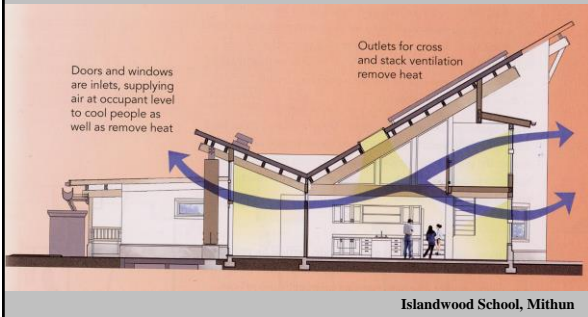


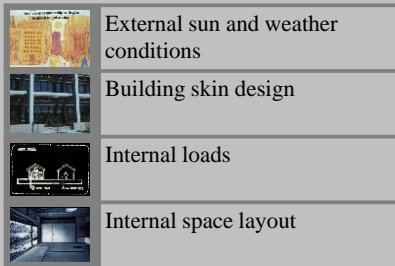
Thermal Zones

Ideally, a “zone” is a contiguous area of a building that has relatively constant thermal needs.



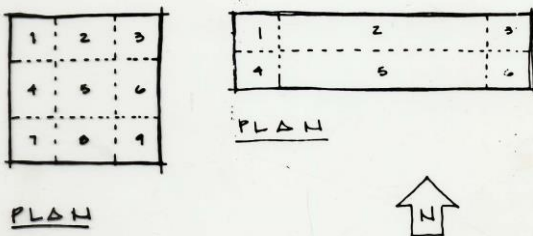
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Four factors that determine thermal zones



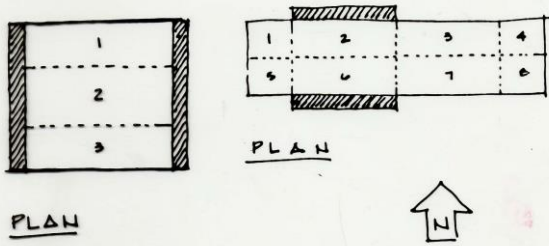
2

Most important: Sun (and weather)



3

Secondarily, Building skin design



Add insulated mass walls.

4

Thirdly, internal loads.

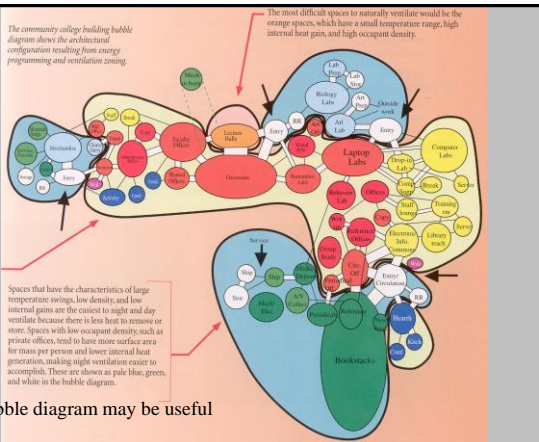
Building Program

Open plan office	12 Btuh/sqft
6 executive offices	6 Btuh/sqft
2 conference rooms	20 Btuh/sqft
Building core	2 Btuh/sqft

Analyze both magnitude and timing.

5

The community college building bubble diagram shows the architectural configurations resulting from energy programming and ventilation zoning.



Spaces that have the characteristics of large temperature swings, low density, and low internal gains are the easiest to night and day ventilate because there is less heat to remove or store. Spaces with low occupant density, such as private offices, tend to have more surface area for minutes per person and lower internal heat generation, making night ventilation easier to accomplish. These are shown as pale blue, green, and white in the bubble diagram.

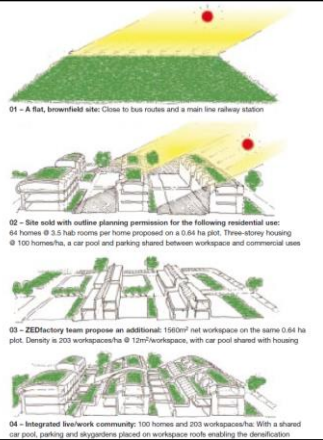
Bubble diagram may be useful

The most difficult spaces to naturally ventilate would be the storage spaces, which have a small temperature range, high internal heat gain, and high occupant density.

