
water
sustainable
reliable
island
good

FUTURE

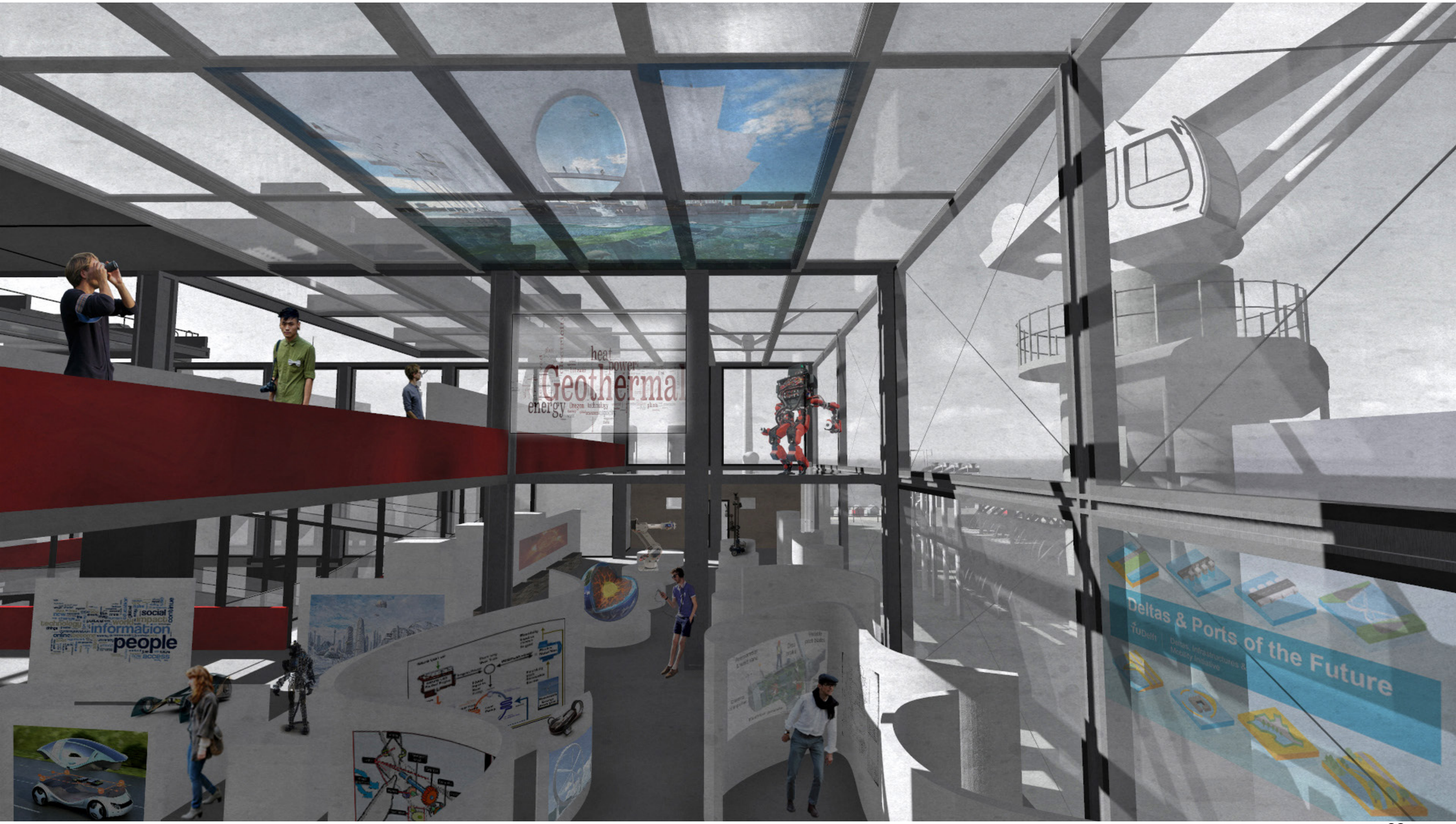
BUY
TICKETS

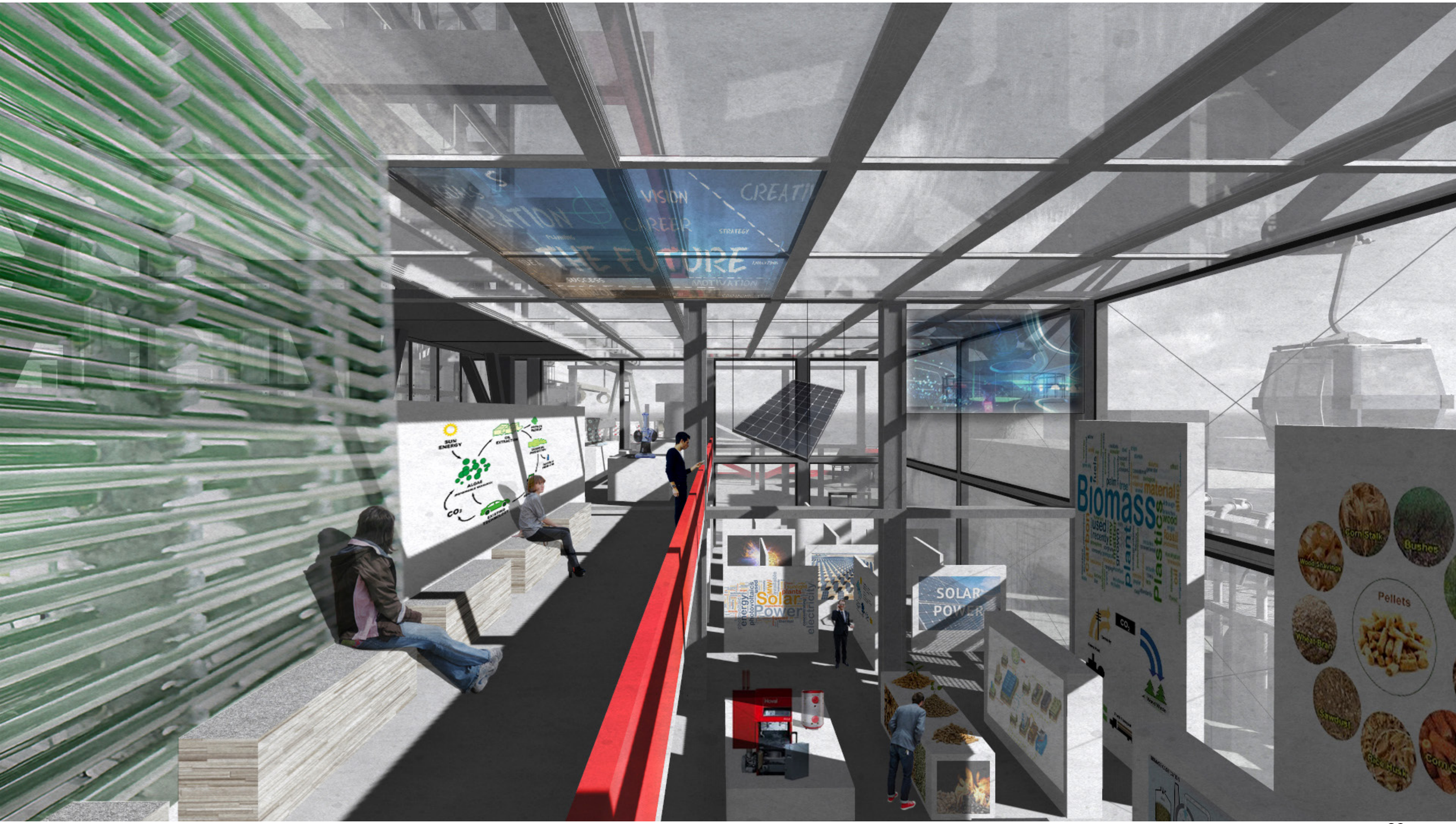

