Iowa UrbanFEWS
Food-Energy-Water Systems Integration

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UrbanFEWS in the News

In This Issue

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Effect of Neighborhood Density on Energy Consumption:

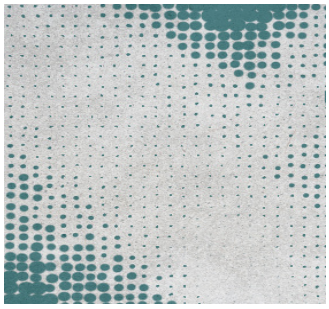
A comparative study of two neighborhoods in Des Moines

Neighborhood layout can mitigate carbon emissions directly by reducing each building's energy consumption, and indirectly by reducing residential demand for energy production in the form of electricity or natural gas. In this study, we focused on how the density of a neighborhood affects residential energy consumption.

We compared two neighborhoods in our study area, Capitol East and Sherman Hill within the City of Des Moines. Single family detached houses, townhouses, and apartments were modeled. In Capitol East, a low-density neighborhood, buildings were mainly single-family houses. In Sherman Hill, higher densitydwellings such as multi-family houses, apartments and townhomes were more common.

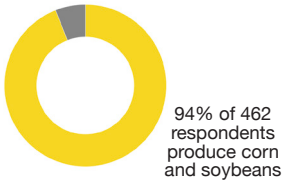
We conducted a sensitivity analysis using the urban modeling interface (UMI) to assess annual heating and cooling in the two neighborhoods based on an analysis of Energy Use Intensity (EUI), population density, and building volume to floor ratio.

We found that multi-family housing created less demand for both cooling energy and heating load compared to low-density single-family building types. This information will be used to inform our future scenarios to assess the impact of urban agriculture on overall urban energy demand.

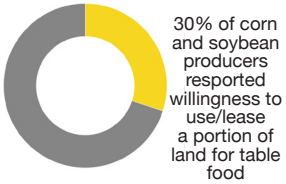


Learning From Iowa Producers: Preliminary Survey Results

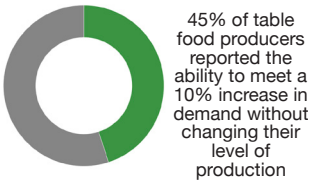
Our team completed a survey of commodity and specialty producers in central Iowa. The survey had questions about attitudes related to possible changes in production to increase locally-produced table food for Iowa consumers. Analysis of the survey is on-going and some preliminary findings are below:



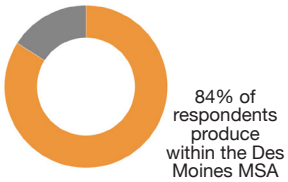
94% of 462 respondents produce corn and soybeans



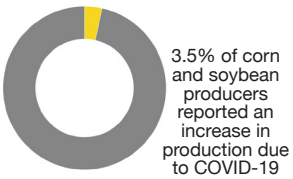
30% of corn and soybean producers resported willingness to use/lease a portion of land for table food



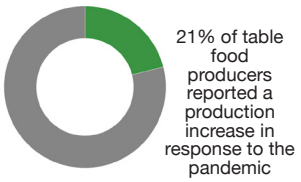
45% of table food producers reported the ability to meet a 10% increase in demand without changing their level of production



84% of respondents produce within the Des Moines MSA



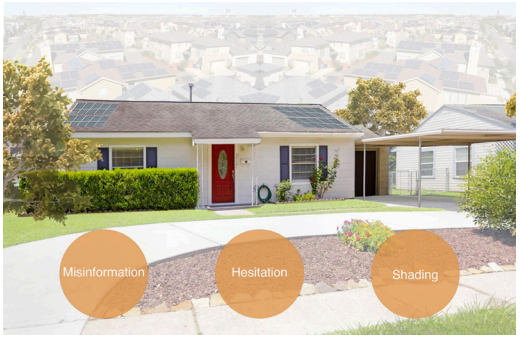
3.5% of corn and soybean producers reported an increase in production due to COVID-19



21% of table food producers reported a production increase in response to the pandemic

An Interactive GIS-based Method to Determine Feasible Roof Areas for Photovoltaic Panels

Multiple platforms, software, and tools are available to support homeowners in efforts to assess the feasibility of installing photo-voltaic (PV) panels on their homes. However, current platforms are not very user-friendly and often ignore the shading effect of nearby trees or other obstacles on the efficiency of PV panels. We used a GIS-based method to consider these shading effects and to identify suitable roof areas for installing PV panels. We also developed estimates of potential electricity output for three representative dates based on suitable rooftop areas.



Of currently available tools that can calculate shading, most require some training and knowledge to use. This might deter homeowners from installing rooftop PV systems. The approach we developed is user-friendly and interactive.

Users can enter their home address on the map and then graphically view the best location for PV panels on their roofs. They can also see whether their rooftop has enough potential to meet daily electricity needs for three representative dates.

Our case study location is the Capitol East neighborhood in Des Moines. However, the map developed in this project is a Python-based model, so the strategy can be transferred to examine other neighborhoods and used to assess other dates.

Featured Story:

Market Wagon- An online ordering and delivery service for ordering farm fresh foods

Nick Carter of Market Wagon started his company in 2016 to offer consumers and farmers another means of food connectivity. Market Wagon works by offering consumers an online farmers' market resource to get farm fresh produce and goods without having to go in person to an actual farmers' market. This new market system has created a whole new demographic for farmers to sell to. The sustainability efforts of Market Wagon is particularly interesting as well, as orders must be submitted online by Tuesday evenings to reduce food waste, and orders are delivered to "hubs" for pick-up in reusable cooler bags. Iowa State University Community Food Systems Program coordinator Courtney Long said that "There were some issues [with traditional farmers' markets], just because of COVID…" This new market system is promising because it gives residents in the Des Moines area access to farmers' markets year-round, reduces COVID-related economic im-pacts as well as health-related concerns, and could poten-tially open new doors for traditional farmers' markets in the area. To read the full story on Market Wagon, see the Des Moines Register article from September 1, 2021.

Food System Scenarios

Our project team is collecting data to evaluate alternative food systems in the Des Moines area. Preliminary results indicate less energy use for local production systems especially for those with consumption based on dietary guidelines.

Des Moines Metro Area food system scenarios	Current level of local table food production (about 5%)	Future (increased) level of local table food production
Current patterns of food consumption	**BASE:** Current production and consumption patterns	**LOCAL:** Increase to 50% local production with current consumption patterns
Consumption based on dietary guidelines	**DIET:** Current production and recommended consumption	**LOCAL DIET:** Increase to 50% local production with recommended consumption