Repurposing the port
GLOBAL FOSSIL FUEL CONSUMPTION

Global primary energy consumption by fossil fuel source, measured in terawatt-hours (TWh)

OurWorldInData.org/fossil-fuels/  •  CC BY
% OF GLOBAL POPULATION LIVING IN CITIES

54%  66%

2020  2050

Sharma & Chandrakanta 2019
GLOBAL IMPACT OF CITIES

GLOBAL LAND COVERAGE: 3%

GLOBAL MATERIAL USAGE: 75%

GLOBAL CO₂ EMISSION: 60-80%

UN Sustainable Development Goals 2018
DUTCH GOVERNMENT

Klimaatplan

2030

49% \( \text{CO}_2 \)

2050

90% \( \text{CO}_2 \)
**DUTCH GOVERNMENT**

**Klimaatplan**

- **2030**
  - CO$_2$ 49%

- **2050**
  - CO$_2$ 90%

**CITY OF AMSTERDAM**

**Nieuw Amsterdams Klimaat**

- **2030**
  - ‘Inside the ring’: fossil fuel free
  - No ‘fossil activities’ in industry
  - 50% less new/raw materials
  - 3010 kiloTonnes less CO$_2$-emission

- **2050**
  - Independent of fossil fuels
  - 100% circular
Another effect of the Industrialization is the fact that ports and cities, formerly intimately connected, grew apart. 

Hein 2016
Gemeente Amsterdam:
PETROLEUMHAVEN IN DEN AMSTERDAMMER POLDER.

1887

SOURCE: Stadsarchief Amsterdam
Amsterdam
Havenstad
40,000 - 70,000
Dwellings
Delft
51,146 DWELLINGS

Zwolle
58,723 DWELLINGS

Zaanstad
68,944 DWELLINGS

Amsterdam
40,000 - 70,000
Havenstad
DWELLINGS

Bron CBS, 2020
GREEN RIVERSIDE
Quality for viewpoints

CURRENT INDUSTRY
"Non-fossil" and non-polluting

PETROLEUMHAVEN
made Amsterdam the world's largest gasoline port

VATTENFALL PLANT
Closed coal power plant
OVERALL DESIGN QUESTION

“How can a former oil-related port area - in a circular way - be transformed to a mixed-use neighborhood?
How can aboveground steel storage tanks be categorized and reused to house new, urban functions?
ABOVEGROUND STEEL STORAGE TANKS (AST'S)

FIXED ROOF
- Railing
- Roof plating
- Dome-shaped
- Extra wind girder
- Bottom

OPEN TOP
- Railing
- Wind girder
- External Floating Roof (EFR)
- Bottom

NO FLOATING ROOF
- Internal Floating Roof (IFR)
- Storage of K3 products

INTERNAL FLOATING ROOF (IFR)
- Storage of K1 + K2 + K3 products

EXTERNAL FLOATING ROOF (EFR)
- Storage of K1 + K2 + K3 products
- Possible geodesic dome
18,000 KILOTONNES

AMOUNT OF CARBON STEEL
EMBODIED CO₂
 IN kTON

AMOUNT OF CARBON STEEL

18,0 KILOTONNES

EMBODIED CO₂
 IN kTON

37,9 KILOTONNES

7,9 KILOTONNES
AMOUNT OF CARBON STEEL

18,0 KILOTONNES

EMBODIED CO₂
IN kTON

37,9 KILOTONNES

EMITTED CO₂
WHEN REUSED / MELTED
IN kTON

7,9 KILOTONNES
18,0 KILOTONNES

AMOUNT OF CARBON STEEL

37,9 KILOTONNES

EMBODIED CO₂ IN KTON

7,9 KILOTONNES

EMITTED CO₂ WHEN REUSED / MELTED IN KTON

1,3% OF 2030-TARGET
Instead of searching out the best, calling it heritage and fighting to preserve it, we should look at everything around us and accept it all as cultural heritage.

Proceeding from there [...] we can determine the most appropriate ways of using it to create [...] added value for the future

Beauty Redeemed - Braae 2015 (p. 76)
4 TYPES OF REUSING

1. Reuse of an existing structure on the site and possibly add to it or extend it.

2. Relocate most or all of an existing building to a new location.

3. Reuse individual components extracted from the demolition of one project in a new building.

4. Use materials and components that were previously used for a different purpose.
4 TYPES OF REUSING

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CHALLENGES IN REUSING AST’S

DAYLIGHT

STABILITY

INSULATION

FOUNDATION
EXISTING SITUATION

2020
GREENING THE SITE

2025
A MIXED, FLEXIBLE PROGRAM

2025
EXTRAVERT

INTROVERT

OTHER OPTIONS FOR DIFFERENT PHASES

TOP-UP

IN BETWEEN

SUPERBLOCK
SPIRAL STAIRS
INSIDE

SPIRAL STAIRS
INSIDE + OUTSIDE (EXISTING)
One grid system
One grid system
One grid system
One grid system
One grid system
And that was one of the fundamental principles of the Segal process: that houses are flexible to adapt to you, and you don’t have to adapt to a prescribed house.