ENERGY & EXPLORATION PARTNERS
OIL INFOGRAPHICS

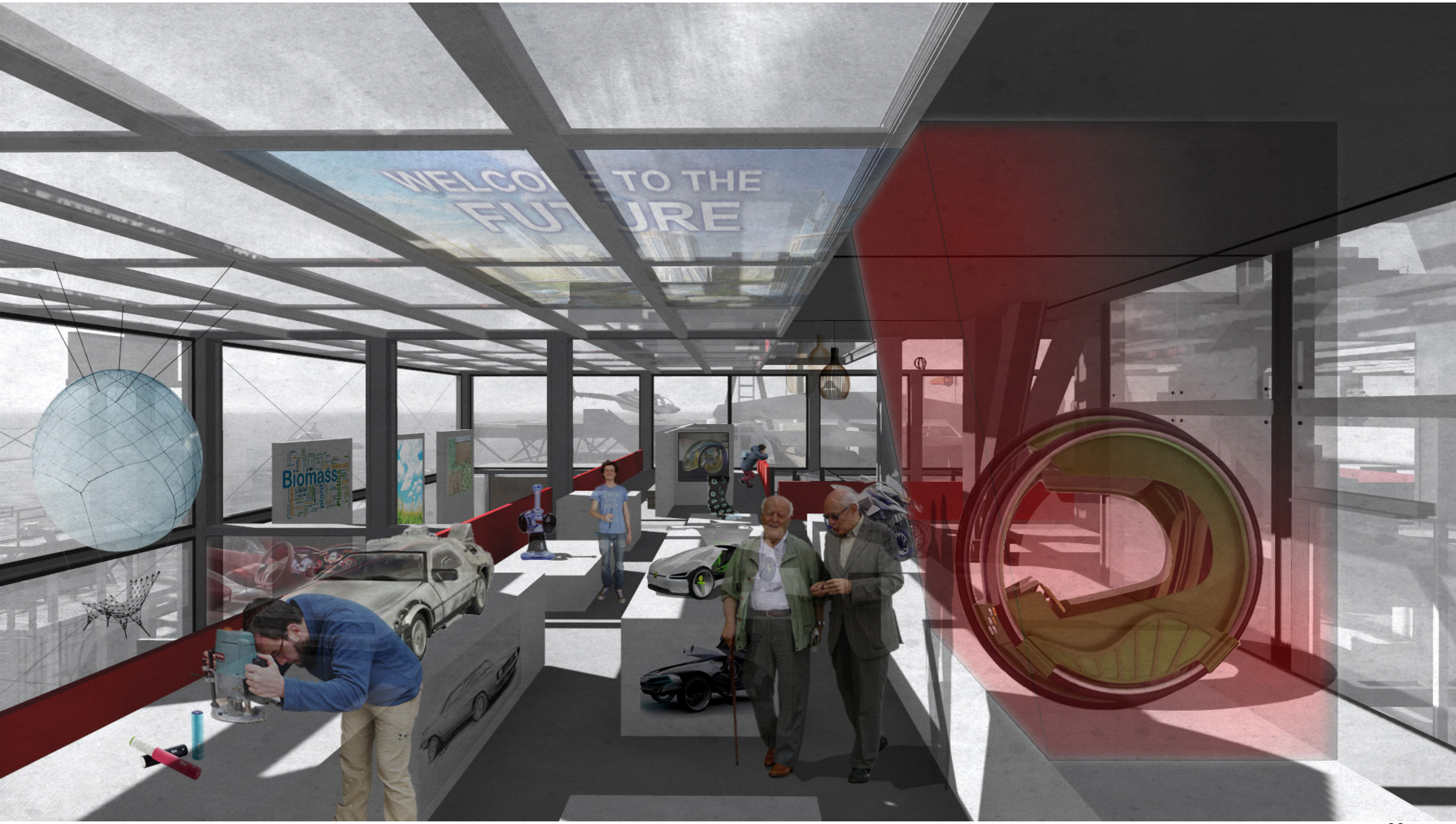
Story

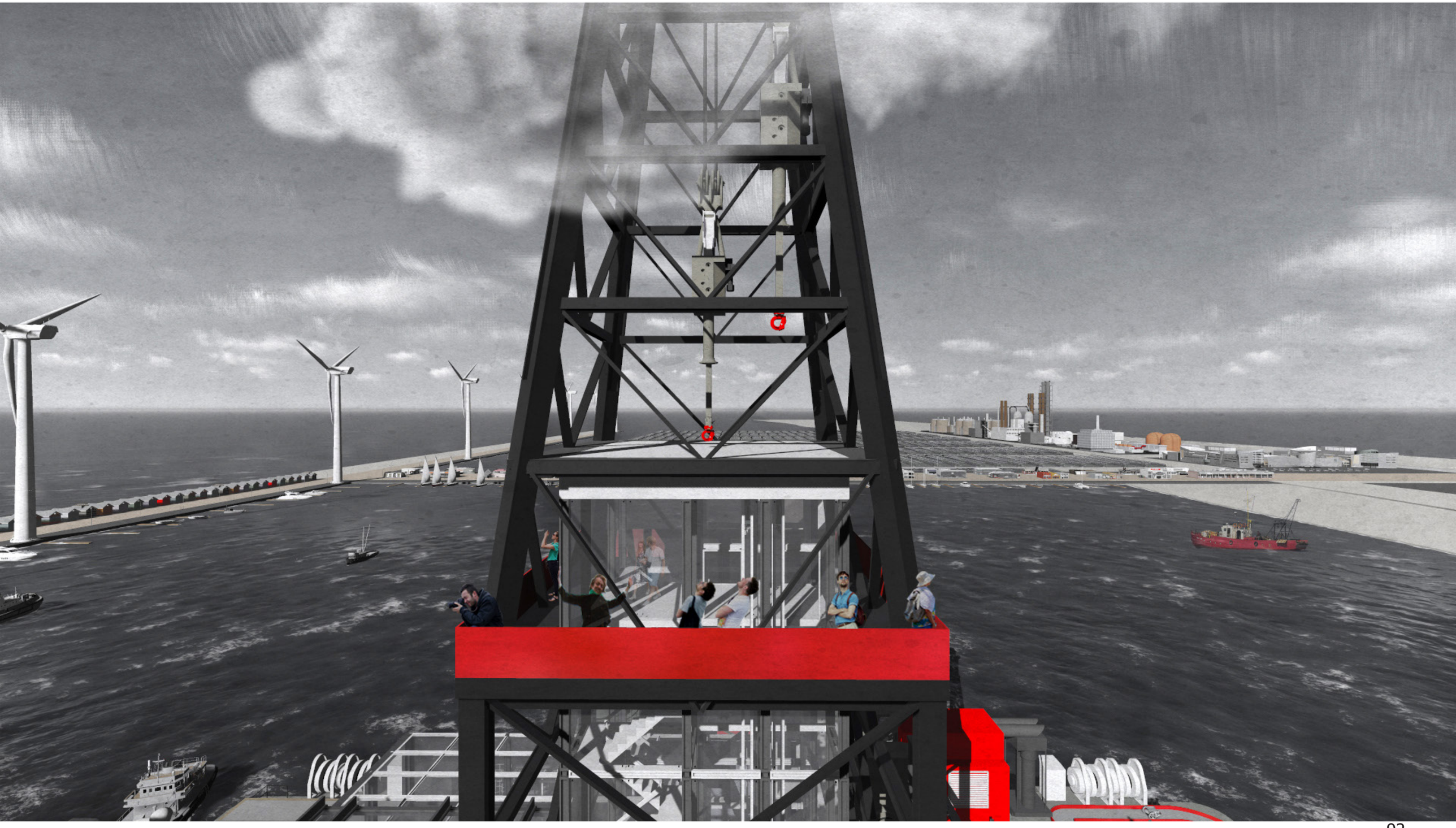


Story

