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
“Climate summit was a pathetic exercise in deceit”
- T. Homer-Dixon, The Globe

“Durban deal may do little to cool heating planet”
- J. Herskovitz, Reuters

“Climate deal marks ‘lowest common denominator’ ”
- G. York, The Globe
who's in control?

environmental program
who's in control?

environmental program
united nations  headquarters  of sustainability

duality of architectural representation
small building for Manhattan, giant impact for mankind
ambitions

- urban context
- architectural language
- sustainability
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

"It's a United Nations headquarters, not a showmodel..."
today's menu

introduction
1  design project
2  ambitions

design
3  urban context
4  architecture
5  sustainability: natural ventilation
programme organized by activities
the idea behind the transparent section is...
rendering internal processes visible
rigid from without
dynamic from within
neutral materialization
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

lobby as transfer node
room for debate, a place to propagate
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

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.
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
why a slender building is ideal for cross-ventilation:

- higher wind pressure differentials
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
Only overcelling and underfloor ventilation are good solutions to avoid obstruction of enclosed offices.

brise-soleils designed to keep summer sun out
1. flexible weather conditions
2. internal obstructions (private offices)
3. peak demands (corners)

combination of various smart design
avoid overheating
Only overceiling and underfloor ventilation are good solutions to avoid obstruction of enclosed offices.
Only overceiling and underfloor ventilation are good solutions to avoid obstruction of enclosed offices

brise-soleils designed to keep summer sun out
floor-to-ceiling glass facades
- save much energy on lighting

structural cooling of thermal mass

winter

preheating/cooling at air inlet

summer

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

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

use of stack effect in cavity

heat recovery at top chimney
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)