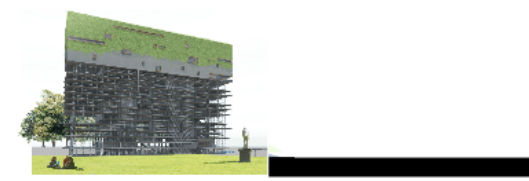
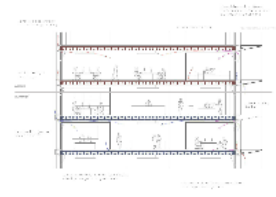
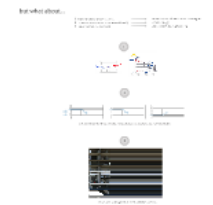
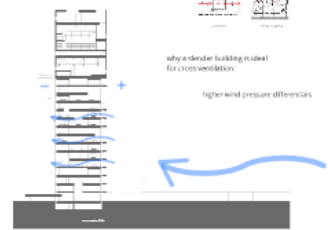
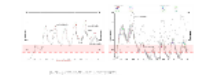


**why?**  
 sustainability with being  
 and?  
 and?





a SADD graduation project by

C. Rovers 02/02/11

Tutors:

R. Bollen (A)

J. van de Voort (A)

E. Gramsbergen (Board of Committee)

P. van den Engel (BT)

F. Schnater (BT)

# UNHQ OF SUSTAINABILITY





## *today's menu*

introduction

1 design project

2 ambitions

design

3 urban context

4 architecture

5 sustainability: natural ventilation

# introduction



**COP17/CMP7**

**UNITED NATIONS**

CLIMATE CHANGE CONFERENCE 2011

**DURBAN, SOUTH AFRICA**

# introduction



“Climate summit was a pathetic exercise in deceit”

- T. Homer-Dixon, The Globe

“Durban deal may do little to cool heating planet”

- J. Herskowitz, Reuters

“Climate deal marks ‘lowest common denominator’ ”

- G. York, The Globe



other priorities

sacrifice?

common interest

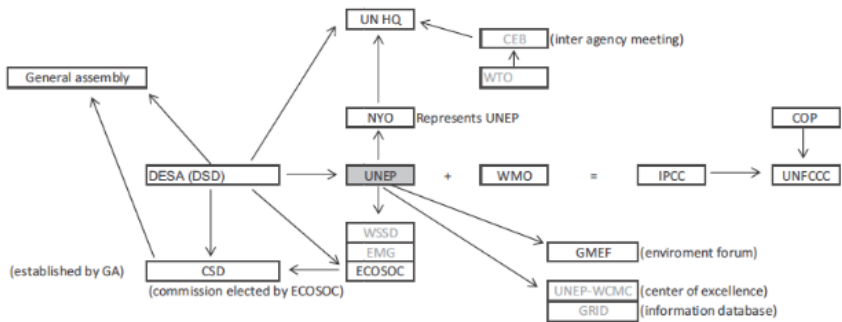
justice







## who's in control?



environmental program







united nations [ headquarters of sustainability ]

duality of architectural representation

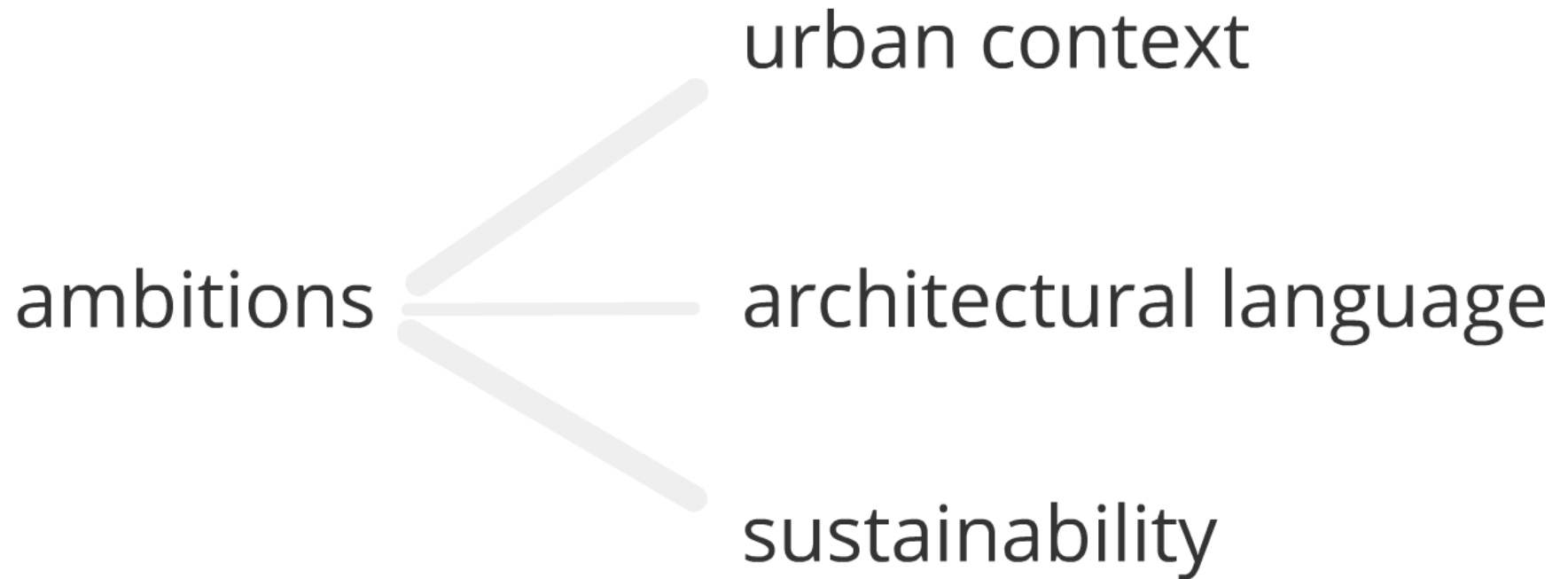
| Overview      | Offices per department |       |
|---------------|------------------------|-------|
| Entrance area | 830 m <sup>2</sup>     | 5,6%  |
| Collect       | 1835 m <sup>2</sup>    | 12,3% |
| Produce       | 1224 m <sup>2</sup>    | 8,2%  |

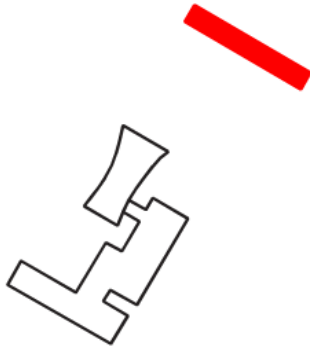


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| Propagate       | 3136 m2                | 21,0%       |
| Exchange        | 3337 m2                | 22,4%       |
| General Offices | 2662 m2                | 17,8%       |
| Facilities      | 1895 m2                | 12,7%       |
| <b>Total</b>    | <b>14919 m2</b>        | <b>100%</b> |

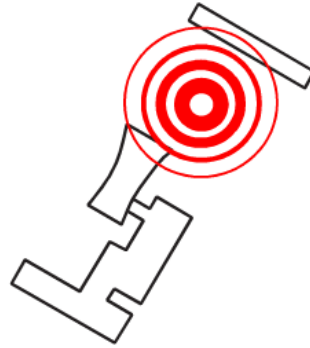


small building for Manhattan,  
giant impact for mankind

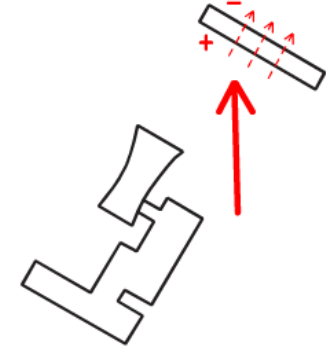




low density +  
horizontal orientation



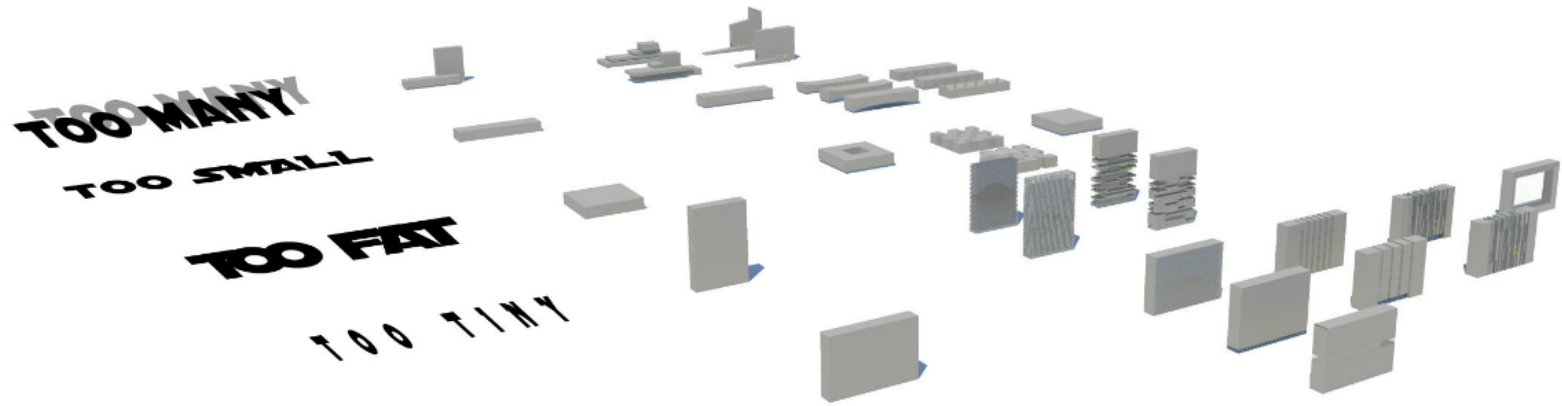
UN plaza & park  
as bonding element



east-west orientation  
ideal for cross-ventilation

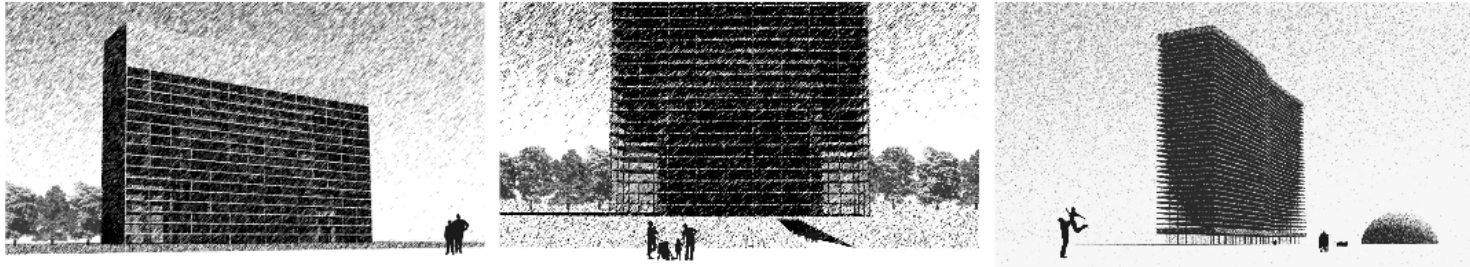
cherish the scarce green space on Manhattan  
and make it a central place

