It's About How and Where We Build:

Connecting Energy and Smart Growth

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Environmental and Energy Study Institute (EESI)

non-profit promoting environmentally sustainable societies. EESI pursues innovative public policy initiatives through coalition building, publications, Congressional briefings, peer networks, workshops and task forces.

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Themes

1. We are at a rare moment when public awareness of energy and climate change issues is high -- and aspects of the problem have become more acute. This increased urgency presents new challenges and new opportunities.

2. Dealing with current energy and climate problems will require a **comprehensive and holistic strategy that relies on establishing connections and collaborations between issues, individuals and organizations** – that may not, previously, have worked together. Energy issues need to be tied to problems of high concern to communities and other stakeholders.

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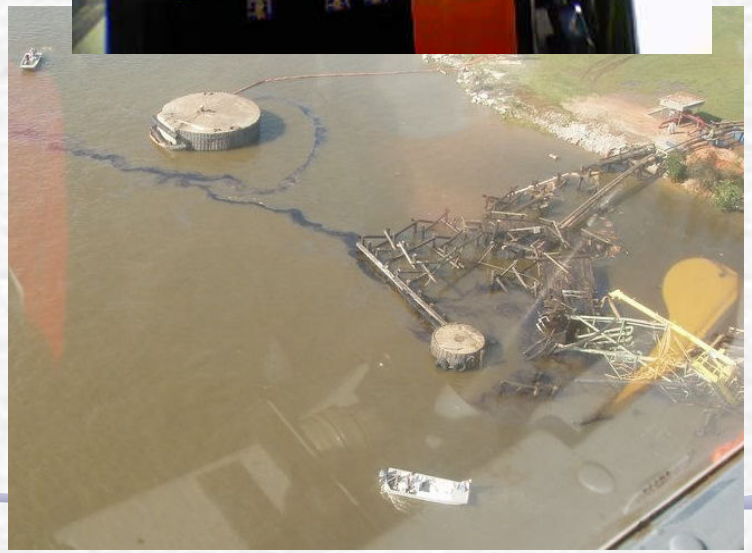
Energy and the General Population:

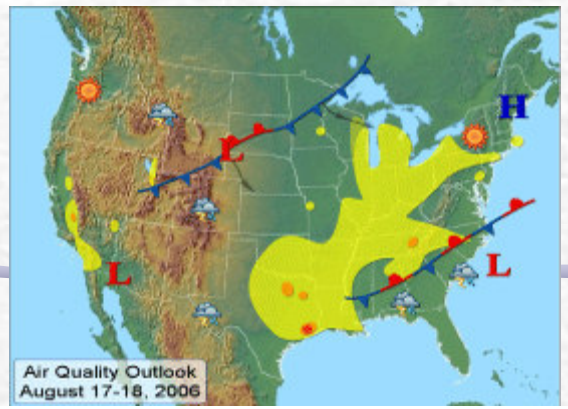
Energy Problems Have Found Their Way into Every U.S. Household

- **Historically high gasoline prices,** blackouts, rising heating, air conditioning costs (crude oil above $70/barrel; electricity and natural gas prices on rise)

- **Our vulnerability exposed**
  - **Gulf Coast Oil Infrastructure** (losing 25% of domestic crude oil production and 10% of refining capacity)



- **Growing Awareness of World Competition for Oil** China's avg. increase in oil consumption 8% year.
- **Peak Oil: 2010? 2016? before 2020? When will world oil production peak?**
  - Almost 60% of the oil we now use is imported. Lack of transparency in world oil markets.
- **Air Quality:** Hundreds of counties in nonattainment with new 8-hour ozone and PM 2.5 standards.



Increased Public Concern about Climate

- **According to 2006 National polls** (Gallup; Time; and Ayres, McHenry and Associates):
  - **85% of Americans say global warming is probably happening**
  - More than half (53%) say **global warming is due to human activity rather than natural cycles**
  - 62% say they **worry a great deal or a fair amount about greenhouse effect** (up from 51% in 2004)
  - **68% say the government should do more to address this problem; 87% support tax breaks for water, wind and solar energy**
- **Twenty-eight U.S. states** (e.g. CA, OR, WA, NY, MA, NM, N.E.) **and over 220 Mayors have set GhG reduction goals and/or plans**
- Some legislative initiatives on Capitol Hill ??

