CARE / CRI Conference
Charleston, S.C. • May 9, 2007

Green Buildings and the Bottom Line
Fourth in a Series of Annual Reports on the Green Building Movement

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Worldwide Urbanization
World Resource Issues

World population
6.3 billion

People with no electricity
2 Billion

People with electricity
4.3 Billion

Source: James P. Cramer, Design Futures Council, April 2006
World population 6.3 billion

People with no clean water: 1 Billion
People with electricity: 5.3 Billion

Source: James P. Cramer, Design Futures Council, April 2006
China – 25% of world’s economic growth in 06-07
Worldwide Urbanization

- By 2030, 23 cities of 10 million people
- Only 4 in developed countries
- Mostly shantytowns
- India, Brazil, Korea, Indonesia, Turkey
Human Ecological Footprint
(in hectares per person)

India: 0.73
Brazil: 2.39
Korea: 2.43
UK: 4.72
North America: 9.57

Source: James P. Cramer, Design Futures Council, April 2006
Global Warming/Climate Change
Global Warming/Climate Change

Clinton Climate Initiative
Need for “Bio-Integration”

“Why should we design merely to reduce negative impacts? Why can’t we design with positive impact?”

—Ken Yeang, Llewelyn Davies Yeang
90% Certainty of Global Warming

“Major advances in climate modeling and the collection and analysis of data now give scientists ‘very high confidence’—at least a 9 out of 10 chance of being correct—in their understanding of how human activities are causing the world to warm.”

—IPCC report (2 Feb 2007)
Water Wars
Water Wars

• Only 1% of water on planet is drinkable.

• In 30 years, the majority of people in the world will not have enough drinkable water—Arup

• “Water will be the next oil.”
  —USGBC’s Rick Fedrizzi
The Next 100 Million
The U.S. is alone among the industrialized nations in experiencing substantial growth. If current trends continue, the United Kingdom and France will add fewer than 10 percent to their populations between now and 2040, while Germany, Italy, and Japan will lose population. Only India—with a current population of about 1.1 billion—will add 100 million people more quickly than the U.S.

Consider the following. On October 16, 2006, America reached a milestone: its population passed the 300 million mark. It took us until 1915 to reach our first 100 million; 53 years (to 1968) to reach 200 million, and 29 years to hit 300 million. The census indicates that the nation should reach 400 million by 2043, but the census routinely underestimates its population. In 1990, the Census Bureau had the U.S. reaching 300 million in 2011, not 2006. Forecasts of World Population Economics' 2002-2030 projections indicate that the U.S. will reach 400 million by 2037, about seven years ahead of the census schedule and just 31 years after reaching 300 million.

What do the next 100 million people mean for America's built environment?

Impact on Housing
For the past decade, the nation has counted about 6.4 housing units of all kinds (including vacant and second homes) per person. To accommodate the next 100 million residents, the nation will have to add about 40 million new housing units to its current inventory of 125 million and replace another 30 million homes that are likely to be damaged or torn down in the next three decades. That means the next 100 million residents will live in 70 million housing units, or about 2.2 units per person. This is similar to the rate of housing construction that has occurred over the past three decades.

However, about two-thirds of the housing built during this time was single-family detached units. Will this trend continue as the nation adds another 100 million people? This appears unlikely for three reasons.

First, the population is aging. Last October, when the population reached 300 million, about 12 percent of Americans were 65 or older. This group will account for 41 million of the next 100 million Americans. In addition, a growing number of families are raising their children in detached single-family settings—more than one in four of them, but perhaps enough to have a significant effect on planning. This could add up to the potential for important changes in housing demand that planners need to consider.

Second, household types are becoming more diverse. In 1970, just after the population reached 200 million, about 44 percent of all households had children and only 17 percent of them were single-person households. The 1960s and 1970s saw the suburbanization of America and the spread of suburban-style planning and zoning, which separated land uses and favored single-family houses. New residents and new families often prefer single family homes, which provide more privacy and a larger living space.

This was the period when child-rearing dominated household concerns. Then it was assumed that communities catering to households with children followed appropriate land-use patterns. Now, however, a new generation of families is entering the housing market

The group aged 20 to 64 will account for the remaining 30 million of the next 100 million Americans, whereas it accounted for 59 percent of the population in 2006. We suspect that the housing preferences of older children in single-family homes will differ from those of other households.

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The Next 100 Million
By Arthur C. Nelson, rex, and Robert L. Lang

www.mi.vt.edu/uploads/The Next 100 Million.pdf
The Next 100 Million

### The Next 100 Million
Impact of 1-Person Households

<table>
<thead>
<tr>
<th>Year</th>
<th>1-Person Households</th>
<th>HHs with children</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>17%</td>
<td>44%</td>
</tr>
<tr>
<td>2006</td>
<td>26%</td>
<td>35%</td>
</tr>
<tr>
<td>2037</td>
<td>26%</td>
<td>27%</td>
</tr>
</tbody>
</table>

## The Next 100 Million

### The Aging Population

<table>
<thead>
<tr>
<th>Age Category</th>
<th>2006</th>
<th>Next 100 MM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 19 or under</td>
<td>29%</td>
<td>19%</td>
</tr>
<tr>
<td>Age 20-64</td>
<td>59%</td>
<td>40%</td>
</tr>
<tr>
<td>Age 65 or more</td>
<td>12%</td>
<td>41%</td>
</tr>
</tbody>
</table>

“Only a third of a typical adult’s life is likely to be spent rearing children, which means adults may live 50 or more years without caring for children.”

—Arthur C. Nelson and Robert E. Lang
The Next 100 Million Impact on Housing Construction

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>New housing units</td>
<td>30 million</td>
</tr>
<tr>
<td>Replacement units</td>
<td>40 million</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>70 million</strong></td>
</tr>
<tr>
<td>Rate/year</td>
<td>2.25 million/year</td>
</tr>
</tbody>
</table>

## The Next 100 Million Impact on Nonresidential Construction

<table>
<thead>
<tr>
<th>Category</th>
<th>Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>New nonresidential construction</td>
<td>30 billion sf</td>
</tr>
<tr>
<td>Replacement nonresidential construction</td>
<td>70 billion sf</td>
</tr>
<tr>
<td><strong>Total, 2006-2037</strong></td>
<td><strong>100 billion sf</strong></td>
</tr>
</tbody>
</table>

Based on 87 billion sf of retail, office, warehouse, institutional, and other nonresidential in 2006.

Source: Arthur C. Nelson, FAICP, and Robert E. Lang [co-directors, the Metropolitan Institute at Virginia Tech, Alexandria, VA]
### The Next 100 Million

$ Investment 2006-2037

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential + Nonresidential Construction</td>
<td>$30 trillion</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>$5 trillion</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$35 trillion</strong></td>
</tr>
</tbody>
</table>

Based on 87 billion sf of retail, office, warehouse, institutional, and other nonresidential in 2006.

Source: Arthur C. Nelson, FAICP, and Robert E. Lang [co-directors, the Metropolitan Institute at Virginia Tech, Alexandria, VA]  