- urban context

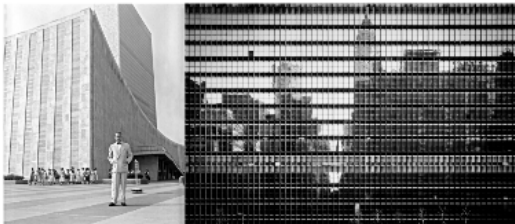


carry out the core values of the United Nations:  
unity, independence, decisiveness

- architectural language



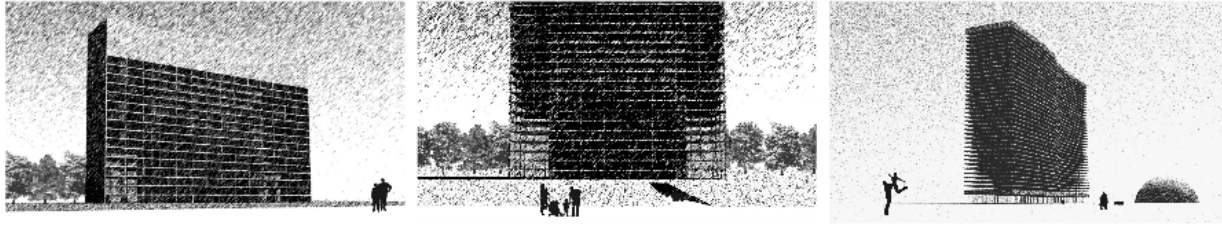
+ transparency



in a physical



and organizational sense



+ transparency



in a physical

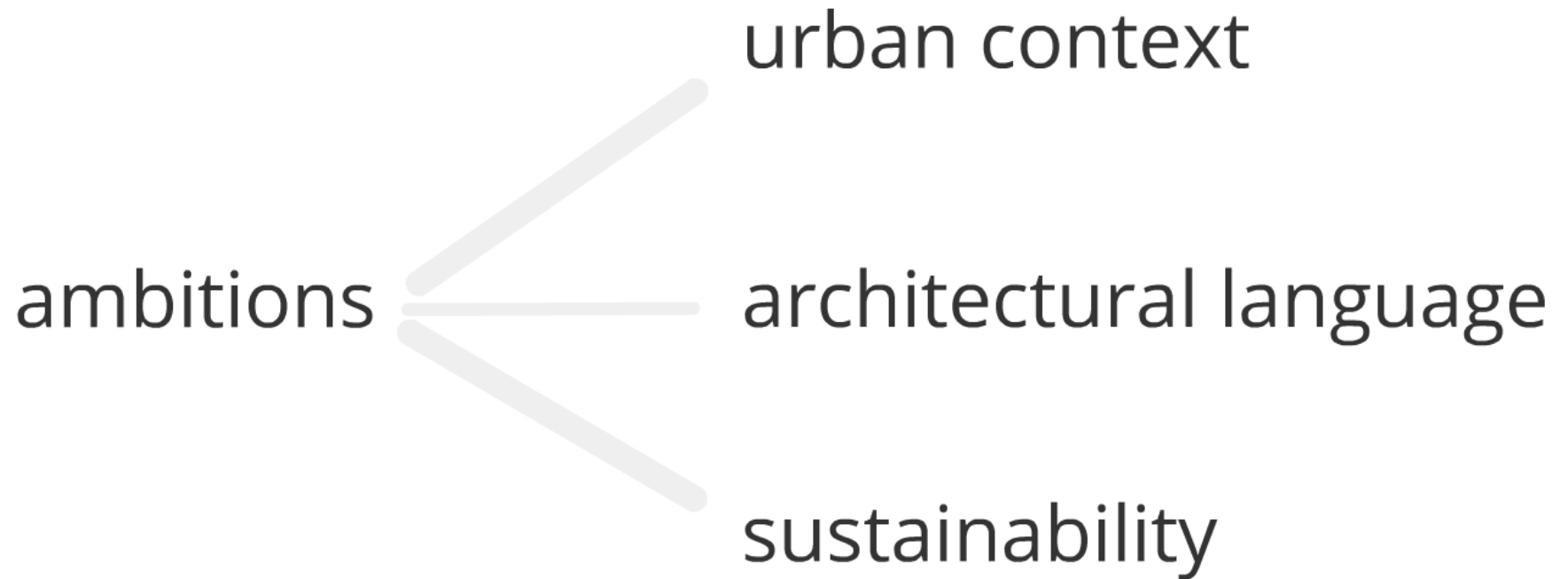


and organizational sense

+ convey its sustainable spirit

(duality of design task)

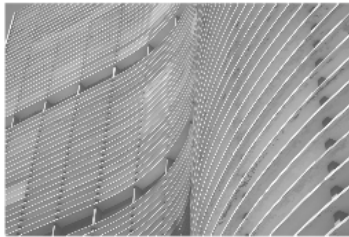




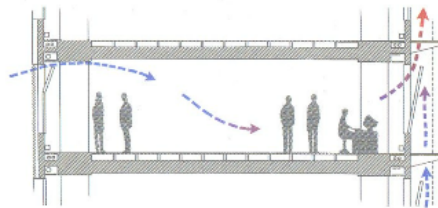
# timeless sustainable principles over state-of-the art technology

- sustainability

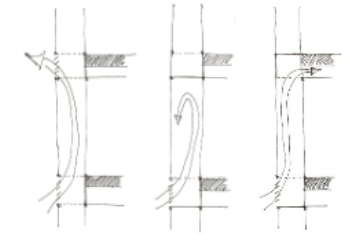
"its a United Nations headquarters, not a showmodel..."



brises-soleils to block  
the summer sun



natural ventilation to save energy  
& improve work environment



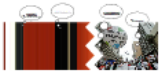
flexible systems to adapt to  
changing demands





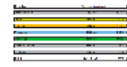
- today's menu
- introduction:
  - 1 design project
  - 2 ambitions
  - design:
  - 3 urban context
  - 4 architecture
  - 5 sustainability: natural ventilation

introduction



united nations headquarters of sustainability

clarity of architectural representation



small building for the metan, gets impact for world of



think the way about space of Metan and what is a context place

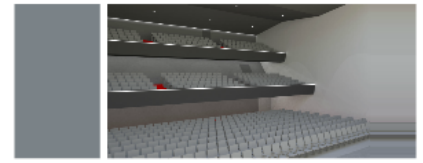
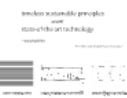


