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高舒适，低能耗：BE 的中国大量性住宅设计案例

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BE香港建筑设计董事，经理

1. Good building 优秀建筑
2. Flexible building 灵活性
3. Low energy 节能
4. Economy 经济

1. Good building优秀建筑

- Locality (Maximize the use of existing quality of the place)
- 因地制宜（最大可能利用基地的自然条件和资源）
- Better than the local buildings远胜于当地已有建筑
- High quality in construction and craftsmanship
- 精良的建造和工艺水平
- Beauty of the architecture (form, proportion, lighting…)
- 建筑美感（形式，比例，光线）

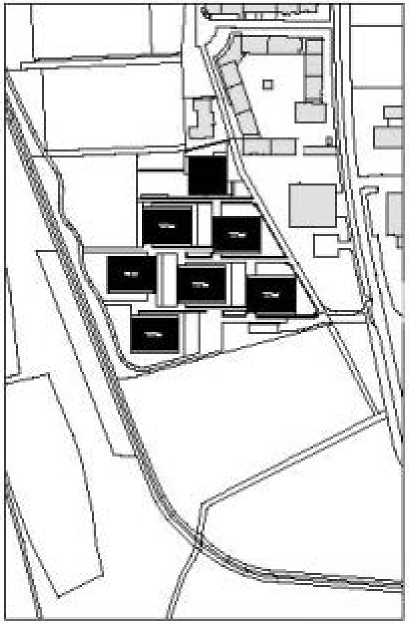
- **Public Space, Façade, Staircase /core, Structure,**
- **公共空间，外墙系统，楼梯/核心空间，结构**