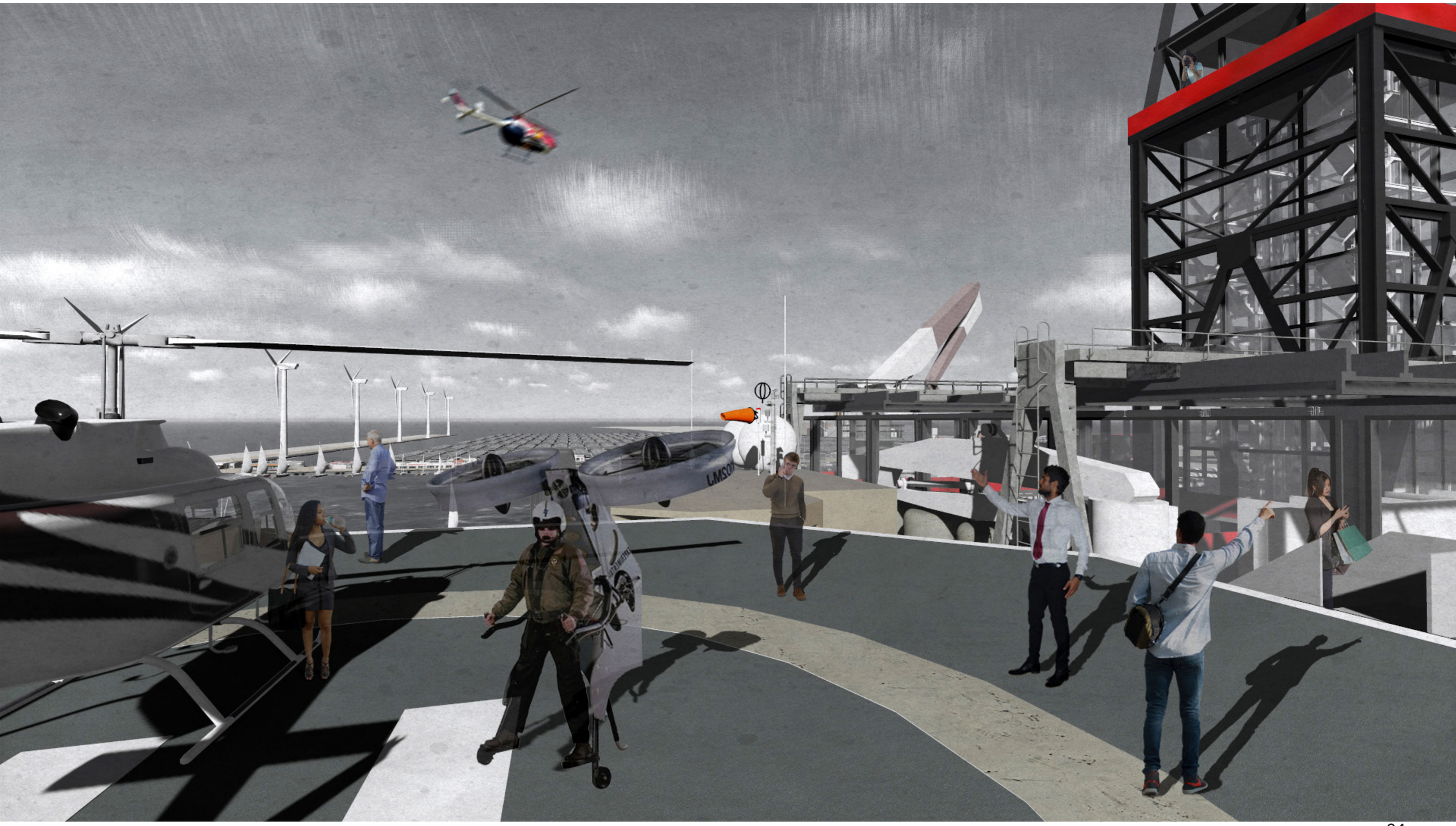

heat
power
Geotherma
energy
social
information
people
Deltas & Ports of the Future

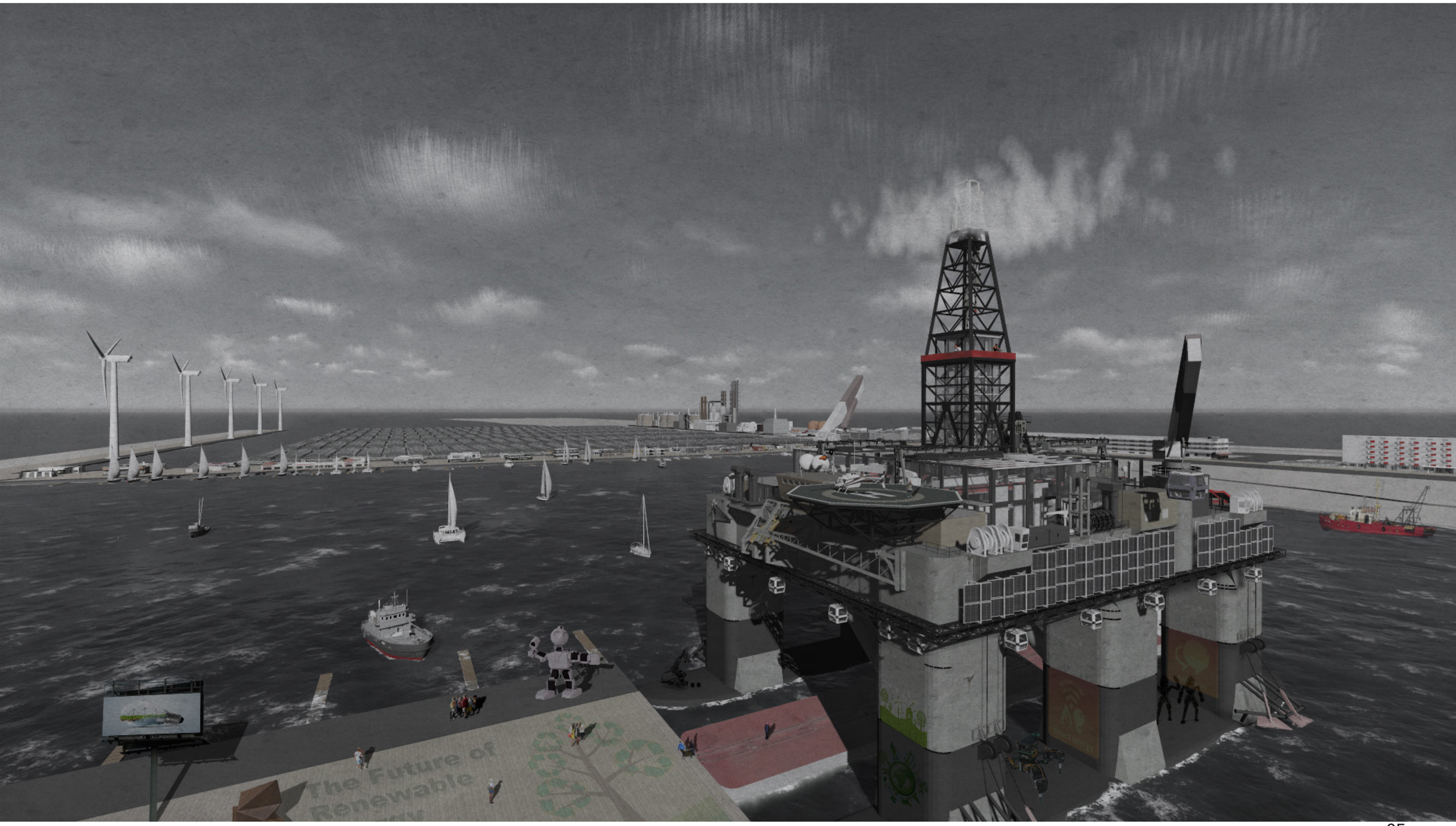

VISION
CREATI
STRATEGY
THE FUTURE
MOTIVATION
SUN ENERGY
Biomass
material
Plastics
Solar Power
energy
electricity
SOLAR POWER
Corn Stalk
Bushes
Pellets


