The Evolution of Food Miles and its Limitations as an Indicator of Energy Use and Climate Impact

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Leopold Center for Sustainable Agriculture

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- Created in 1987 (Iowa Groundwater Protection Act)
- State funded (Iowa general revenue fund and tax on N fertilizer and pesticides)
- Averaging 1.2 million per year in funded projects
- Focus on 3 initiative areas since 2001:
  - Marketing and Food Systems
  - Policy
  - Ecology

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What are "food miles?"

- Distance food travels from where it is grown/raised to where it is purchased (consumer or end-user)
- 1969 DOD study – 1,346 miles
- Other estimates – 1,500-2,500 miles
- Food miles in industrial nations have increased significantly in last 50 years

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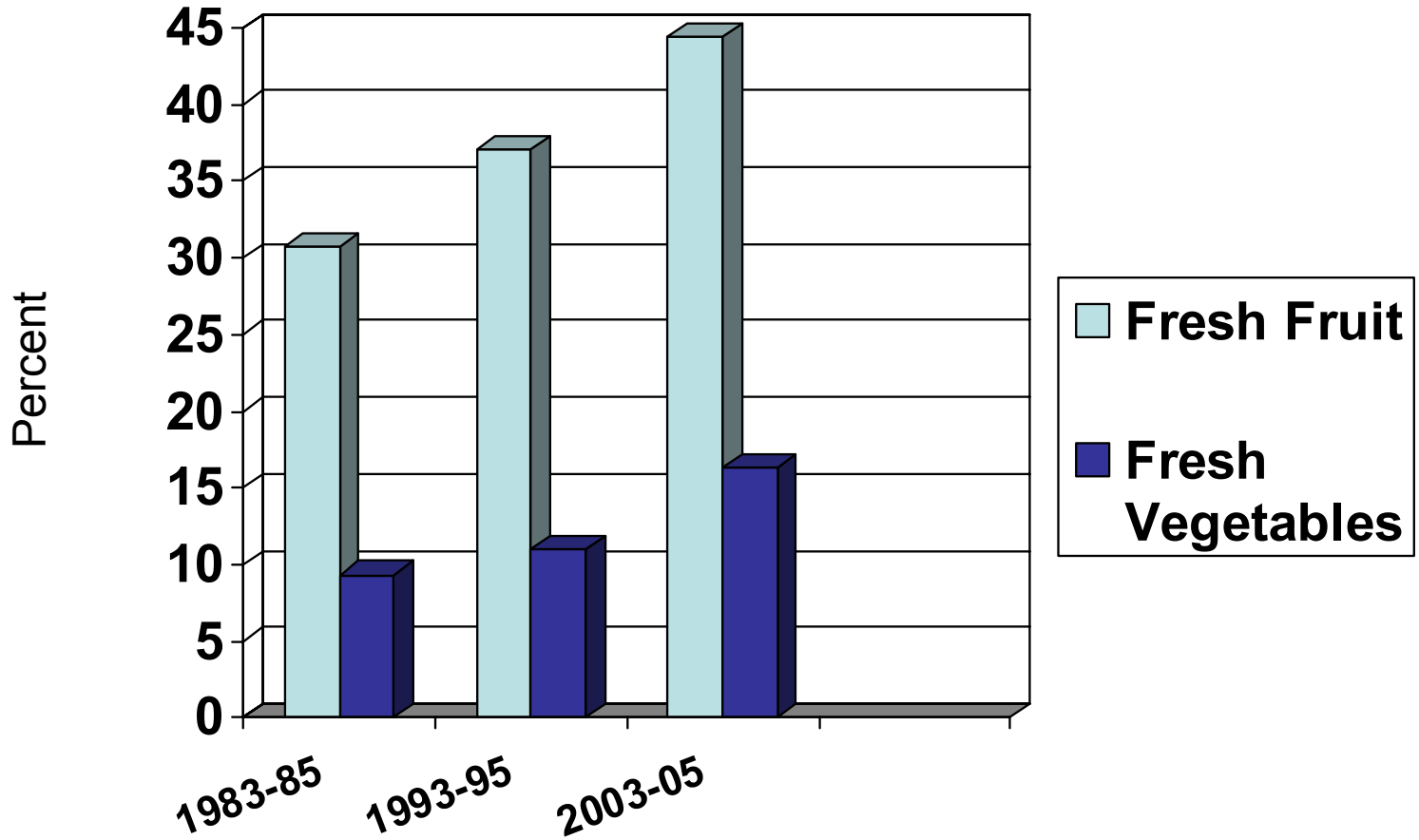
Import Share of Fresh Fruits and Vegetables – U.S. selected years



