

Sources for Phillips Eco-Enterprise Center Green Roof Fact Sheet

Allen Gehrke, American Hydrotech, Minneapolis Representative

PEEC green roof costs around \$24/ft² with lifetime of 30+ yrs, Adjacent Roof around \$4/ft² with lifetime of 12 yrs. "Insulation of GR meets mpls standards and the rest is extra". 1R/in soil

Niachou, A. et al. Analysis of the green roof thermal properties and investigation of its energy performance. 2001. Energy and Buildings. 33. P719-729

- Dark green vegetation has lowest temperature, red hottest which ranges from 26-40 °C
- Energy analysis used Transient System Simulation Program (TRNSYS)
- Scenario A10 applies to PEEC, 4-9% heating savings, 0% cooling, 2% total
- Non-insulated saved 37-48%, med insulated saved 4-7%

Kristin, G.L. and D.B. Rowe. The role of extensive green roofs in sustainable development. 2006. HortScience. 41(5): 1276-1285

- Green roof reduced runoff by 60-100%
- 57-87% reduction in stormwater flow rate
- 37% reduction in sulfur dioxide, 21% reduction in nitrous acid
- Fertilization and over watering can lead to too-lush conditions that don't survive drought
- Every decrease in 0.5 °C indoor temperature saves 8% energy
- Reduced solar energy gain by 90%
- Fixes 0.2 kg particles/yr*m²

Wong N.H. et al. The effects of rooftop garden on energy consumption of a commercial building in Singapore. 2003. Energy and Buildings. 35. pg 353-364

- Green roof reflects 27% and absorbs 60%
- Reduces building surface temperature up to 20 °C
- R-values (metric): Shrubs – 1.61, Trees – 0.577, Turf(similar to prairie grass) – 0.36
- Turf saved 15% energy

Kerry Glader, Plaisted

- Saturated soil weight 92lb/ft³, Dry weight 57lb/ft², Drained weight(carrying capacity) 76lb/ft³

Wong, E. Reducing Urban Heat Islands: Compendium of Strategies. 2008. US EPA Climate Protection Partnership Division.

- Black roof can be 90 °F hotter than surrounding air temperature

Sustaining the environment and our communities through practical innovation.

- Annual temperature difference between urban and rural areas is 1.8°-5.4 °F
- 1000 ft² roof can capture 40 lbs of particulate matter a year, equiv to 15 car annual production
- Cost \$10-25 per square foot

Cost Benefit Evaluation of Ecoroofs. 2008. City of Portland Bureau of Environmental Services.

- Study that involved the review of approximately 50 articles pertaining to green roofs
- Storm water volume reduction from 50-100%
- Peak flow reduction 74-85%
- 0.04lbs/ft²*yr dust and particulate matter out of the air

For more information, contact Agatha Vaaler, 612.278.7142 or avaaler@greeninstitute.org