TO THE
Biomass

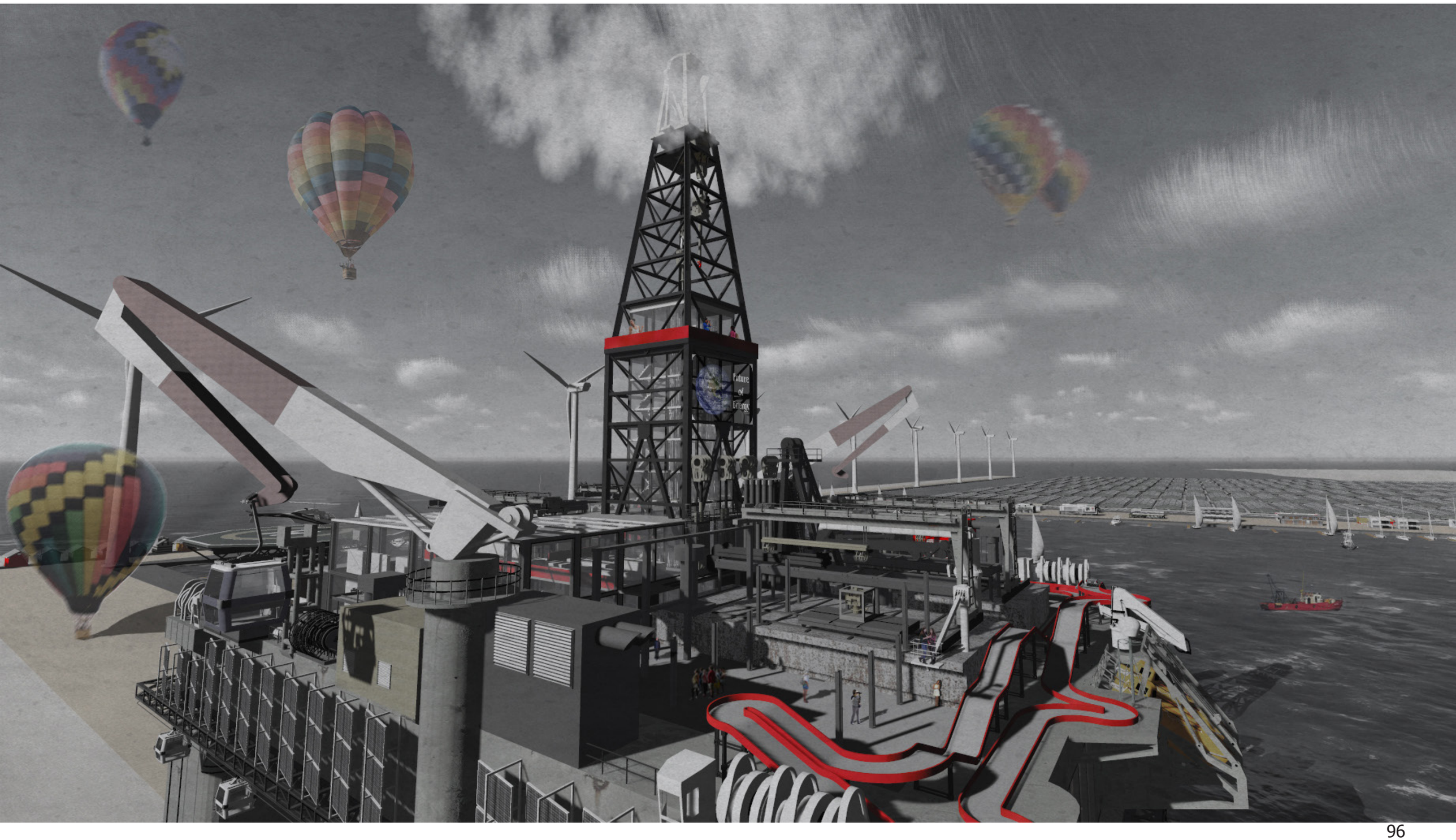


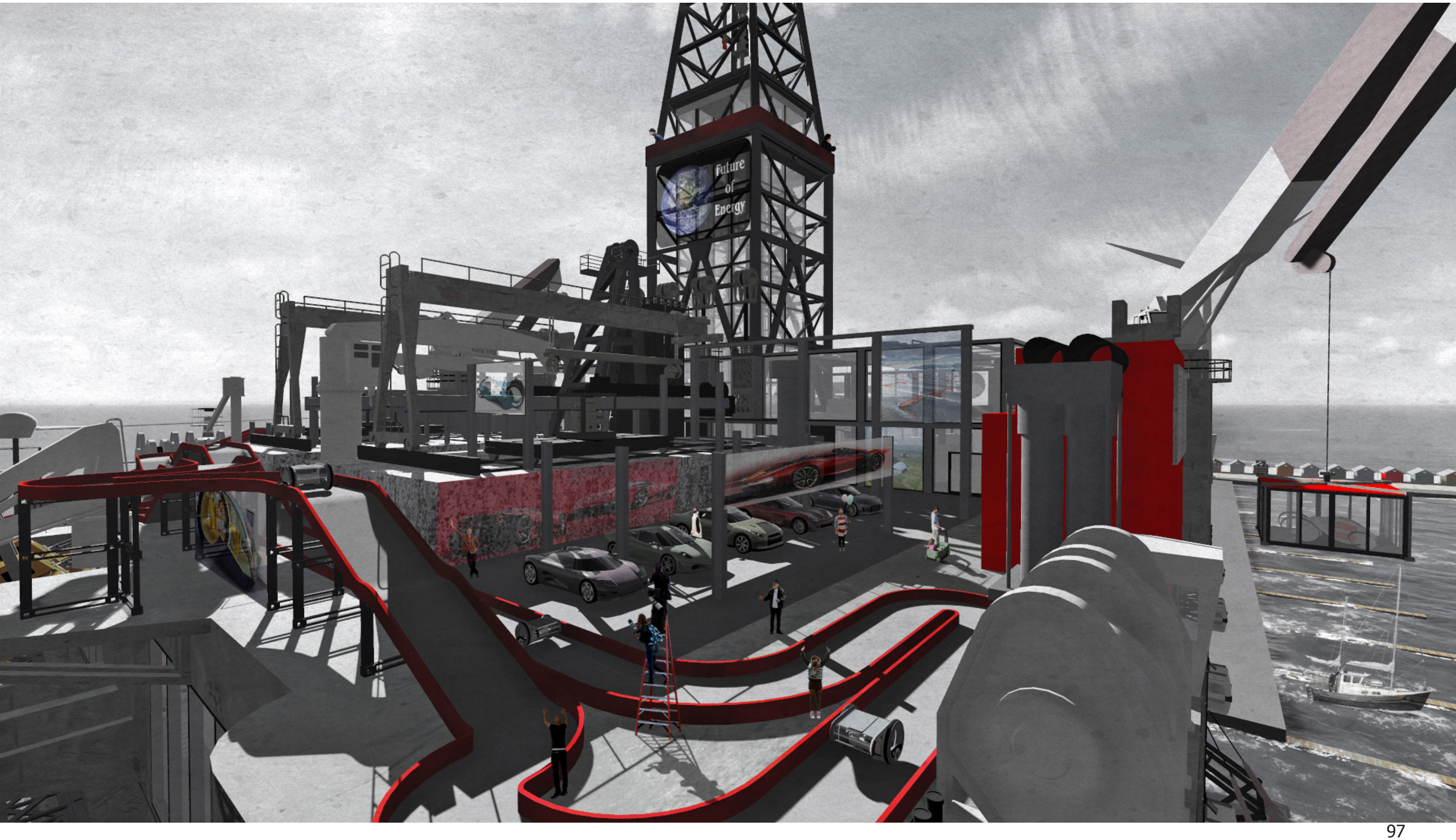
Flyttlåda
Mellan