2. Flexibility灵活性

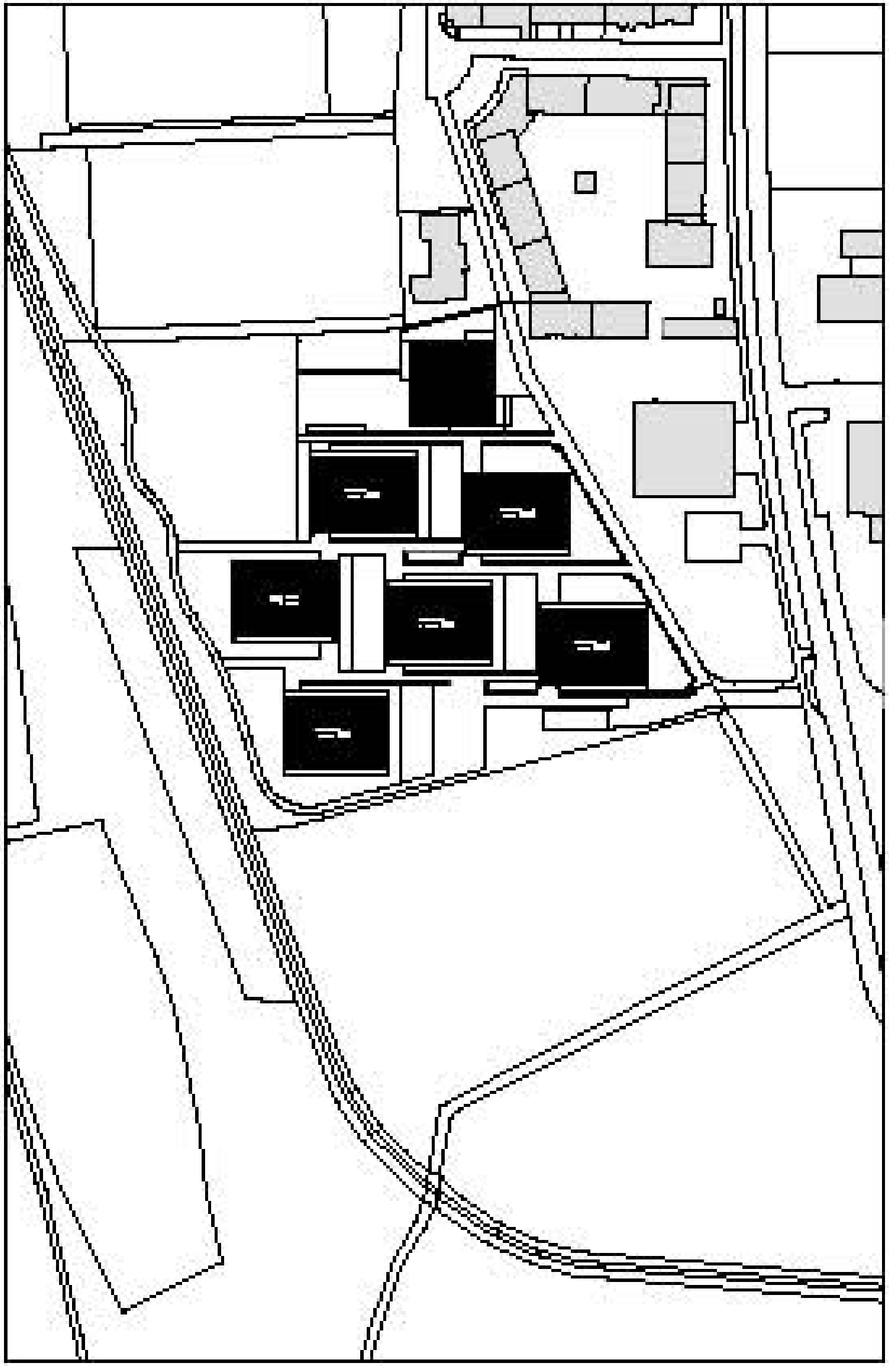
Structural Neutrality 独立结构

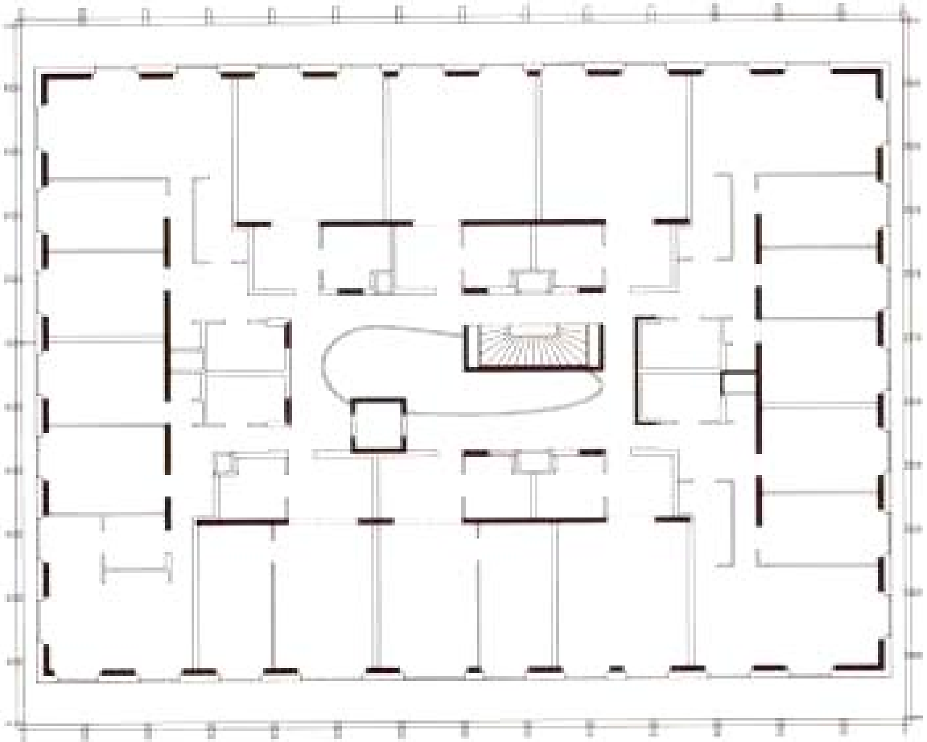
Support and Infill are separated

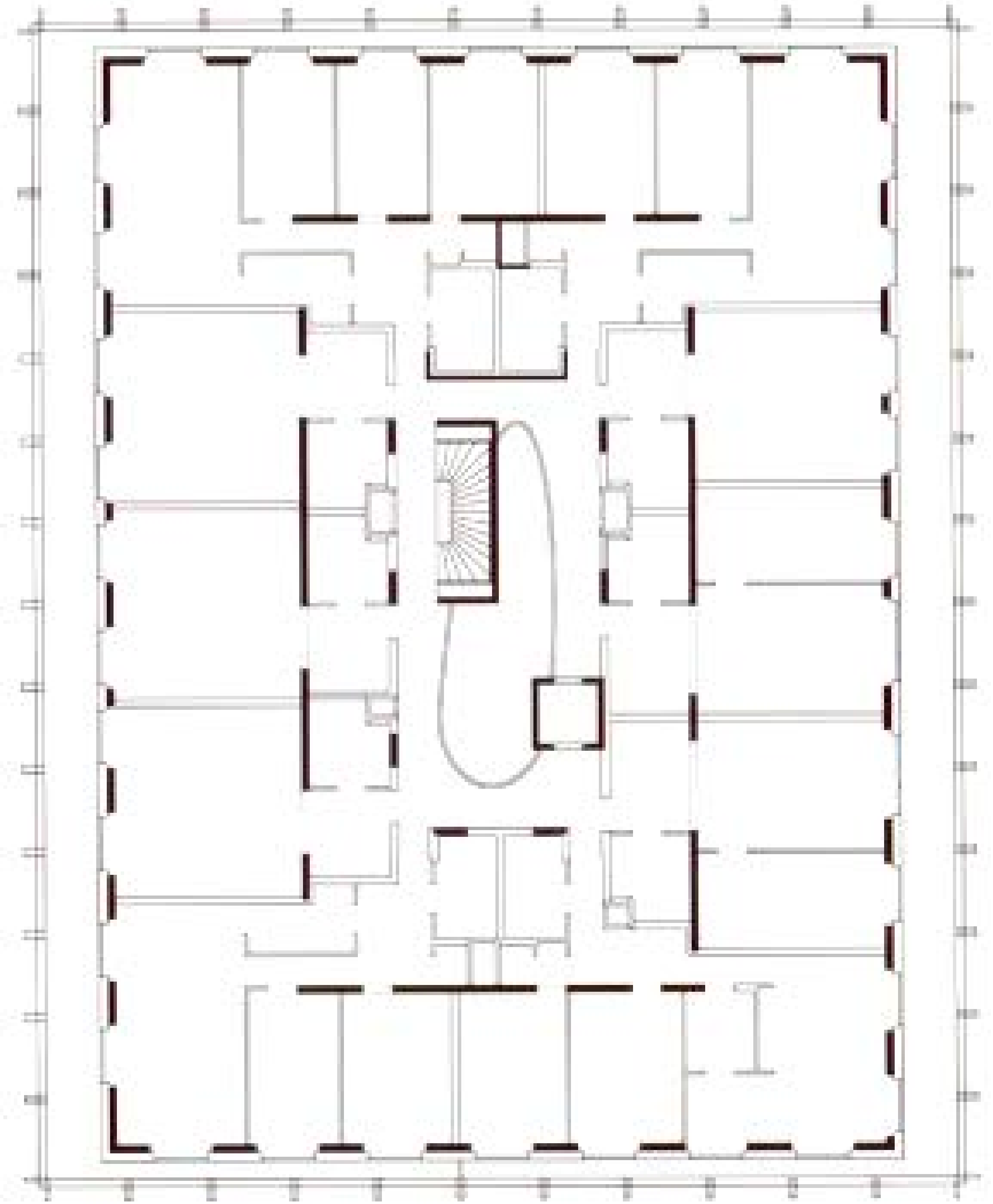
支撑体和填充系统的分离



总平面图之二



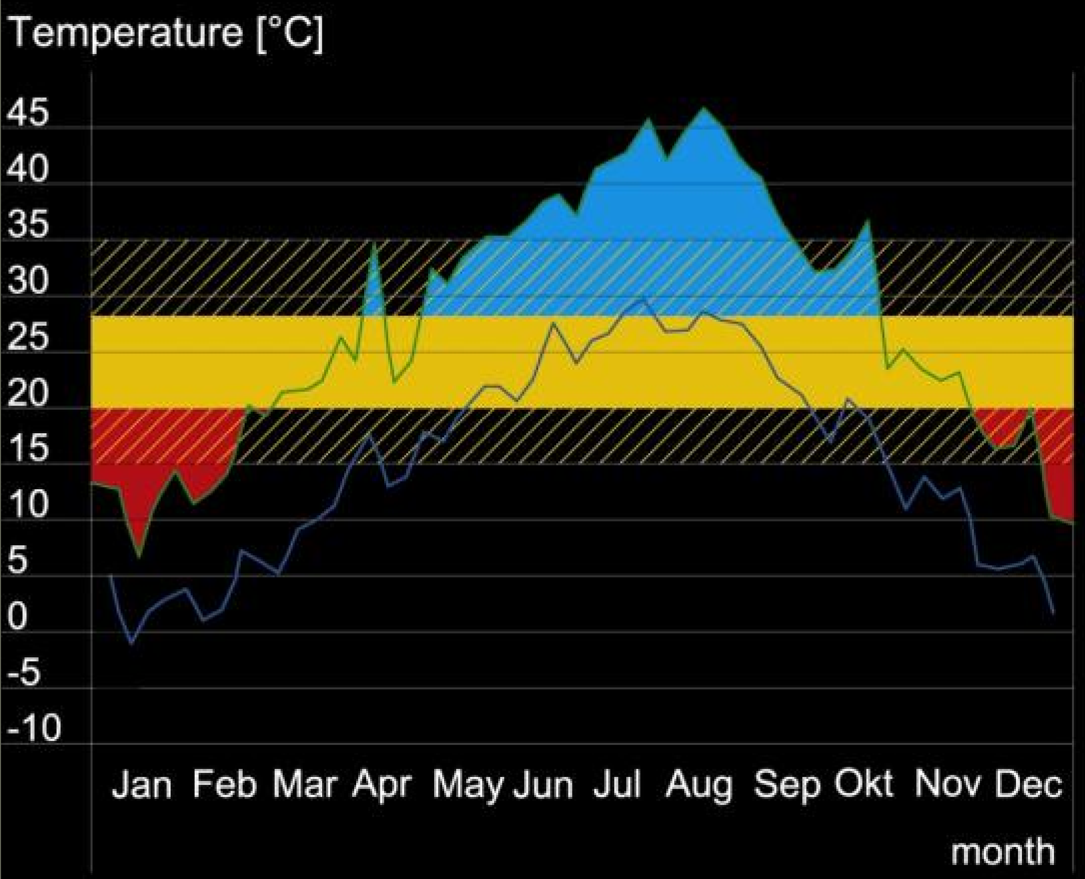


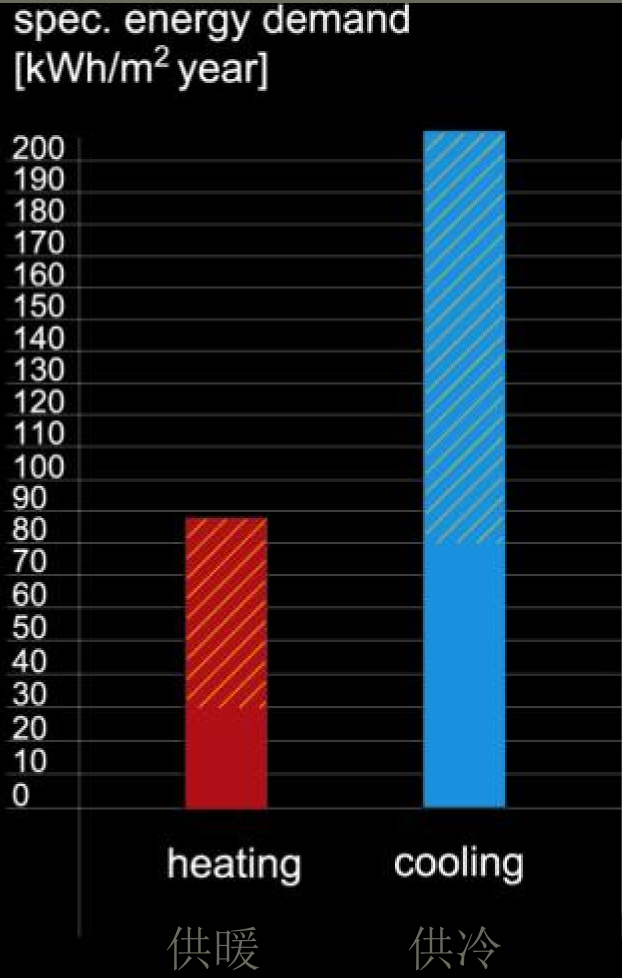


3. Low energy节能

Architectural solutions can safe 70% energy
建筑设计策略能节能70%的能源

If doing well, there is no need of heating!
