SURFACE WITH PURPOSE: DEVELOPING A CLIMATE ADAPTATION & RESILIENCE TOOL

RESILIENT COMMUNITIES PROJECT

About the Partner

The Metropolitan Council is the regional policy-making body, planning agency, and provider of essential services for the Twin Cities metropolitan region. The Met Council provides Metro Transit's bus and rail system, Metro Mobility, Transit Link, wastewater treatment services, regional parks planning, affordable housing, and more — that support communities and businesses and ensure a high quality of life for residents.

Project Description

Surface parking lots and rooftops drive stormwater runoff and pollution and the urban heat island effect, exacerbate localized flooding, increase chloride use, increase cooling loads in the summer, decrease carbon sequestration, and increase specific types of air pollution.

Decreased water, air, and soil quality coupled with more extreme heat and flooding translates to more hospital visits, increased water treatment costs, increased tax rates to pay for reconstruction & adaptation, higher insurance rates, higher interest rates- all of which disproportionately harm our region's low income residents.

This project focuses on the development of green roofs and BioSolar (integrated green roof and solar PV) systems on large rooftops and surface parking lots as climate resilience tools. These systems provide a “surface with purpose” and address the negative impacts of inactive surfaces, and thus, increase the climate resilience of communities.

This project seeks to quantify the qualitative benefits of green roof and BioSolar systems by furthering the impact analysis of the tool. The analysis will need to examine the economic, environmental, and public health impacts of these technologies so that the tool can visualize the analysis on large rooftops and surface parking lots across the region.

Key Issues, Questions, and Ideas to Explore

1. How can the qualitative benefits of green roof and BioSolar systems be quantified?
    - *Increase Carbon Sequestration, Reduce Chloride Reduction, Reduce Building Heating & Cooling loads, Increase Urban Biodiversity, Decrease Stormwater Thermal Pollution, Decrease Stormwater Total Suspended Solids (TSS), Decrease Urban Heat Island effects, Increase Pollinators, Decrease Air Pollution*
2. Identify additional economic, environmental, or public health benefits of green roof and BioSolar systems.
3. Qualify any additional economic, environmental, or public health benefits of green roof and BioSolar systems.
4. Quantify any additional economic, environmental, or public health benefits of green roof and BioSolar systems.

How Student Work Will Be Used to Build Community Resilience

- To quantify the various qualitative benefits of green roof and BioSolar systems to assist communities in making more informed climate resilience investments
- To continue developing the “Surface with Purpose” tool, which is designed to complement the Met Council’s current climate work including the Climate Vulnerability Assessment (Heat and Flooding) and the Twin Cities Greenhouse Gas Inventory tools

Potential Community Partners or Stakeholders

- AD Greenroof
- Minnesota Green Roof Council
- Capitol Region Watershed District
- St. Croix Watershed Research Station, Retired - Metropolitan Council
- MN Science Museum
- Washington County Conservation District
- TreeTrust
- City of Saint Paul
- Kandiyo Consulting, LLC

Existing Plans & Reports

- Climate Vulnerability Assessment
- Twin Cities Greenhouse Gas Inventory

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