

Sustainability and “Green” Suburbs



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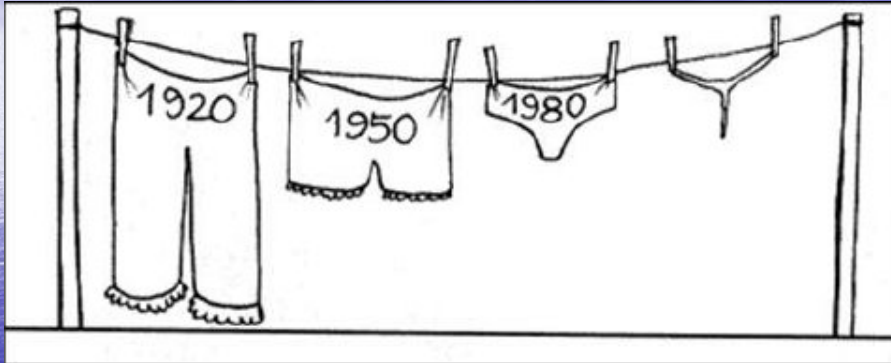
Global Warming

Is it True?

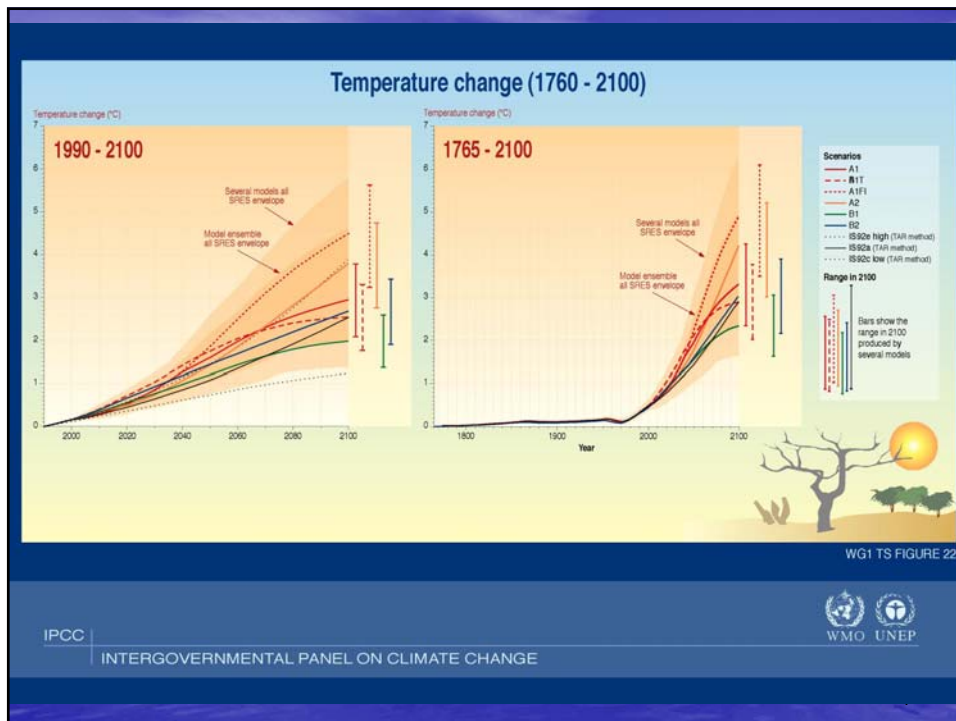
How serious is it?

