

Data, Decisions, and the Built Environment

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What We Know: The HUD-Assisted Housing Stock in Unit Count



**TOTAL: ~ 4.5 M units,
housing ~ 4.5 M families**

What We Know: The HUD-Assisted Housing Stock in Utility Costs



Section 9
Public Housing

~ \$2 B util./yr
\$2,000 util./unit/yr



Section 8
MF Rental Assistance

~ \$2 B util./yr
\$1,250 util./unit/yr

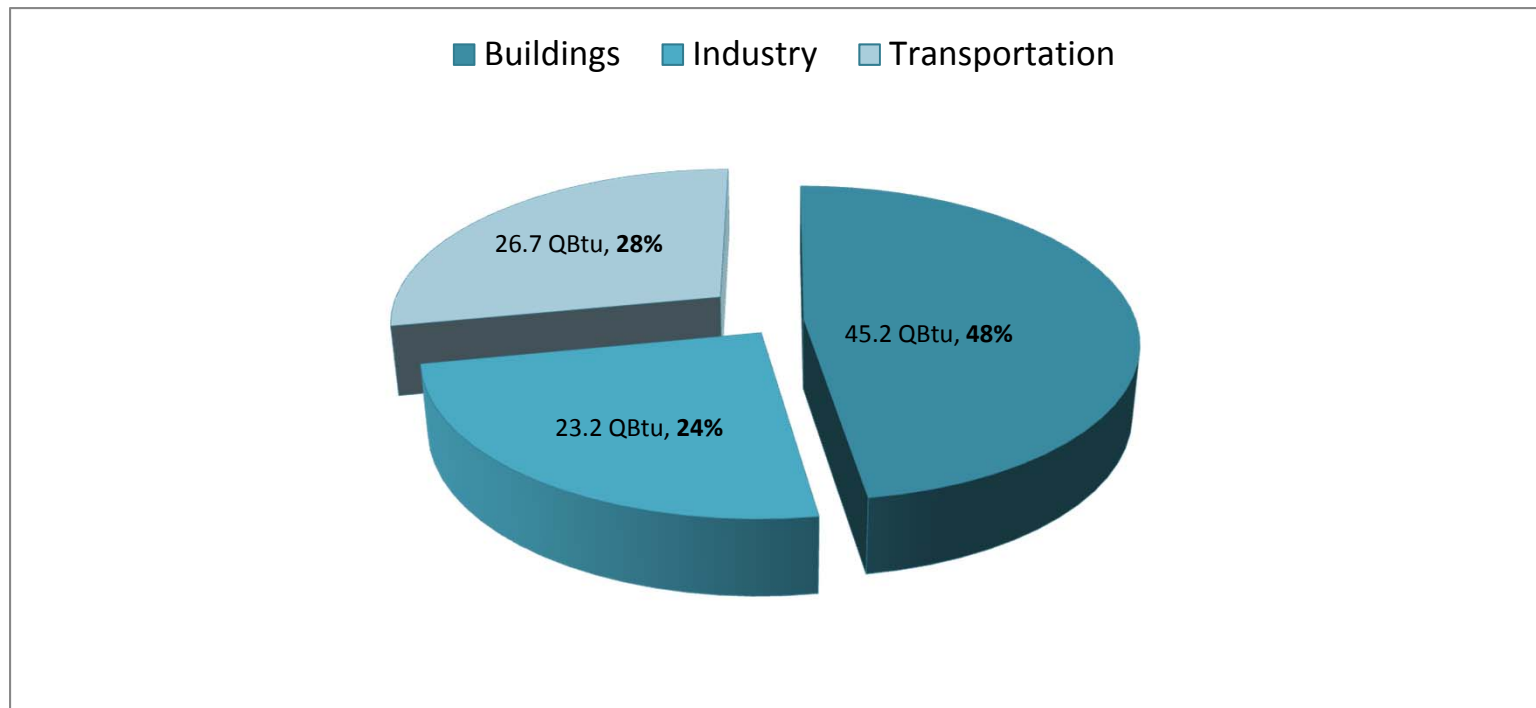


Section 8
Housing Choice Vouchers

~ \$3 B util./yr
\$1,500 util./unit/yr

**TOTAL: ~ \$7 B util./yr,
with HUD covering ~\$6.5 B**

What We Know: US Energy Consumption in the Building Sector



Each year, \$450 B is spent on energy for the US building stock, with **the poorest performing buildings using 3-7 times the energy of the highest performing buildings.**

