


Greening San Diego's Affordable Housing

Moving Existing Buildings Along the Sustainability Continuum: Energy Efficiency, Green, and Net Zero

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Why Focus on Buildings? Energy? Greenhouse Gas Emissions?

- **48%** of total US **energy consumption** can be attributed to the **building sector**
- **21%** of this from **residential** buildings
- **40%** attributed to **building operations:**
  - heating, lighting, cooling, and hot water
- **8%** is **GHG emissions** from producing **building materials**
  - materials that architects can specify - as well as during the construction process itself.
- **40%** can be influenced by ***design***
- **Design sets up energy consumption and GHG emission patterns for 50-100 years**

This is why building design is critical

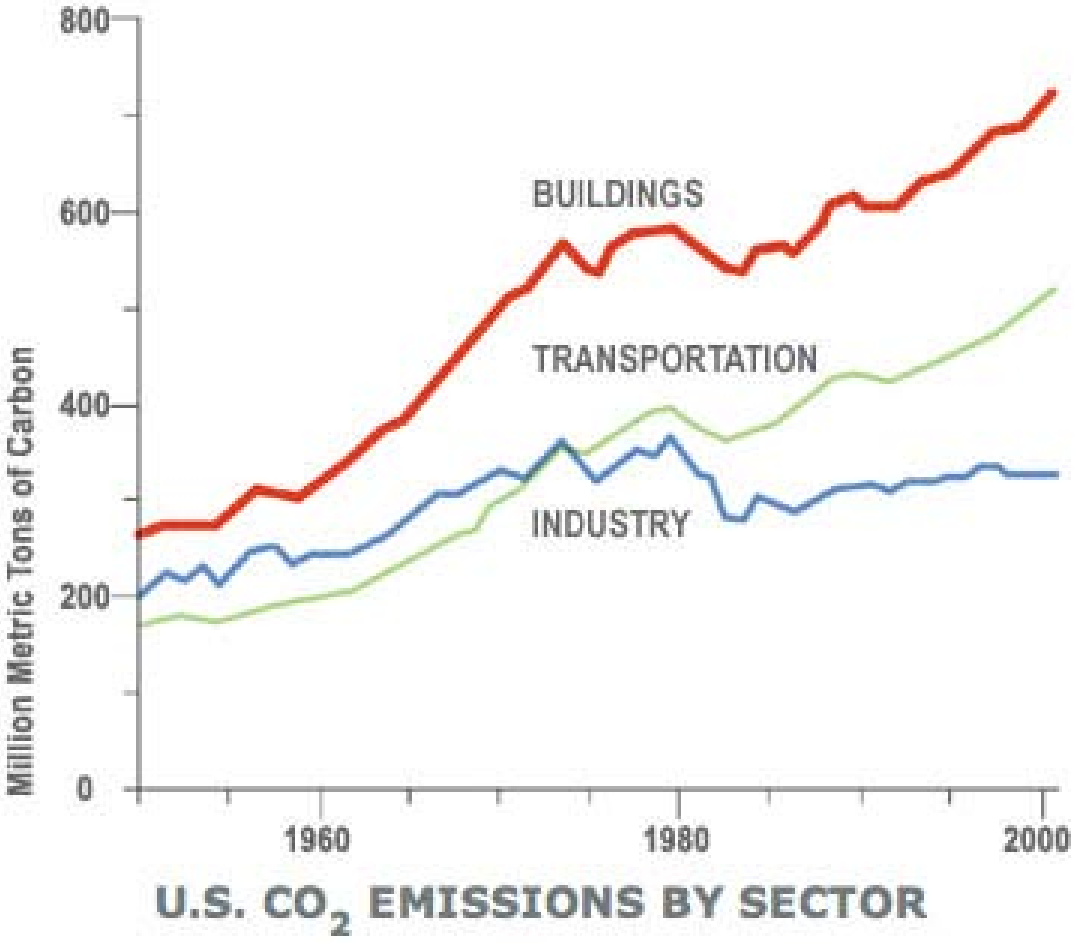
Source: http://www.inhabitat.com/2007/01/29/interview-ed-mazria-from-architecture-2030/

Session Discussion

- Multifamily Buildings
- Energy Efficiency
- Affordable Housing
- Existing Buildings Rehab
- Green
- Zero Energy
- New Construction

Source: http://www.inhabitat.com/2007/01/29/interview-ed-mazria-from-architecture-2030/