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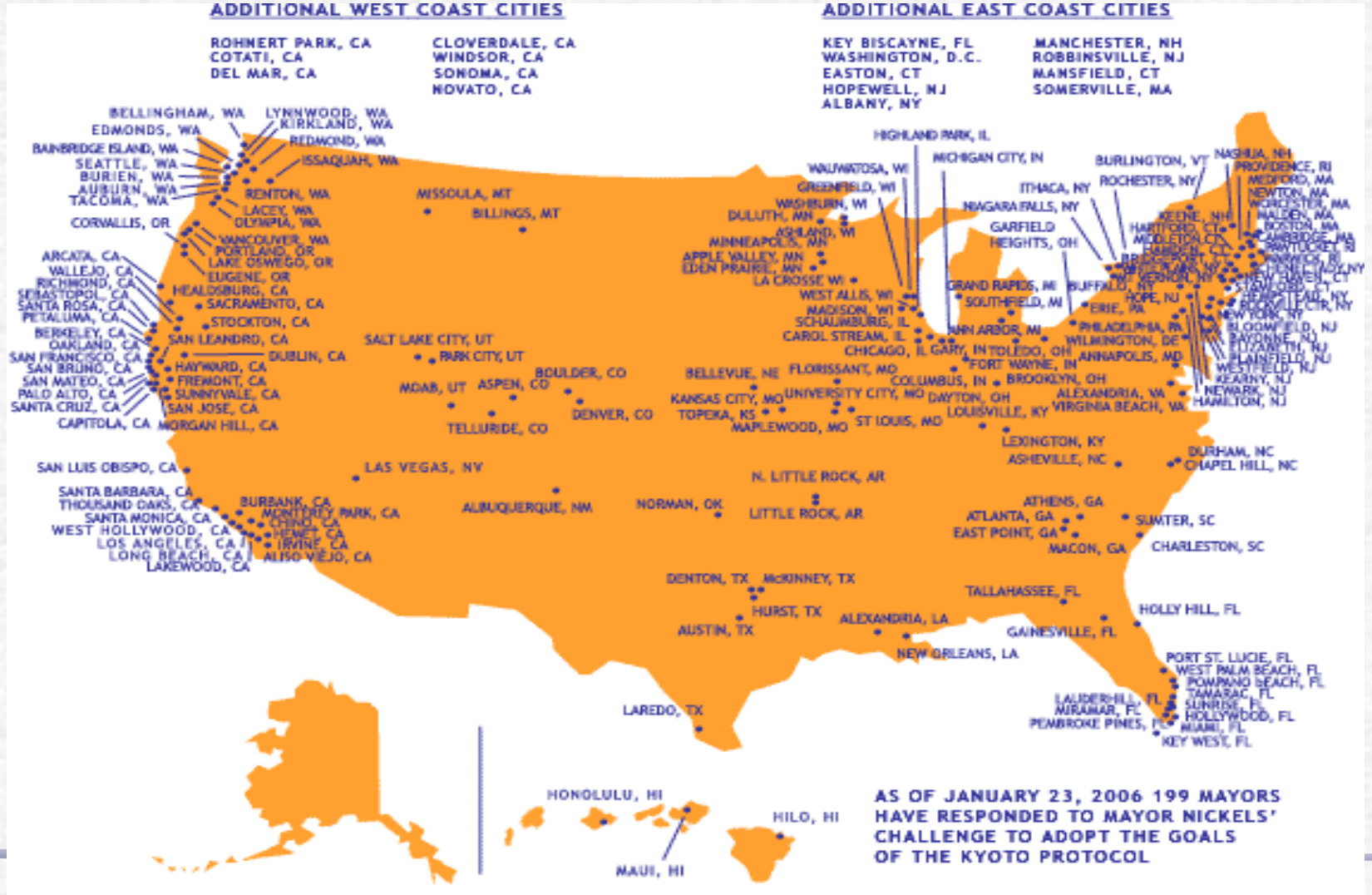
Local Action on Climate Change



It's About How and Where We Build

- While great progress has been made in increasing the energy efficiency of certain products, and diversifying energy supply (e.g., through renewables), **comparable progress has *not* been made in decreasing the energy demands associated with the way in which we design, plan, build and LIVE in our communities.**

Conventional Suburban Development

- Grew up around abundant and inexpensive supplies of energy
- Relies on cheap sources of energy to function
- Locks us into wasteful patterns that can be difficult to alter…even when we want to.

Can the built environment help rather than hinder our energy, environmental and quality of life goals? Can these two communities come together?

Land-Use Patterns and Energy Use, Distribution, and Supply

Where We Build? Location Efficiency:

- Development in or near city or town centers (e.g., infill)
- Close proximity to public transportation (e.g. ¼ to ½ mile)
- Mix of uses – locating residential development close to commercial development and other services
- Compact development
- Proximity to water, wastewater, and electricity distribution
- Presence of walking and biking paths
- Schools sited within walking/biking distance
- Preservation and promotion of greenspace/forests.
- Integration of land-use/energy resources planning for cogeneration, distributed generation, and renewable energy generation.

