Early Collaboration Between Engineers and Architects

"Ways of working effectively, together, to create successful energy-efficient designs"

presented to

SimBuild 2008

by

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Summary

- Oregon Energy Code Compliance – 3 methods
  - Prescriptive
  - Simplified Trade-off Approach (STA) – CodeComp
  - Whole Building Approach
- Envelope analysis
- Efficiency vs. costs
- Overall building efficiency

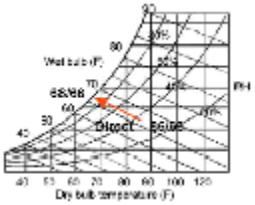
Different ways of looking at the world

Physical world (visual images)

Numbers (quantitative)

$$\text{Energy} = \text{Mass} \times (\text{speed of light in vacuum})^2$$

$$\frac{1}{2}V^2 = P + \rho g Z + Const$$

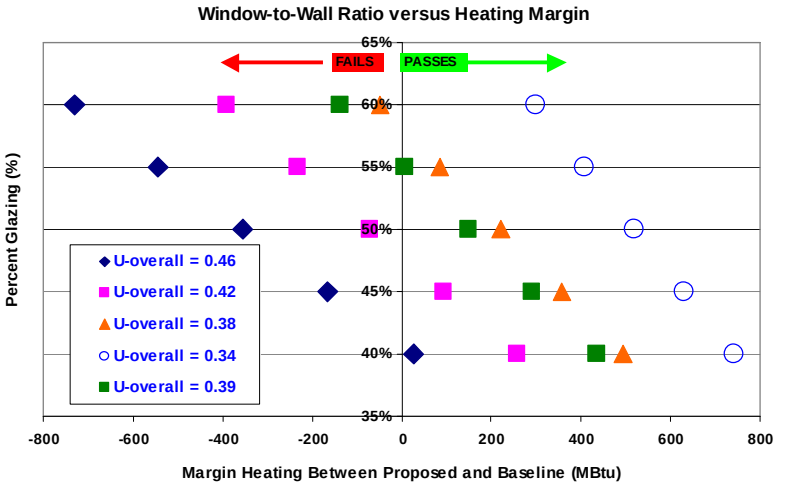


Simplified Trade-off Approach with CodeComp

Balancing the envelope components for an efficient, code-compliant building

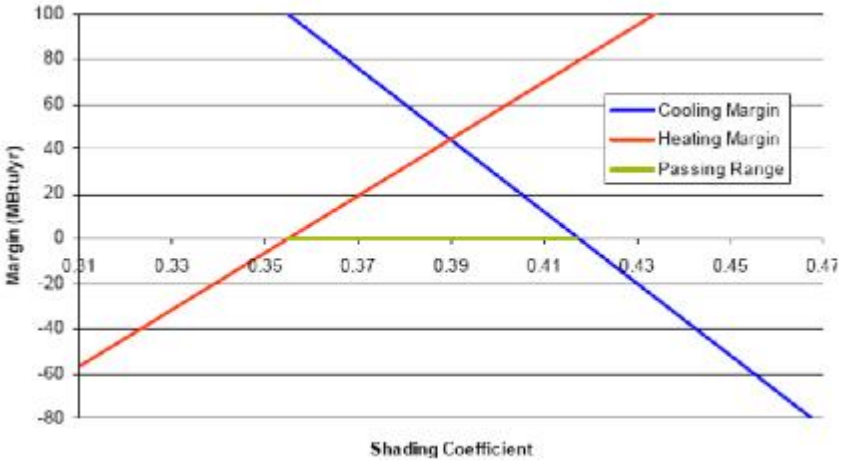
Glass, Glass, and More Glass…

How window to wall ratio affects the design

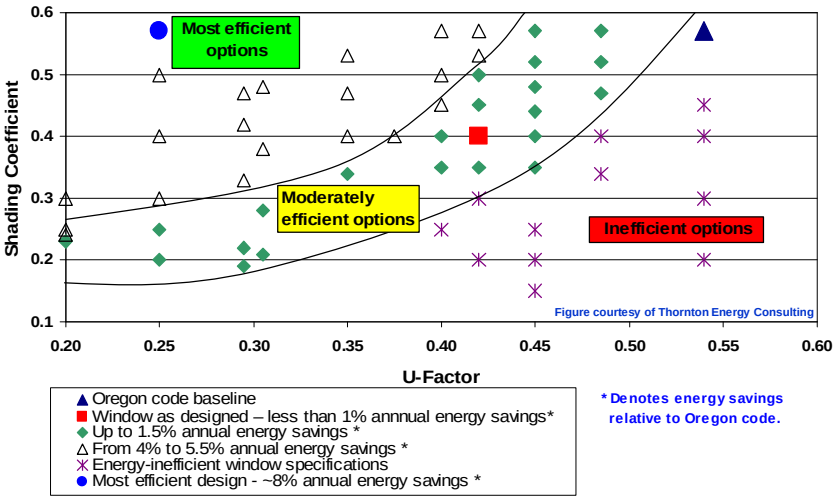


More window to wall ratio problems

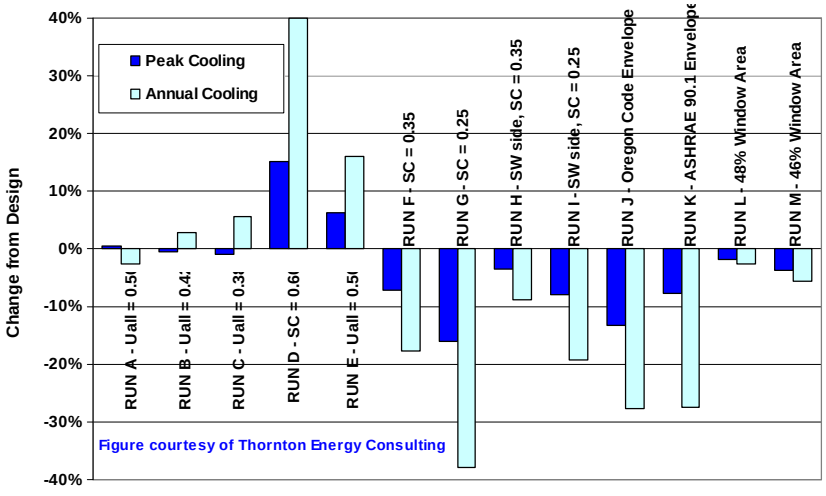
Adjusting the glazing shading coefficient