Why Focus on Buildings? Greenhouse Gas Emissions



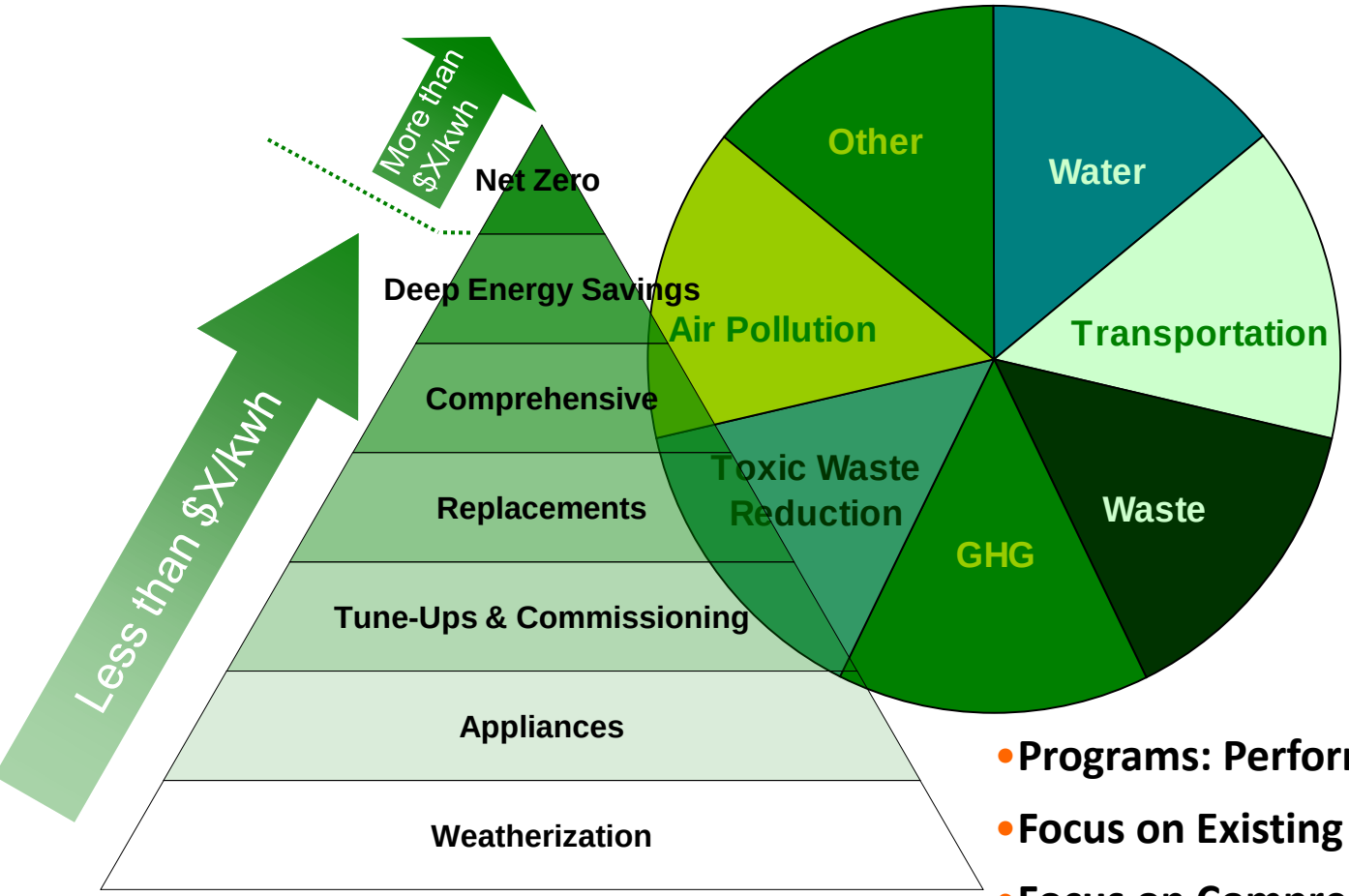
Source: http://www.inhabitat.com/2007/01/29/interview-ed-mazria-from-architecture-2030/

The Sustainability Continuum: Focus on Energy

The Sustainability Continuum

- Umbrella term for actions that:
  - Focus on increasing the efficiency of resource use
  - Meet the needs of the present without compromising the ability of future generations to meet their own needs
- Continuum includes:
  - Energy efficiency, deep energy savings, net zero (REAL and measureable savings)
  - Neighborhood design or redevelopment
  - Green measures and products, resource conservation and efficiency
  - Water, air quality, waste, pollution prevention, toxic waste reduction, etc.
  - Other resource efficiency
  - Economics

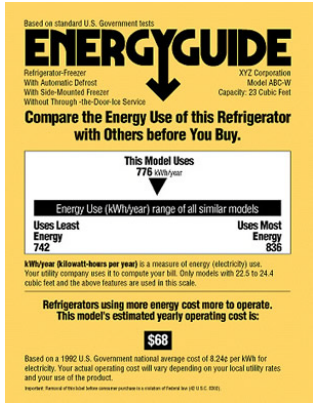
The Sustainability Continuum: Loading Order - All Efforts to Push Buildings to Achieve Deep Energy Savings and Toward Net Zero

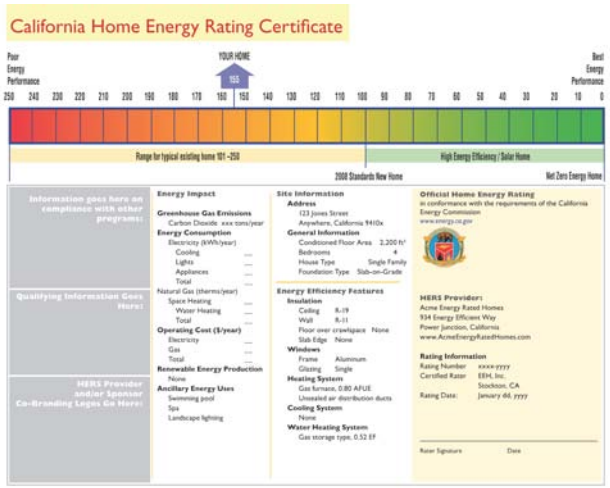


- **Programs: Performance-Based Incentives**
- **Focus on Existing Buildings**
- **Focus on Comprehensive Approach - Whole Building Analysis**

The Sustainability Continuum: Rating Systems for Products, Equipment, and New and Existing Buildings