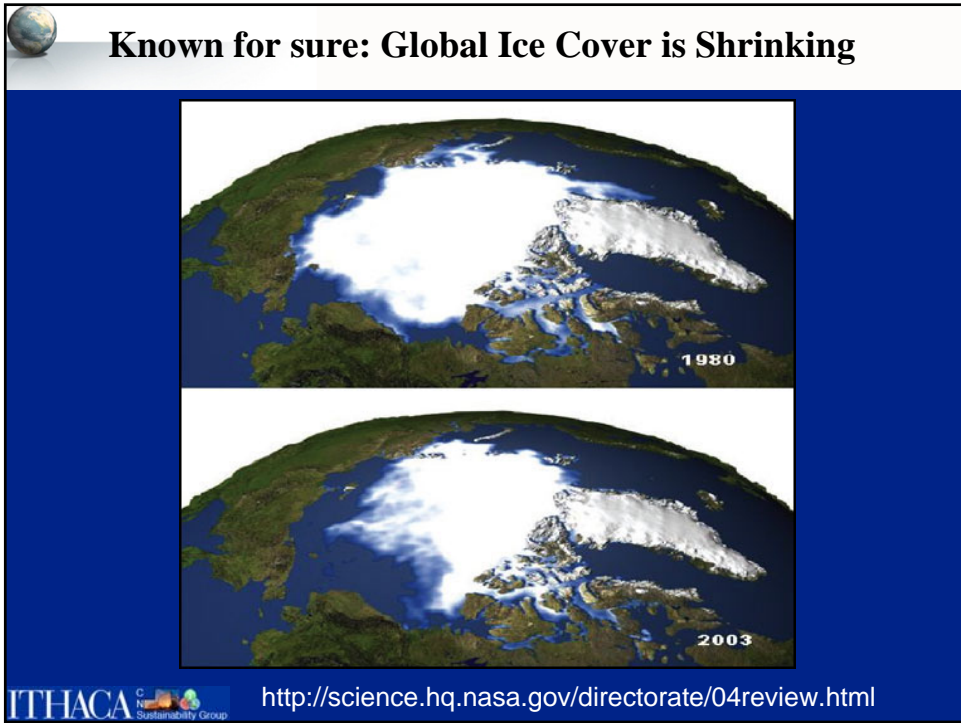
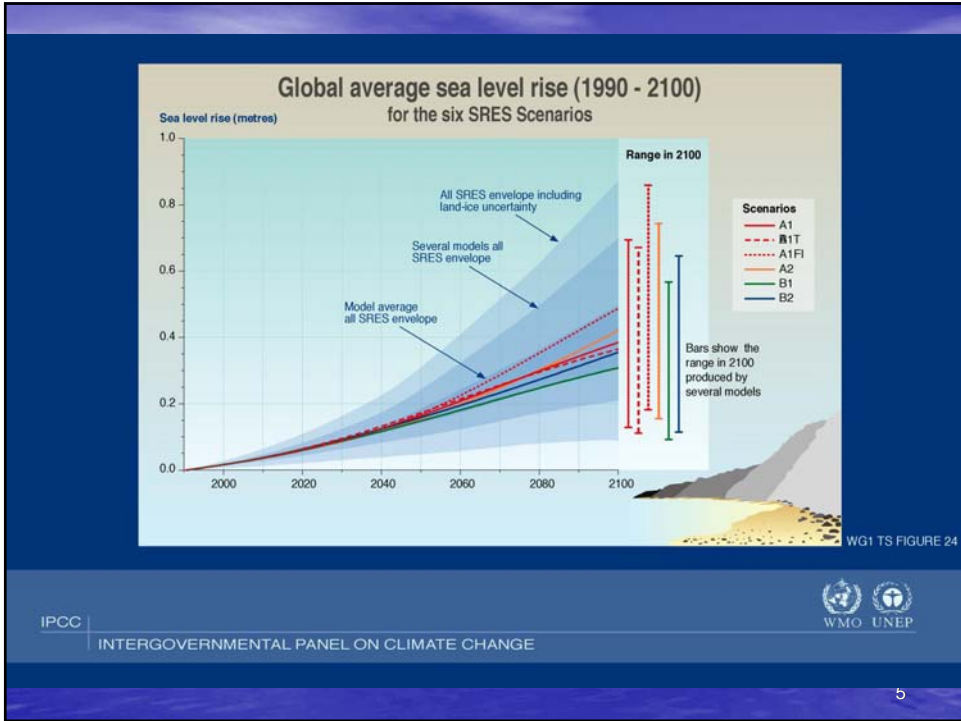
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Proof that global warming is real

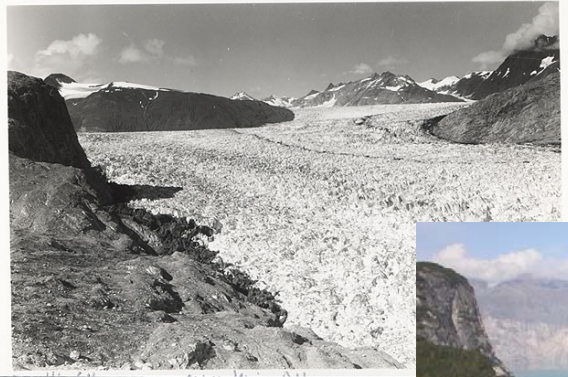


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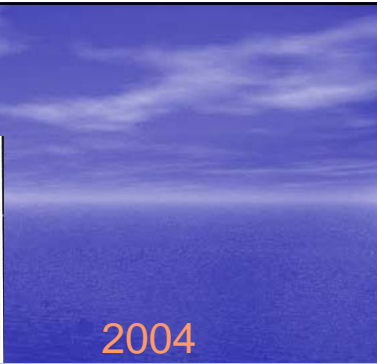




