BUILDING FOR SUSTAINABILITY
United Nations Environmental Council
BUILDING FOR SUSTAINABILITY

content of presentation
BUILDING FOR SUSTAINABILITY

content of presentation

• UNEC: the assignment
BUILDING FOR SUSTAINABILITY

color of presentation

• UNEC: the assignment
• Urban masterplan
BUILDING FOR SUSTAINABILITY

content of presentation

• UNEC: the assignment
• Urban masterplan
• Building design
BUILDING FOR SUSTAINABILITY

content of presentation

• UNEC: the assignment
• Urban masterplan
• Building design
  • building concept
BUILDING FOR SUSTAINABILITY

content of presentation

• UNEC: the assignment
• Urban masterplan
• Building design
  • building concept
  • programme & spatial lay-out
BUILDING FOR SUSTAINABILITY

content of presentation

• UNEC: the assignment
• Urban masterplan
• Building design
  • building concept
  • programme & spatial lay-out
  • structure
BUILDING FOR SUSTAINABILITY

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• UNEC: the assignment
• Urban masterplan
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  • structure
  • installations
BUILDING FOR SUSTAINABILITY

content of presentation

• UNEC: the assignment
• Urban masterplan
• Building design
  • building concept
  • programme & spatial lay-out
  • structure
  • installations
  • facades
BUILDING FOR SUSTAINABILITY

current of presentation

- UNEC: the assignment
- Urban masterplan
- Building design
  - building concept
  - programme & spatial lay-out
  - structure
  - installations
  - facades
- Summary
SUSTAINABLE DEVELOPMENT

introduction

• Sustainability is:

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.
Brundtland Commission, United Nations 1987
SUSTAINABLE DEVELOPMENT

introduction

• 2012: different views and definitions
SUSTAINABLE DEVELOPMENT

introduction

• 2012: different views and definitions

• urgent need for solutions
SUSTAINABLE DEVELOPMENT

introduction

• Worldwide decisiveness

• Worldwide consensus
SUSTAINABLE DEVELOPMENT

introduction

• Worldwide decisiveness

• Worldwide consensus

• United Nations as worldwide coordinator
introduction

• 193 countries
UNited nations

introduction

• 193 countries

• friendly relations between countries
introduction

- 5 councils
introduction

• 5 councils

• international peace and security
introduction

- 5 councils
- international peace and security
- social progress, human rights, better living standards
UNEC
the 6th UN Council

- United Nations Environmental Council

International Court of Justice
General Assembly
Security Council
Economic & Social Council
Secretariat

Sustainability Council (UNEC)
UNECE: the 6th UN Council

- United Nations Environmental Council

- positioning by new iconic headquarters
what should the building do?
what should the building do?

- Representative function: Council Chamber
what should the building do?

• Representative function: Council Chamber
• Communication & information
what should the building do?

• Representative function: Council Chamber

• Communication & information

• **Focal point for sustainability**
what should the building do?

- Representative function: Council Chamber
- Communication & information
- **Focal point for sustainability**
- up-to-date sustainable architecture
UNECD: the assignment
urban masterplan  building design  summary
UNECD
Location

International Court
of Justice
General Assembly
Security Council
Economic & Social
Council
Secretariat

The Hague

Sustainability
Council (UNEC)
UNEC

Location

International Court of Justice
General Assembly
Security Council
Economic & Social Council
Secretariat

The Hague

Sustainability Council (UNEC)

Manhattan, NYC
UNEC
Location

- Building location: New York City
### UNEC Location

<table>
<thead>
<tr>
<th>International Court of Justice</th>
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<th>Security Council</th>
<th>Economic &amp; Social Council</th>
<th>Secretariat</th>
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<td>Manhattan, NYC</td>
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- Building location: New York City
LOCATION
Manhattan Midtown East, New York City