- Various ratings systems (existing and under development
- ENERGY STAR®, Energy Guide
- LEED, Green Point Rated
- HERS Phase II





From Energy Efficiency to Net Zero

	Program	15% Better than Title 24 Requirement ?	Incentives	Program Website
	Utility New Construction Energy Efficiency	YES	Cash Incentives Design Assistance Basic Marketing Support	www.sdge.com h-m-g.com (multifamily)
	ENERGY STAR® Qualified New Homes	YES	ENERGY STAR® logo ENERGY STAR® Marketing Support	energystar.gov
	California Solar Initiative/New Solar Homes Partnership	YES	Cash Rebates (25% Higher for Affordable Housing)	gosolarcalifornia.ca.gov
	US Green Building Council LEED for Homes	YES	N/A	usgbc.org (National) davisenergy.com (CA)
	Build It Green Green Point Rated	YES	N/A	greenpointrated.org
	Enterprise Green Communities	YES	$50,000/Project $5,000/Design Charrette (Affordable Housing Only)	enterprisecommunity.org

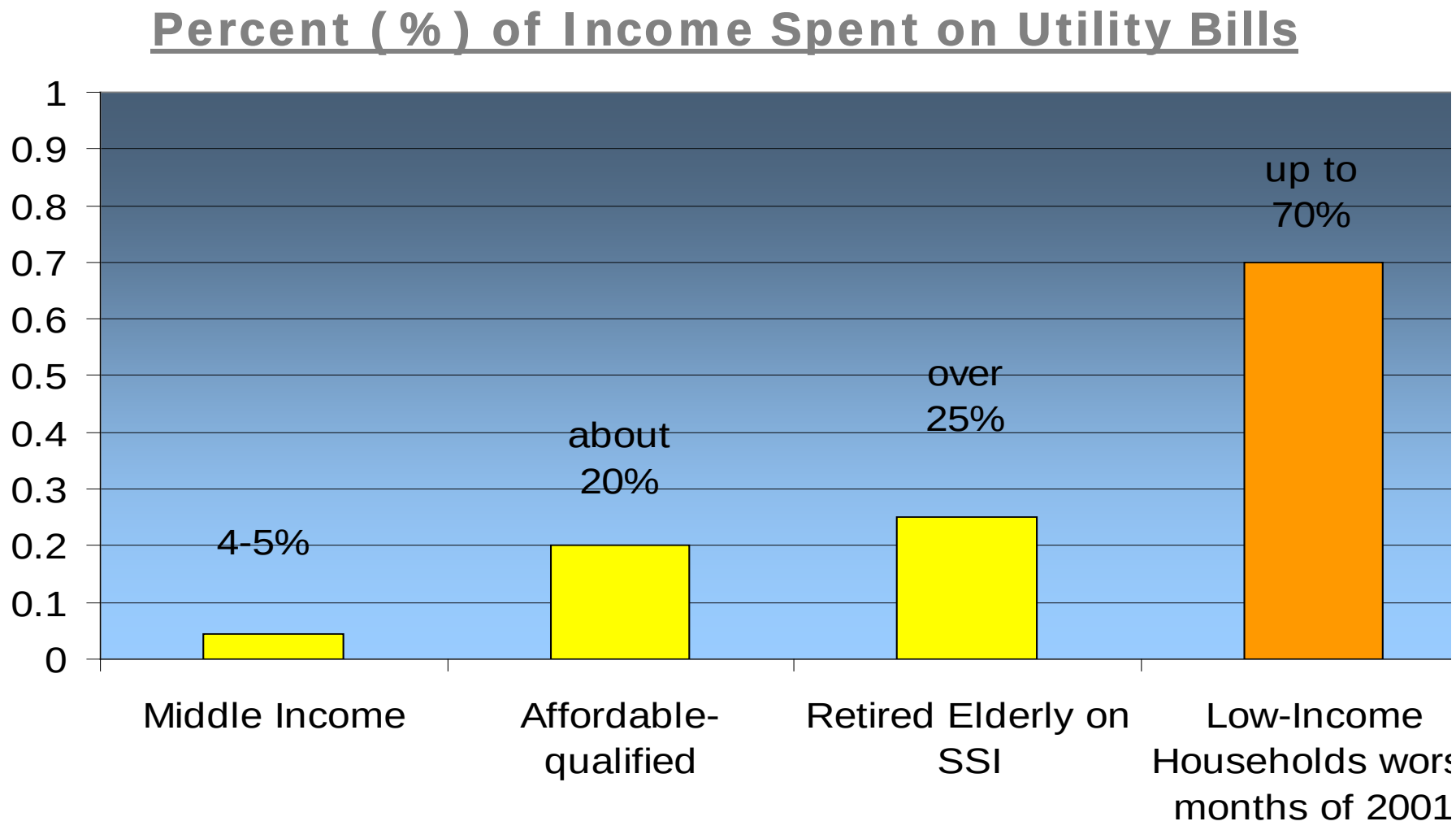
Sustainable Productivity Metrics

- Cheap vs. affordable
- Performance (resource use) - measureable savings
- Sustainability (meets future needs without depleting resources)
- Create job in the US
- Is about prosperity as much as it is about the health of the people and the planet
- Focuses on quality in terms of installation, efficiency, performance (do it right)
- Is ultimately, about investing in our future

Why is Energy Efficiency a Critical Component of Sustainability?