理想的模型，建筑可达到无需额外的供热系统。





~ Room temperature [°C]

~ Outside temperature [°C]

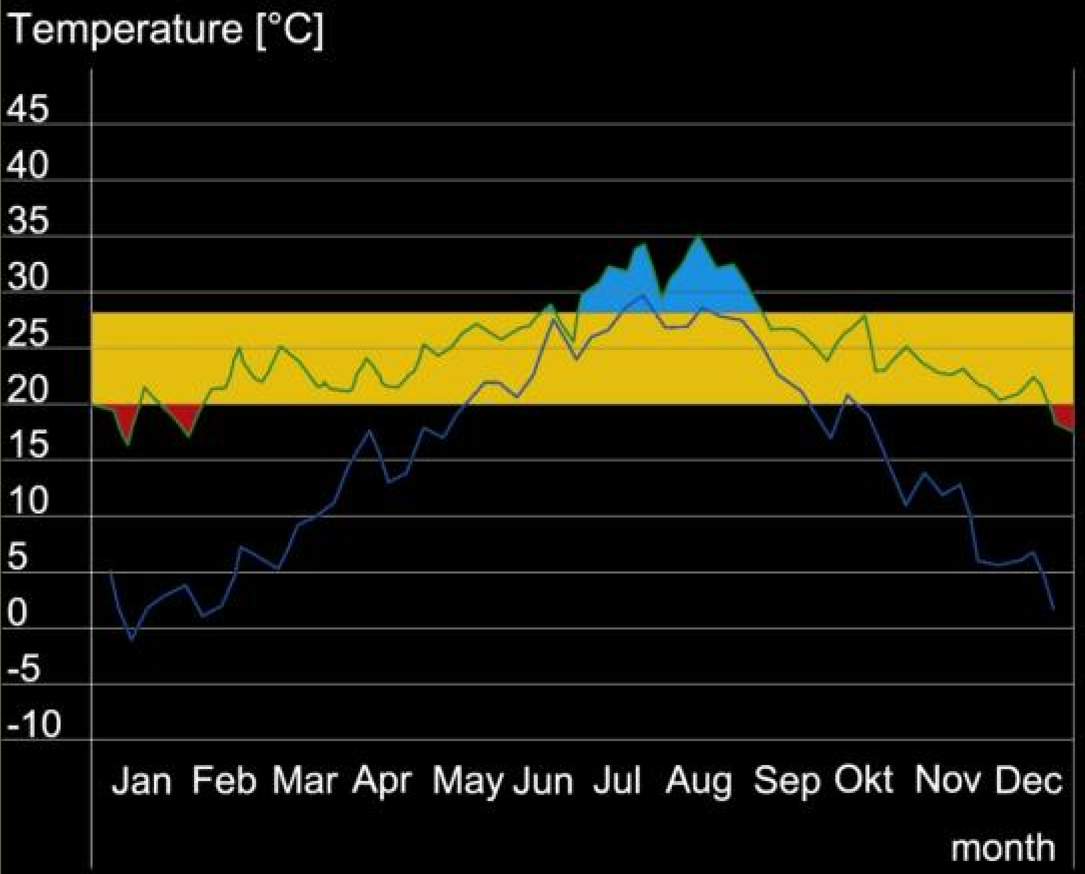
🟨 Comfort temperature zone [°C]

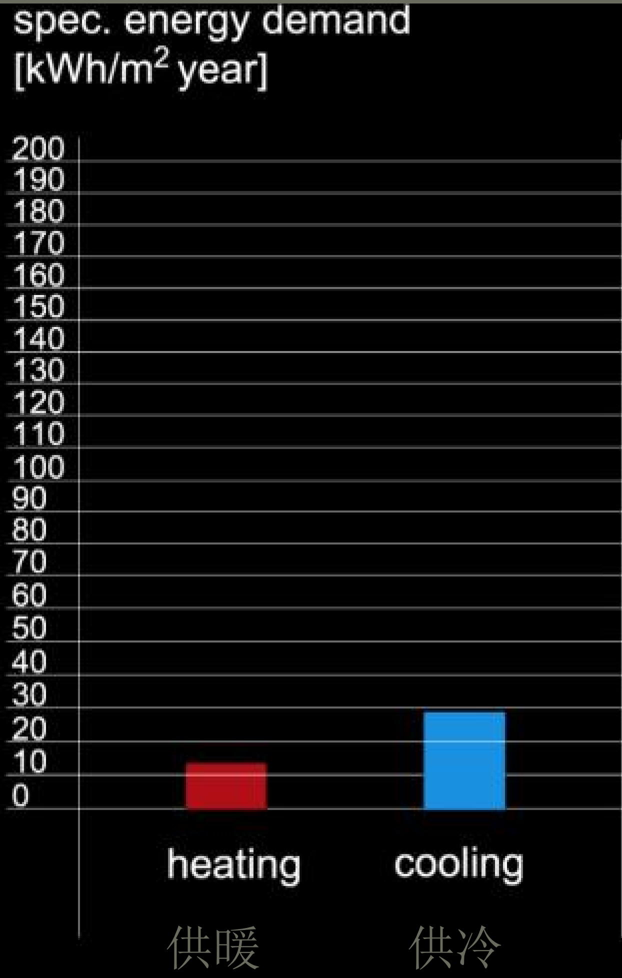
Room temperature without heating and cooling device

🟥 heating 供暖

🟦 cooling 供冷

Cooling energy demand includes dehumidification





~ Room temperature [°C]

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Room temperature without heating and cooling device