copy out the core value of the United Nations and what is a context place

transparency



convey its sustainable quest



## *today's menu*

introduction

1 design project

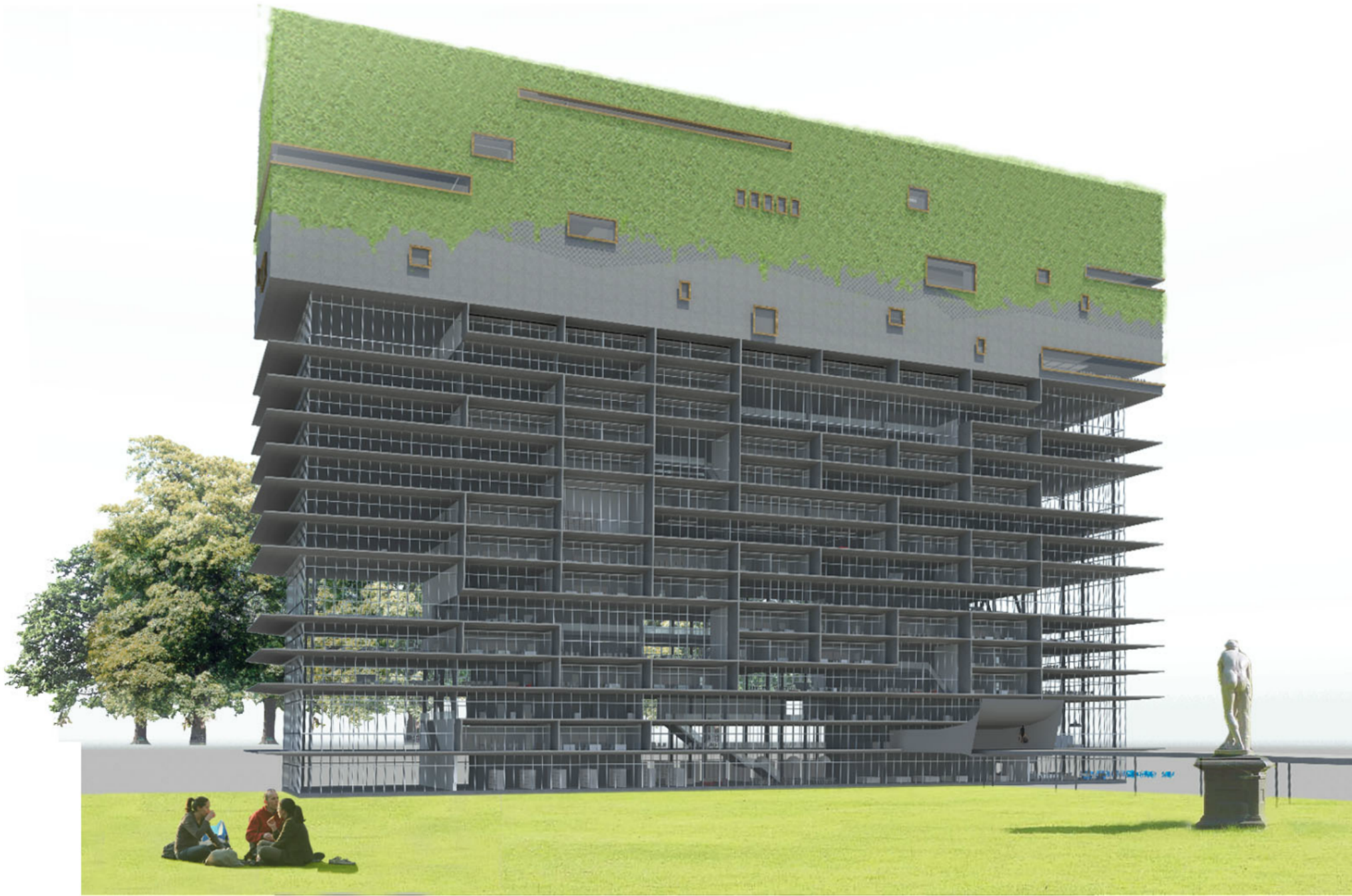
2 ambitions

design

3 urban context

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5 sustainability: natural ventilation







situation







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programme organized by activities



programme organized by spaces and user groups

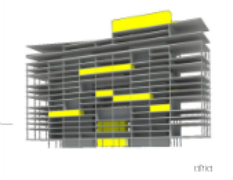
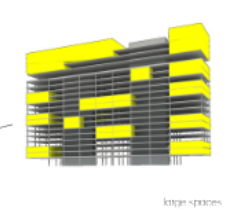
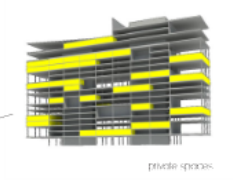
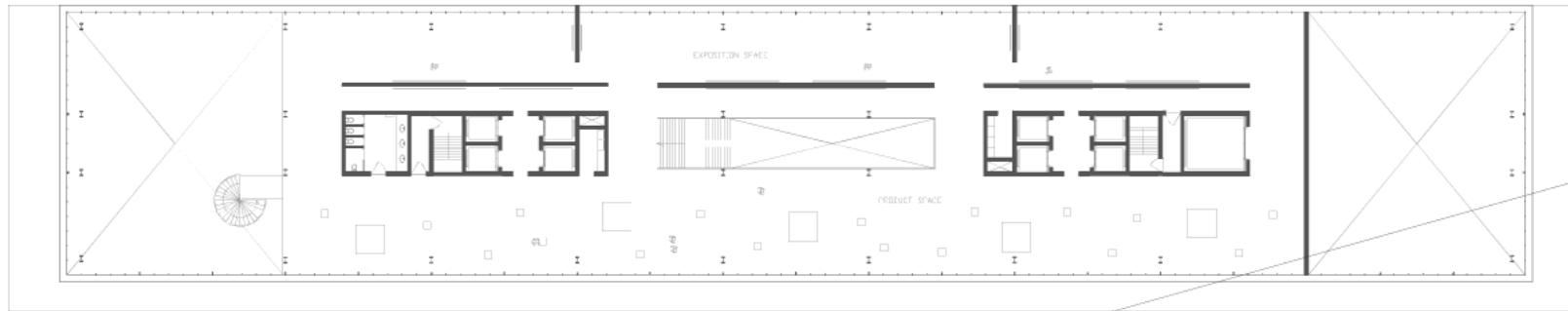




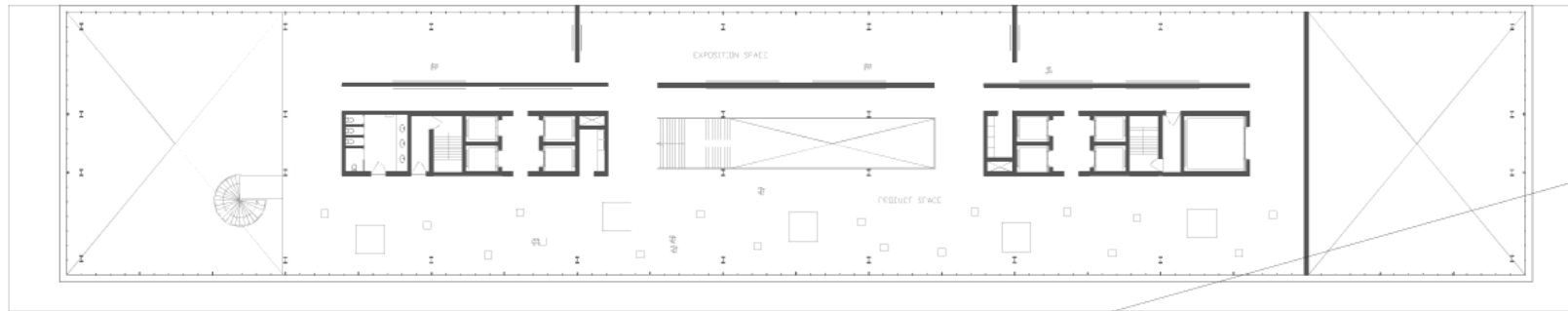




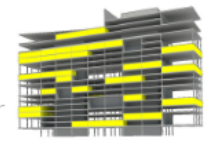
the idea behind the transparent section is...  
rendering internal processes visible  
rigid from without  
dynamic from within  
neutral materialization







SECOND FLOOR



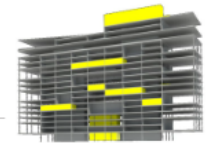
private spaces



FIRST FLOOR



large spaces



first





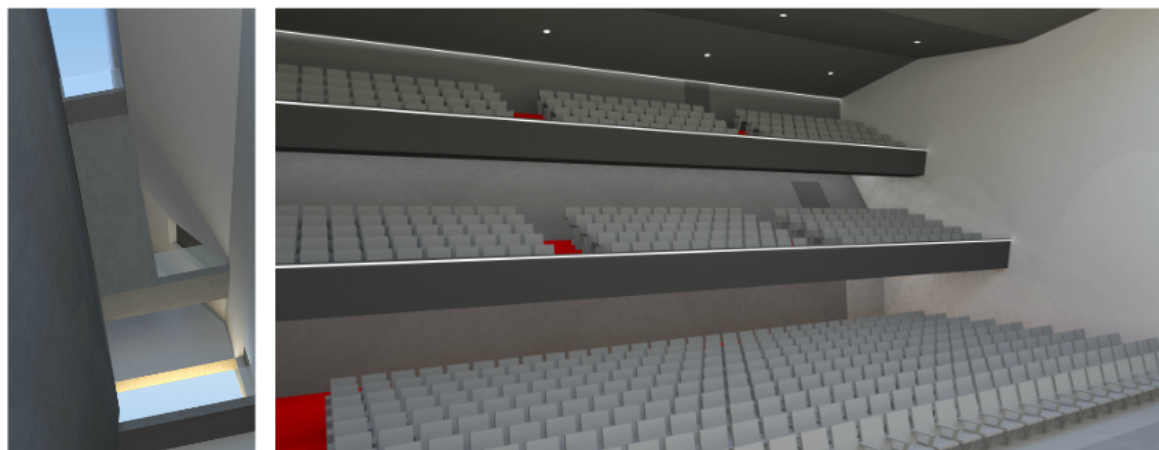


programme organized by spaces and user groups

each space demands its own interior  
walkways equally important as conference  
spaces

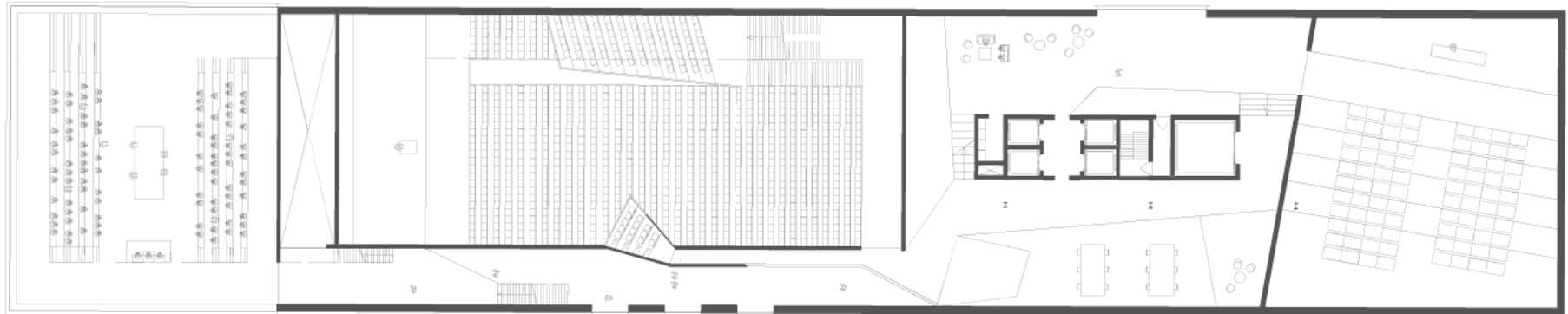




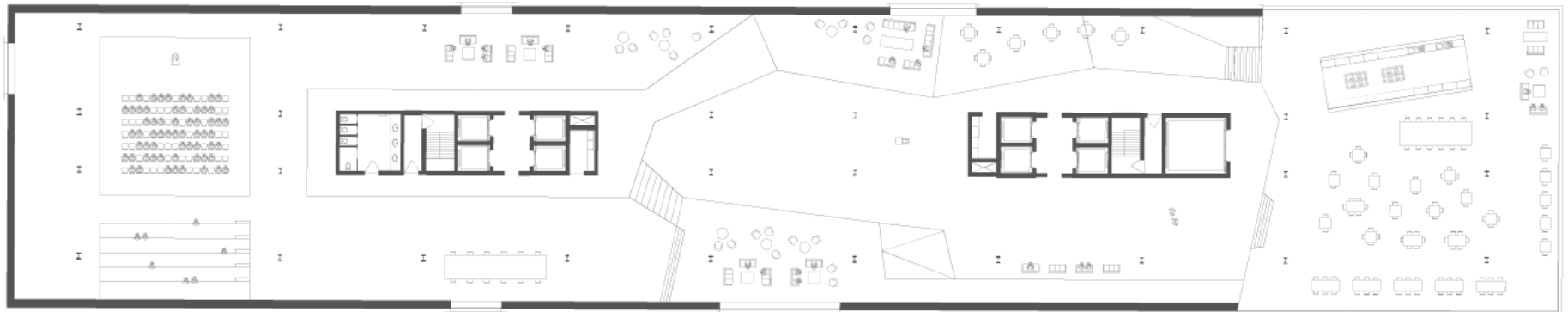


the idea behind the conference centre is...  
sculpting space with space  
each space demands its own interior  
walkways equally important as conference  
spaces