6

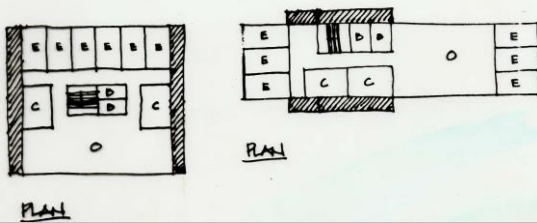
At BedZED thermal zoning helped to plan for increased density...

Strategy: IDL workplaces in the shadows of SDL residences.



7

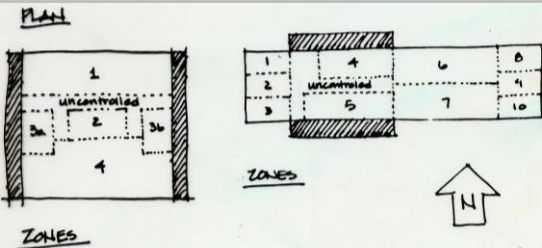
Lastly, internal space design.



Fit program to space.

8

Thermal zone layout.



9

Planning for thermal zoning

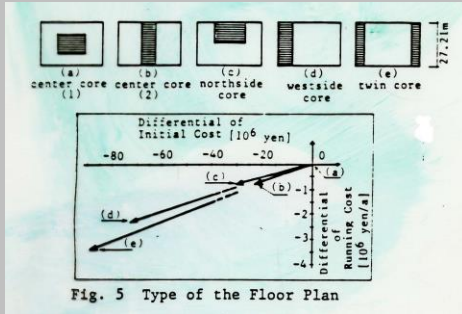


Fig. 5 Type of the Floor Plan

Life cycle cost analysis for a 9-story Tokyo building in 1984.