🟥 heating 供暖

🟦 cooling 供冷

Cooling energy demand includes dehumidification

Humidity

Sun path

Temperature

Climate

湿度

Wind

太阳路径

Radiation

温度

气候

Rain fall

风向

太阳辐射

降雨

Comfort

Visual

Acoustic

光环境

Temperature

舒适度

Relative humidity

温度

隔音

适宜湿度

Goal

How to reduce

Primary energy demand and CO2

In the most efficient way

建造

Construction

窗墙比

Window to wall ratio

形体紧凑

Compactness

Glazing

节能玻璃

erable windows

可调窗户

Building optimization

Shading

遮阳系统

çade air tightness

优化建筑设计

气密性

Roof insulation

屋顶保温/隔热

Wall insulation

外墙保温/隔热

Floor insulation

楼板保温/隔热

技术体系

Technical system

Energy conversion

Energy distribution

节能手段

能源消耗分布

Construction

建造

Window to wall ratio

窗墙比

Compactness

形体紧凑

Glazing

节能玻璃

Building optimization

优化建筑设计

Operable windows

可调窗户

Shading

遮阳系统

Façade air tightness

气密性

Roof insulation

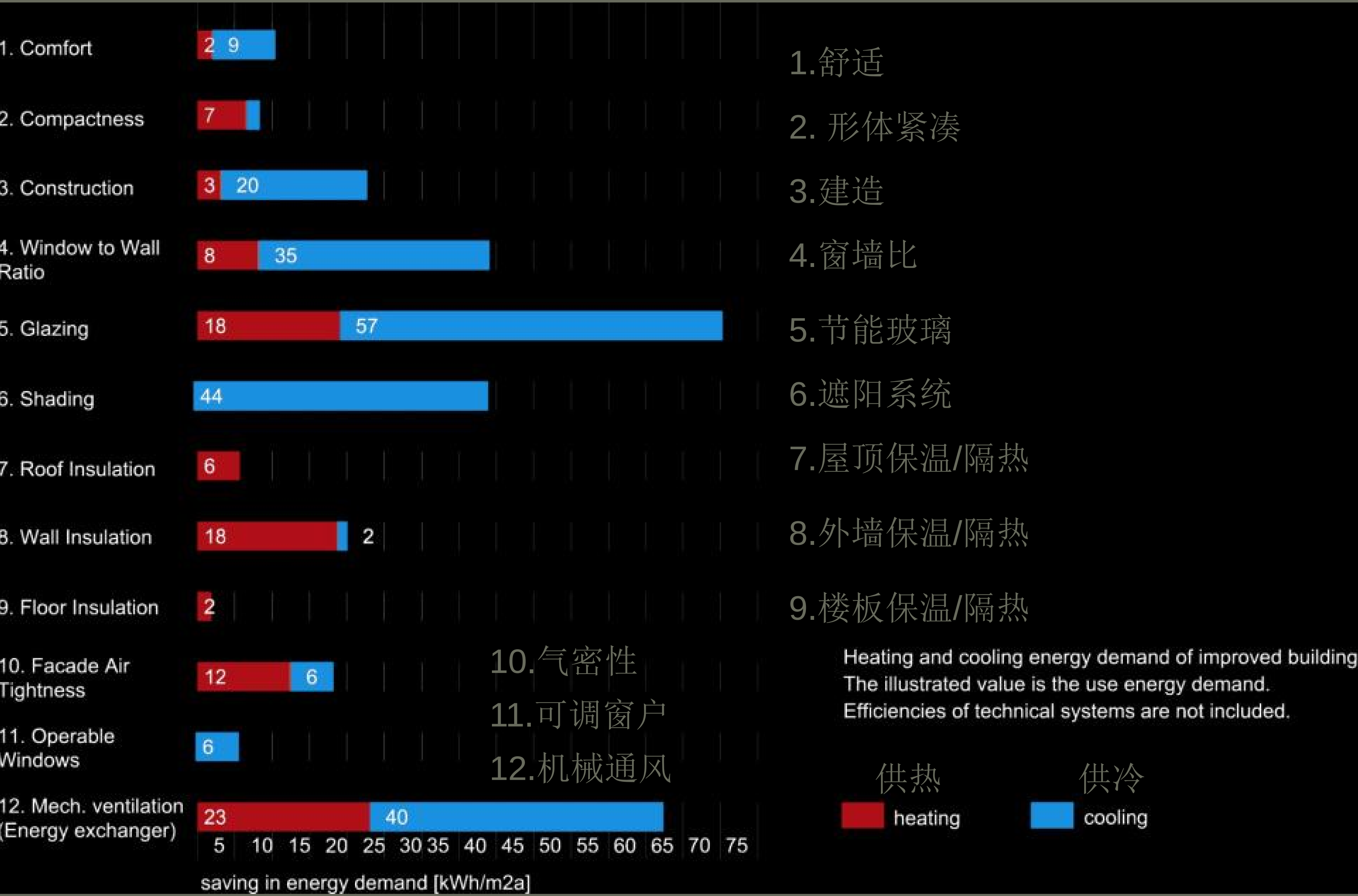
屋顶保温/隔热

Wall insulation

外墙保温/隔热

Floor insulation

楼板保温/隔热



Heating and cooling energy demand of improved building
The illustrated value is the use energy demand.
Efficiencies of technical systems are not included.

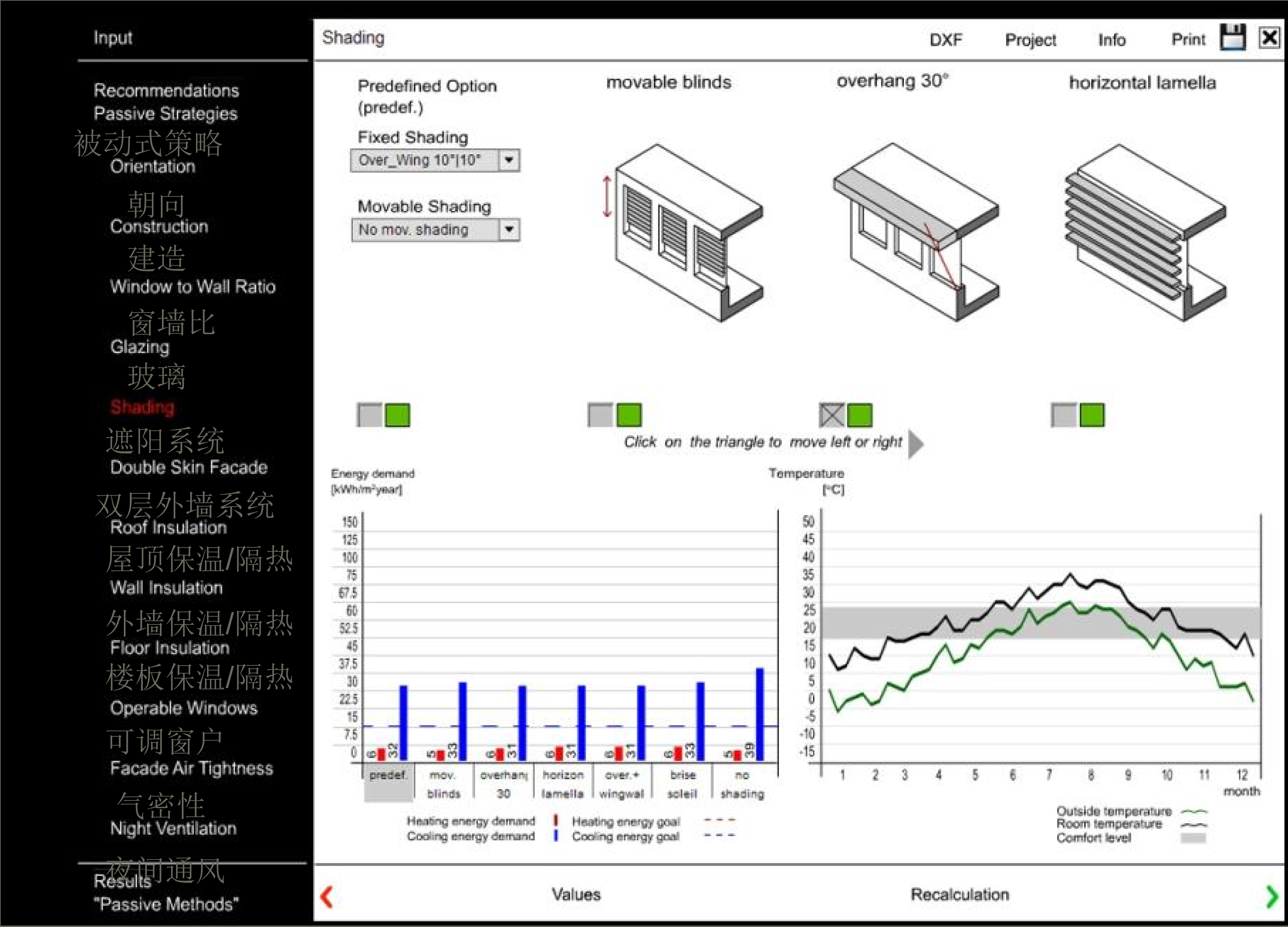
1.舒适
2. 形体紧凑
3.建造
4.窗墙比
5.节能玻璃
6.遮阳系统
7.屋顶保温/隔热
8.外墙保温/隔热
9.楼板保温/隔热
10.气密性
11.可调窗户
12.机械通风