Source: Prepared by USDA Economic Research Service

Dole sliced peaches

Peaches grown in Spain

Peaches shipped to Thailand
For processing

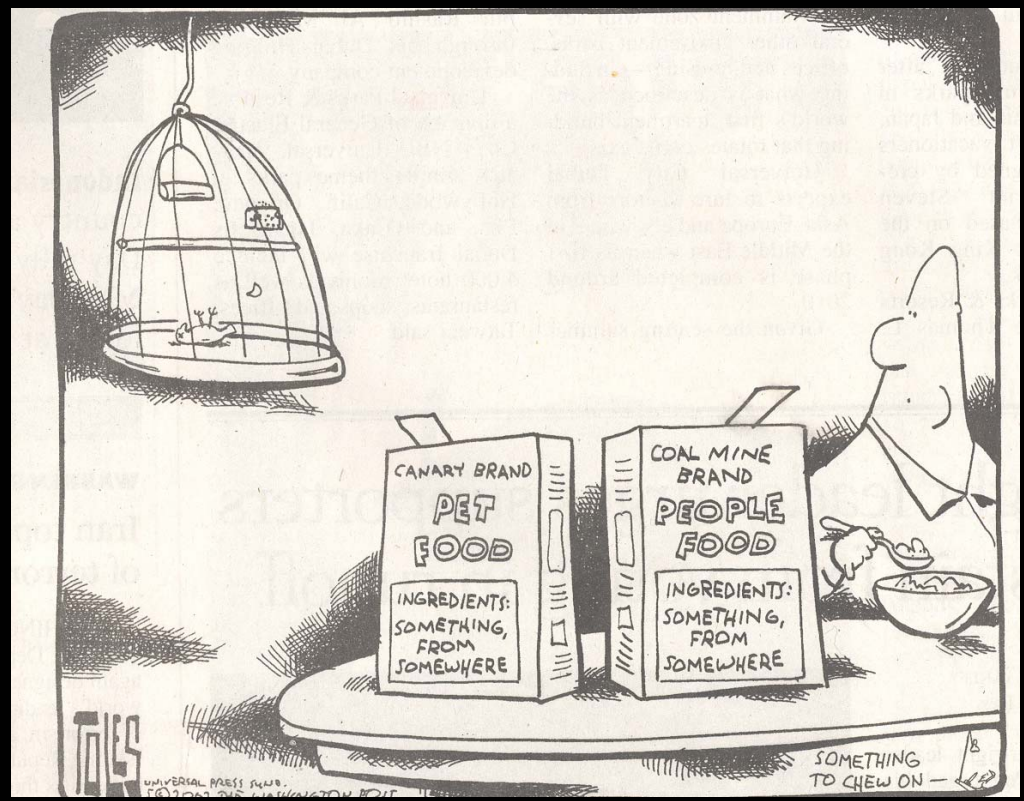
Peaches shipped to U.S.
for distribution

Peaches arrive in Iowa store

Total food miles:
14,700 (minimum)

Local foods in a changing context

Growing interest in local, more concern about climate change, health, food safety



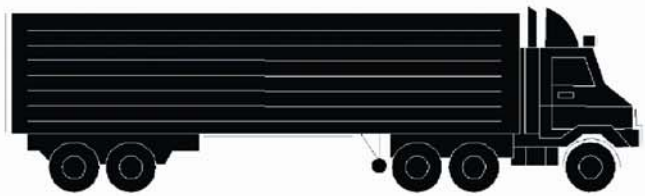
Environmental impact of food transportation

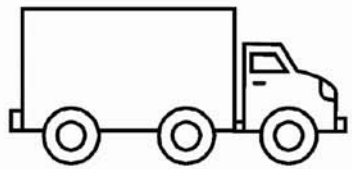
Estimating fuel usage, CO_2 emissions and miles traveled

Three food (produce) distribution systems

- **Conventional system** — integrated retail/wholesale national system using semitrailer trucks

- **Iowa-based regional system** — based on existing regional distribution system using semitrailer and midsized trucks





