Windows and lighting technologies for building retrofits

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Lighting/daylighting analysis for Building 669, Philadelphia Navy Yard:
Energy savings: >70%, Cost: $12-15K, Payback time: 4.2 years
Annual source energy consumption with automated roller shades as a function of window size, glazing type and fabric transmittance for south facing offices in (a) Chicago and (b) Los Angeles.

- Heating energy is not affected much by shade transmittance (small difference in $\tau$)
- G-I: heating increase with WWR
- G-II G-III: heating does not increase much with WWR
- Lighting energy reduce for large WWR and shade transmittance
- Cooling increase with WWR
Holistic evaluation of design and control options for perimeter offices

Energy and lighting metrics for different design and control options