供热 🟥 heating
供冷 🟦 cooling

The BE Tool (BE 软件) - The ‘DCC (digital content creation) Assistant(DCC设计辅助软件）

开发目的：为建筑节能设计提供一种简单而有效的工具

使用步骤：
步骤1： 输入所需信息。包括基地，气候，目标，内部功能需求，窗户尺寸等基础的一手数据；
步骤2：适宜的被动式技术引入。包括朝向，窗墙比，遮阳系统，节能材料等一系列可使用的被动设计策略，展示各自的有效性；
步骤3：计算出被动技术带来的能耗效果，与节能及舒适的目标进行对比；
步骤4：主动技术的使用。包括建筑设备的选择，供暖供热系统的选择等一系列可使用的技术设备，展示各自的有效性；
步骤5：小结。提出项目预测投资成本报告，包括设备成本，后期维修成本等。同时提供已选择的技术设备的详细分析报告。



Input
DXF
Project
Info
Print
movable blinds
overhang 30°
horizontal lamella
Energy demand [kWh/m²year]
150
125
100
75
67.5
60
52.5
45
37.5
30
22.5
15
7.5
0
6
32
5
33
6
31
6
31
6
31
6
33
5
39
predef.
mov. blinds
overhang 30
horizon lamella
over.+ wingwal
brise soleil
no shading
Heating energy demand
Cooling energy demand
Heating energy goal
Cooling energy goal
Temperature [°C]
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
1
2
3
4
5
6
7
8
9
10
11
12
month
Outside temperature
Room temperature
Comfort level
Values
Recalculation

Recommendations

Passive Strategies

被动式策略

Orientation

朝向

Construction

建造

Window to Wall Ratio

窗墙比

Glazing

玻璃

Shading

遮阳系统

Double Skin Facade

双层外墙系统

Roof Insulation

屋顶保温/隔热

Wall Insulation

外墙保温/隔热

Floor Insulation

楼板保温/隔热

Operable Windows

可调窗户

Facade Air Tightness

气密性

Night Ventilation

夜间通风

Results

"Passive Methods"

Shading

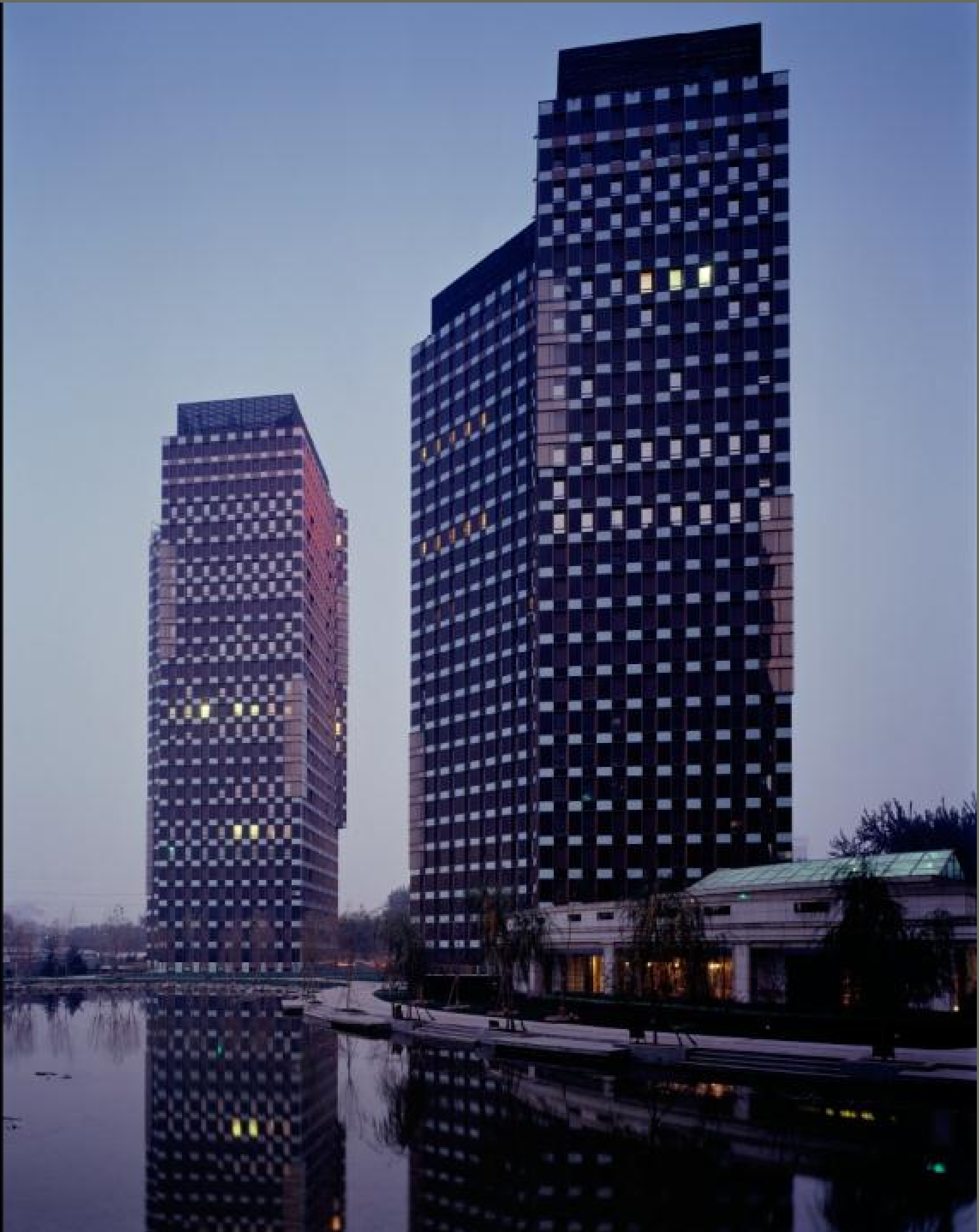
Predefined Option (predef.)