Walter Segal
One self-buildable system

FINISH
Wooden wall finish, customizable per panel (colour bio-based paint, texture or thickness)

INSULATION
Added when needed, e.g. in division walls or exterior walls

‘BOX’ CONSTRUCTION
Composed of 10 mm plywood panels, providing strength, stability and ‘space’

‘PLATE’ CONNECTION
10mm plywood panel providing the connection between building elements, while strengthening construction.

ACOUSTIC INSULATION
Preventing (impact) noise transmission through the construction elements
A SELF-BUILT INTERIOR

2025
MAIN-B1
EXTRAVERT

MAIN-A1
INTROVERT
SAME SYSTEM, DIFFERENT APPEARANCE

2025
**Pre-fab wooden façade element**

- **Roller blind sunscreen** behind façade element
- **Glue-laminated beam** main construction 200 x 400mm
- **Curtain wall system**
  - Triple-glazed panels + insulated sandwich panels
- **Insulated sandwich panel** in curtain wall system
- **Acoustic insulation** preventing impact noise
- **Floor-elements (box)** laid in main construction, on acoustic interrupting rubber elements

**DucoMax SR**

**Sound-absorbing ventilation**
CONNECTION FLOOR - FAÇADE (LOGGIA)
1:10 | VERTICAL

Pre-fab wooden façade element
Roller blind sunscreen behind façade element
Glue-laminated beam main construction 200 x 400mm
Curtain wall system Triple-glazed panels + insulated sandwich panels
Insulated sandwich panel in curtain wall system
Acoustic insulation preventing impact noise
Floor-elements (box) laid in main construction, on acoustic interrupting rubber elements
DucoMax SR sound-absorbing ventilation
SAME SYSTEM, DIFFERENT APPEARANCE

2025
AN ‘EXTRAVER’ DWELLING

2025
SUMMER

WINTER

SOUTH-ORIENTED FACADES

NORTH-ORIENTED FACADES

SUMMER

WINTER
ACCESSIBLE GREEN ROOF WITH A VIEW

2025
ACCESSIBLE GREEN ROOF WITH A VIEW

2025
TWO TYPES OF TRANSFORMATION
CO₂ IMPACT OF WOOD CONSTRUCTION

A comparison of CO₂-impact, based on CO₂-impact (Idemat2021) en CO₂-storage in wood (van der Lught, 2020)

EXTRA VERT

CO₂ 10,2 emitted stored total - 160,6 - 170,8

INTRO VERT

CO₂ 14,0 emitted stored total - 218,9 - 232,9
Green structure

2050
A FUTURE-PROOF NEIGHBOURHOOD

2050
AMOUNTS OF YEARLY TRADE OF OIL AND OIL-PRODUCTS IN 2019, IN BILLIONS OF LITRES

(2019 Feiten & Cijfers, 2019; Goederenoverslag in de haven van Rotterdam, 2020; Jaarverslag 2019, 2020)
OIL STORAGE CAPACITY IN 2020 IN MILLIONS M³

(1worldenergy, 2020)
GEACHTE MEVROUW HALSEMA, BESTE FEMKE

2025
GEACHTE MEVROUW HALSEMA, BESTE FEMKE

2025
Repurposing the port
BACK-UP SLIDES
PRE-HEATED THROUGH SHELL

MECHANICAL EXHAUST VIA SHAFT
LE PARIS DU 1/4 HEURE

BÉN MO MANGER

APPRENDRE

TRAVAILLER

PARTAGER ET RÉEMPLOYER

SE DÉPENSER

45 mn

CIRCULER

CHEZ MOI

15 mn

SE SOIGNER

S'APPROVISIONNER

S'AÉRER

SE CULTIVER, S'ENGAGER

THE 15-MINUTE CITY

2050

SOURCE: Ubique / Micaël
An ambitious direction is set out in which the port will develop to an ecosystem with a strong focus on innovation, having a biobased and circular economy and accommodating and enhance the energy transition.

CLUSTER AMSTERDAM NOORDZEEKANAALGEBIED
ONTWERP HAVENNOTA 2020-2030
WATERFRONT DEVELOPMENT

“\ The waterfront is one of the most significant public assets in the built environment, featuring so-called port-cities with a large potential of developing these areas. \ Williams 2004
WATERFRONT DEVELOPMENT

“Not to densify or gentrify, but more creative and quality-oriented, more green and community-based: an experimental field for ecological urbanism, creating new circular values” Carta 2016