room for debate,  
a place to propagate



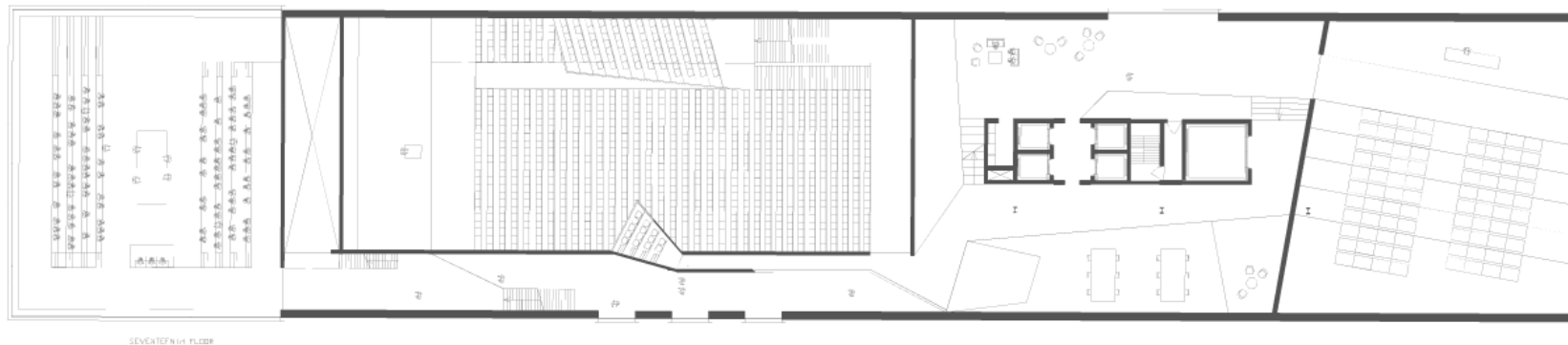
SEVENTEENTH FLOOR



FIFTEENTH FLOOR

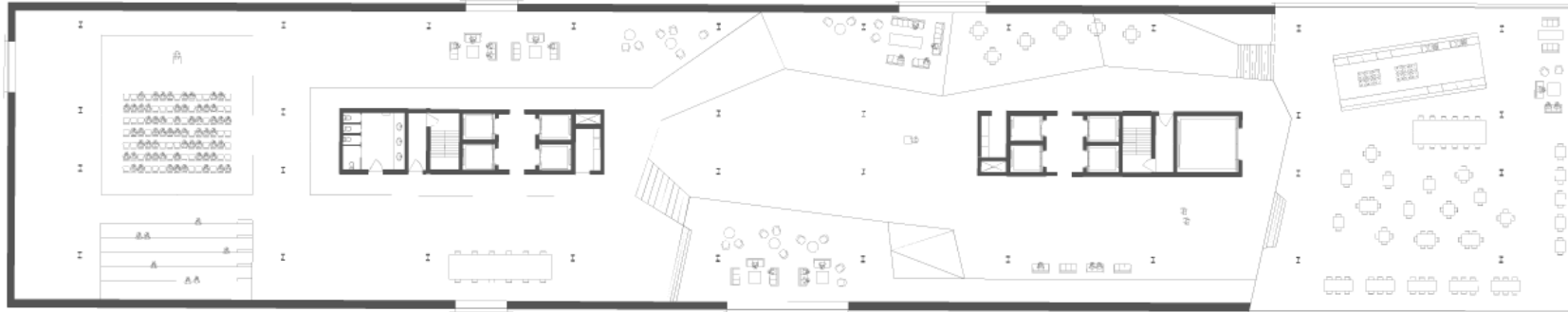
lobby as transfer node

room for debate,  
a place to propagate





9 VENTEDICH FL.008



FF-L010 / FL.008

lobby as transfer node  
for all visitors



design criteria:  
 conference centre at top for longer spans  
 two service cores for wet rooms, access and escape  
 to/from all floors  
 even floor heights over entire length  
 use of floor for concrete core activation  
 lightweight floors  
 for a slimmer construction  
 for more transparency

construction

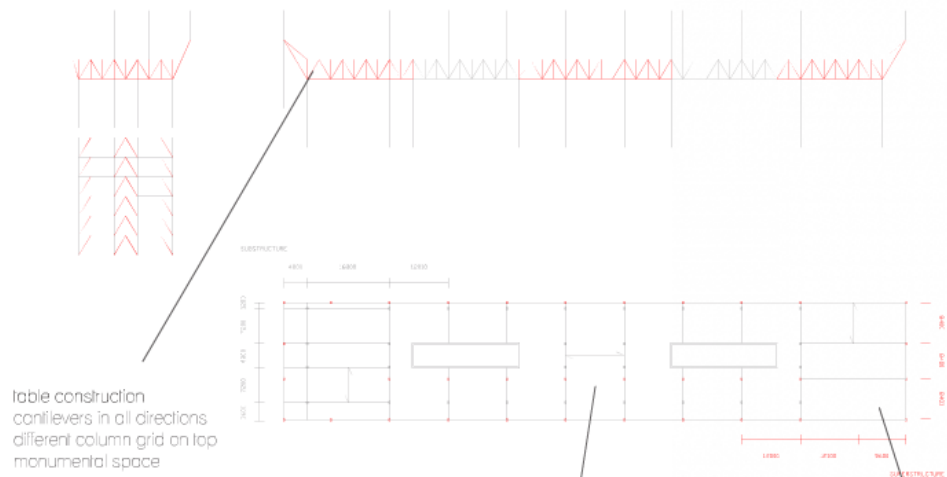
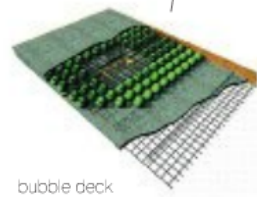


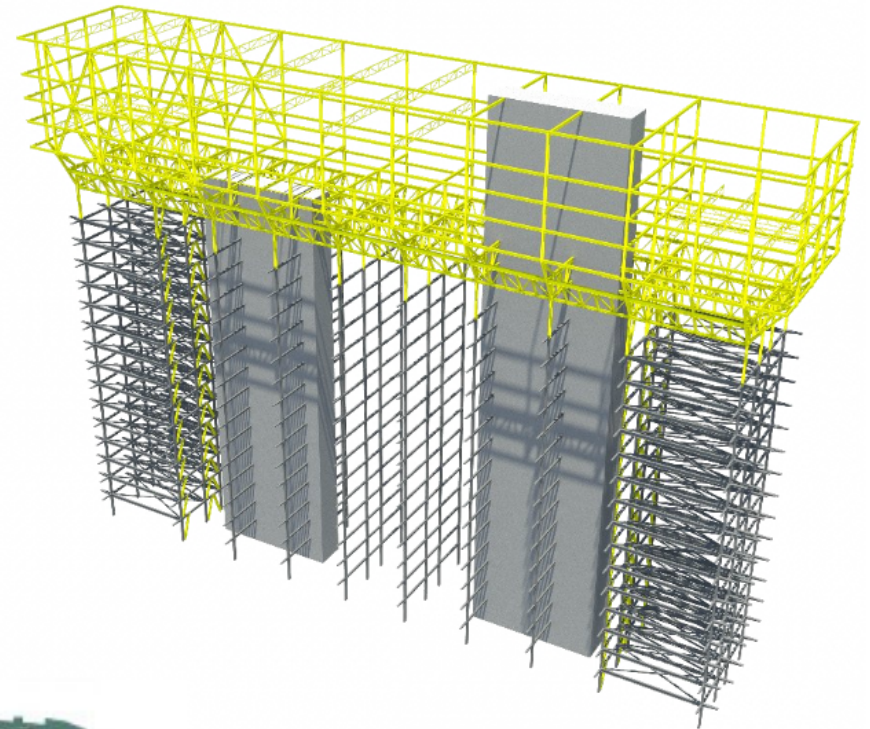
table construction  
 cantilevers in all directions  
 different column grid on top  
 monumental space