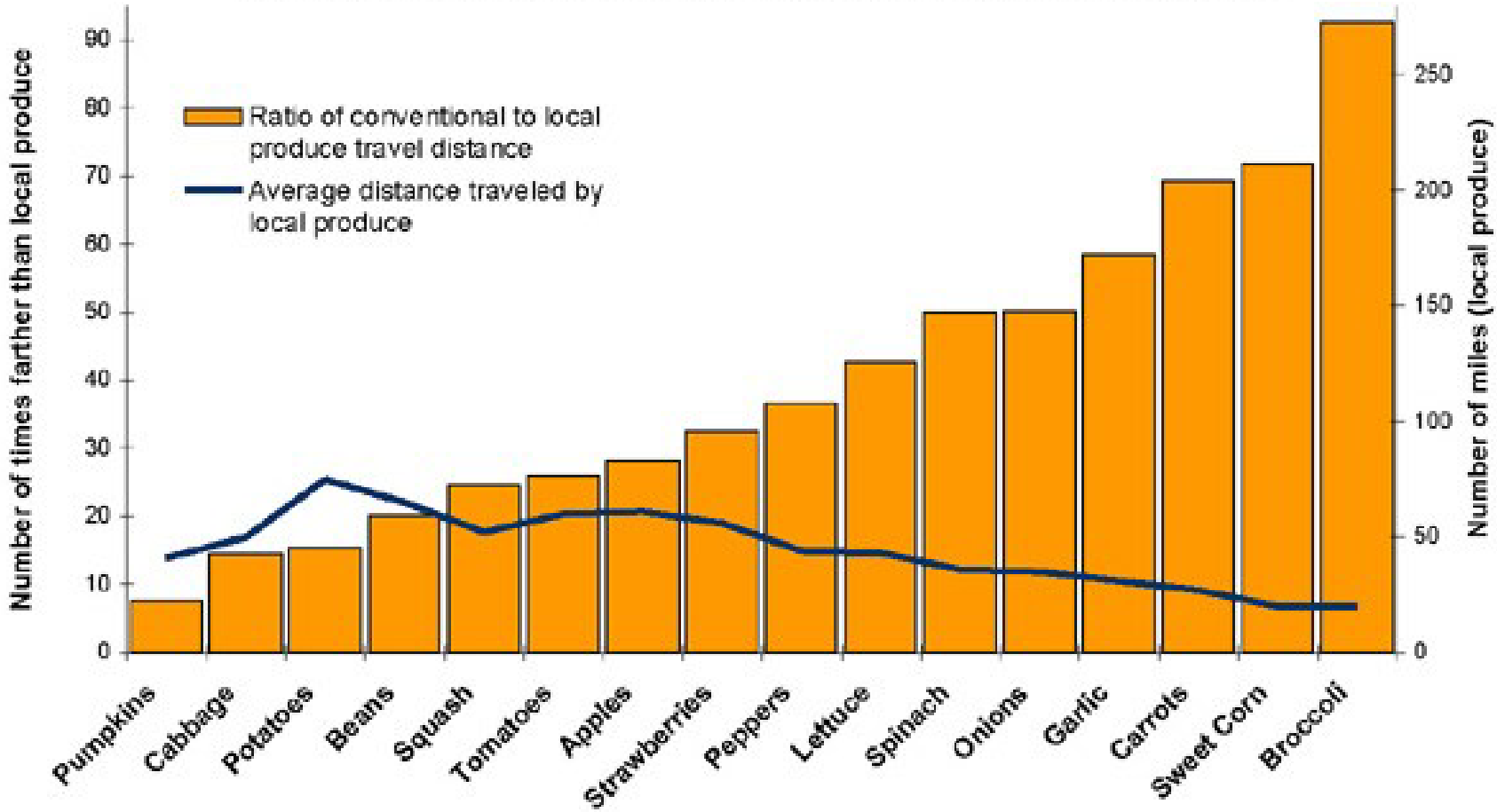
- **Local system** — CSA/farmers markets and institutional markets using light trucks

Estimated fuel consumption, CO2 emissions, and distance traveled for three truck-based food transport systems.

Food transport system	Fuel Consumption (gal/year)	Co2 Emissions (lbs./year)	Distance traveled (miles)
National semitrailer	368,000	8,400,000	2,245,000
Regional midsize truck	44,000	993,000	370,000
Local small truck (institutional)	88,000	1,730,000	1,518,000

From: Food, Fuel, and Freeways – Leopold Center, 2001. Each system was to transport 10% of per capita consumption of fresh produce to feed Iowa

How much farther does conventional produce travel?