Sources: Architecture2030, Institute for Market Transformation, Energy Information Administration

Improve Building Performance

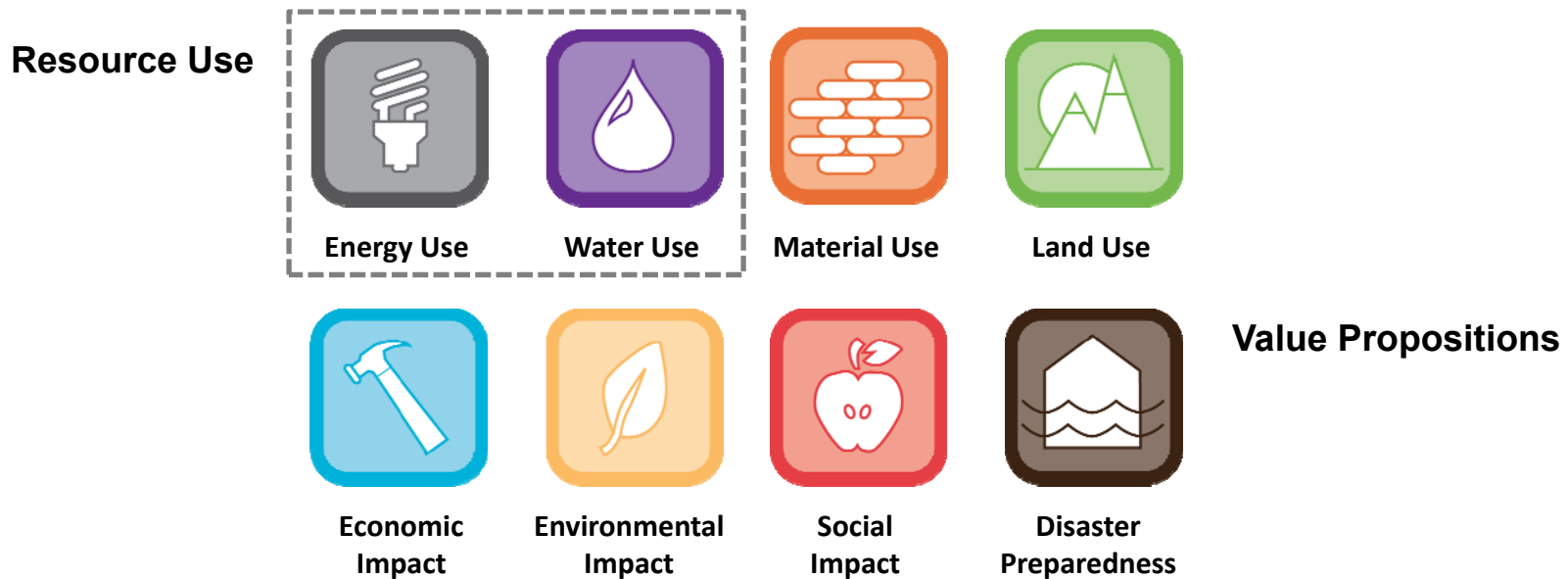
Objectives of Performance

- Increase fiscal efficiency
 - Reduce operating costs (especially utilities)
 - Target capital investments wisely
 - Preserve the HUD-assisted housing stock
- Mitigate climate change
 - Reduce carbon emissions
- People - Improve social outcomes (for tenants and public)
- Planet - Improve environmental outcomes (for public)
- Profit - Improve economic outcomes (for public, providers, tenants)