- UN Headquarters plot
LOCATION

UN security objection

- Highway along East River
URBAN MASTERPLAN

Redeveloping the East River embankment
URBAN MASTERPLAN

New York City plans

- facilities
- recreation
- sustainability
- traffic
- safety
- connection between city and water

source:
PlaNYC 2030
New York State Strategic Highway Safety Plan
URBAN MASTERPLAN

current situation

- area of opportunity
- bicycle route
URBAN MASTERPLAN

relocating the highway

• City cut off from water by a highway
URBAN MASTERPLAN
relocating the highway

- City cut off from water by a highway
- Introvert city
URBAN MASTERPLAN
relocating the highway

• Many different bank profiles
URBAN MASTERPLAN

new situation: East River Park

- Green zone: connecting the city with the river
URBAN MASTERPLAN

new situation: East River Park

• Green zone: connecting the city with the river
URBAN MASTERPLAN

new situation: East River Park

- Green zone: connecting the city with the river
URBAN MASTERPLAN
relocating the highway

- Alternative routes for highway traffic
URBAN MASTERPLAN
relocating the highway

- Alternative routes for highway traffic

![Diagram of urban masterplan with alternative routes for highway traffic.]
URBAN MASTERPLAN
relocating the highway

- Solution: highway in tunnel
URBAN MASTERPLAN
relocating the highway

• Solution: highway in tunnel
URBAN MASTERPLAN
relocating the highway

• Solution: highway in tunnel
URBAN MASTERPLAN

new situation: East River Park
URBAN MASTERPLAN

new situation: East River Park
URBAN MASTERPLAN

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URBAN MASTERPLAN

new situation: East River Park
URBAN MASTERPLAN

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new situation: East River Park
URBAN MASTERPLAN

new situation: East River Park
URBAN MASTERPLAN

new situation: East River Park
URBAN MASTERPLAN

new situation: East River Park
URBAN MASTERPLAN

consequences for the UN plot

• current situation
URBAN MASTERPLAN

consequences for the UN plot

- fly-overs adjacent to plot
URBAN MASTERPLAN

consequences for the UN plot

- international territory
- unclear plot boundaries
URBAN MASTERPLAN

consequences for the UN plot

• new situation
URBAN MASTERPLAN
consequences for the UN plot
URBAN MASTERPLAN

consequences for the UN plot
URBAN MASTERPLAN
impression of the UN plot
URBAN MASTERPLAN

consequences for the UN plot

One face
URBAN MASTERPLAN

impression of the UN plot
BUILDING DESIGN
from concept to detail
UN BUILDING

UNHQ building ensemble

- Le Corbusier, Niemeyer and Harrison, 1952
- Buildings and park, sculptures
UN BUILDING

UNHQ building ensemble

- Le Corbusier, Niemeyer and Harrison, 1952
- Buildings and park, sculptures
UN BUILDING

current UN plot composition

- Composition of volumes
UN BUILDING

masterplan UN plot composition
UN BUILDING

masterplan UN plot composition
• One composition: buildings and podium
CONCEPT

UN plot composition

• Unbalanced composition
CONCEPT
UN plot composition

- UNEC to balance composition
CONCEPT

UN plot composition

• emphasizing podium edges
CONCEPT

UN plot composition

• 2 icons: tension
CONCEPT

UN plot composition

• Synergy and connection
CONCEPT

UN plot composition

- one UN podium
CONCEPT
UN plot composition

- connection through podium
LOCATION

UN plot composition

• UN plaza
LOCATION

UN plot composition

• UN plaza
LOCATION
UN plot composition

• UN plaza
LOCATION

UN plot composition

- UN plaza
- UNEC as ‘plaza creator’
UN PLAZA

early intention

design sketch 1946
CONCEPT

UN plot composition
BUILDING FOR UNEC

aims and requirements
BUILDING FOR UNEC

user groups
BUILDING FOR UNEC

user groups

- delegates & staff
BUILDING FOR UNEC

user groups

- delegates & staff
- press
BUILDING FOR UNEC

user groups

• delegates & staff

• tourists

• press
BUILDING FOR UNEC

user groups

• delegates & staff

• press

• tourists

• invited visitors
ORGANISATION
schedule of requirements

- **23200 m²** gross floor area
ORGANISATION

schedule of requirements

Collect

Propagate

Exchange

Produce

General office space

Facilities

Collect Produce Propagate Exchange General office space Facilities

1835 m²

1224 m²

3536 m²

3330 m²

2680 m²

2300 m²
### Organisation

#### Schedule of Requirements

<table>
<thead>
<tr>
<th>Collect</th>
<th>Propagate</th>
<th>Exchange</th>
<th>Produce</th>
<th>General Office Space</th>
<th>Facilities</th>
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<td>3536 m2</td>
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### ORGANISATION

