it’s all about innovation
Approached from a northern climate

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Design phase in simplification

Designing thermal indoor environment

- Façade
  - Window/wall ratio
  - Insulation
  - Internal/external solar shading
  - Orientation
Design phase in simplification

Designing thermal indoor environment

- Ventilation
  - Mechanical ventilation with heat recovery
  - Natural ventilation (no heat recovery)
  - Hybrid ventilation with heat recovery
Design phase in simplification

Designing thermal indoor environment

- Heat loads
  - Occupants
  - Equipment (Computer, Monitors etc.)
  - Lighting
Operation phase in simplification

Operating the thermal indoor environment

- Façade
  - Operating internal/external solar shading
- Ventilation
  - Mechanical ventilation with heat recovery
    - Difference between inlet temperature in the room and at the ventilation unit
    - People’s own adjustments of inlets
  - Natural ventilation (no heat recovery)
- Heat loads
  - Occupants
  - Equipment (Computer, Monitors etc.)
The technical solutions in simplification

- Simple technical solutions
  - Manual/operated section control (i.e. orientation based)
    - No cooling
    - Mechanical or natural ventilation
    - Manual solar shading
    - Manual radiator thermostats
The technical solutions in simplification

- Moderate technical solutions
  - Operating on a section level
    - Central cooling coil
    - Mechanical ventilation
    - Manual/operated solar shading
    - Manual/operated radiator thermostats
The technical solutions in simplification

- Advanced technical solutions
  - Operating on room level
    - Individual cooling coil
    - Mechanical ventilation
    - Operated solar shading
    - Operated radiator thermostats