Source: Leopold Center for Sustainable Agriculture, 2003

Local produce data from 2001 Practical Farmers of Iowa "All Iowa" meals. Conventional data extrapolated from 1998 USDA AMS produce arrival data for Chicago and St. Louis

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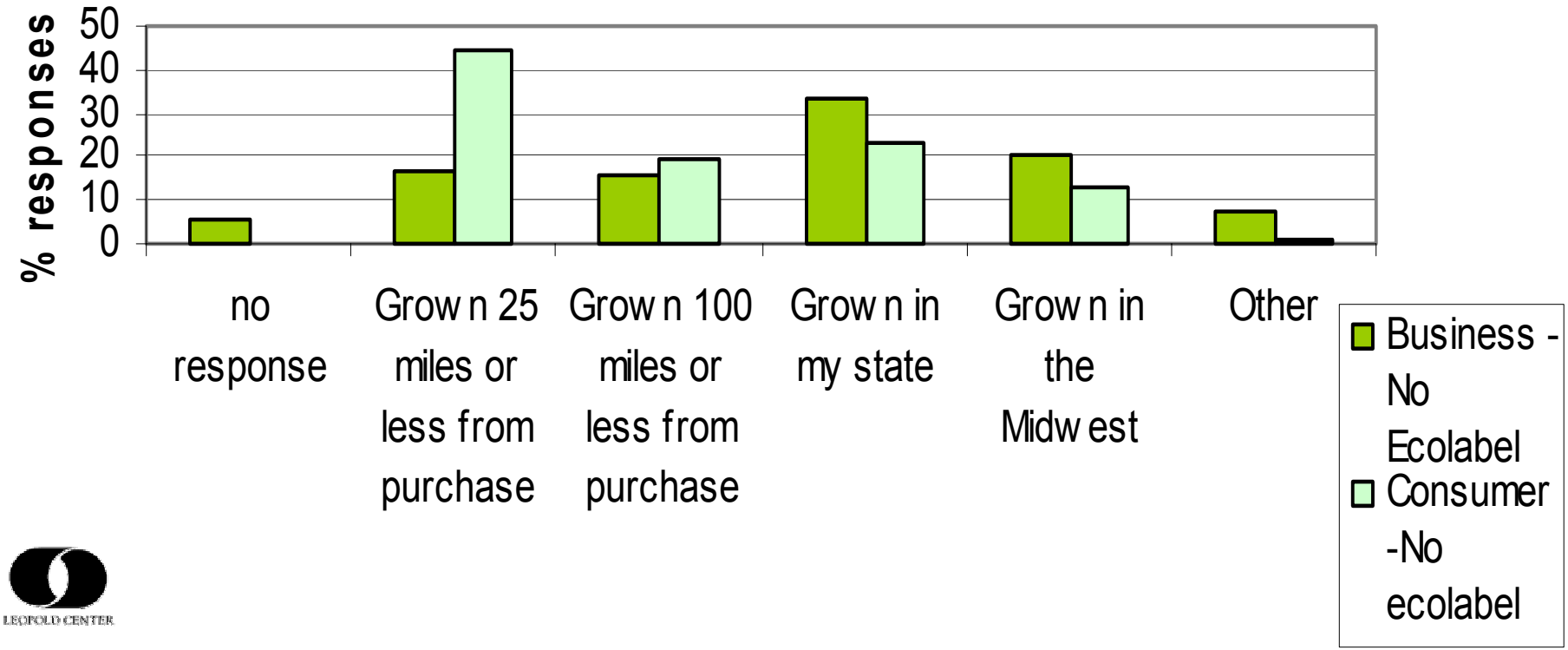
Ecolabel Value Assessment – Phase I

What do you consider "local" when making a food purchase or carrying a food product through your store or business?