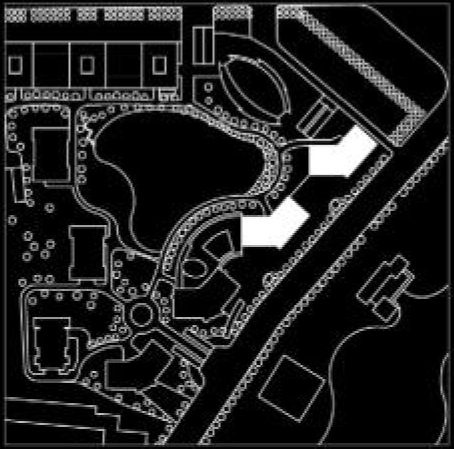
Fixed Shading: Over_Wing 10°|10°

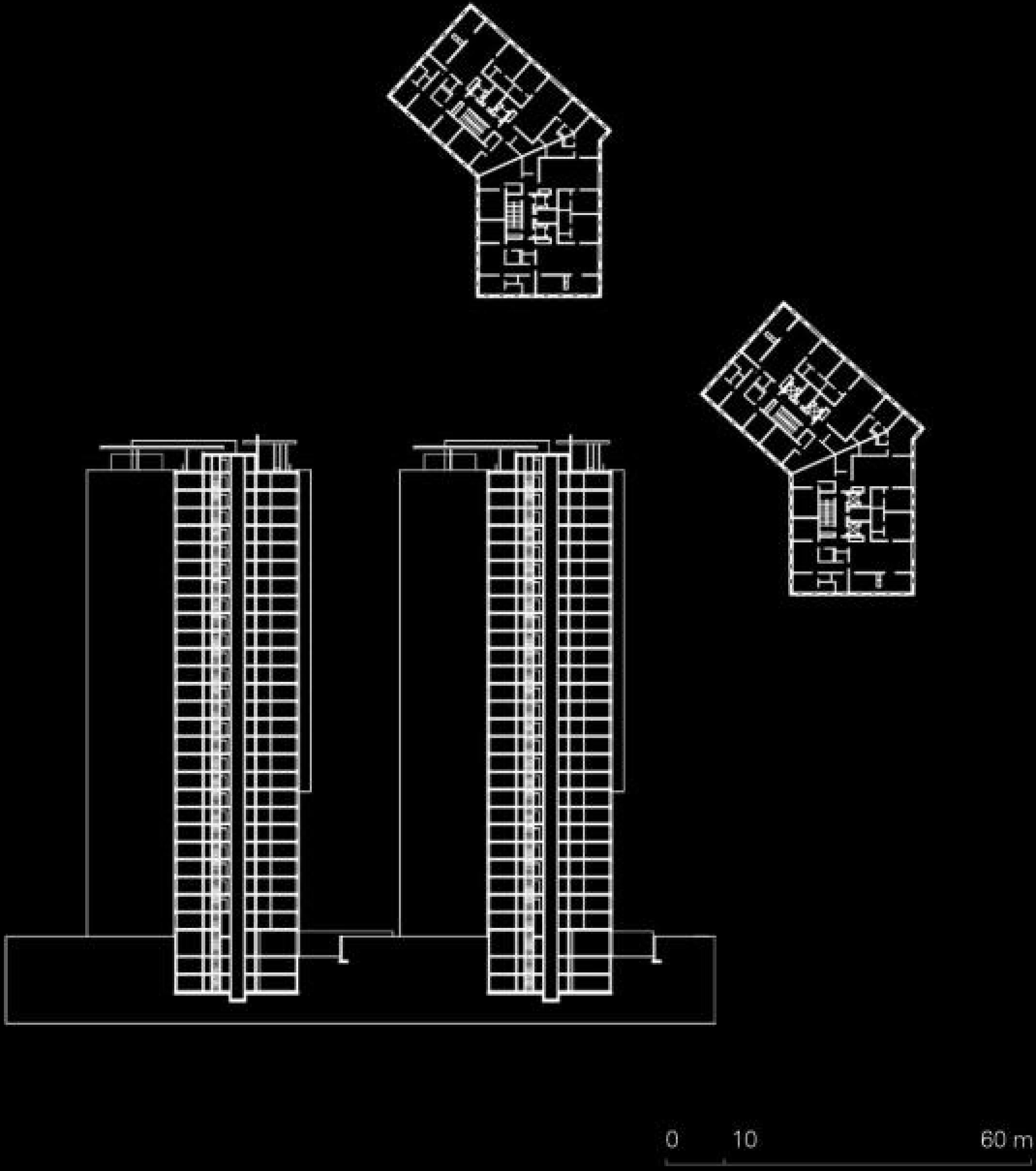
Movable Shading: No mov. shading

Click on the triangle to move left or right

Moma
Beijing, China

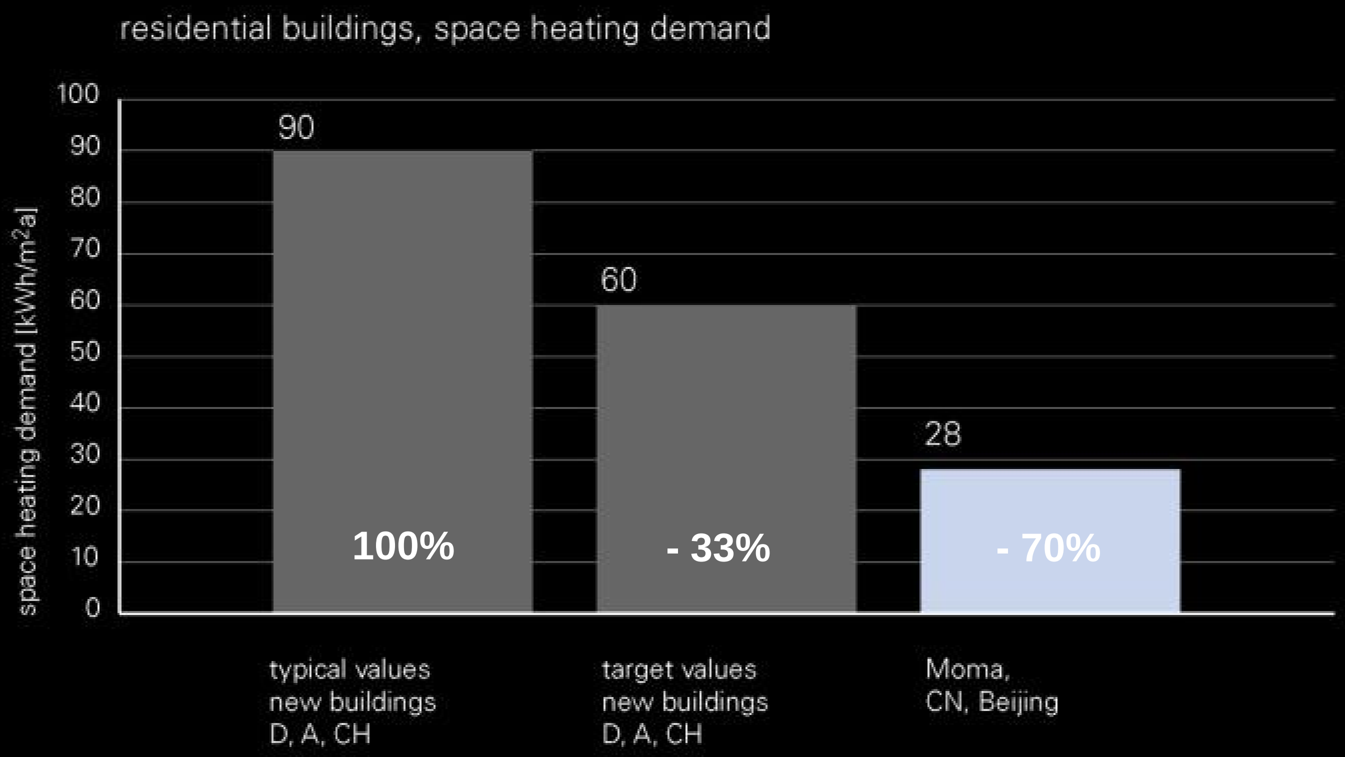






Section and typical floor

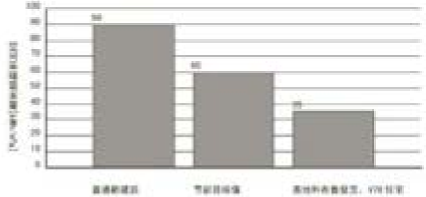
Moma
Beijing, China



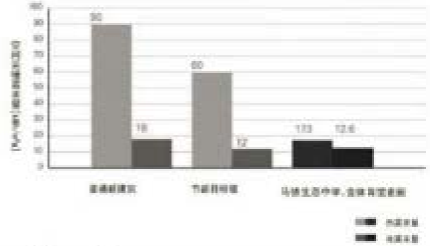
Moma
Beijing, China

附录二：部分 BE 建筑节能效果与当地建筑及当地节能目标值的比较

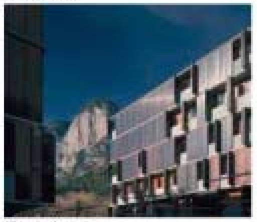
VTB 住宅

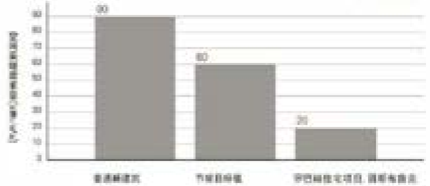


麦德生态中学

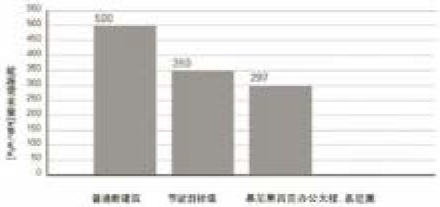


罗巴赫住宅

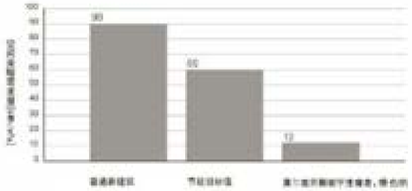




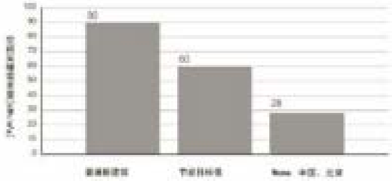