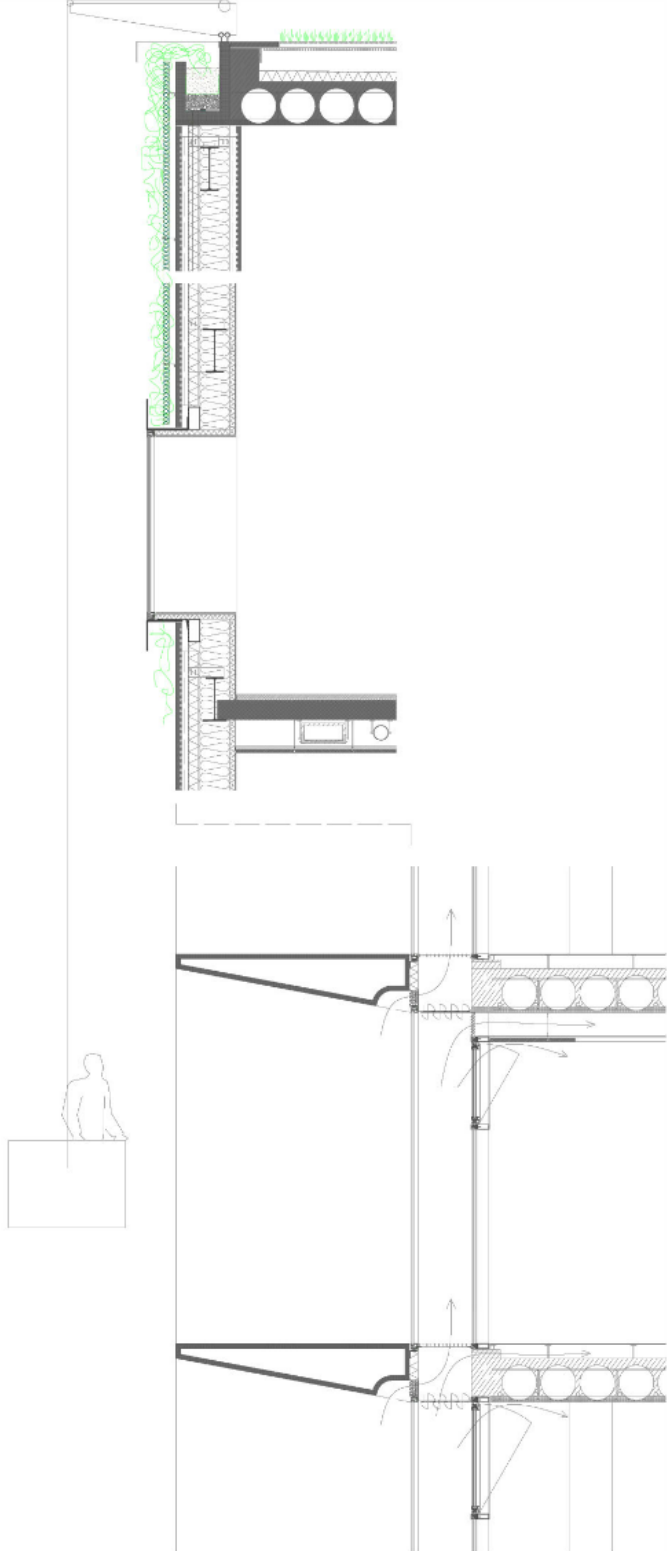
bubble deck  
 lightweight  
 large spans  
 integrated installations  
 easy cantilevers  
 concrete core activation



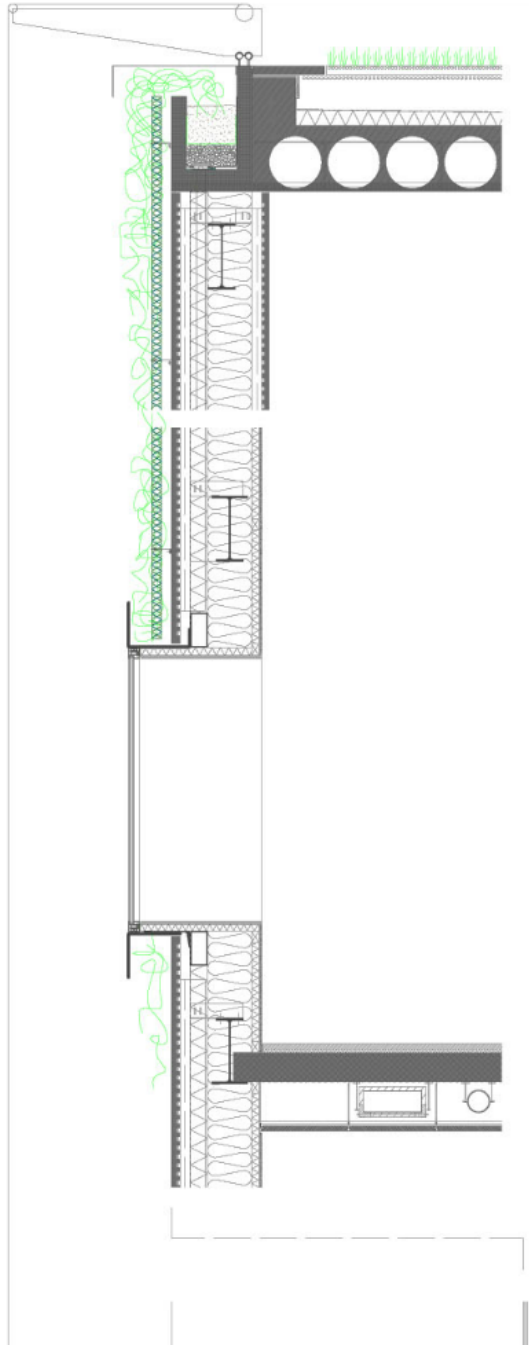
slimline floors  
 lightweight  
 integrated beams & installations  
 slim  
 concrete core activation

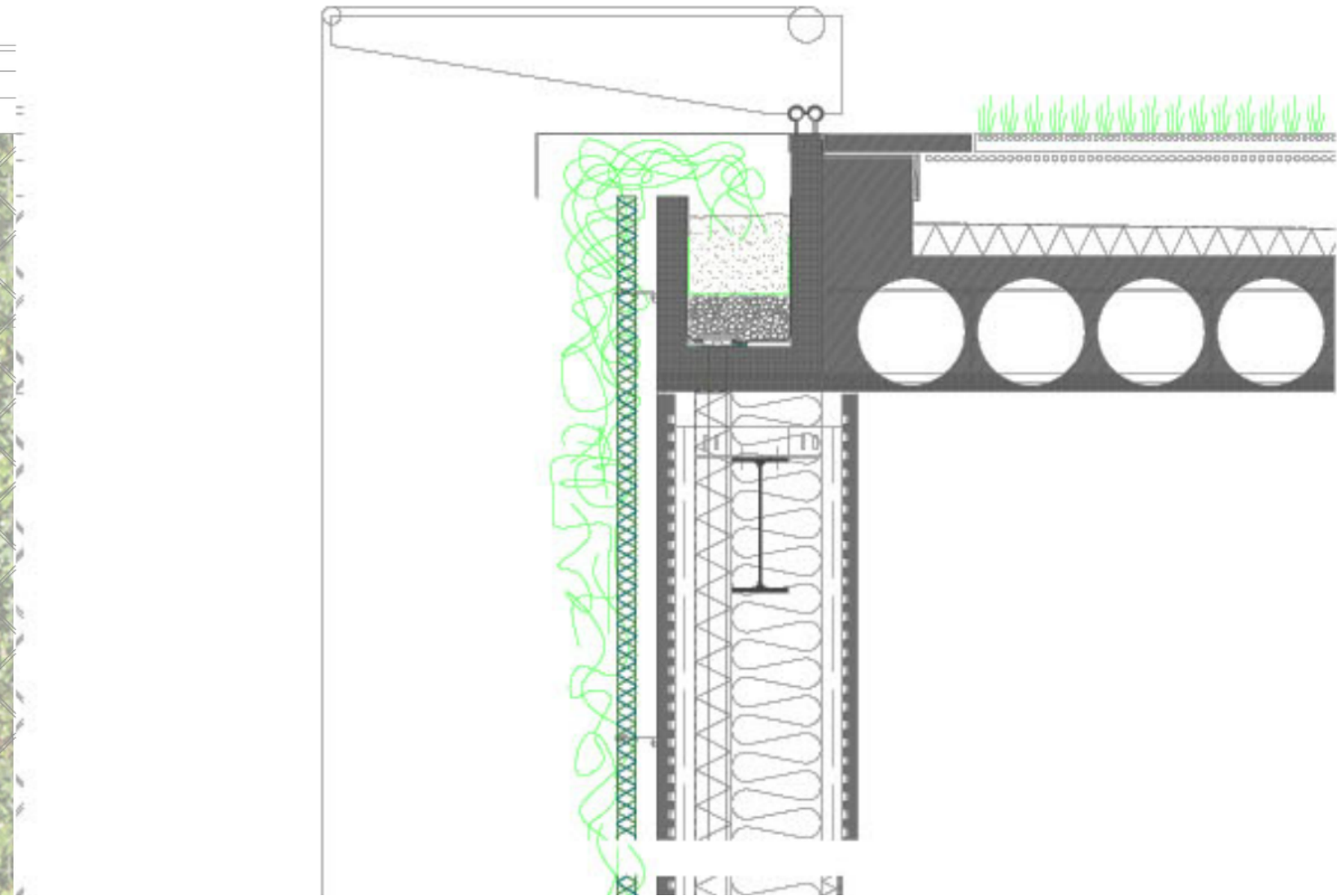


furthermore:  
 prebent steel beams at end bays  
 eccentrically braced frames for cross-stability

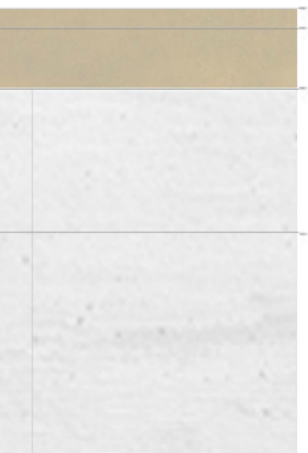












for more details see  
natural ventilation

natural ventilation

why?