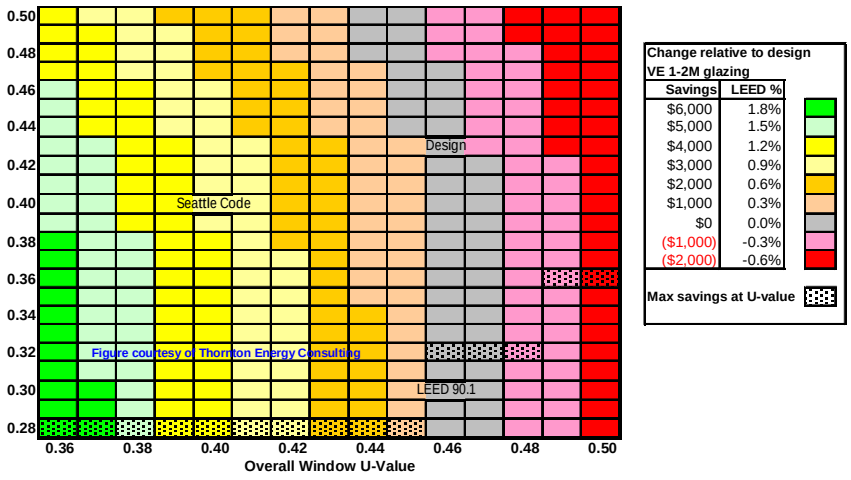
Adjusting glazing U-factor and SC



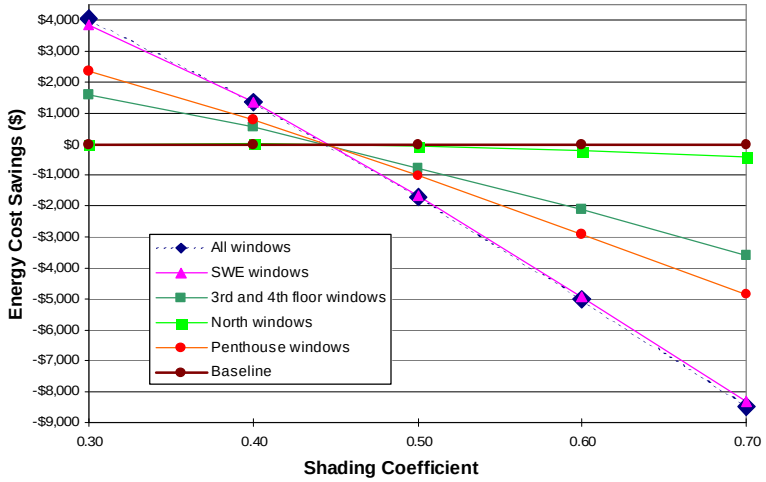
How windows affect the cooling loads



Energy efficiency vs. energy savings

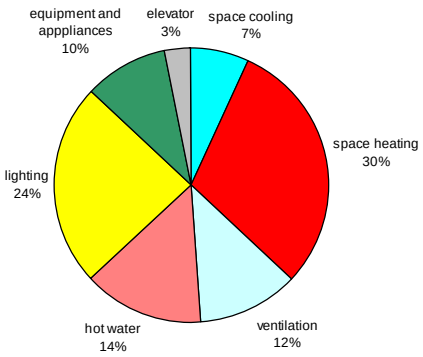


Energy efficiency vs. energy savings (con't)

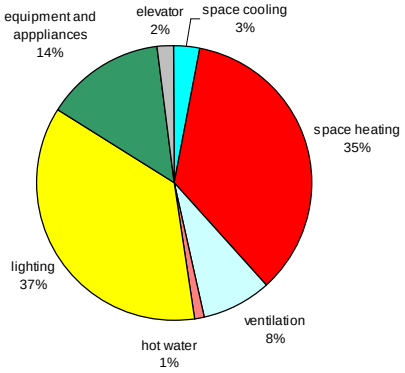


Identifying energy efficiency measures (EEMs)

Energy End Uses for a Typical High Rise Apartment

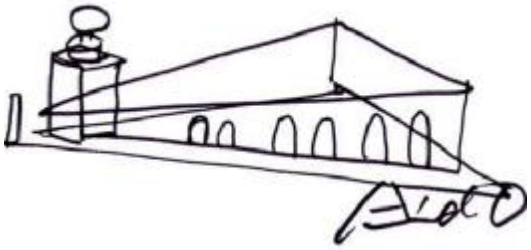


Energy End Uses for a Typical Office Building



Solution: Start compliance work early!

Preliminary CodeComp models are easy to create and provide direction for the building's compliance

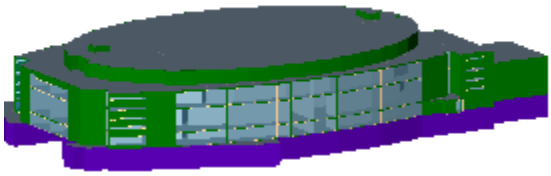