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How to Build: Energy Improved Neighborhood and Building Design:

- Energy efficient site planning, inc. solar street and building orientation
- Narrower streets and reduced parking requirements
- Energy efficient building design, including equipment, appliances, upgrades, insulation, light colored roofs, awnings, etc.
- More compact housing
- Broad canopied, deciduous shade trees, green roofs, less water demanding vegetation

Land Development and Energy

Where We Build?

Location Affects:

- **Transportation energy use** (car ownership and VMT)
- **Infrastructure energy** – e.g. electricity transmission, water and sewage delivery
- **Renewable generation potential**
- **Building energy use** (more compact housing typical in more urban areas)

How We Build?

Design and Size Affects:

- **Building energy use** (inc. size, purchase of misc. electronics)
- **Opportunity for passive and active solar**

Total Benefit? What Might This Add Up To?

	Urban Households	Suburban Households
Travel	80 Million Btu/yr	140 MMBtu/yr
Home	100	110
Community Infrastructure	140	190
TOTAL	**320**	**440**

Source: CA Energy Commission, PLACES3, 1996

- Mark Jaccard, et al: range of community energy efficient improvements could reduce community energy usage by 15 to 30%. Extending these to a larger region, could yield GhG reductions of 17%.
- City of Seattle: Reducing Dependence on automobile (170,000 T GhG reduction) and using energy more efficiently in homes and businesses -inc. some utility improvements (316,000 T reduction) = 71% of their 7% below 1990 reduction goal.
- Portland/Multnomah Co. 13% GhG reduction since 1993, through variety of improvements.

"The single most important factor affecting the relationship between urban form and transport energy requirements is the physical separation of activities, determined by both density and the interspersion of land-uses."

-Susan Owen, *Energy Planning and Urban Form*.