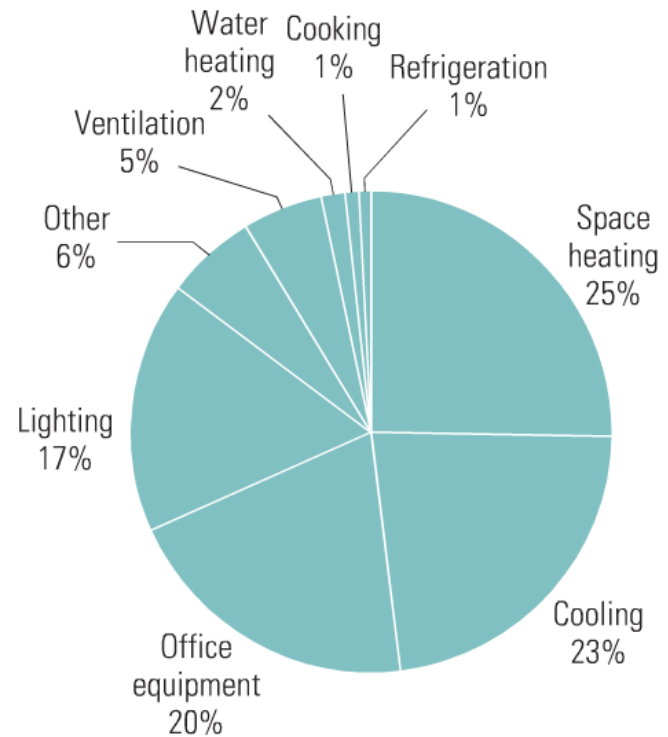
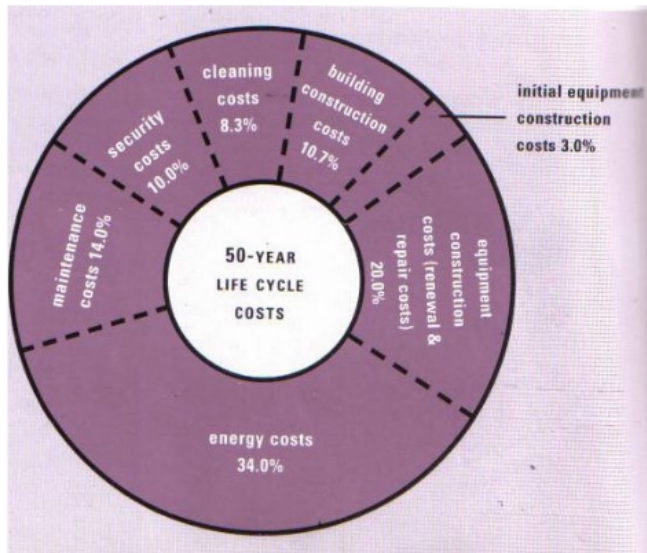
sustainability starts with finding  
the right match. the design is  
ideal for cross-ventilation

and?

because it's free

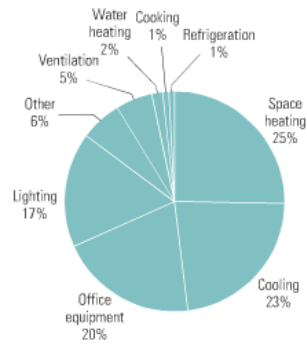
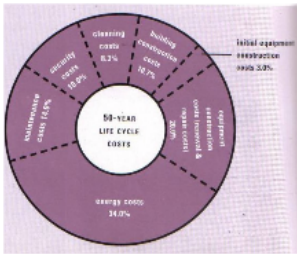
it saves energy

people feel better in naturally ventilated offices



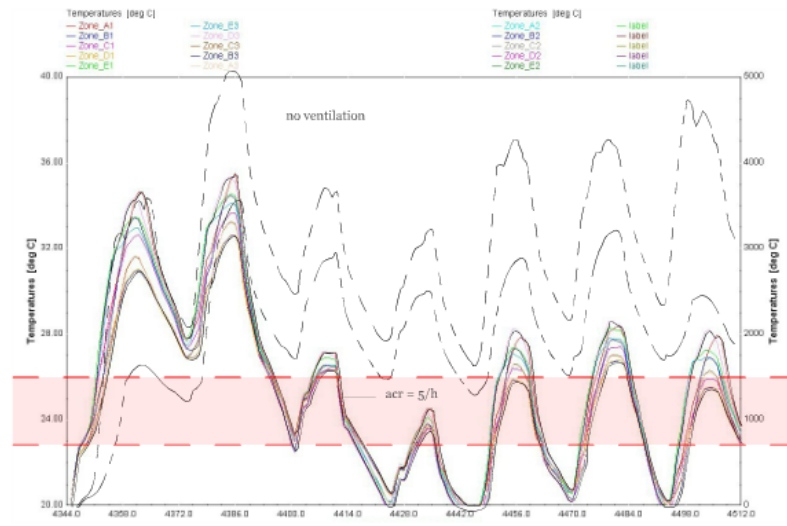
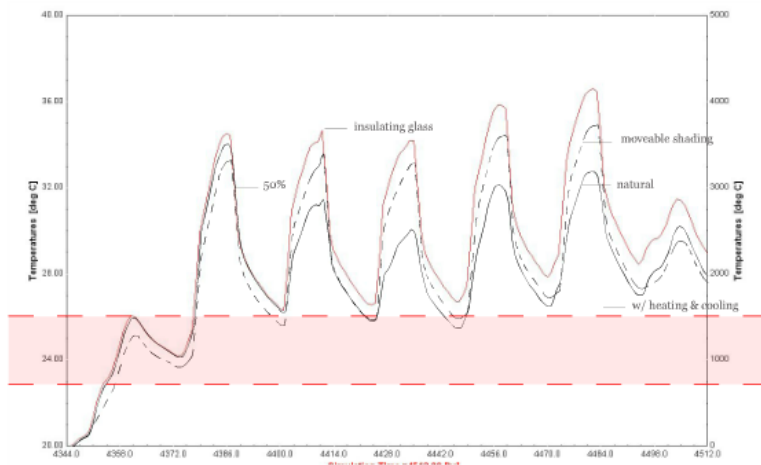
Energy represents about 19 percent of total expenditures for the typical office building. In a typical office building, lighting, heating, and cooling represent about 65 percent of total energy use, making those systems the best targets for energy savings.





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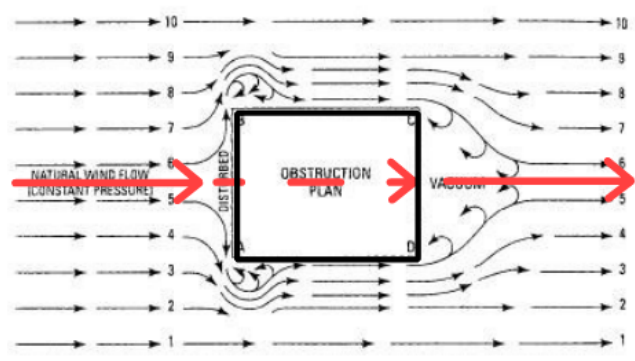
my hypothesis is natural ventilation not only saves energy on ventilation but also on heating, cooling and airconditioning



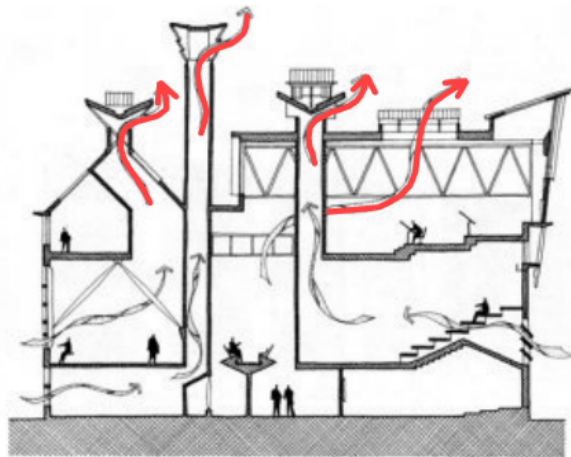
test results show that ventilation is not only a good "insulator" but also reduces temperature fluctuations



how does it work?

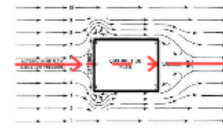


wind forces

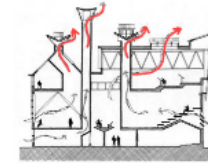


thermal buoyancy

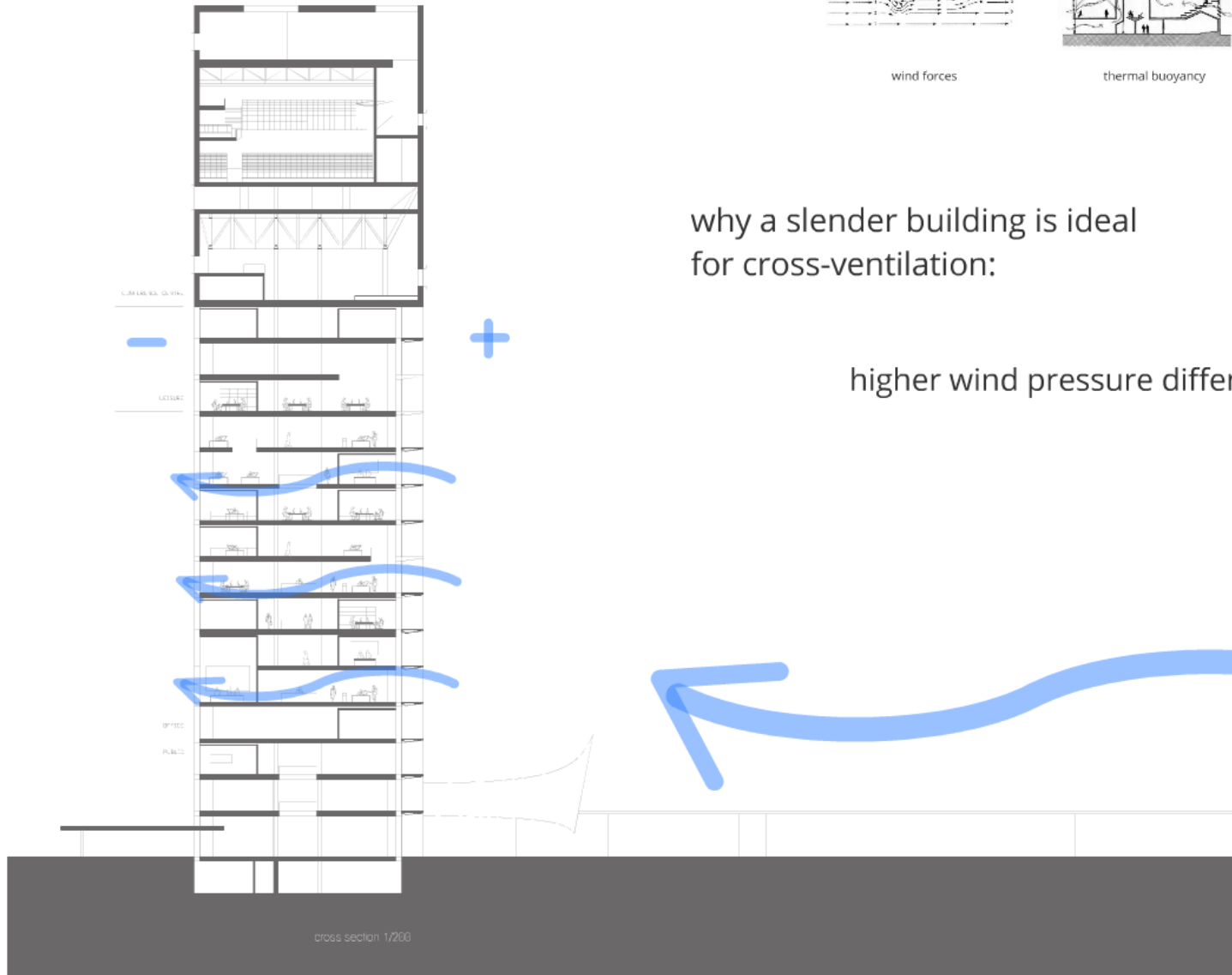
how does it work?