- **Greatest impact on utility bills**
  - Makes homes more affordable
  - Dollars saved on energy bills results in additional money available to be spent in the community - multiplier effect
  - Impact on operating costs
- **Greatest impact on comfort**
  - Fewer complaints (tenants and homebuyer callback)
  - Critical for sensitive populations
- **Major impact on green house gases**
- **Associated with higher quality and high performance homes and equipment**

Why Focus on Affordable Housing? Affordability



Why Multifamily Buildings? Multifamily Buildings by Vintage

It is estimated that over 3.5 million multifamily units exist in California

Residential Building Stock				
	Single-Family Dwelling Units		Multifamily Buildings	
	Units Added	Total Units	Units Added	Total Units
pre-1982		5,554,290		2,723,422
1982-1991	1,080,354	6,634,644	610,900	3,334,322
1992-2000	720,714	7,355,358	216,720	3,551,042
2001-current	193,220	7,548,578	73,577	3,624,619

Over half (2 million) were constructed before there was an Energy Code

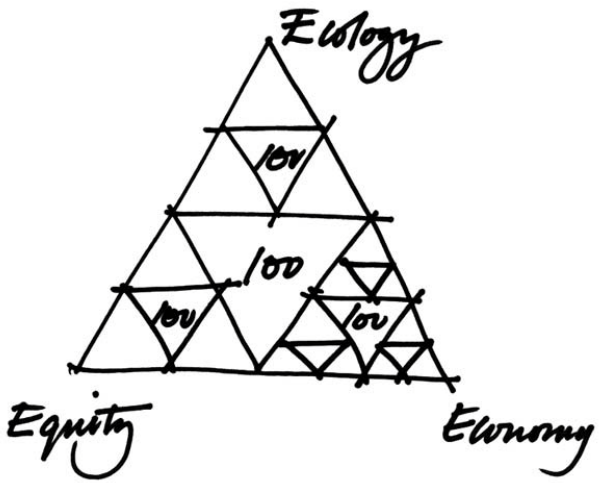
Source: California Energy Commission, 2003 Forecast Data for Residential Buildings

Opportunities in the Multifamily Buildings Market

- Abundance of existing buildings on continuum of needing various energy upgrades (weatherization to comprehensive/major rehab)
- New construction market is being pushed by energy code updates
- Equitable mix of stimulus investments in single-family homeowners, municipal buildings, AND low-income families and seniors and rental residents
- Help contribute to the reversal of funding cuts for housing over the last administration:
  - housing providers focused on keeping people in homes and not cutting staff
- Help fund the "gap" for energy efficiency as public funds limited and competitive:
  - Energy efficiency was a luxury item
  - Energy efficiency oftentimes "value engineered" out of project

Barriers to Energy Efficiency in Affordable Housing

- First Costs
- Know How: Lack of expertise or inexperienced team
- Non-profit, competing for very limited funds - almost always a gap in funding
- Leaves energy efficiency at risk for elimination through value engineering
- Artificially high utility allowances
- Split incentives
- Hinder Processes



Opportunities in the Multifamily Buildings Market

Saving energy

- **Greatest impact on utility bills**
  - Makes homes more affordable
  - Lowers operating costs
  - Greatest impact on comfort
  - Fewer complaints (tenants and homebuyer callback)
  - Critical for sensitive populations
- **Associated with higher quality and high performance homes and equipment**

Opportunities in the Multifamily Buildings Market

- Maximize energy savings, comfort, quality and minimize greenhouse gas emissions
- Make homes more affordable and healthy
- Create jobs - “green” jobs and transition lost new construction jobs to rehab
- Invest in improving older communities
  - Upgrading older buildings
  - Dollars saved on energy bills results in additional money available to be spent in the community - multiplier effect
- Take advantage of lower transaction cost/dwelling unit and economies of scale
- Combat rising utility costs
- Provide options for energy efficiency upgrades - weatherization to comprehensive

Benefits

Evidence of Rational Market Valuations for Home Energy Efficiency

Ground breaking study by ICF International[1]

- Home value increases by about $20 for every $1 reduction in annual utility bills
- Validated by real world "cost vs. value" survey of real estate agents[2]

[1] The Appraisal Journal (1990s data from the American Housing Survey (AHS) and Metropolitan Statistical Area (MSA))

http://www.icfi.com/Markets/Community_Development/doc_files/apj1099.pdf

[2] Remodeling Magazine (annual national survey of real estate agents)

Economic Benefits of Investing in Energy Efficiency: Increased Property Values

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Other Economic Benefits: Increased Financing, Funding, Tax Credits

Increased Financing, Funding, and Tax Credit Eligibility

- Utility, ARRA, block grant programs and funding - LEVERAGE!
- Tax Credit Allocation Committee (TCAC) Funding:
  - Existing buildings: 25% improvement
  - New Construction:
    - Minimum construction standards: ENERGY STAR® appliances
    - Competitive Points: 10% above Title 24, etc.
    - 4% Basis Boost: 35% or 15% AND various green measures
    - 5% Basis Boost: Distributed generation/Renewables
- Federal Tax Credits and Deductions
  - The Tax Incentives Assistance Project (TIAP): www.energytaxincentives.org
  - Residential Energy Services Network (RESNET): www.natresnet.org/taxcredits
- Financing/Grants
  - LISC, Enterprise Community Partners (grants, financing, green)
- Lower Utility Allowances
  - Increased permanent loan
  - Increased cash flow