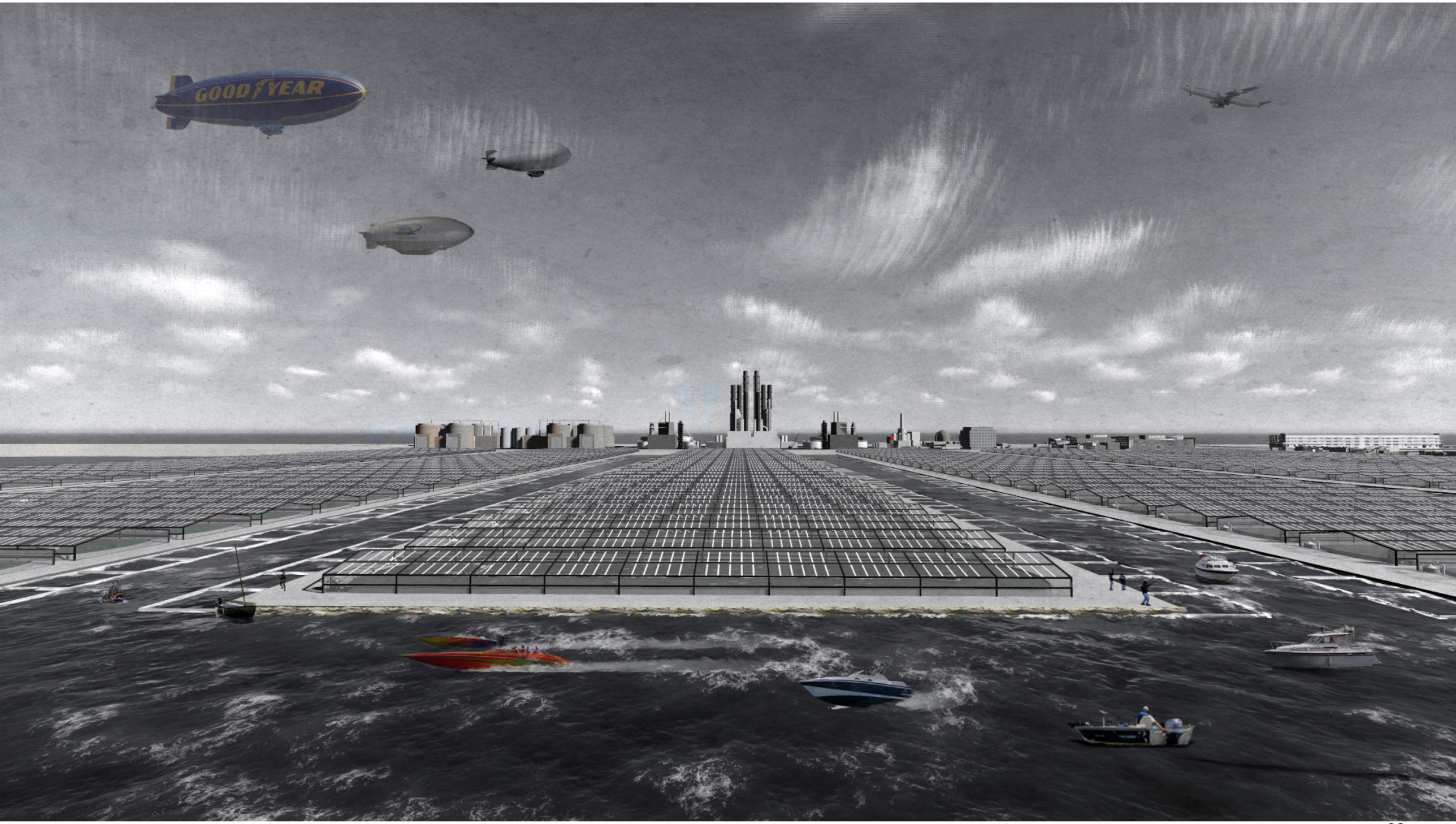

The Future of
Renewable

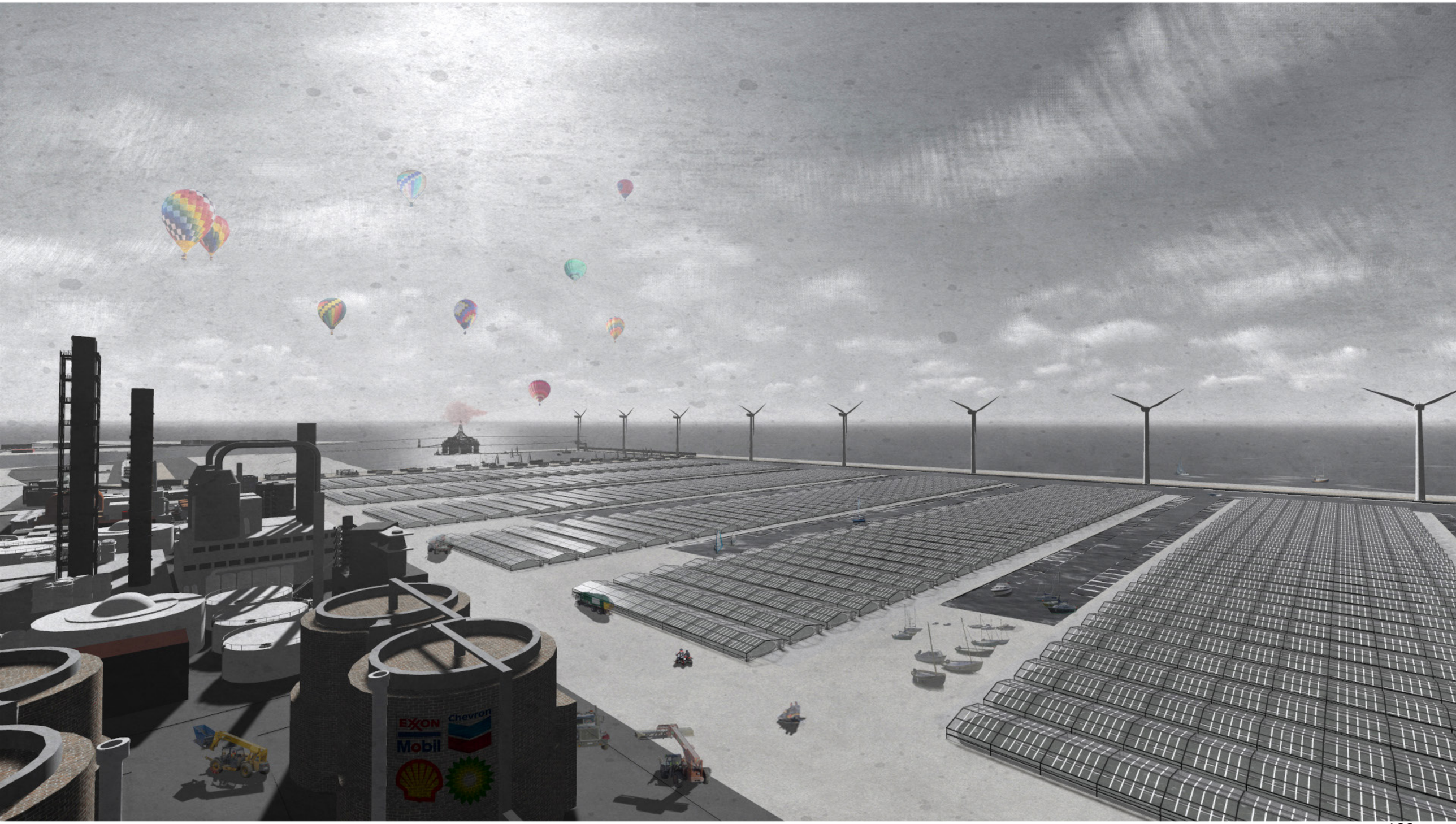