wind forces



thermal buoyancy



why a slender building is ideal for cross-ventilation:

higher wind pressure differentials

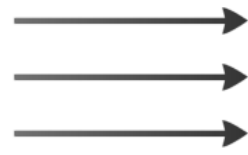
cross section 1/200

# but what about...

- 1 flexible weather conditions
- 2 internal obstructions (private offices)
- 3 peak demands (corners)

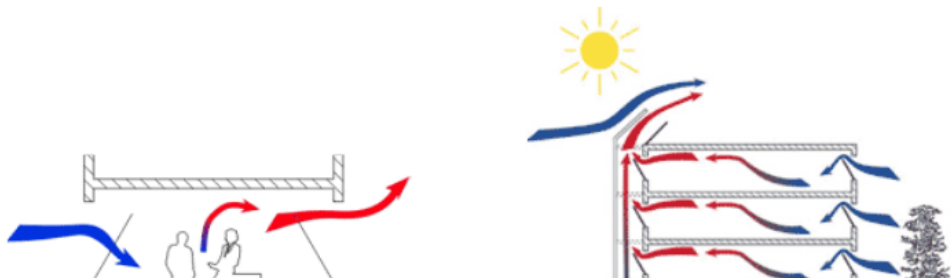


- 1 flexible weather conditions
- 2 internal obstructions (private offices)
- 3 peak demands (corners)

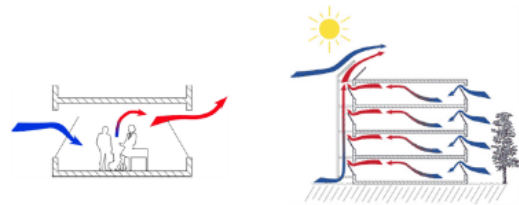


combination of ventilation strategies  
smart design  
avoid overheating/-cooling

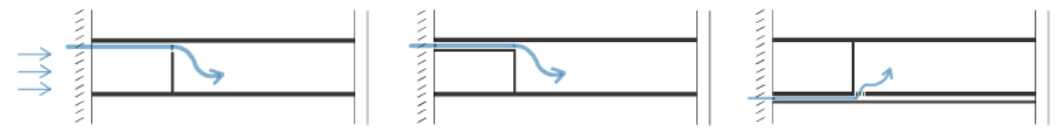
1



1

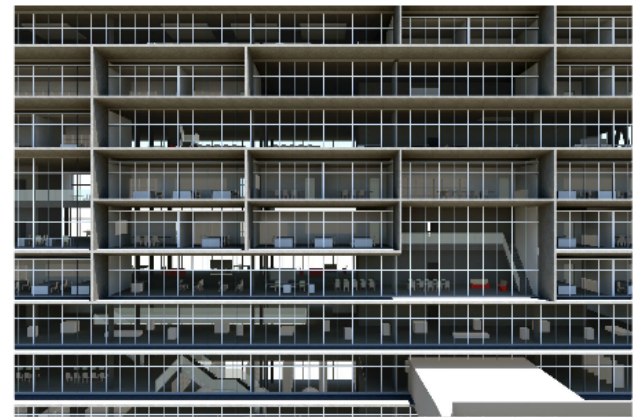


2



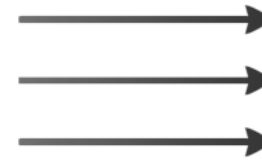
*Only overceiling and underfloor ventilation are good solutions to avoid obstruction of enclosed offices*

3



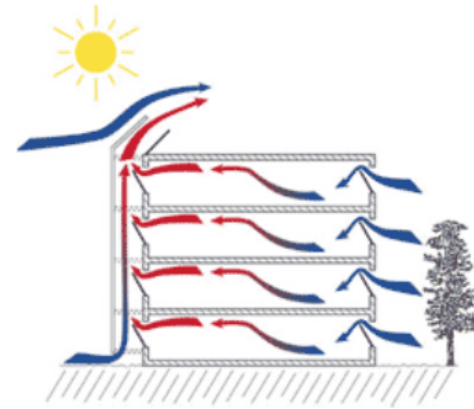
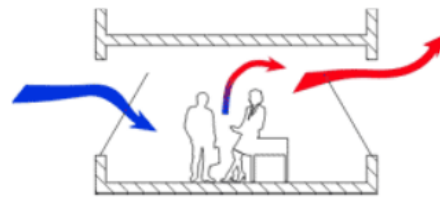
brise-soleils designed to keep summer sun out

- 1 flexible weather conditions
- 2 internal obstructions (private offices)
- 3 peak demands (corners)



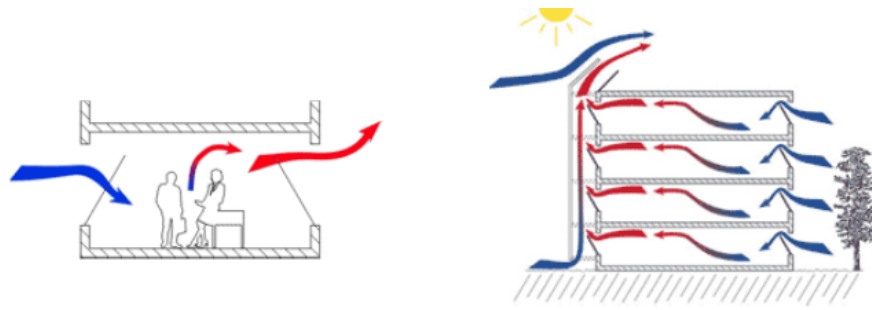
combination of v  
smart design  
avoid overheating

1

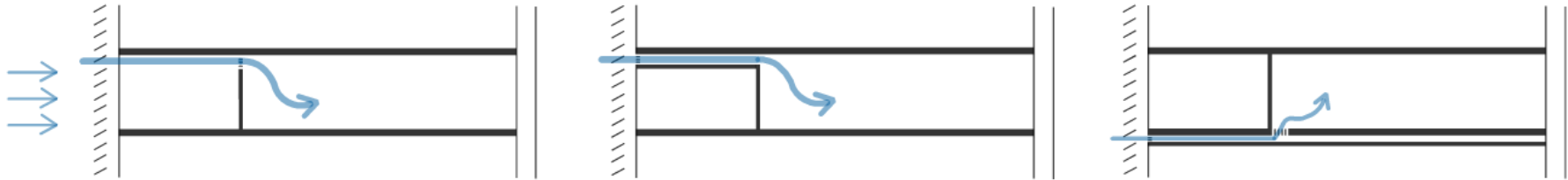


2





2



*Only overceiling and underfloor ventilation are good solutions to avoid obstruction of enclosed offices*

3



*Only overceiling and underfloor ventilation are good solutions to avoid obstruction of enclosed offices*

3



brise-soleils designed to keep summer sun out



brise-soleil on south, east & west facade designed to keep summer out & let winter sun warm up cavity