Energy Efficient Building – From the Start

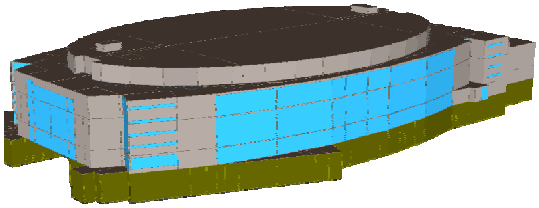
A building cannot meet the 2030 challenge
without an integrated design

Making early collaboration easier

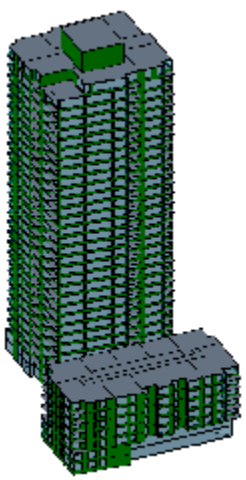
From Revit...

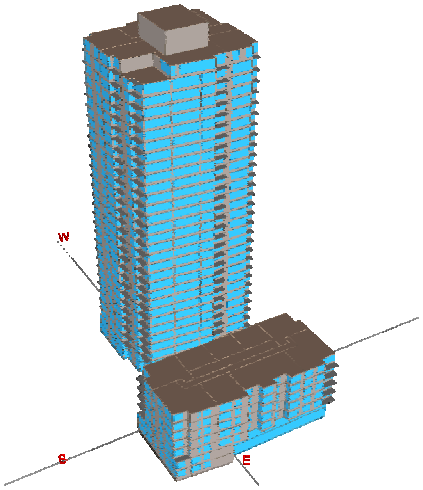


...to eQUEST



More Revit to eQUEST





By Collaborating with Engineers Early…

- Avoid costly redesign and change orders
- Make code compliance easy (and fun?)
- Optimize and design an energy efficient envelope, not just building systems
- Obtain that higher window-wall ratio you always wanted
- Track all energy efficiency measures from the start
- Makes it easier to get all 10 LEED EAc1 points