Energy-Efficient Transportation Strategies:
An Assessment of Public Attitudes, Behaviors and Preferences

A presentation by

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Purpose of the Study

- Gauge preferences for policies to improve energy efficiency in surface transportation on O'ahu.

- Possible policies:

    Use incentives and disincentives to induce shifts to more fuel-efficient modes of transportation.

    Increase the passenger load factor of existing vehicle fleets.

    Increase the existing capacity of the transportation system and/or shift travel demand from peak periods to reduce congestion.

    Provide incentives for motorists to buy more fuel-efficient vehicles.

    Promote smart growth to decrease overall travel demand.

- See handout: Policy Recommendations to Promote Greater Fuel Efficiency in Surface Transportation

Motivation for the Study

- Volatile oil and motor fuel prices.

- Potential impact of pending national greenhouse gas emission (GHG) regulations.

- Much understood by electric utilities, but not yet a factor in urban transportation planning.

- Need to gauge consumer attitudes, behaviors and preferences to determine which policies appeal to the public.

Survey Residents of O'ahu

- Part One: Measure personal attitudes toward and changes in behavior regarding more fuel-efficient options in surface transportation.

- Part Two: Measure trade-off preferences for alternative living and commuting environments that could be built during the next 25 years.

Part One

- Natural Experiment of Rising and Falling Oil Prices
  - Evidence to suggest that people are driving more with oil prices down, even in recession (NY Times)
- Need to understand what behaviors "stick" - to keep momentum towards energy efficiency
- HCEI emphasis on
  - Increased mass transit
  - More fuel-efficient internal combustion
  - Alternative fuel vehicles
  - Improved personal mobility
  - Behavioral changes (including non-travel modes)
  - Emphasis on electricity as a clean fuel possibility

Questions about
Attitudes and Behaviors

Did the rapid rise in the cost of gasoline last spring cause you to change your travel behavior by any of the following means?

- Combine several errands into one trip.
- Change driving habits to increase my car's fuel economy.
- Eliminate some non-commute trips entirely.
- Consider purchase of a more fuel-efficient car.
- Use a bicycle and/or walk more often.
- Join a carpool or vanpool to commute to work.
- Use a bus more often.
- Telecommute or look for a home closer to work.

Source of Questions

- See handout: Potential Questions for Web-Based Survey
- Questions taken from large-scale national polls of adults on energy issues performed during the past three years as reported by PollingReport.com.

  - Section 1: Questions about a person's
    past attitudes and behaviors.

  - Section 2: What if questions about the future.

  - Section 3: Background questions about respondent.

- Currently gathering comments on these questions from different stakeholders.

Part Two
Transportation and Land Use

The U.S. needs to cut CO_2 emissions by 60-80% relative to 1990 levels to achieve climate stabilization by 2050.

Transportation sector cannot do its fair share to meet this target through vehicle and fuel technology alone.

Need to sharply reduce the growth of vehicle miles driven through policies that encourage smart growth.

Source: Reid Ewing, et al., Growing Cooler: The Evidence on Urban Development and Climate Change. ULI et al., Washington, DC. October, 2007.

Smart Growth May Occur in Different Locations

- Urban renaissance and redevelopment
- Urban infill
- Suburban infill
- Greenfield projects - including "smart growth" developments at the edge.

Principles of Smart Growth

- Promote mixed land use
- Encourage compact building design
- Provide a range of housing opportunities and choices
- Build distinctive and attractive communities with a strong sense of place.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Strengthen and direct development towards existing communities.
- Provide a variety of transportation choices.
- Make development decisions predictable, fair and cost effective.
- Encourage community and stakeholder collaboration in development decisions.

Source: Getting to Smart Growth: 100 Policies for Implementation

Market Demand for Smart Growth

Consumer surveys show about one-third of the home buying market wants the smart growth product.

Academic research [Dowell Meyers, 2001]

Homebuilder surveys [NAHB, 2002]

Smart growth studies [SGA/NAR, 2004]

Preference surveys by regional/metropolitan organizations
    [SMARTRAQ (Atlanta) 2006]

Private sector reports [Robert Charles Lesser & Co., compiled 2007]

Source: Gregg Logan. 2007. *The Market for Smart Growth*, EPA White Paper, Washington, D.C.