Story




Future
of
Energy

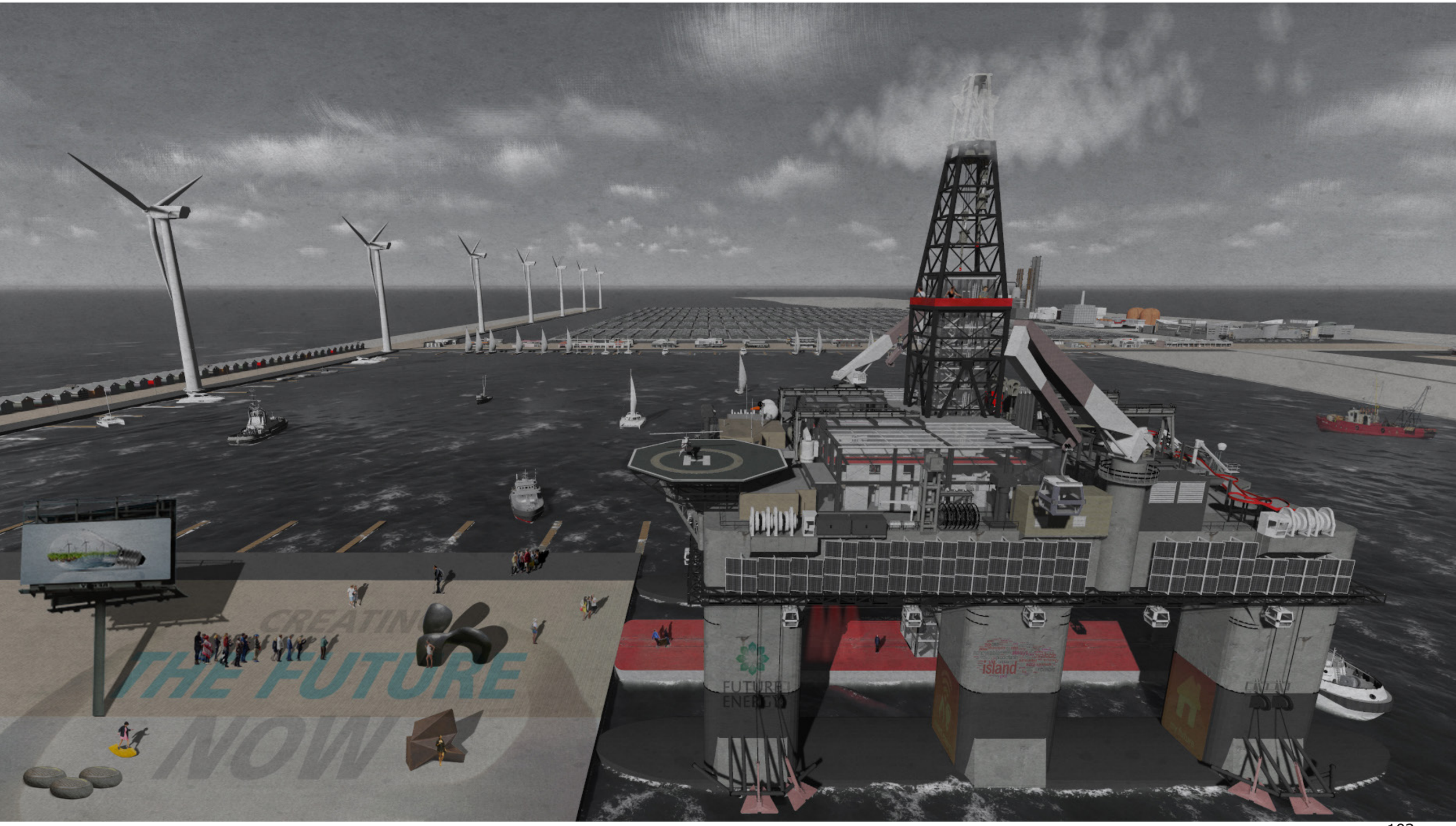
海の家 れもん
Tofu garden
Making plans for the future