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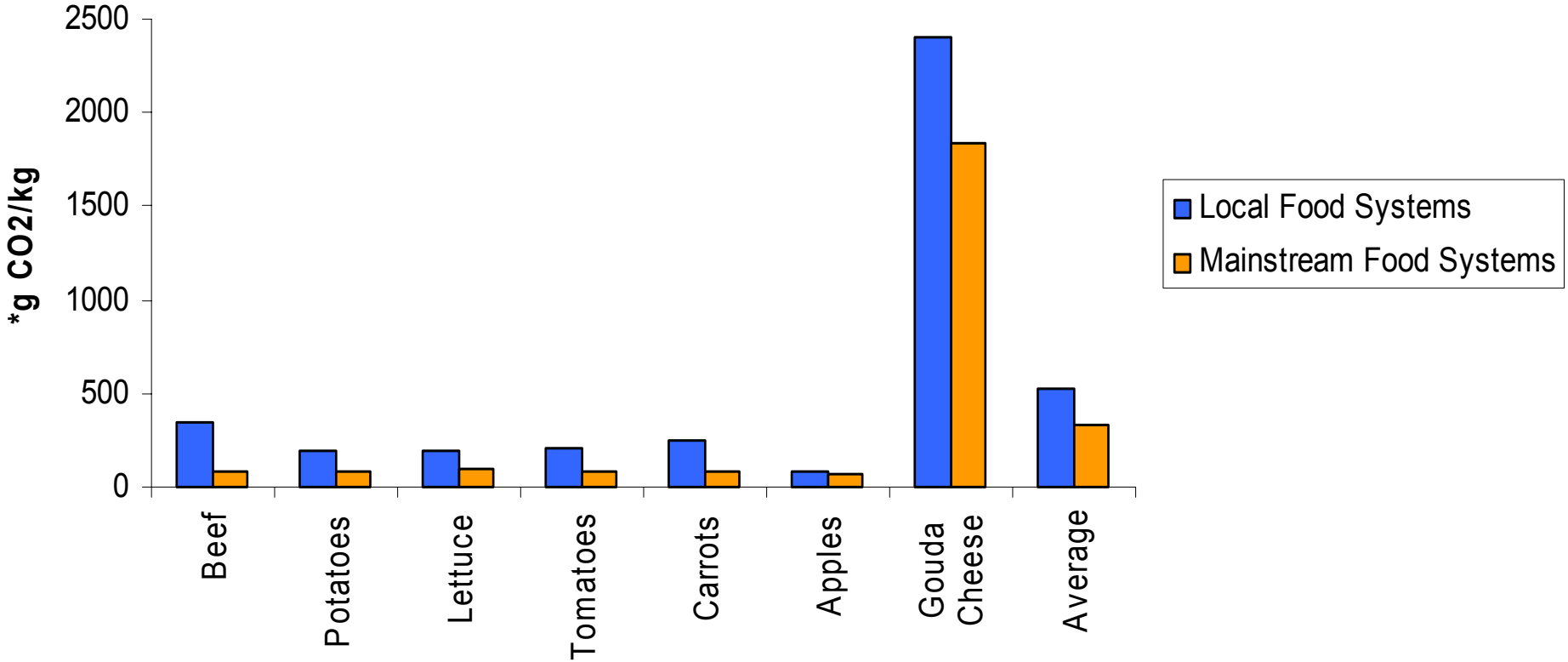
Food miles

- A very good indicator of “localness” of a food
- A great metaphor to contrast local and global food systems
- Not a good indicator of environmental impact

Need to consider

- Mode of transport and fuel efficiency
- Environmental impact across the entire food supply chain (LCA)

Comparison of CO2 emissions in g CO2 per kilogram of food item for local food systems and mainstream food systems



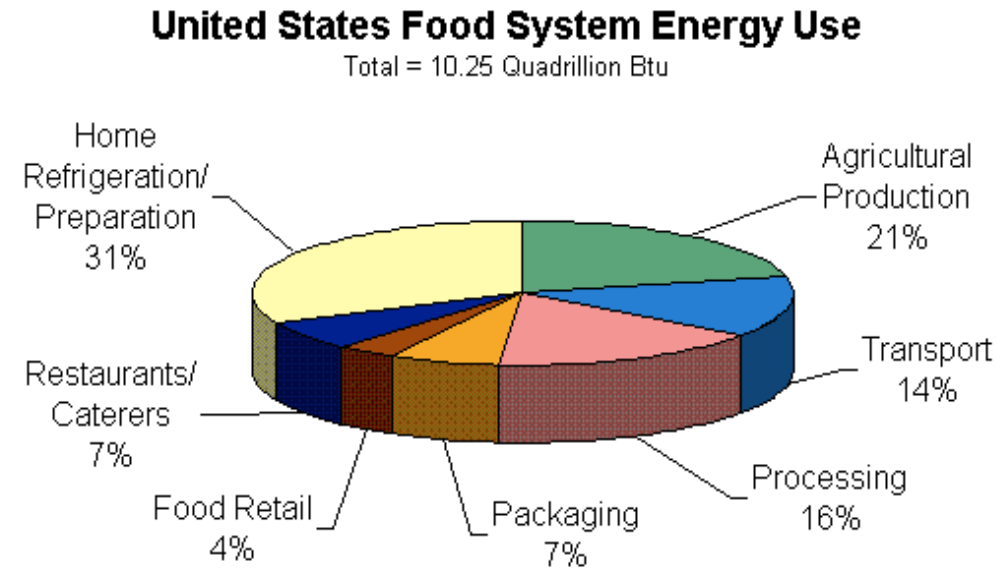
*CO2 Emissions are from transport, processing, storage.