**schedule of requirements**

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<th>Collect</th>
<th>Propagate</th>
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**UNECS: the assignment urban masterplan building design: programme summary**
ORGANISATION

schedule of requirements

Preparation
ORGANISATION

concept

communication

representation

preparation
ORGANISATION

concept

• public
• press
• guests

communication

representation

preparation
ORGANISATION

concept

• public
• press
• guests

communication

delegates
•
diplomates

representation

preparation
ORGANISATION

concept

- public
- press
- guests

communication

- employees
- researchers

preparation

representation

- delegates
- diplomats

- secretary general & staff
ORGANISATION

concept

- public
- press
- guests

- employees
- researchers

communication

representation

feed

feed

- delegates
- diplomats

- secretary general & staff

preparation
BUILDING FORM

programme arrangement

served
communication

served
representation

serving
preparation

feed

feed
BUILDING FORM

programme arrangement
BUILDING FORM

overview
BUILDING LAY-OUT

floor plans and sections
UN PODIUM
entrances to the UN
UN PODIUM

entrances to the UN
UN PODIUM
entrances to the UN
UN PODIUM

entrances to the UN
UN PODIUM

exposition plaza
UN PODIUM

exposition plaza
UN PODIUM

exposition plaza
UN PODIUM

exposition plaza
impression
UN PODIUM

grey water

- Retention and helofyte filtering on plaza: toilet flushing
- (ca. 2600 m², depth varying 0.5 - 1.5 m)
- Estimated use UNEC: 5000 m³/yr, ca. 11000 m³/yr on plot
ENTRANCE
ENTRANCE
ENTRANCE
impression
FLOOR PLANS

-1

existing basement
FLOOR PLANS

existing basement

safety
ENTRANCE HALL

impression
FLOOR PLANS

existing basement
FLOOR PLANS

existing basement

auditoria

safety
FLOOR PLANS

-1

existing basement

UNHQ

library

safety

auditoria
FLOOR PLANS
PATIO

impression
ATRIUM

impression
FLOOR PLANS

ground floor

offices
workshop & meeting
FLOOR PLANS

office lay-out
FLOOR PLANS

office lay-out

- Circulation zone
FLOOR PLANS

office lay-out

• Circulation zone
• Transition zone
FLOOR PLANS

office lay-out

- Circulation zone
- Transition zone
- Private zone: workplaces
OFFICES

impression
FLOOR PLANS

+2
FLOOR PLANS

+2
FLOOR PLANS

+2
OFFICE PLANS

+2

- Lounge
- Restaurant
- Press
- Offices
- Facilities

UNECD: the assignment
urban masterplan
building design: spatial lay-out
summary
FLOOR PLANS

+2
LOBBY

impression
FLOOR PLANS

+2
FLOOR PLANS

+2
COUNCIL CHAMBER

impression
STRUCTURE
STRUCTURE

Constructing the canopy

• Large cantilever, two sides
• Steel structure
STRUCTURE
Spatial arrangement
STRUCTURE

Spatial arrangement
STRUCTURE

Spatial arrangement
STRUCTURE

Spatial arrangement
STRUCTURE

Spatial arrangement
STRUCTURE
Spatial arrangement
STRUCTURE

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STRUCTURE
Spatial arrangement
STRUCTURE

in 3D
CONSTRUCTION

Column
INSTALLATIONS

energy & climate
ENERGY

Solar

- **PV panels on roof**
  (ca 6000m², 1100 MWh)

- **Collectors on plaza**
  (300m², enough for tapwater and concrete core activation)

