

EnerQ

A Digital Platform for Equitable Energy Efficiency Scenario Analysis Considering Ambient Air Quality

TEAM MEMBER(S)

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- The Duwamish Valley, specifically the neighborhoods of Georgetown and South Park in Seattle, WA, are the focus community in this project. This area is classified as a priority zone, characterized by racial, ethnic, demographic, socioeconomic, and health disparities, and has ranking among Seattle's most significantly impacted zip codes by cumulative health effects, and its status as an overburdened community highly affected by air pollution, highlighting their status as communities in urgent need of support.
- This research presents EnerQ, a framework and platform that integrates bottom-up Physics-based urban building energy modeling (UBEM) and spatiotemporal urban exposure modeling approaches. EnerQ aims to concurrently assess urban building energy usage and human exposure to air pollutants across varying times and locations for energy efficiency scenario analyses. The integrated framework documents spatial and temporal characteristics alongside urban building physical and semantic attributes. EnerQ's exposure component calculates exposure to ambient particulate pollutants (PM1, PM2.5, PM10) across community areas with high granularity resolution (per building per hour), addressing data scarcity issues in exposure modeling. High-granularity air pollution data from the Duwamish air quality sensors dashboard, Clarity, is utilized for spatiotemporal air pollution model creation and validation. EnerQ prioritizes generating retrofit strategies, particularly focusing on solar energy systems, informed by the local context of air pollution and energy use patterns, with an aim to reduce energy use through renewable methods while considering health implications.