Local system: various local case studies in and around Flanders, Belgium

Data from *Energy Lifecycle Inputs in Food Systems: A Comparison of Local Versus Mainstream Cases.* A. Van Hauwermeiren et al - 2007.

Energy Consumption in the food system

- Total U.S. Energy Use: 100 QBtu (2005) ***1***
- Food System: 10.25 Qbtu ***2***

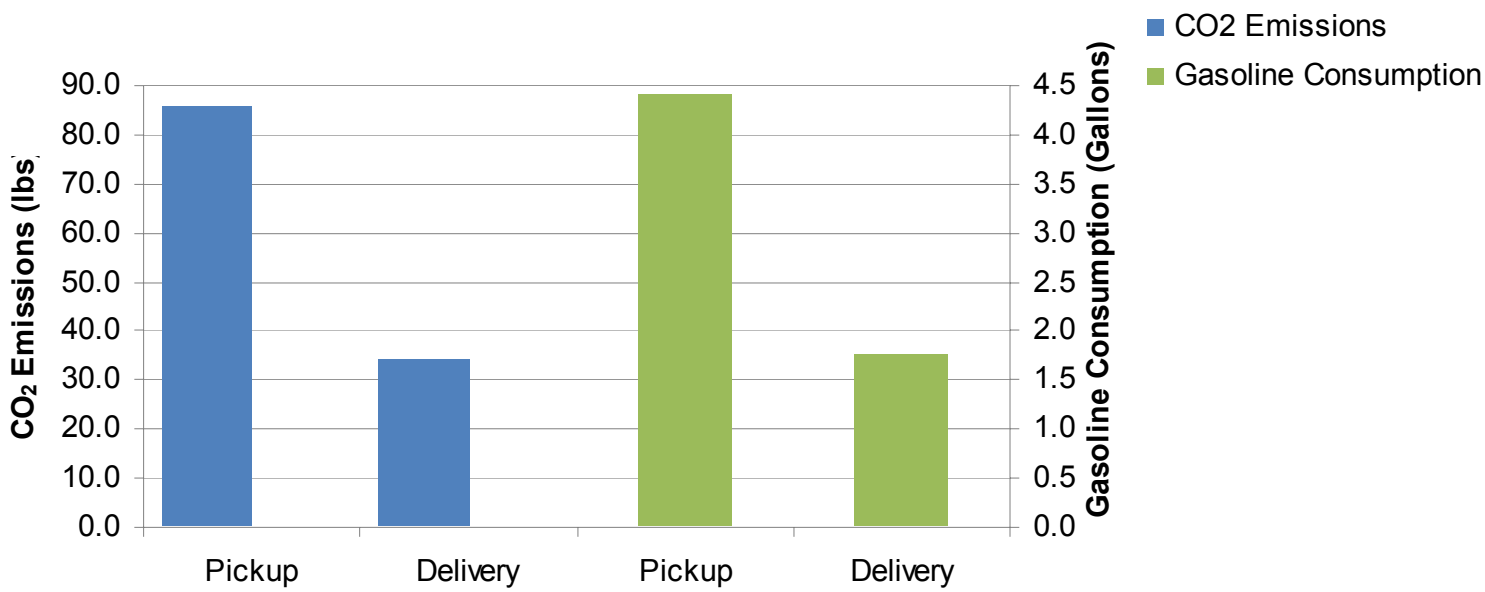


Based off producing 3,800 calories of food

Source: Heller and Keoleian

Sources: 1) Energy Information Administration Annual Energy Overview (2005); 2) Heller and Keoleian "Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System" (2000);