GOODYEAR

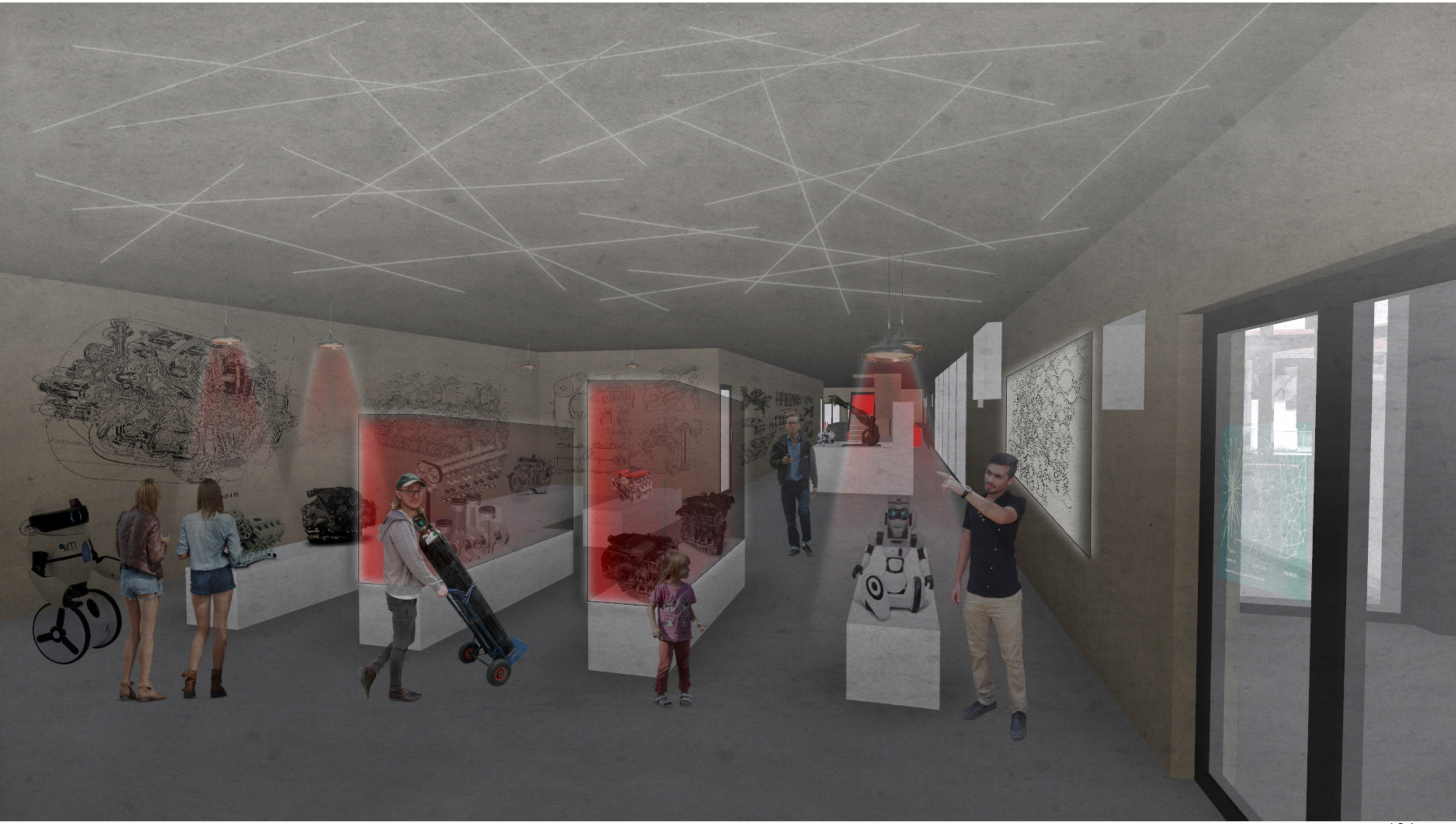

EXXON
Mobil
Chevron

MALL

Story



FOOD



Story

Thanks for attention,

Questions?