Other Economic Benefits: Local Government Benefits

- **City & Local Support**
  - Permitting Benefits:
    - Fast tracking
    - Reduced permit fees
  - Redevelopment Funds
    - Energy efficiency requirements or rewards
  - Housing Authority
    - Energy efficiency requirements or rewards in NOFAs
    - Energy Efficiency-Based Utility Allowance (EEBUA) policy

3 Ways to Lower Utility Allowances to Reflect Energy Efficient Buildings

- Utility Cost Estimates (ask SDG&E)
- Energy Efficiency-Based Utility Allowances
- Energy Consumption Model

  Aka Project-Specific Utility Allowances via the California Utility Allowance Tool (for TCAC projects)

Energy Efficiency-Based Utility Allowance Schedule Option

Adopted by PHAs

- Lower utility allowance for both new construction and rehab
- Like SUA – represents average energy use for energy efficient projects
- Lower adjustment of the numbers of SUA
- Retrofit – 20% improvements corresponds to a 20% reduction in energy costs*
- New Construction – Building simulation - develop a ratio of energy use in energy efficient new construction (15% above code) compared to a typical existing building (pre 1980 building practices). Ratio applied to SUA

About the EEBUA Tool

Methodology:

- Considers allowances for space heating, cooling, and water heating for each unit type (multifamily low-rise, high-rise, and single family)
- Can add appliances and lighting
- Water, sewer, trash, and plug load not modeled
- “Safety factor” in favor of tenant (75% of savings to developer 25% to tenant) - PHA can choose otherwise
- Provide tool to PHAs to update when rates change or SUAs are updated

EEBUA Applications

EEBUA Can Apply to:

- New construction projects that exceed California's Title 24 energy code by 15% - mostly adopted, easily accepted
- Rehab construction projects that improve efficiency by 20% over existing conditions
- Up to adopting body to set performance thresholds
- California – applied it consistently with utility incentive programs and TCAC (LIHTC) funding requirements

EEBUA Process and Verification

How it works in California for financing packages

- PHA grants conditional EEBUA use approval for financing package based on:
  - Title 24 calculations indicating level of energy efficiency
- PHA grants final EEBUA use approval upon completion based on:
  - HERS Completion Report confirming installation of measures indicated in Title 24

Energy Consumption Model: TCAC Regulations

- For LIHTC applications, developers can submit utility cost estimates from the CUAC
- Professional using the CUAC to calculate utility allowances must be:
  - A Certified Energy Plans Examiner (CEPE), AND
  - Either:
    - A CA licensed electrical or mechanical engineer, or
    - A qualified HERS Rater
- Construction will require HERS inspections

Energy Consumption Model: Approved Use

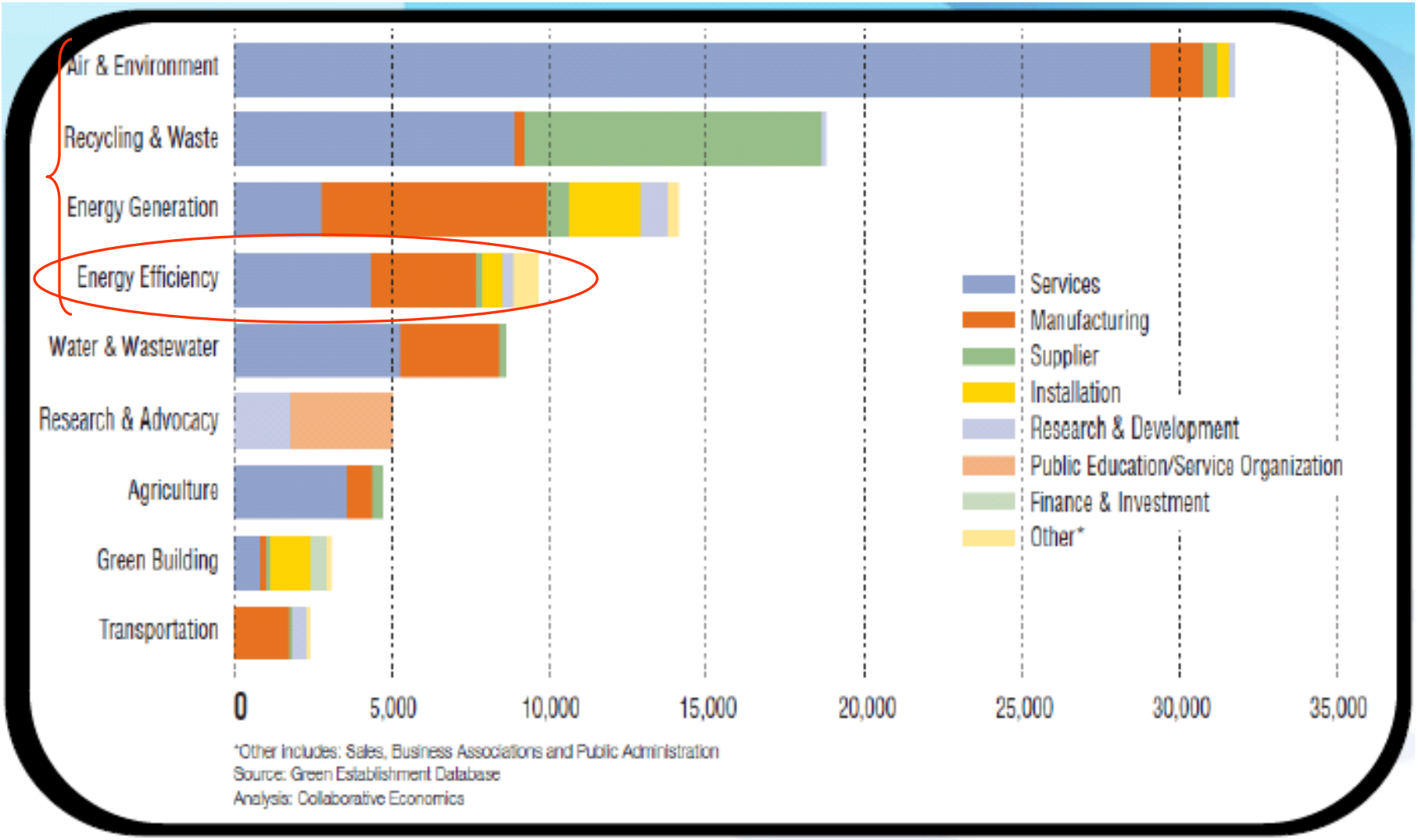
- Applications for LIHTCs for New Construction – ***only***
- ***Not*** for:
  - LIHTC rehab
  - Existing properties (TCAC or other)
  - HUD funded properties
  - RHS funded properties
  - Local Public Housing Authorities