Comparison of Fuel Consumption and CO_2 Emissions between Iowa CSA Delivery and Pickup



CSA Pickup Data based upon U.S. average fuel economy - two routes, Story County, IA
CSA Delivery Data based upon Toyota Prius fuel economy - two routes, Story County IA

Pirog and Rasmussen, Leopold Center for Sustainable Agriculture, Iowa State University 2008

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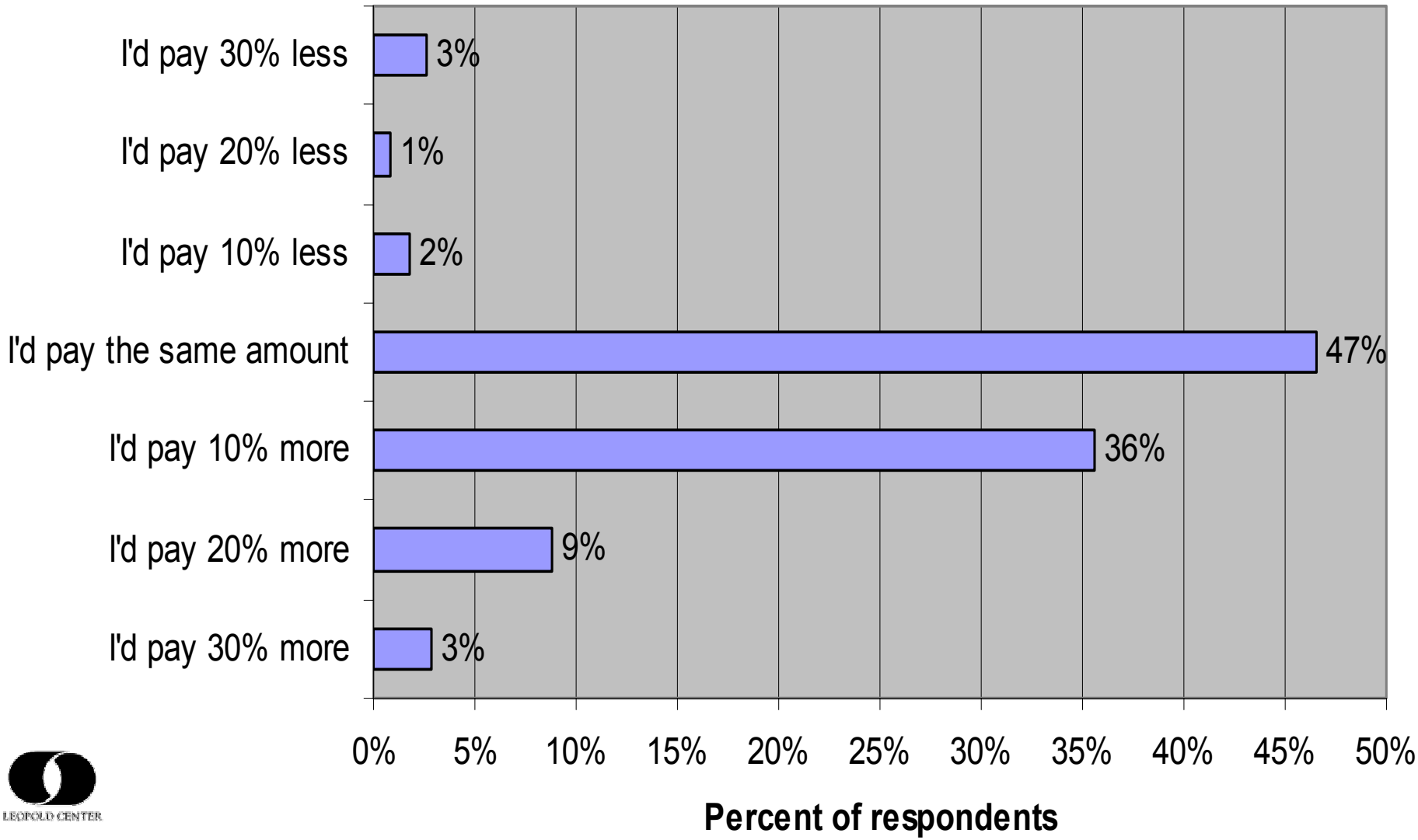
Figure 12. Willingness to pay for produce that contributes 50 percent less greenhouse gas emissions