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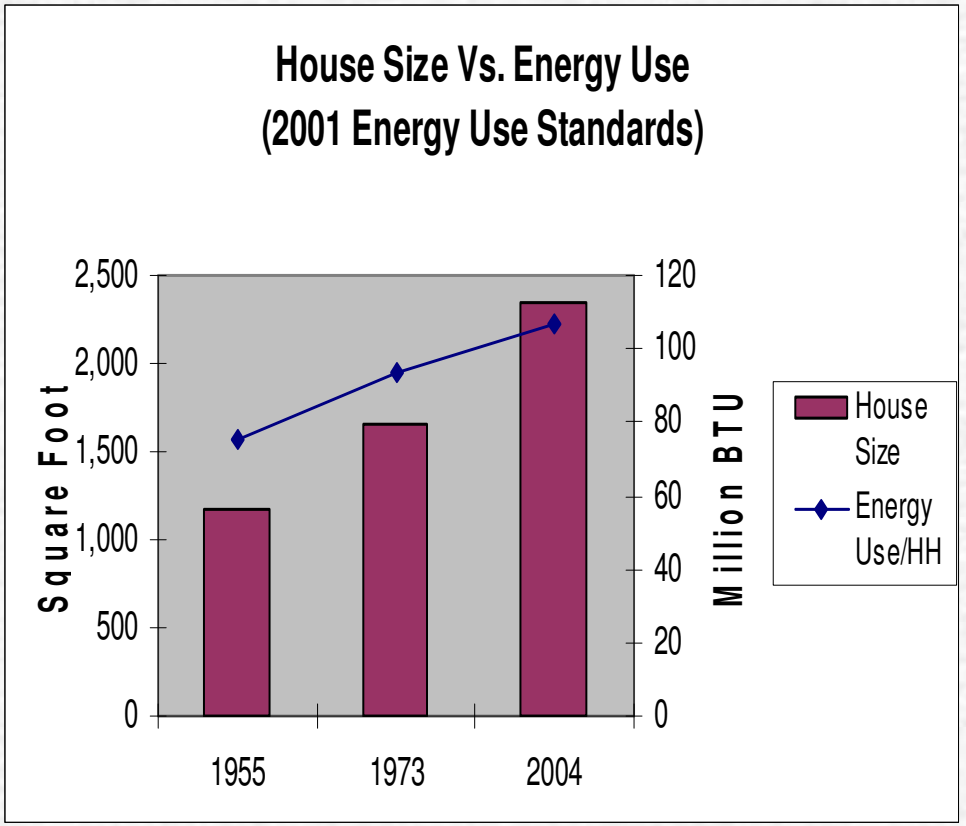
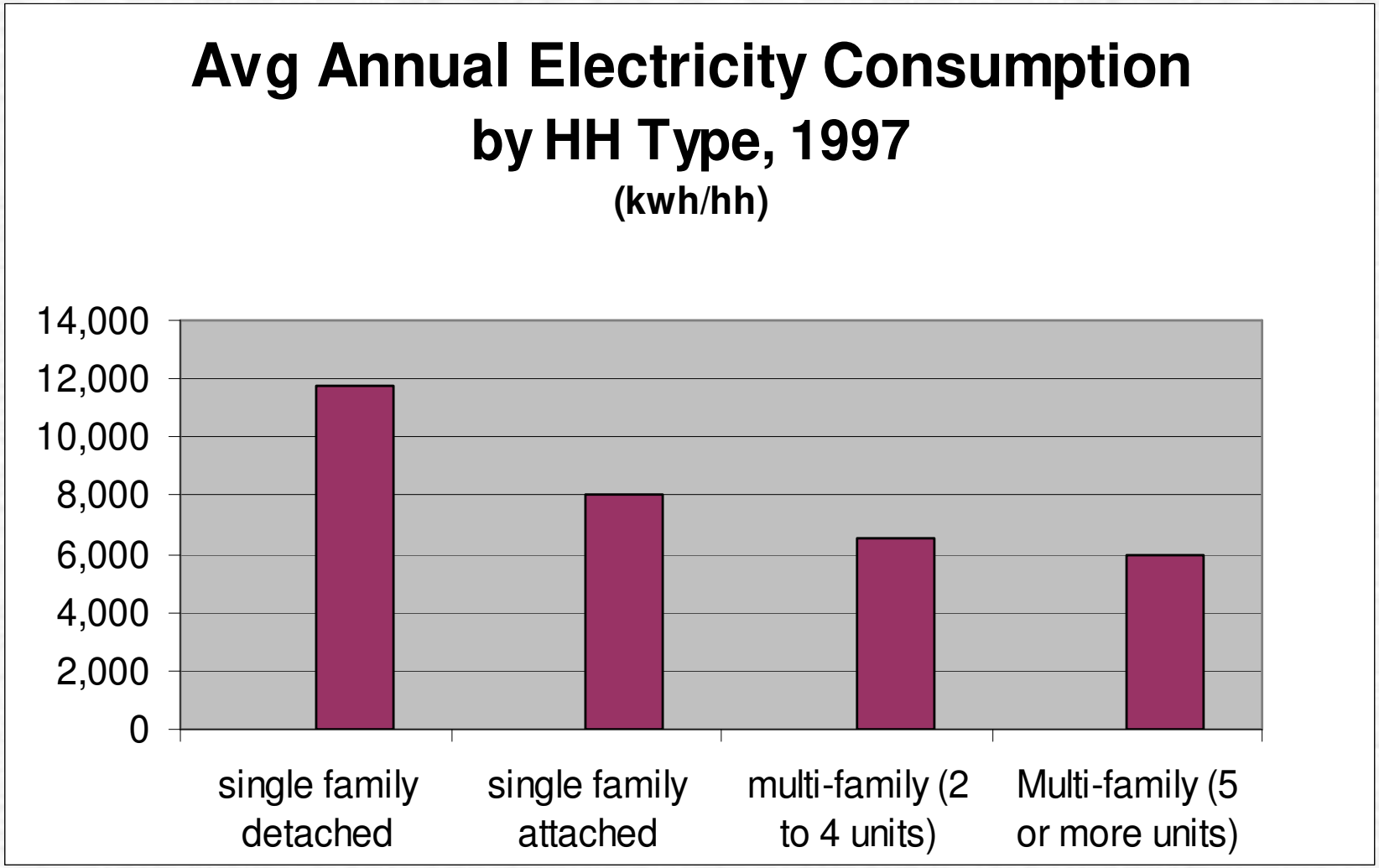
Size Matters!

- Size is one of them most significant factors to resource efficiency, yet it is underrepresented in most green building rating schemes.

