Overview

- Progress
- Efficiencies
  - Technical Efficiency
  - Systematic Efficiency
  - Integrated Efficiency
- Next Steps
Progress

- Crisis of Credit
- Geography of a Recession
- Road to Recovery
- Benchmarking Recovery Approaches
  - Japan, Sweden
- Land Use
  - Vacancy Rates
  - Current Trends
  - Options
- Efficiencies
## Household Debt to GDP Ratio

<table>
<thead>
<tr>
<th>Country</th>
<th>Years</th>
<th>Debt to GDP Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1991</td>
<td>125%</td>
</tr>
<tr>
<td></td>
<td>1995</td>
<td>95%</td>
</tr>
<tr>
<td>US</td>
<td>2007</td>
<td>133%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>130%</td>
</tr>
</tbody>
</table>

*SOURCE: Federal Reserve Bank of San Francisco Economic Letter 2009-16*
## Land Use – Vacancy Rates

### Residential Vacancy

<table>
<thead>
<tr>
<th>Number</th>
<th>Vacancy Rates</th>
<th>Total Square Footage</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 million (130 million)</td>
<td>14% (67.3% home ownership)</td>
<td>42.2 billion (median footage: 2,219)</td>
</tr>
</tbody>
</table>

### Commercial Vacancy

<table>
<thead>
<tr>
<th>Category</th>
<th>Vacancy Rates</th>
<th>Total Square Footage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>9.6%</td>
<td>12.4 billion</td>
</tr>
<tr>
<td>Office</td>
<td>14.7%</td>
<td>1.6 billion</td>
</tr>
<tr>
<td>Retail</td>
<td>10.2%</td>
<td>2.6 billion</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>----------</strong></td>
<td><strong>58.8 billion</strong></td>
</tr>
</tbody>
</table>

*SOURCE: United States Census Bureau Report on Homeownership and Vacancy (as of April 27, 2009; Colliers North American Industrial, Office, and Retail Real Estate Q12009 Highlights (as of March 31, 2009)*
Current Trends

- Used as Temporary Shelters
- Consumed in Fires
- Turned into Squatter Locations
- Demolished
- Reclaimed in Distressed Neighborhoods
Land Options - Approaches

- Land Use Options for Vacant, Foreclosed Land:
  - Remain Public
  - Sale to Private
  - Bank the Land
  - Do nothing…
Efficiencies –
A Framework for Innovation

- **Technical Efficiency**
  - Efficiency based on the individual components of an infrastructure sector
    - Example: installing no flow/low-flow toilets

- **Systematic Efficiency**
  - Efficiency based on the entire infrastructure sector
    - Example: determining appropriate energy mixes

- **Integrated Efficiency**
  - Efficiency based on the synergies found between infrastructure sectors
    - Example: developing decentralized power and water systems
Efficiencies - Technical

- **ENERGY STAR (1992)**
  - Joint program of the U.S. EPA and U.S. DOE
  - Certification: Ensures product meets strict energy efficiency guidelines

- **WaterSense® (2006)**
  - Program of the U.S. EPA
  - Goal: To encourage water efficiency by encouraging use of specially labeled consumer products

- **Forest Stewardship Council (1993)**
  - Intergovernmental organization headquartered in Germany
  - Certification: Ensures that the most current standards of sustainable forestry are being used in the production of the consumer product.
Efficiencies - Technical

- **LEED (1998)**
  - Leadership in Energy and Environmental Design
  - A green building rating system
  - Developed by the U.S. Green Building Council (USGBC)

- **EarthCraft House™ (1999)**
  - Joint program of the Greater Atlanta Home Builders Association and Southface Energy Institute
  - Partnered with ENERGystar
  - Goal: To educate on resource and energy-efficient construction
Efficiencies - Systematic

- Systematic Efficiency
  - Mixed-Use Development

- Livable Centers/Communities Initiatives
Efficiencies - Integrated

- Integrated Efficiency
- Integrated City/Development Planning

Case Study: Turn unused roof space into power supply

Case Study:
Use wastewater to heat homes

Efficiencies – Facilities

- **Technical Efficiency**
  - ENERGY STAR, WaterSense®, EarthCraft Homes™, Forest Stewardship Council, LEED

- **Systematic Efficiency**
  - Mixed-Use Development, Livable Centers/Communities Initiatives

- **Integrated Efficiency**
  - Integrated City/Integrated Developing Planning
<table>
<thead>
<tr>
<th></th>
<th>Consumption*</th>
<th>Expenditures*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total U.S. Residential</td>
<td>10.55 Quadrillion Btu</td>
<td>$201.07 Billion</td>
</tr>
<tr>
<td>Per Household</td>
<td>94.9 Million Btu</td>
<td>$1,810</td>
</tr>
<tr>
<td>Per Household Member</td>
<td>37.0 Million Btu</td>
<td>$705</td>
</tr>
<tr>
<td>Per Square Foot</td>
<td>43.7 Thousand Btu</td>
<td>$0.83</td>
</tr>
</tbody>
</table>

**SOURCE:** 2005 Residential Energy Consumption Survey conducted by the Energy Information Administration (http://www.eia.gov/emeu/recs/recs2005/c&e/detailed_tables2005c&e.html)
# Energy Expenditures by Type of Housing Unit

<table>
<thead>
<tr>
<th>Type of Home</th>
<th>% of Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homes Detached</td>
<td>68.9%</td>
</tr>
<tr>
<td>Attached</td>
<td>6.6%</td>
</tr>
<tr>
<td>Apartments 2 to 4 Unit Building</td>
<td>6.6%</td>
</tr>
<tr>
<td>5 or More Unit Building</td>
<td>11.9%</td>
</tr>
<tr>
<td>Mobile Homes</td>
<td>6.0%</td>
</tr>
</tbody>
</table>

**Energy Expenditures per Household Member (2005)**

**Single-Family Homes**
- Detached
- Attached

**Apartments**
- 2-4 Unit Buildings
- 5 or More Unit Buildings

**Mobile Homes**

Energy Expenditures by Year of Construction

Energy Expenditures per Household Member