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Healthy foods

Environmental

Benefits

Swedish research

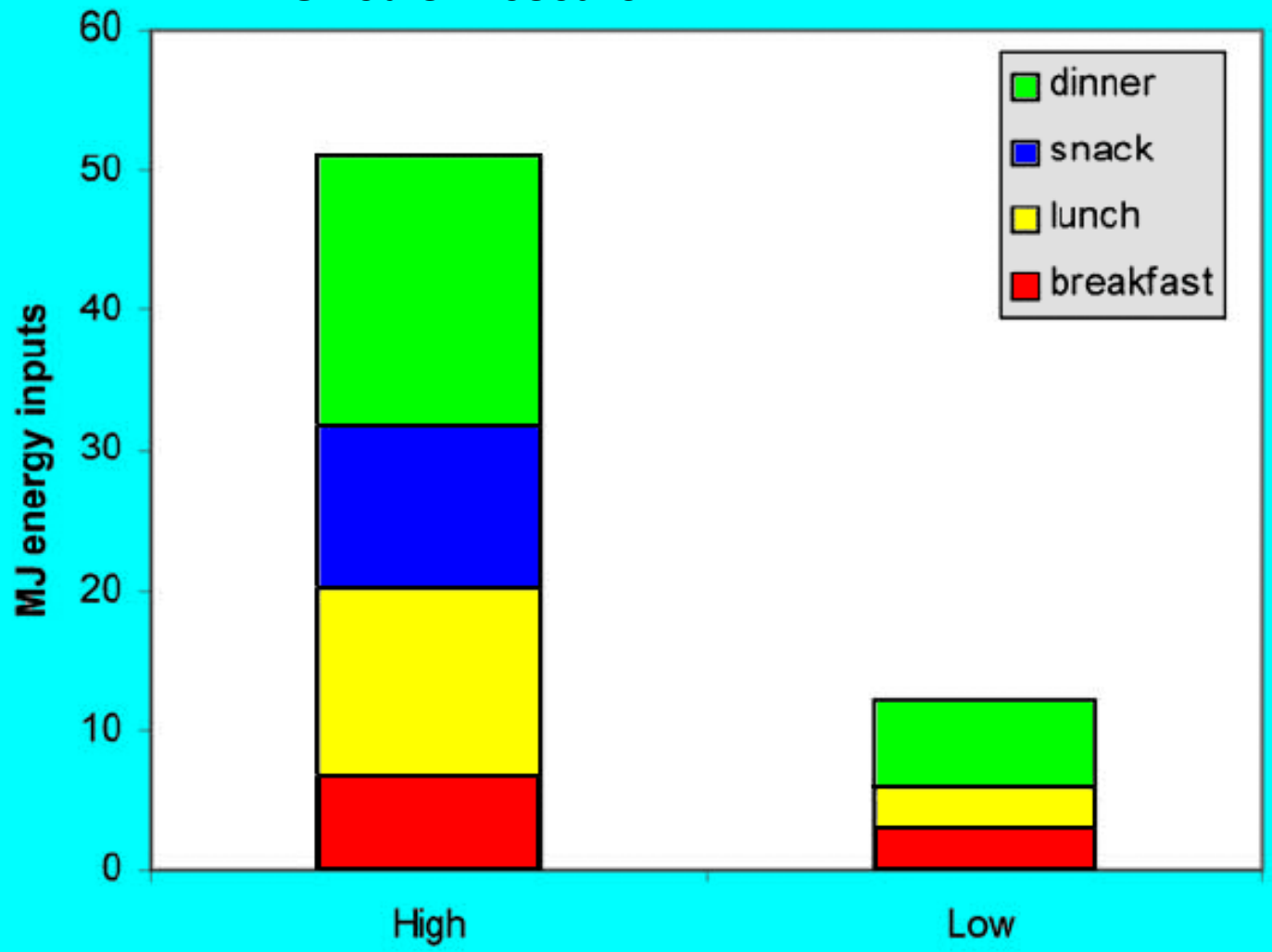

Fig. 2. Examples of life cycle energy inputs for two daily diets for one person. The two diets have similar amounts of diet energy but the High differs from the Low by a factor of four in terms of life cycle energy inputs. Carlsson-Kanyama et. al - 2003

Thank you…for more information

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