  -Michael Horowitz, Sustainable Solutions, Montpelier, VT

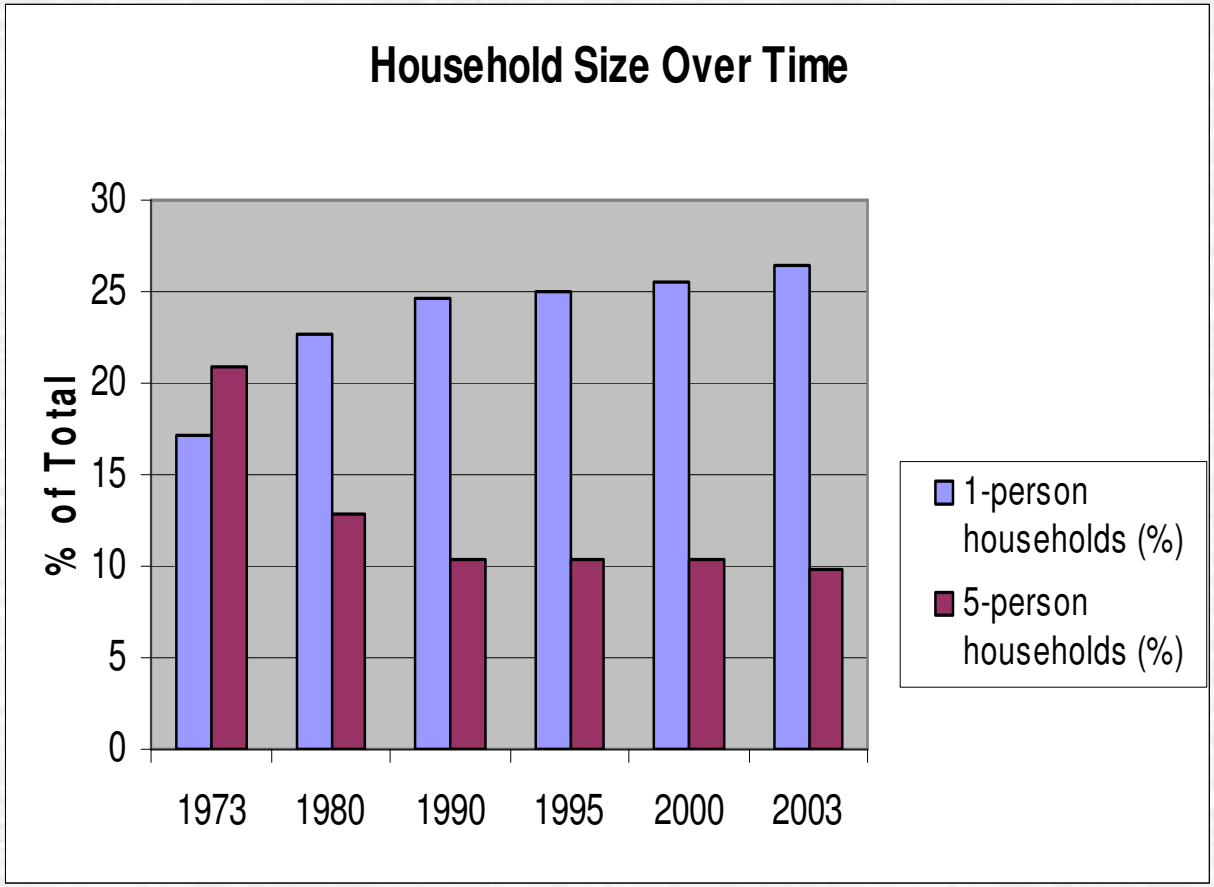


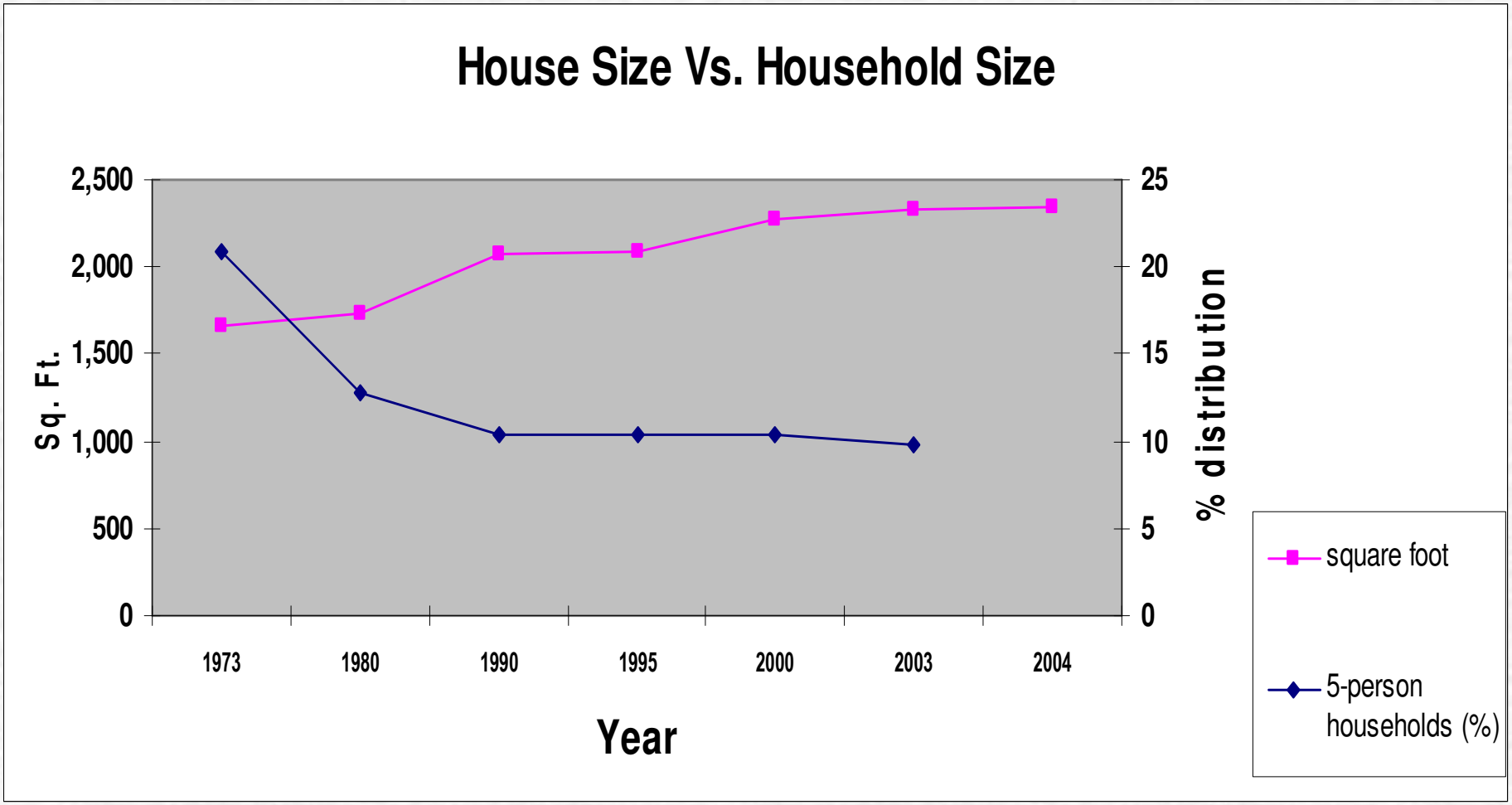

Avg Annual Electricity Consumption
by HH Type, 1997
(kwh/hh)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
single family detached
single family attached
multi-family (2 to 4 units)
Multi-family (5 or more units)

Source: EIA

House Size vs. Household Size

- While house size Has grown 42% since the early '70's, household size *decreased* by 18%!





Data Source: U.S. Census Bureau

4 Immediate Opportunities to Bridge the Land-Use/Energy Gap

- LEED – ND
- GhG Reduction Planning
- Affordable Housing/Community Dev.
- Land-Use Planning

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LEED-ND

- NRDC, CNU, USGBC's national set of standards for neighborhood design that addresses green building design AND smart land-use practices.
- It is about how we build.. It's about where we build.

GHG Reduction

- 28 states, over 200 cities
- 11 of the 17 plans examined had VMT reduction/land-use improvements, with 9 having significant sections.
- Smart growth community needs to be involved.
- CCAP, ICLEI, USCM, etc.

Affordability

- High utility bills are a major reason lower income individuals cannot afford to stay in homes.
- Travel Costs and Housing Costs **increase** as one moves away from the central cities (Neptis Foundation).
- Brookings Institute and CNT Housing and Affordability Index –the combined costs of housing and transportation are most affordable in areas **well serviced by public transit.**