吕界办公大楼



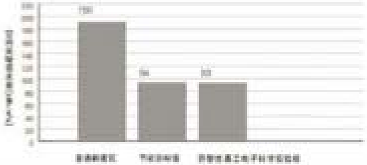
莫尔克莱斯岗学生宿舍



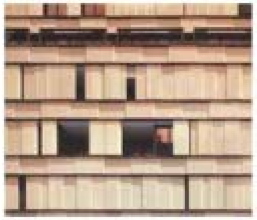
当代集团万国城公寓

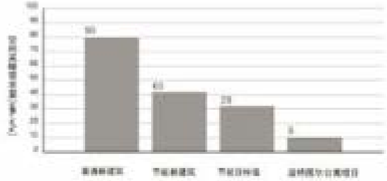


苏黎世高工电子科学实验楼



温特图尔公寓项目

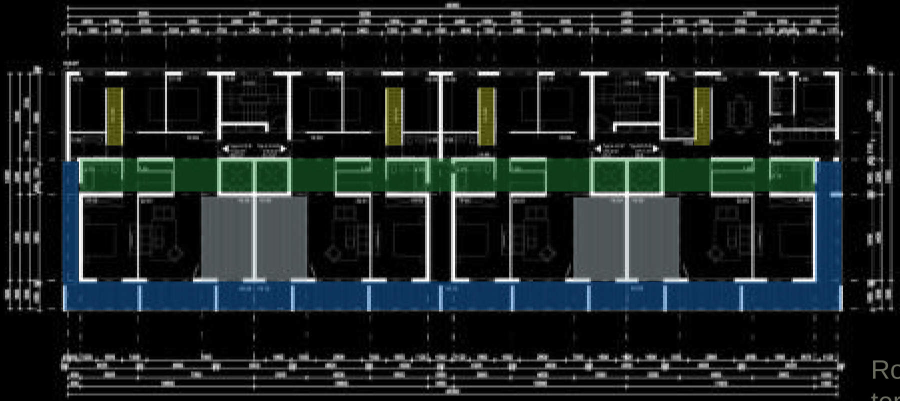




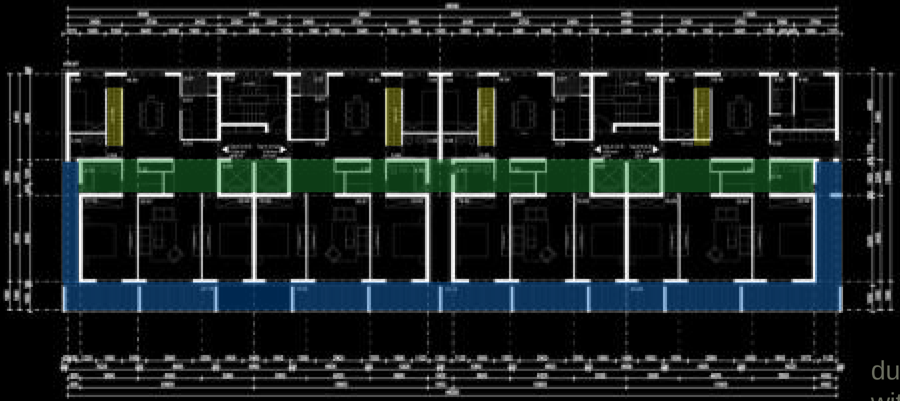
Pilot Housing Project
Shanghai

Pilot Housing Project Shanghai

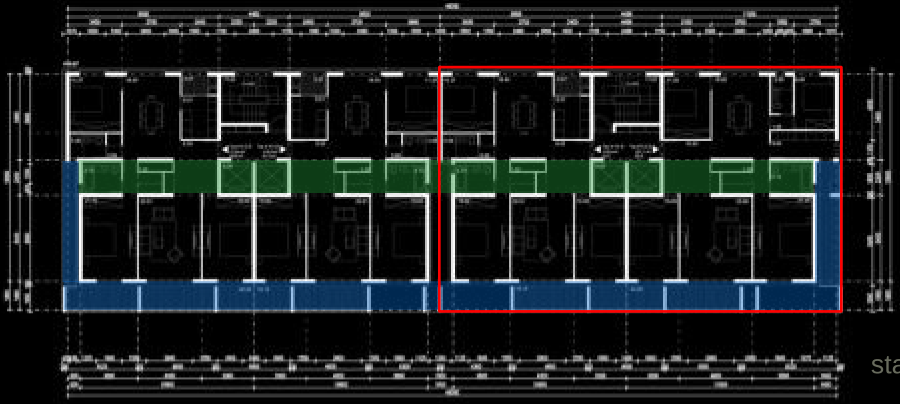
- 4 main structural walls
- Prefabricated
- All partition walls are removable and changeable
- Stair can be added
- All technical elements contained in the central zone
- External sun shading are usable as balconies or as terraces
- Buildings are modular and additive