California Utility Allowance Tool

- For TCAC funded projects:
  - Provide utility cost estimates for all tenant paid utilities (including water)
  - Adjust for ENERGY STAR® appliances
  - Adjust for "all high efficacy lighting"
  - Account for the developer's choice of how to allot PV energy to tenants vs. common area

http://www.gosolarcalifornia.org/affordable_housing/cuac.html

Green Jobs Creation – California, 2007



Green Jobs Created by Stimulus Investments in Energy Efficiency (Per HUD)

- 2007: top 4 job growth areas related to energy, green, and helping preserve the environment
- Energy: 4th largest growth
- More growth from ARRA funding:
  - Energy efficiency block grants:
    - Weatherization assistance: 52 direct jobs per million, $358 per year per dwelling unit
    - Manufacturing from energy investments: 5/M for renewable energy systems, 3-4/M for building energy efficient systems, 5/M for appliances
    - Energy efficiency block grants: direct jobs: 10/M, manufacturing jobs: 3-4/M, indirect jobs: 19/M

Putting out of work new construction industry back to work enlisting newcomers

- New construction ‘refugees’
- 11 existing buildings for each new one built in past 7 years

Multifamily Buildings are Complicated
Ownership and Use Structures and Building Types

- For sale, for rent, market rate, affordable
- Mom and pop to large corporations to non-profit building owners (national, statewide, local)
- Small (2-49 units) individual owners ("mom & pop") represent the largest group of apartment building owners
- Master or individually metered for electricity
  - Central systems and common area energy bills are building owner-paid
- High-rise, mid-rise, low rise, garden style
- Transitional, assisted living, dorms, apartments, condos, townhouses, etc

Bottom line is that in terms of energy management and programs 'one-size-fits-all' is not applicable

So, Where Do You Start? Approaches to Rehab

- Remember Loading Order?
- Escalating Investment and Payoff through Various Approaches to Rehab and Retrofit
  - Weatherization Assistance Program (start here)
  - Operations and Maintenance (key component of energy management)
  - Equipment Tune-Ups (ongoing maintenance strategy)
  - Prescriptive Replacements (based on need, tiered investments)
  - Performance - Whole Building Approach (the holy grail - big energy savings, green jobs)

In-House or Hire Out?

- Depends on your level of in-house commitment, resources, and expertise
- If you don't have a commitment to or an energy management plan, create one, train your building managers, or hire out
- In-house - weatherization, O&M, equipment tune-ups, rely on building managers, maintenance staff, and utility programs

BUT

- If you want to assess your portfolio of buildings to categorize buildings by need and in turn the appropriate level of investment or if you have deep energy savings goals, hire a consultant (or team)

Create Green Jobs: Hire Experts (HERS Raters, Energy Consultants, Building Performance Contractors, etc.)

- Experts to Assess and Categorize Buildings: Match Need with Approach/Investment Level
  - Operations and Maintenance - First step is prioritizing energy management for both common areas (owner paid) and dwelling units (tenant paid)
  - Weatherization Assistance Program - Get the free stuff first
  - Tune Ups - Part of O&M, increases longevity and performance of equipment - frees funds to invest in other replacements
  - Prescriptive Replacements - usually based on need - failing equipment
  - Performance - Whole Building Approach - Audit of existing conditions, building simulation to determine how to maximize energy savings for the least cost, HERS verification to ensure installation and performance - to meet performance goals (25% above existing conditions for TCAC funding) - Internally or via ESCO

How to Achieve Deep Energy Savings in Existing Buildings? Comprehensive Approach

- Integrated, whole-building approach
- Building science approach
  - Maximizes the energy savings to reduce payback period and save on costs
  - Counts synergistic energy savings from multiple measures
- Typically requires use of an outside energy/building science expert (new green jobs)
  - Energy consultants (evaluate energy efficiency options) - typically engaged in new construction only
  - HERS Raters conduct audit and final inspection) (typically engaged in new construction only
  - Home Energy Performance Contractors - emerging field

Comprehensive Approach: Designed for Comfort (DfC) Program

- SCE/SCG Territory
- Performance-Based Program
  - Show a minimum of 20% improvement over existing conditions
    - Space Heating
    - Space Cooling
    - Water Heating
    - Insulation
    - Windows