Urban Planning

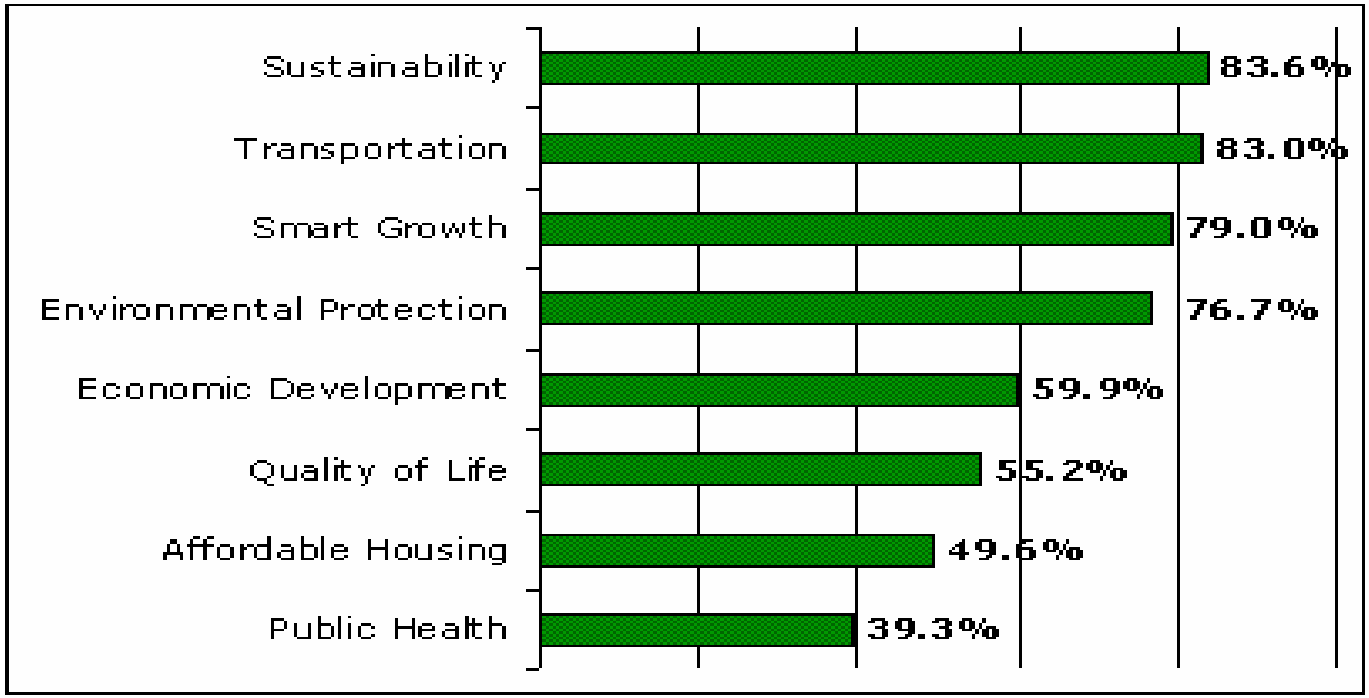
- Smart growth advocates, new urbanists, some urban planners are allies. May use different language, same ideas.
- Energy rarely included as dedicated section in comprehensive land-use plans (VT, CA).
- High interest among planners, low technical knowledge.

What do Planners Think?

- **APA/EESI Survey of 5,000 U.S. planners**, August 2005
- Majority respondents public sector planners working for local or regional government
- **Nearly 95% of planners stated they believe energy issues are "very" or "somewhat" connected to their jobs as planners (65% "very connected" 30 % energy issues are "somewhat" connected.)**

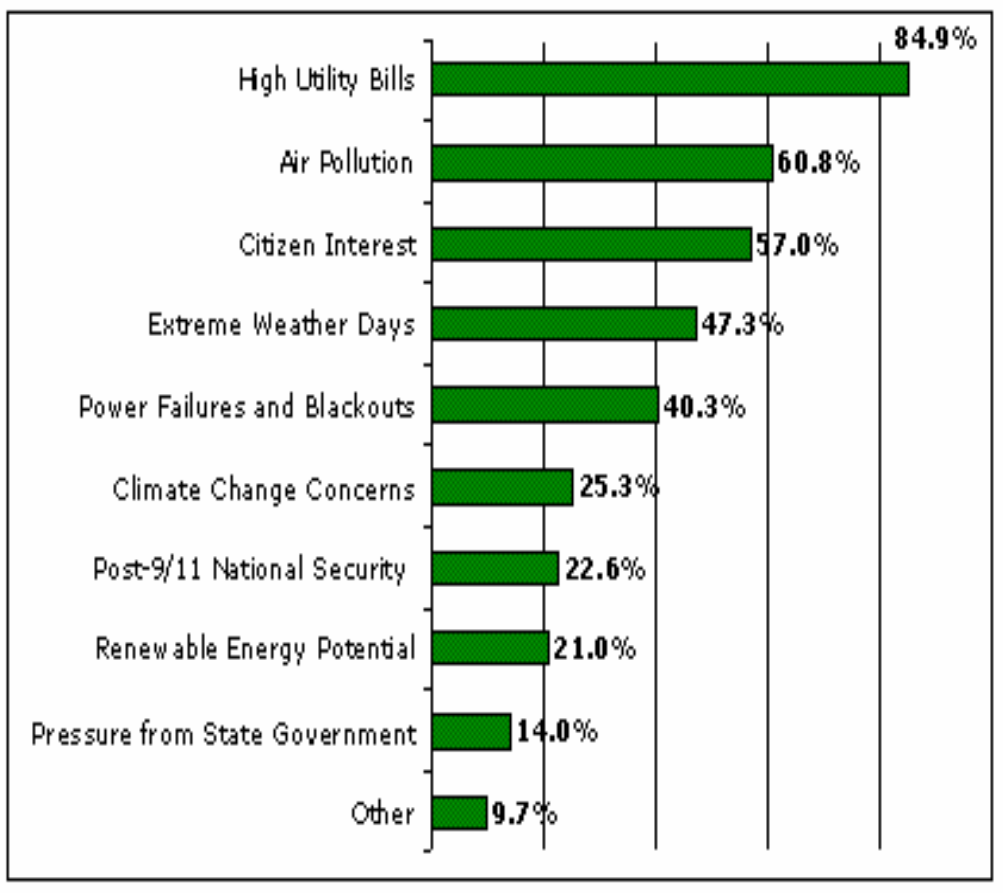
In What Way is Planning Connected to Energy?