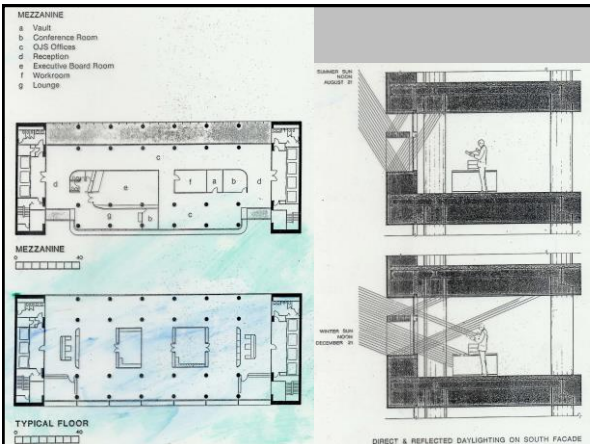
10

Wells Fargo Bank, Spokane

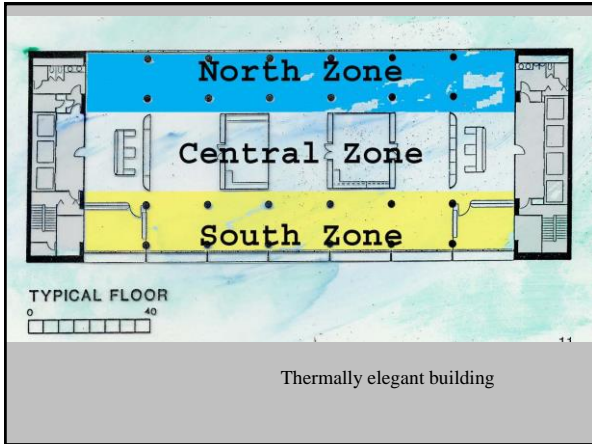
nee Farm Credit Bank



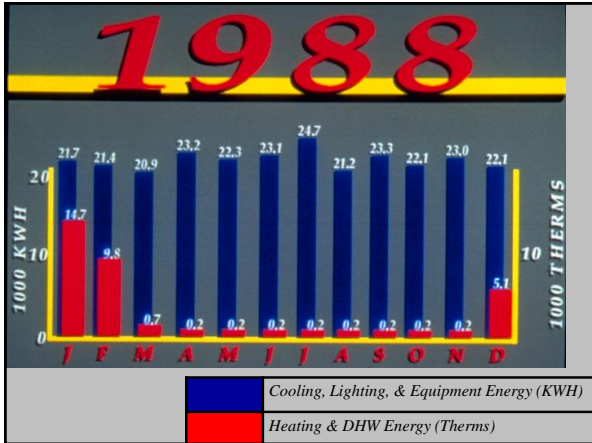
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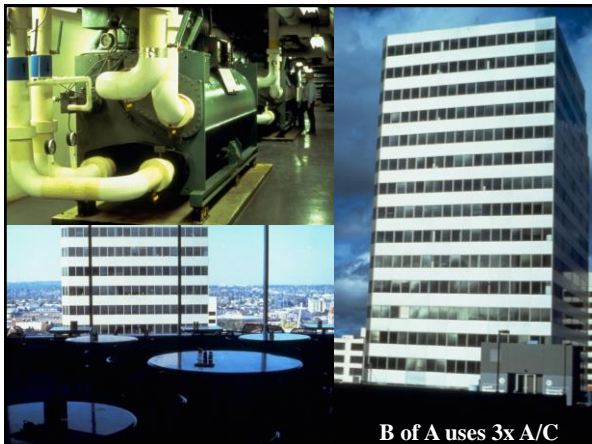
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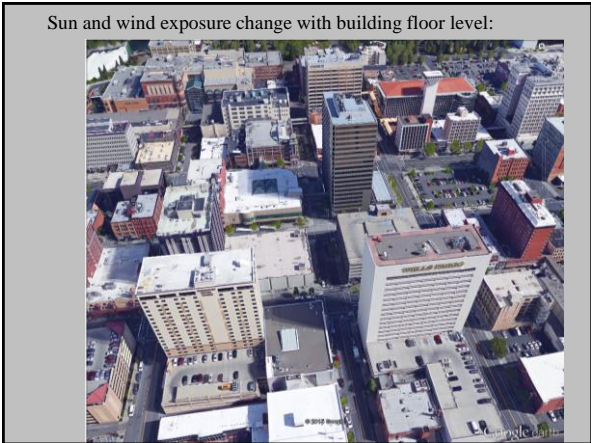


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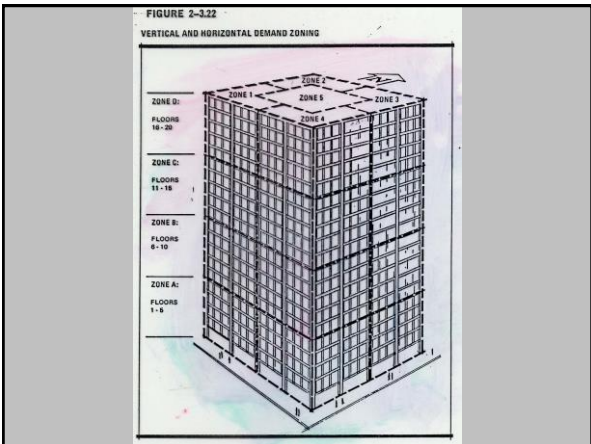