Roof floor with terrace



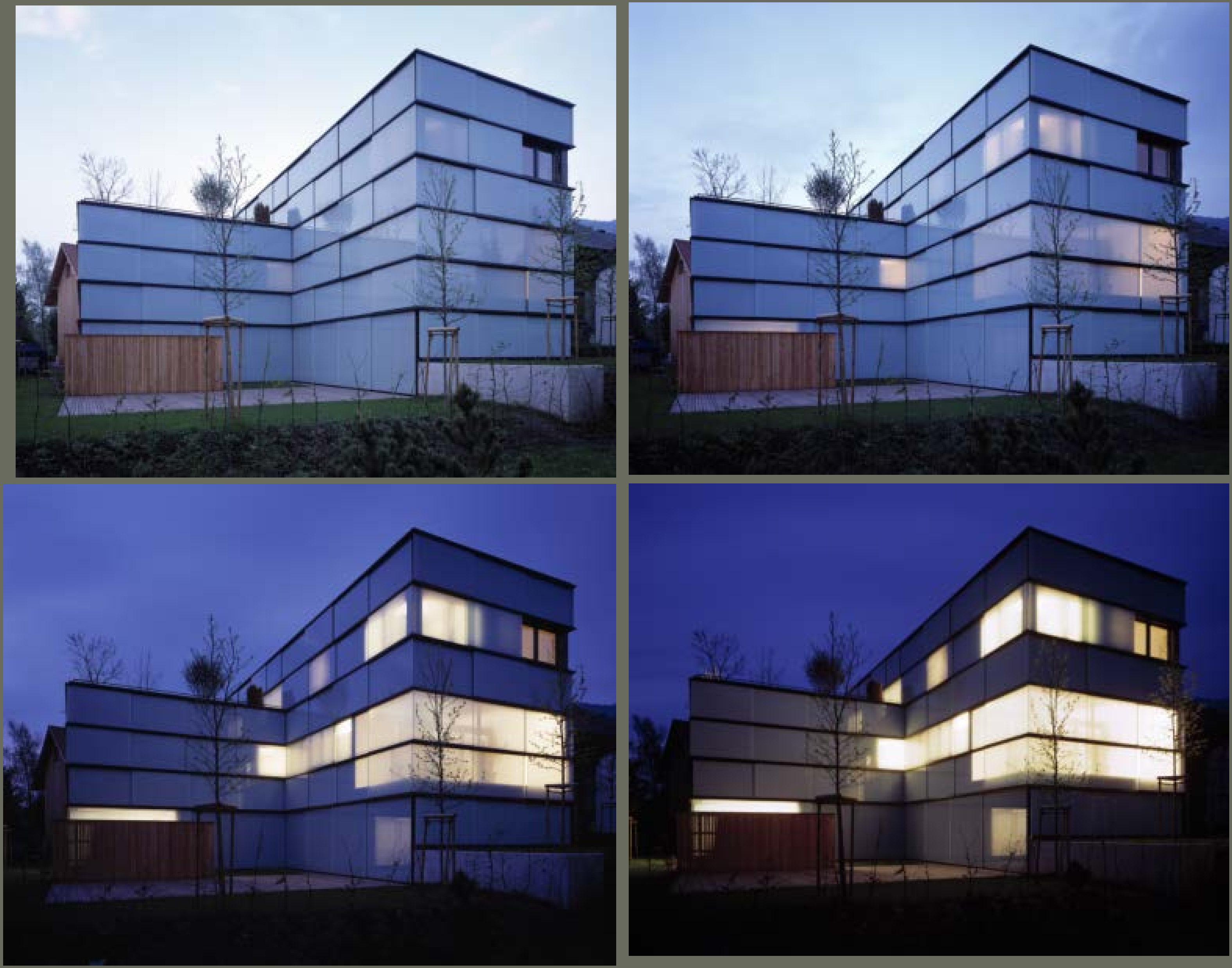
duplex floor with stair



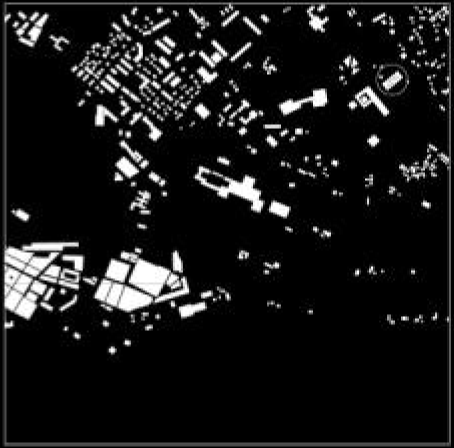
standard floor

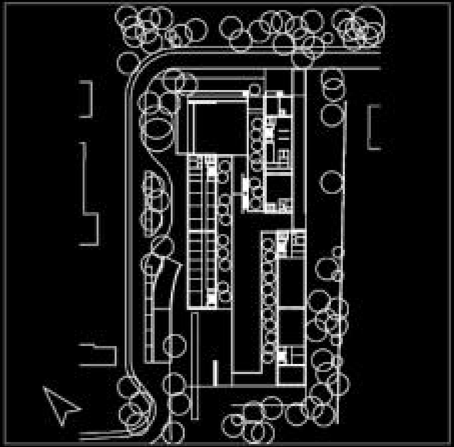
4. Economy经济

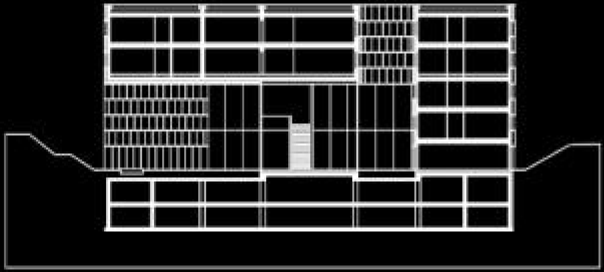
- Simple shape 简单形体
- Support and public space 支撑体系和公共空间
- Maximize the use of existing resources of the place
- 最大可能的利用当地的自然资源和条件
- Don’t try anything we don’t know
- 不尝试使用我们不了解的技术

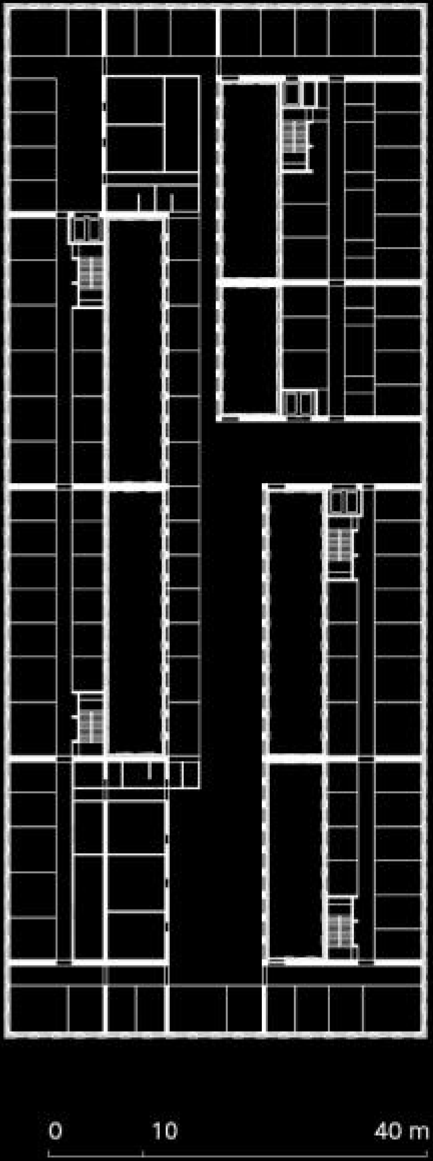


WHO/UNAIDS Administration Building
Geneva, Switzerland









WHO/UNAIDS Administration Building
Geneva, Switzerland

Typical floor and section
标准层平面及剖面

谢谢

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