- Incentives, assistance and training to help analyze cost-effective energy efficiency upgrades
  - Up to $700/dwelling unit for LARGE projects
  - Up to $1500/dwelling unit for SMALL projects
  - Up to $500/unit for Special Needs projects
  - Energy consultants ($40/unit, max. $5,000/project)
  - HERS raters ($50/unit, max. $6,000/project)
  - Energy Smart Pak (worth $35/pak) provided to each tenant of participating project
  - Tenant training to change energy use behavior

Who to Call: Energy Consultants

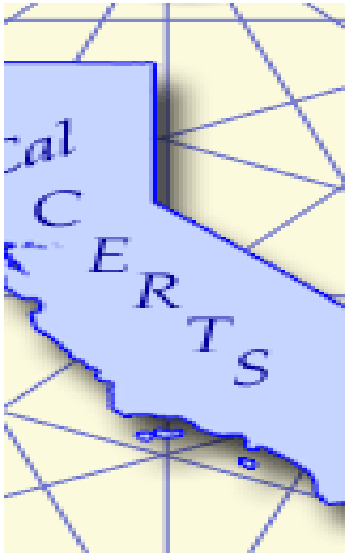
Energy consultants are typically associated with ensuring the building designs meet California's Title 24 Building Energy Standards. They also play a critical role in designing a high performance building

- Versus Title 24 consultant
- California Association of Building Energy Consultants (CABEC)
  - Certified Energy Plans Examiner (CEPE)
  - Certified Energy Analyst (CEA)
  - www.cabec.org

CABEC
California Association of Building Energy Consultants

Who to Call: Home Energy Rating System Raters

Some building features require field verification and/or diagnostic testing by a third party inspector. The California Energy Commission has a process for certifying HERS raters, and a certified HERS rater is required when field verification and/or diagnostic testing is necessary



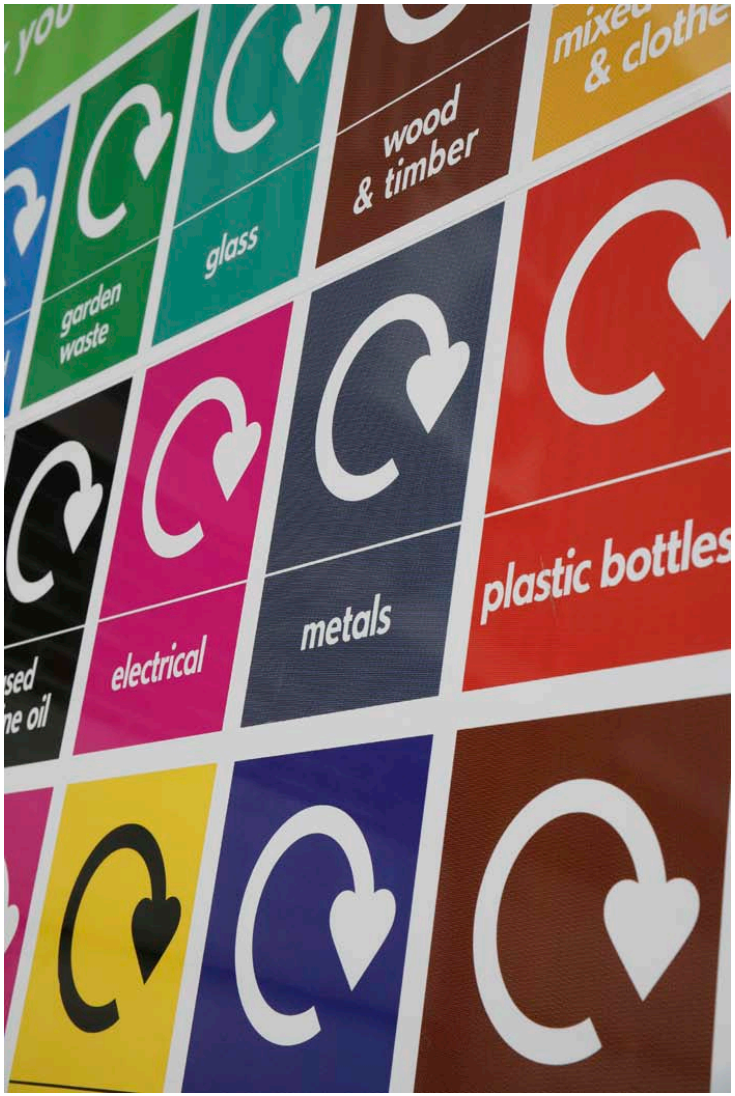
CHEERS®

- CalCERTS, CHEERS, CBPCA
- CalHERS

www.calcerts.com, www.cheers.org, cbpca.org

Who to Call: Contractors & Green Consultants

- Building Performance Contractors
- Green Consultants



Make the Effort Count Long Trm: Manage Your Housing Portfolio - Sustainably

- Establish internal/company wide commitment and standards for energy efficiency within their portfolio
- Manage investments in energy efficiency by hiring experts to:
  - Categorize buildings according to vintage (building and equipment), need, performance, etc.
  - Match categories to goals and rehab approach
  - Determine programs and funding sources available (SDG&E weatherization, tune ups, prescriptive, ARRA, redevelopment, TCAC, etc)
  - Establish a guidebook for energy management and pathways/resources to train their building managers to effectively manage energy use, benchmark your buildings, and operations and maintenance protocols
- Help to ensure that the money is better spent where it will yield the most energy savings (aside from need or failing equipment) – if you are going to spend money on energy efficiency – do it right
- Help to facilitate a deeper understanding of building energy use and a longer term commitment to effectively managing energy use