Calculations based on graduation project L.E. Welling
INSTALLATIONS

mechanical and natural ventilation

• Offices: natural ventilation
  • evenly use

• Auditoria and Council Chamber: mechanical ventilation
  • all-air system, peak loads
INSTALLATIONS

mechanical and natural ventilation

grey water distribution and filtering
INSTALLATIONS

mechanical ventilation and columns
INSTALLATIONS

mechanical ventilation and columns

- Columns as air transporters
- Heat exchangers
- Short-cut between -1 and +2 floors
INSTALLATIONS
thermal labyrinth
INSTALLATIONS

thermal labyrinth

- Demolition rubble as thermal mass
- Constant air temperature
INSTALLATIONS

thermal labyrinth

- Demolition rubble as thermal mass
- Constant air temperature
INSTALLATIONS
thermal labyrinth

• Demolition rubble as thermal mass
• Constant air temperature
INSTALLATIONS

offices: natural ventilation
INSTALLATIONS

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offices: natural ventilation
INSTALLATIONS

offices: natural ventilation

- winter situation
INSTALLATIONS

offices: natural ventilation

• summer situation
INSTALLATIONS

offices: natural ventilation

Concrete core activation
INSTALLATIONS

offices: natural ventilation

Concrete core activation

Slimline floor system
INSTALLATIONS

offices: natural ventilation

Concrete core activation

Slimline floor system

Lignatur timber floor system
INSTALLATIONS

flooring systems

• lightweight & sustainable
FACADES
Expression, materialisation and detail
FACADES

elevations

- two types of facades
FACADES

elevations

• two types of facades

• lobby facade: horizontal
FACADES

elevations

• two types of facades

  • lobby facade: horizontal

  • office facade: vertical
FACADES

north-east facade

- structural glazing facade: lightness in office interior
FACADES

north-east facade

• structural glazing facade: lightness in office interior

• north-east: shading morning sun
FACADES

north-east facade

• structural glazing facade: lightness in office interior

• north-east: shading morning sun

• shutters: verticality
FACADES

north-east facade

• structural glazing facade: lightness in office interior
• north-east: shading morning sun
• shutters: verticality
FACADES

north-east facade

• structural glazing facade: lightness in office interior

• north-east: shading morning sun

• shutters: verticality
FACADES

north-east facade

• glass

• aluminium shutters
FACADES

north-east facade
FACADES

south and east facade

- Continuity and unity
FACADES

south and east facade
FACADES

south and east facade

- south facing: insolation
FACADES

south and east facade

- south facing: insolation
- shading by shape
- horizontality
FACADES

south and east facade

• south facing: insolation
• shading by shape
• horizontality
FACADES

south facade: materials

- white concrete
FACADES

south facade: materials

- white concrete

• ceiling & plaza paving:

CO2 absorbing concrete
FACADE
Fragment
FACADE
Fragment
FACADE

Fragment
FACADE

Fragment
FACADE
Fragment
FACADE

Fragment
FACADE
Fragment
FACADES

south facade interior
SUMMARY

UNEC building design
SUMMARY

UNEC building design

urban context

• one plot composition
• respecting the existing ensemble
• plaza as UN focal point
SUMMARY

UNEC building design

**urban context**

- one plot composition
- respecting the existing ensemble
- plaza as UN focal point

**spatial arrangement**

- served & serving functions
- building parts connected by light shafts
SUMMARY

UNEC building design

**urban context**

- one plot composition
- respecting the existing ensemble
- plaza as UN focal point

**sustainability awareness**

- special exposition space

**spatial arrangement**

- served & serving functions
- building parts connected by light shafts
SUMMARY
UNECE building design

**urban context**
- one plot composition
- respecting the existing ensemble
- plaza as UN focal point

**spatial arrangement**
- served & serving functions
- building parts connected by light shafts

**sustainability**

**sustainability awareness**
- special exposition space

**sustainability**
- water retention
- smart climate control
- solar energy
- reuse: thermal labyrinth
SUMMARY

UNEC building design
Thank you