Muir Glacier, Alaska



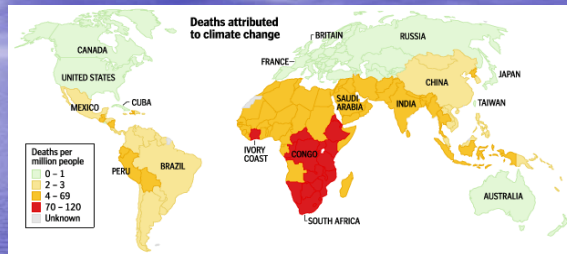
1941



2004



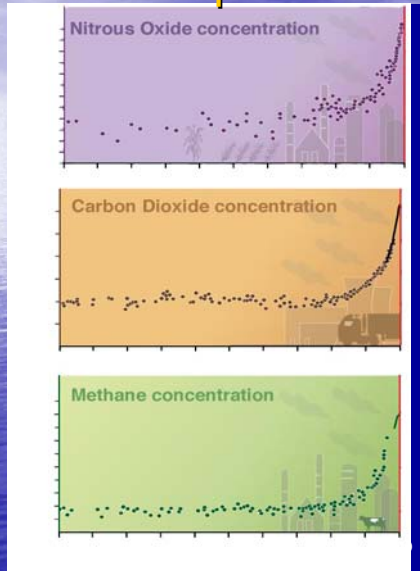
Known for sure: People are dying



Earth's warming climate is estimated to contribute to more than **150,000 deaths** and **5 million illnesses** each year, according to the **World Health Organization**, a toll that could double by 2030.

<http://www.washingtonpost.com/wpdyn/content/graphic/2005/11/17/GR2005111700052.html>

Known for sure: We are Altering the Atmosphere



Data from www.gncc.ch

Photograph: <http://www.maricopa.gov/envsvc/PHOTOS/carpollution.jpg>

Direct Carbon Foot-print

- The household's consumption of almost 16,000 kilowatt hours of electricity per year produced **25,000** pounds of carbon. Heating fuel added up to \$2,500 for the year, producing about **20,000** pounds of carbon.
- For every 10,000 miles of driving we produce about **10,000** pounds of CO₂.

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Indirect Carbon Emission

- Disturbing the soil **releases** Carbon
- All building materials have **embodied energy** from production to delivery
- The food, clothing, and all the consumed goods have **embodied energy**
- Filling the landfills releases **green-house gases**

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Buildings Account For

65% of total U.S. electricity consumption ¹

36% of total U.S primary energy use ²

30% of total U.S. greenhouse gas emissions ³

25% of landfill materials are construction waste. ⁴

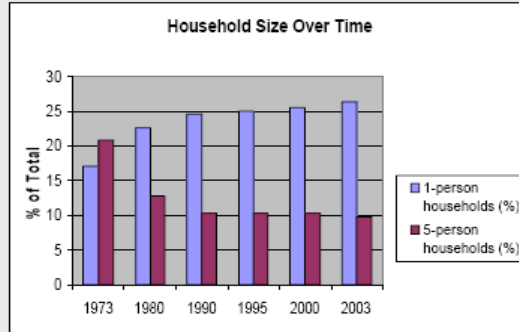
40% of raw materials used globally ⁵

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Our Increased Energy Use

House Size vs. Household Size

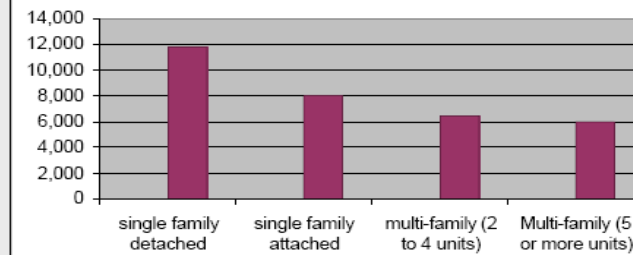
While house size has grown 42% since the early '70's, household size **decreased** by 18%!



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Energy Use by Household Type

Avg Annual Electricity Consumption by Household Type, 1997 (kwh/hh)



Source: EIA

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Did you know?

- In Colorado we use about **90% coal** in our power plants, and coal is the **biggest air-pollutant** in power production

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Growing Water Demands



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Did you know?

- Largely due to irrigation, total **per capita** off stream **water use in Colorado** is 3690 gallons/day, nearly three times the **national** average of 1280 gallons/day ...

www.colorado.edu/news/releases/2001/501.html -

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Take a Quiz –How many worlds would you need?