Post Investment: Better Energy Management Practices for Multifamily Buildings

Systematic Community Energy Management Planning Practices

- Encourage multifamily building owners to actively manage their community's energy use on an ongoing basis
- Oftentimes, energy management consists of either replacing failed equipment or focuses on common areas (where building owner pays utilities) and not so much on the dwelling units
- Energy management plan can help communities develop a process to:
  - Set energy performance or savings goals
  - Identify opportunities to save energy
  - Establish operations and maintenance procedures for energy measures
  - Determine the appropriate approach to a rehab/retro fit
  - Select the most cost effective measures and specifications
  - identify financing, funding, incentive, and free resources
  - Analyze their investments in energy efficiency
  - Create action and implementation plans
  - Evaluate progress

EPA's Energy Management Cycle

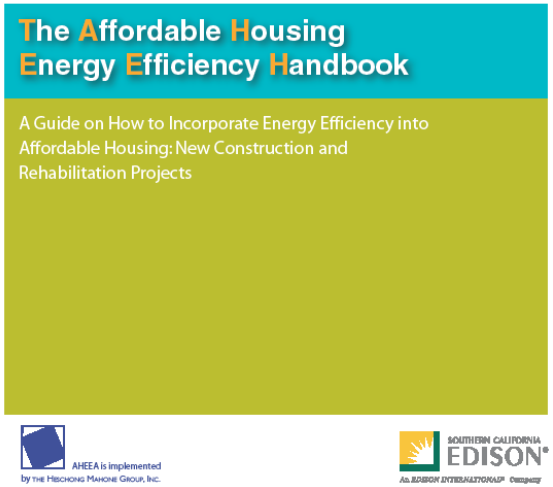
Steps to Energy Management:

- Make Commitment
- Assess Performance
- Set Goals
- Create Action Plan
- Implement Action Plan
- Evaluate Progress
- Recognize Achievements

Affordable Housing Energy Efficiency Handbook

- Basic concepts of energy efficiency and integrated design
- Details on various energy saving measures
- Possible funding sources and assistance
- All about Energy Efficiency-Based Utility Allowance Schedules
- **FREE Download at**

AFFORDABLE HOUSING ENERGY EFFICIENCY ALLIANCE



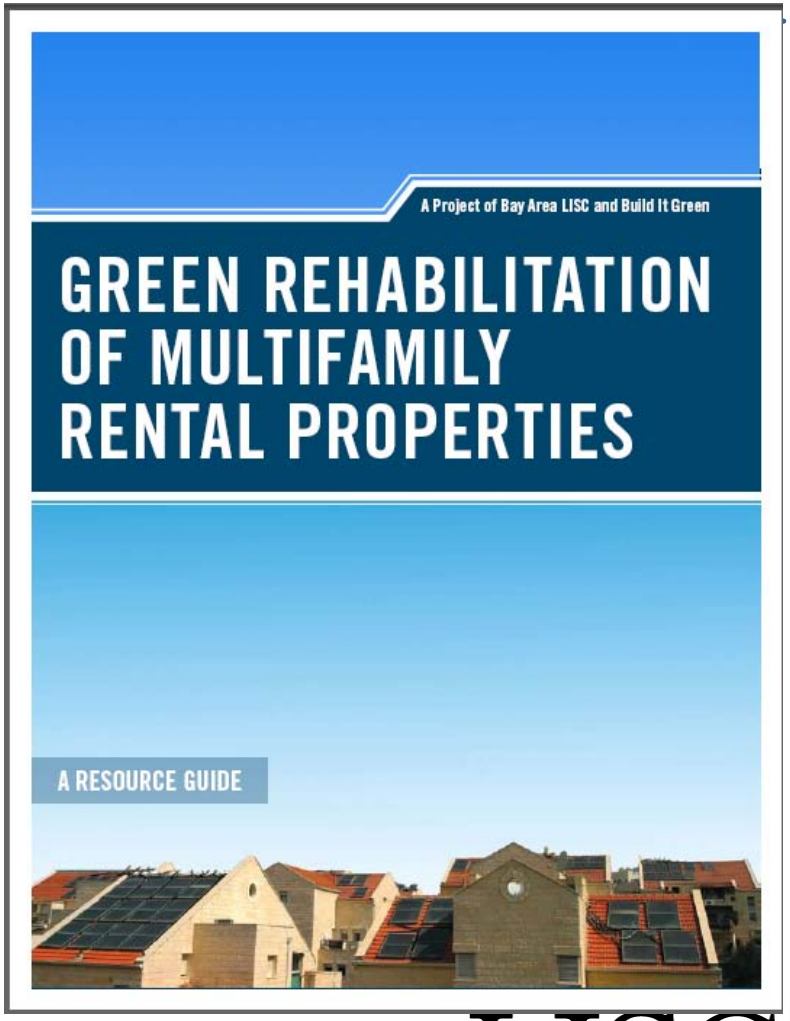
www.h-m-g.com/multifamily/aheea

Rehab: Green Physical Needs Assessment

Designed to be used in tandem with an energy audit, site assessment or building walkthrough that occurs at the outset of any rehab project

Available free for download

www.bayarealisc.org



LISC Bay Area

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