- The following planning issues were ranked as being very connected to energy efficiency and/or renewable energy.



What is motivating this Concern?

- High utility bills, air pollution and citizen interest top reason communities are interested in energy. **Energy a multi-prong issue.**



Community Priorities that Directly or Indirectly Relate to Energy

Highest community priorities that relate to energy:

1. Reduce sprawl
2. Promote alternative modes of transportation
3. Reduce energy bills

Moderate priorities cited related to energy:

- Increase energy efficiency
- Reduce overall energy demand
- Reduce oil consumption
- Reduce dependence on autos
- Incorporate renewable energy options

Energy Policy Status:

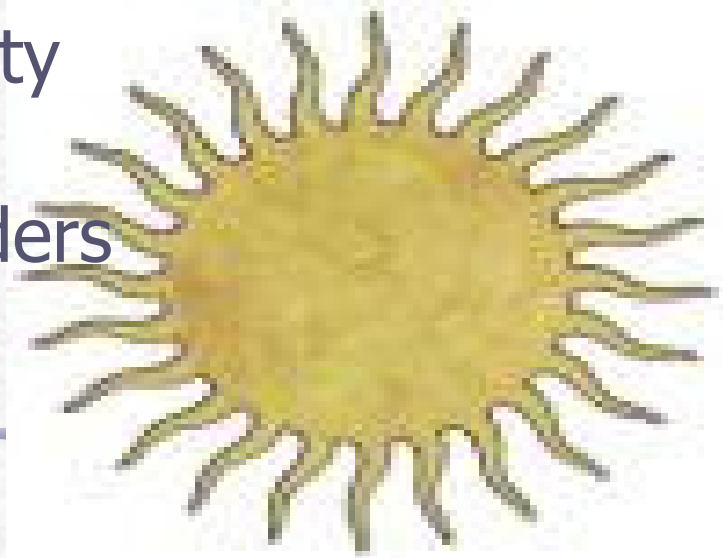
- **About 1/3 of communities have an energy use reduction goal** with 28% energy policy statement
- **Nearly 1/3 of communities have a PM goal**; and 29% had an **ozone goal**
- Nearly **1/3 have policies for public buildings to be energy efficient**
- 11% said they have **goal to reduce GhG**

Energy Policy Goals Popular Components:

- Encouraging pedestrian and bicycle travel
- Increasing energy efficiency
- Supporting renewable energy
- Decreasing VMT
- Reducing use of petroleum and fossil fuels
- Some – include energy efficiency in affordable housing.

Energy Knowledge

- Awareness of renewable energy technologies mixed. Most **only somewhat or not familiar with renewable energy technologies.** Planners most familiar with passive solar and hydropower with some familiarity with wind and solar hot water.
- Nearly ½ offer developers/builders energy efficiency information



Implementation

- 20% have siting standards for power generation and distribution facilities
- **Few** include energy as an element in their comp. plans (20% say will be in updated plans)
- **Few** address renewable energy or efficiency in zoning ordinances, overlay zones, subdivision regulations, solar access requirements, density bonuses

Survey Findings:

- **Energy interest high!** (e.g.last two editions of Planning Mag on climate/energy)
- **Energy knowledge limited.**
- **Energy Implementation low.** Energy more typically addressed indirectly. May not be calling it energy efficiency… but it is! (E.g. nearly 30% have TOD regulations, with 65% of these having at least one built TOD project.)

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Conclusions

- **Energy awareness growing**… chance to capitalize on this attention.
- **Opportunity for a broader look at energy use – including where and how we build.**
- **Need for new partnerships, shared language, outreach, education**
- **Need for more research, metrics, more complete energy models, policy initiatives.**

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Need to tie to local issues of concern

- Fuel cost savings
- Cleaner Air
- Economic development
- Innovation/Leadership
- Increased livability/comfort/
  Security/convenience
- GHG reduction goals

Thanks! For more information

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