floor-to-ceiling glass facades save much energy on lighting

use of stack effect in cavity

heat recovery at top chimney

structural cooling of thermal mass

winter

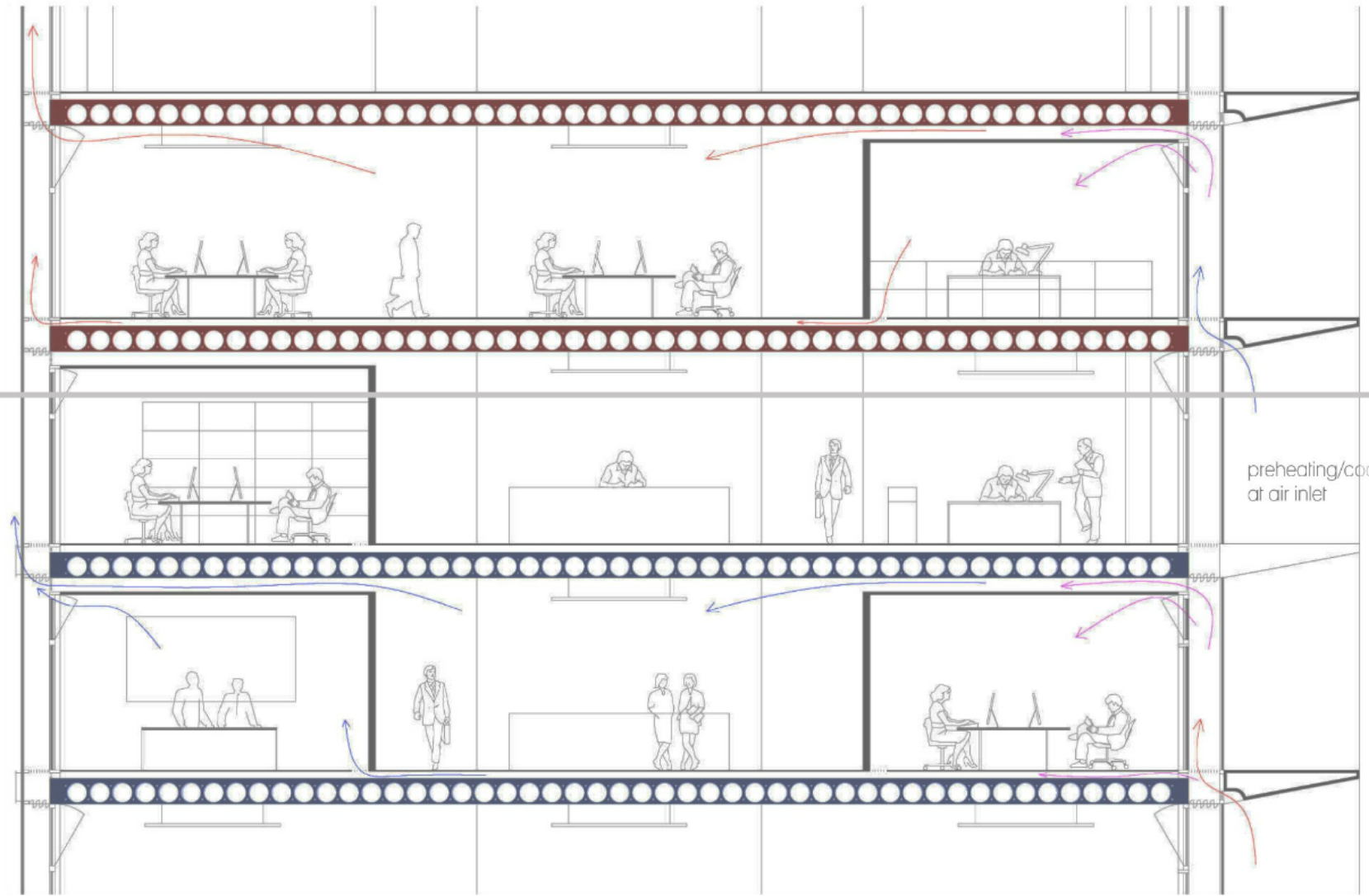
summer

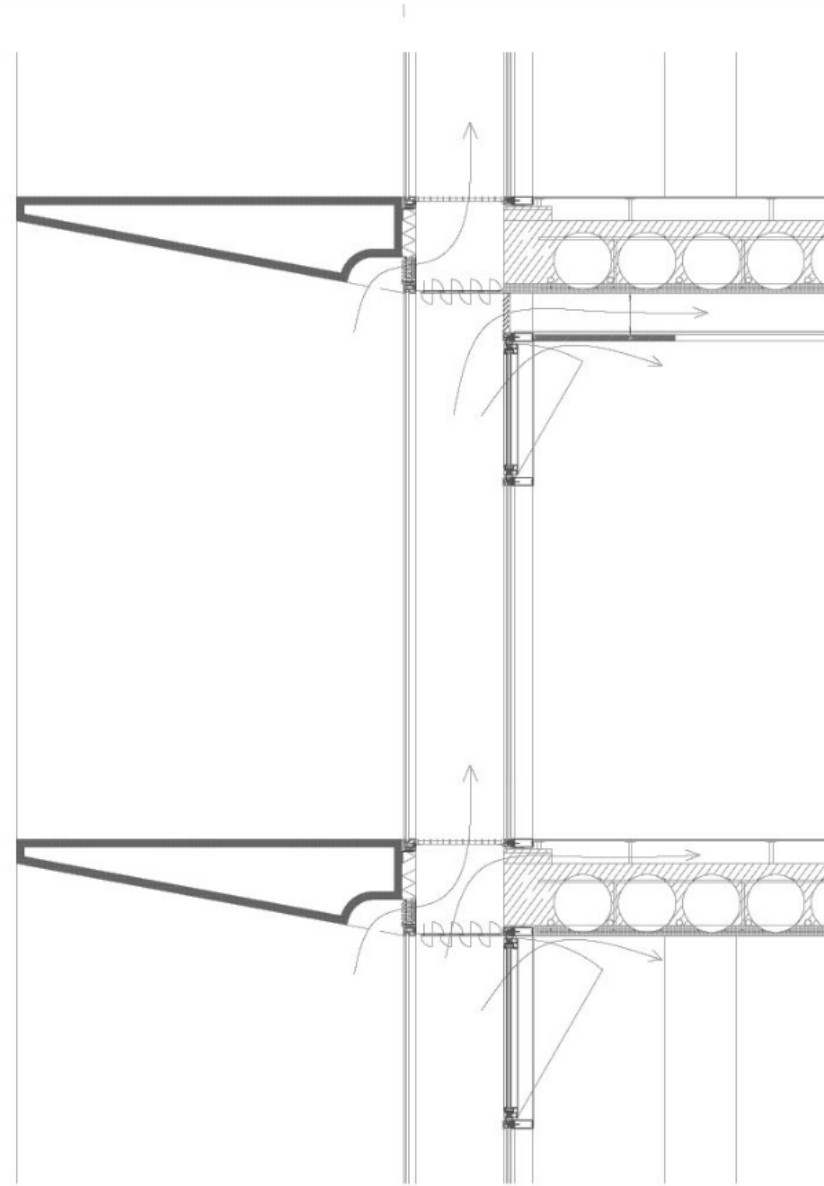
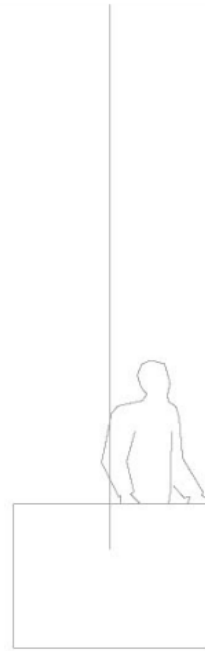
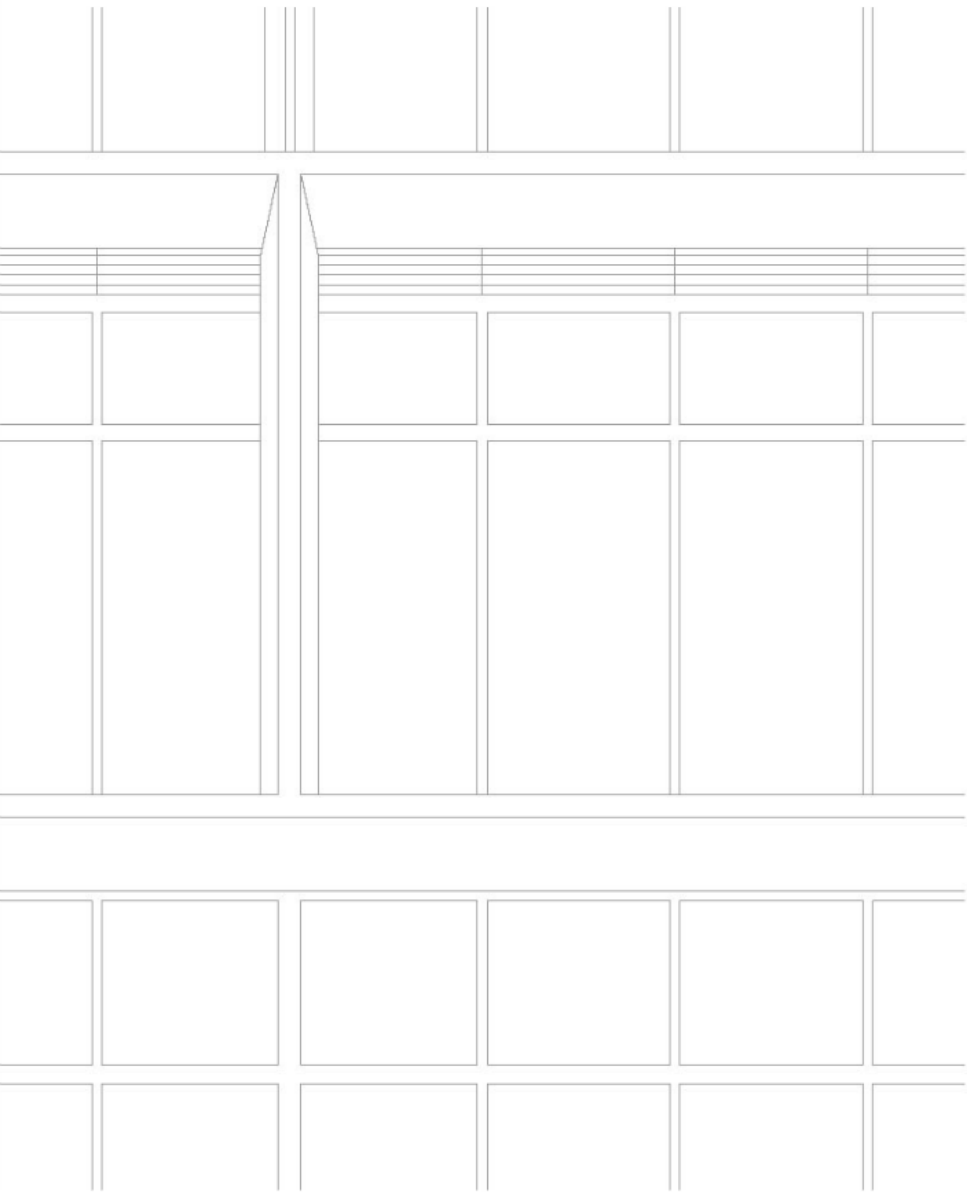
preheating/cooling at air inlet

smart ventilation (e.g. night cooling in summer)

concrete core activation for radiant heating/cooling + heating/cooling of air through convection

private offices do not obstruct natural ventilation; in fact they make a longer throw





design can now cope with:  
required air change rate  
keeping temperatures within comfortable regions (even at corners)  
no energy use in midseason  
low energy use in summer/winter (only peak demands)