Studies of Consumer Housing Preferences

- Conventional surveys show large majority of consumers still prefer single-family detached homes.

- But well-designed "visual surveys" show a growing number of housing consumers prefer …
  - higher-density development with smaller lots and homes
  - mixed housing types
  - accessible open space
  - narrower streets and sidewalks
  - commercial activity within walking distance

- Source: Emil Malizia and Susan Exline, Consumer Preferences for Residential Development Alternatives, Center for Urban and Regional Studies, University of North Carolina, February 2000.

Decision to Purchase a House

- Consumers make "trade-offs" when choosing a house and where to live.
  - Larger lot or a shorter commute to work?
  - Larger home or a better quality home?
  - Closer to shopping and services or spend more time driving?
- Rather than a single dominant housing preference, a significant market exists for a variety of housing alternatives.

- Source: Terrye Underwood, Consumer Trends and Greenfield Development, RCLCO, February 29, 2008.

Household Types

- Changes in life stage and lifestyle predict when households seek new housing.
- Shifts dictate preferences for both infill and greenfield development.
- Different household types:
  – Maturing "baby boomers" born between 1946-1964.
  – Generations X and Y are entering housing market in greater numbers.
  – The presence - or absence - of children in the home.

Source: Underwood, 2008.

Attitudes of Baby Boomers vs. Generation Y for Infill Development

- Baby boomers
  - Quality of schools is now a lower priority.
  - May seek a home that requires lower maintenance.
  - May value proximity to urban amenities (culture, entertainment).

- Generation Y
  - Diverse in terms of people, household compositions and housing types.
  - May seek excitement, a "sense of place, and quality design.
  - Some are very accepting of higher density.
  - The ideal community is a "walkable" environment.
  - Infill development is consistent with value to be "green".
  - Half now say single-family home isn't important if they have kids.

- Source: Underwood, 2008.

Need to measure trade-off preferences for specific residential attributes such as…

- Dwelling unit density
- Lot size
- Homogeneous vs. mixed land uses
- Quality of design
- Travel distance to work, school, and other urban services
- Costs of public and private modes of travel
    - Relative to other costs
    - Based on vehicle and fuel type

Conjoint Analysis

- Asks respondents to prioritize options that describe alternative residential environments.

- Each option represents a bundle of attributes that can take on different values.

- Questionnaire design is a challenge.

  - Must choose attributes and values that are relevant to respondents.

  - Yet not overwhelm respondents with too many options to rank order.

- If successful, this method reveals the importance that respondents attach to residential and travel attributes.

Simple Example of Conjoint Analysis

Option A
- Live in a suburban single family home
- Drive 30 minutes to work
- Park for $10/day

Option B
- Live in a suburban single family home
- Ride a bus 50 minutes to work at $2 per ride

Option C
- Live in an urban condominium
- Walk 15 minutes to work

Intend to include other options

Maximum Difference Scaling

- Superior to conventional questionnaires that use scales of importance.

- Similar to conjoint analysis, but simpler for respondents to comprehend.

- Has been used in Web-based online surveys.

- Sawtooth Software developed the methodology
  - Presents a large panel of respondents with alternative living and commuting environments.
  - Asks respondents to make choices between competing options.
  - Enables respondents to progressively narrow their preferences.
  - Reveals rankings of the relative importance of the items being rated.

Source: Measuring the Market for Green Residential Development, Robert Charles Lesser and Company, Los Angeles, California, January 2008.

Possible Control Variables

- Age
- Gender
- Educational achievement
- Employment
- Household size
- Number of motor vehicles available for use
- Current residential location
- Annual household income

Alternative Sampling Plans

- Ask recipients of HECO's *Consumer Lines* newsletter to participate in a Web-based online survey.
- Hire a call center to draw a representative sample of O'ahu residents of driving age to participate in a telephone interview.
- Hybrid methodology
  - Use call center to recruit a representative sample.
  - Email the questionnaire to this sample.

Direct comments and questions to…

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