- If all the people lived the way an average American lives we would need about 6 worlds to support our needs (Decompose our waste, produce resources, and accommodate our needs)

<http://www.earthday.net/footprint/index.asp>

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<ol style="list-style-type: none"> 1. Energy Reduction 2. Resource Depletion 3. Landfill Reduction 	<ol style="list-style-type: none"> 4. Habitat Loss 5. Air Pollution 6. Water Conservation
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"Green" environmentally friendly

DEEP GREEN PHOTOGRAPHY
stock images & fine art prints of Costa Rica's biodiversity

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"Sustainable"

- Sustainability is a characteristic of a process or state that can be maintained at a certain level *indefinitely*. (From Wikipedia)
- Defined by the Brundtland Commission, led by the former Norwegian Prime Minister Gro Harlem Brundtland:
sustainable development "meets the needs of the present without compromising the ability of future generations to meet their own needs."

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Rating & Labelling Systems

- **LEED™** - from the US Green Building Council (Leadership in Energy & Environmental Design) 
- **BREEAM** - originated at Building Research Establishment in UK (Building Research Establishment Environmental Assessment Method)
 - Green Leaf / Green Globes
 - BOMA – Go Green Plus
 - GBI in U.S. 
- **GBC 2002** - Canadian-led international effort (Green Building Challenge 2002) 
- **Others**  **ENERGY STAR Label for Buildings**  United States Environmental Protection Agency 

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The U.S. Green Building Council

- 1. Sustainable site planning**
- 2. Safeguarding water**
- 3. Energy efficiency & renewable energy**
- 4. Conservation of materials & resources**
- 5. Indoor environmental quality**

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Areas of Consideration for the TOD Besides the Existing Rating Systems

- Durability
- Embodied Energy
- Site Original Carbon Foot-print
- Service Life

Life Cycle Assessment

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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.

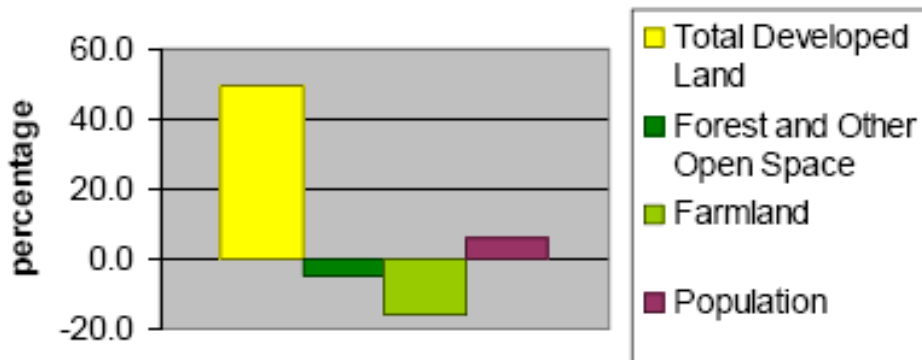
Can the built environment help rather than hinder our energy, environmental and quality of life goals? Can these two communities come together?



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Sprawl Effects in 30 Years

% change 1970-2000



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Total Benefit? What Might This Add Up To?

Urban Households

Suburban Households

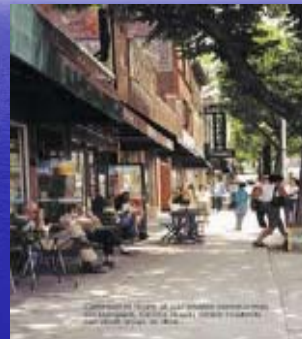
Travel	80 Million Btu/yr	140 MMBtu/yr
Home	100	110
Community Infrastructure	140	190
TOTAL	320	440

Source: CA Energy Commission, PLACES3, 1996

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Issues of Concern for the Community

- Fuel Cost Savings
- Cleaner Air
- Economic Development
- Innovation/Leadership
- Increased livability/Comfort
- Security/Convenience



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Energy Efficient Neighborhood

- Solar Street & Building Orientation
- Narrower Streets with Reduced Parking
- Energy Efficient Building Design
- More Compact Housing
- Broad Canopies, Deciduous Shade Trees, Less Water Demanding Vegetation

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Mixed-Use Development

Paul Zykovsky, Redwood City 2002



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Increase Density



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Design Walkable Communities



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Have Bicycle-Friendly Neighborhood



Substitute Public Transportation for Personal Cars



Use Nature as Mentor, and Design with positive effects on the environment.

"We need to make bigger footprints, but leave behind wetlands"—

Architect, William McDonough

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Group Brain-storming: How do we link TOD to the existing suburbs?

Where do you live?

Do you use Public Transportation?

Can you get to the TOD Line?

What is the problem?

How can the problems be solved?

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