Top floor cafeteria

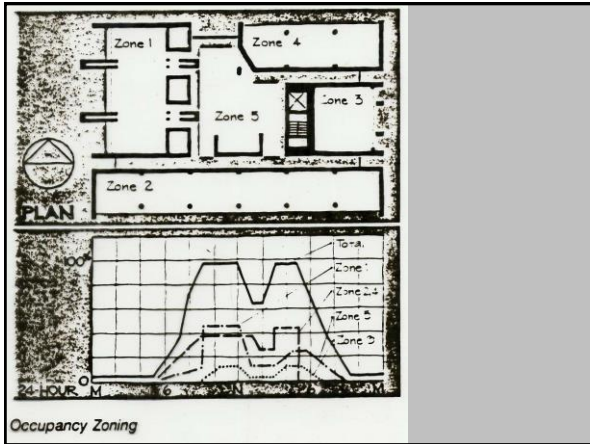
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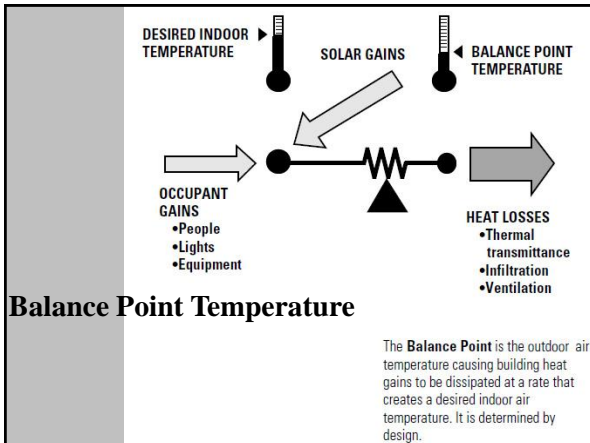
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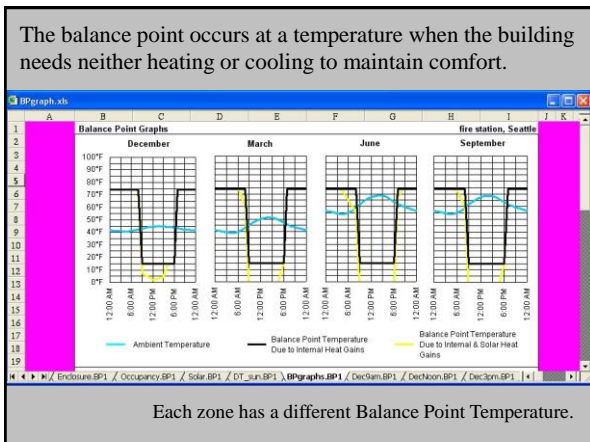
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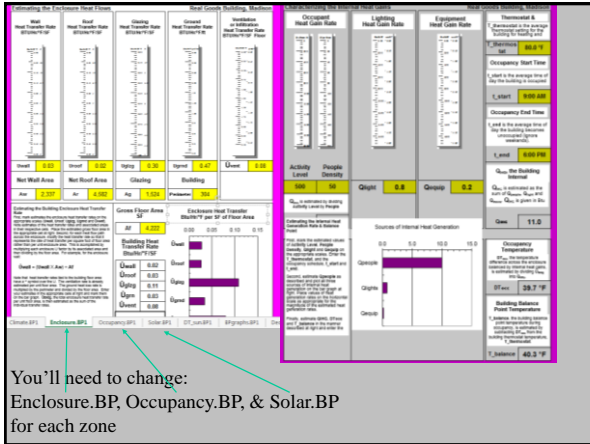
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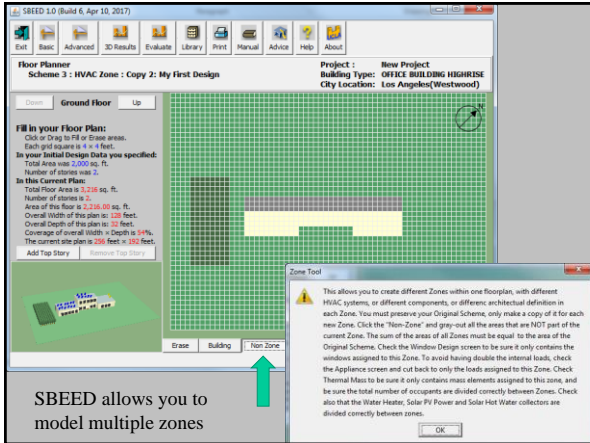
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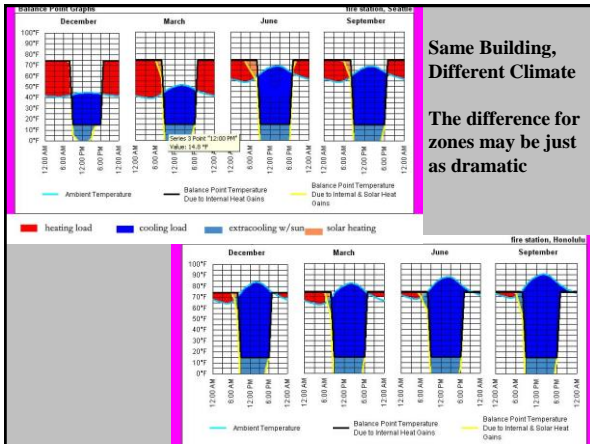
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