

Resilient Innovations in Food Freight

JULIA SCHILLING, Department of Landscape Architecture
 NANCY CHACHULA, Department of Landscape Architecture

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CURRENT SYSTEM

Centuries ago, food systems made up of producers, distributors and consumers existed within a single localized area. Today, this system has been expanded through globalized trade and social mobility, creating mega-regions (Figure 2) throughout the United States.

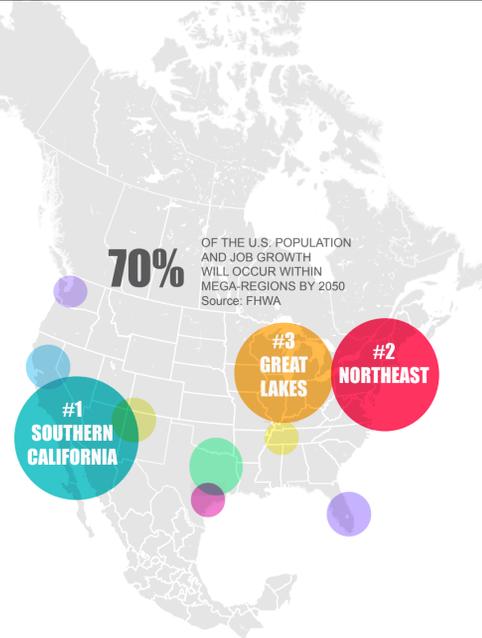
Resilient food production, freight distribution, and market demand is ready for change. Climate change impacts the reliability of cross-country food systems, affecting the food security of the most fragile of our communities: the poor, the young and the aging. The future of food security will rely on improved public access to multiple food sources, minimizing food deserts, improved rural/urban relationships and public transparency of how we get our food.

Bottleneck congestion delaying food freight truck entry into urban areas has created complex labor issues for truckers and challenges for local farmers attempting to enter regional food markets. Long-haul trucks are poorly designed for stop and go traffic, producing more greenhouse gas emissions than other freight modes impacting public health. This is true particularly in the case of cold storage freight, which requires greater and more constant energy use.



FOOD SYSTEM CHAIN

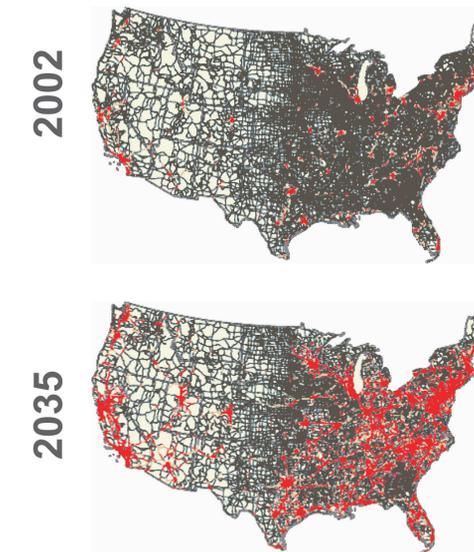
Source: Stevenson et al, "Midscale Food Value Chains: An Introduction"



MEGA-REGIONS

Congestion is prevalent in most U.S. cities but the three most congested cities ranked in order are Los Angeles, New York and Chicago. The cost of congested delay for truck freight affects delivery reliability, high labor turnover and high fuel cost amongst many other costs.

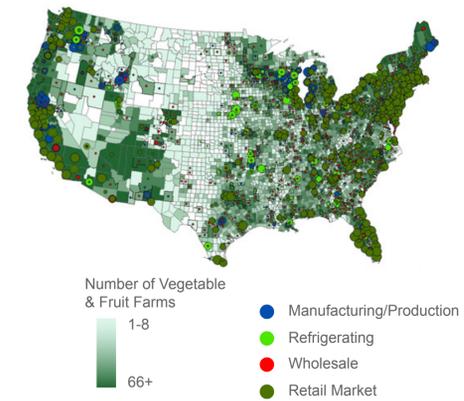
Image: Julia Schilling
 Data: RPA, America 2050



PROJECTED US CONGESTION IN 2035

The average delay per vehicle mile traveled makes a steady increase while the total hours of delay increases sharply. This is due to the outward spread of congestion from major cities affecting areas that may be without congestion today.

Images: Nancy Chachula
 Data: Brookings' analysis of FAF



PRODUCE INDUSTRY SUPPLY CHAIN

Map of produce sources and destinations.
 Source: Hamideh Etemadniaa et al, "Optimal Wholesale Facilities Location within the Fruit and Vegetables Supply Chain With Bimodal Transportation Options: An LP-MIP Heuristic Approach"

PROPOSED SYSTEM

We intend to bridge the urban-rural transition by modeling and proposing a series of truck hubs located outside of Chicago and other major urban areas in the upper Midwest. Our interdisciplinary team of researchers, designers, food and freight experts and stakeholders are investigating the decentralization of the current food freight system by separating rural and urban duty cycles.

Urban freight hubs along the perimeter of metropolitan areas will lessen both congestion and greenhouse gas emissions exacerbated by long-haul trucks. This also creates an opportunity for sustainable fuel methods such as **wind, solar,** and **alternative fuel** or **hybrid use** by trucks entering urban areas. These hubs will open up the market for local producers by creating a **web of urban access points** where consumer demand for local foods can be met.

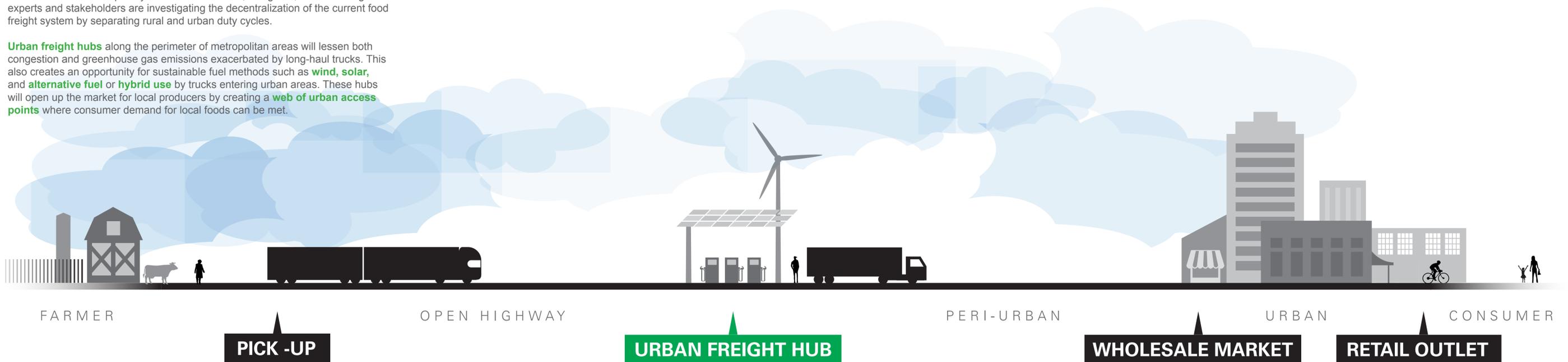


Image: Julia Schilling