What We Want for The HUD-Assisted Housing Stock

Improve Building Performance

Aspects of Performance



**“Technique without morals is a menace,
but morals without technique is a mess.”**

- Karl Llewellyn

anecdote fad
rule of thumb
traditional belief DATA
guess academic theory
approach
prior experience instinct
best practice
expediency

~~PAPER~~

Utility Data Collection, Management & Benchmarking: The Basics

- Logging of consumption and cost
 - of each utility type (electricity, gas/oil, other energy sources, water)
 - for each housing development
 - on a monthly basis
- On-going review of utility data
 - quality control
 - billing errors
 - malfunctioning meters, equipment, leaks, etc.
 - trends and forecasting
- Utility benchmarking
 - calculation of energy and water efficiency
 - rating of energy and water efficiency compared to similar housing developments in the US (based on EPA's multi-variable regression)

Utility Data Collection, Management & Benchmarking: Building Owners

- **Data-Driven Decision-Making**
 - ensure utility subsidies are accurately requested
 - address billing errors & fix malfunctions
 - understand the potential of each housing development to improve
 - choose the best intervention
 - building retrofits
 - facility management change
 - resident behavior change
 - reprocurement of utility services
 - target investments to
 - specific housing developments
 - specific utility types
 - establish performance goals
 - track the results of interventions

Owner: Building Owner
Year Built: 1987
Square Footage: 6,666 sf
Analysis Period: 12/1/2006 - 12/1/2007

ENERGY STAR® PortfolioManager™ Score

Your Building's Score

94

Average Score For Your District

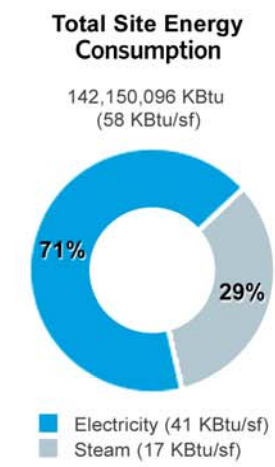
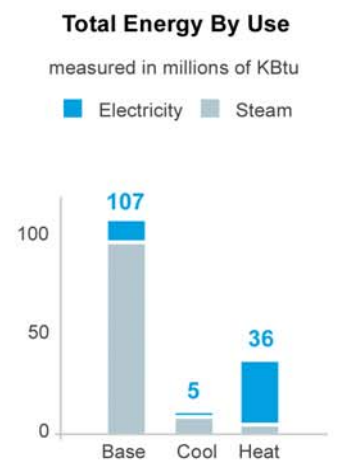
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Total Carbon Footprint:

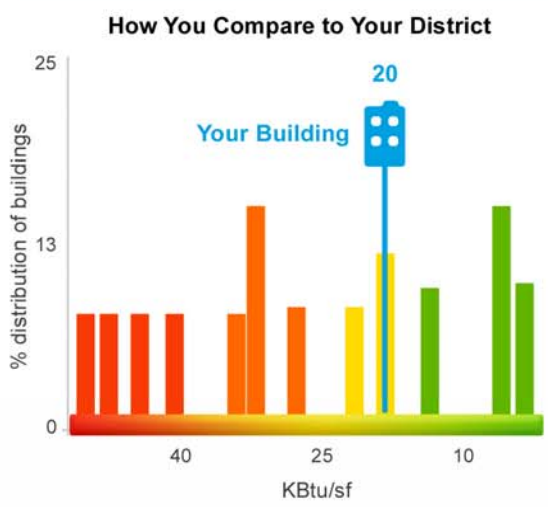
27,109,373 lbs/year

The total building energy is converted to one consistent unit (Btus) to allow for comparison with other buildings. Display of carbon emissions accounts for the environmental impact of the site energy used and considers the source fuel for electricity.

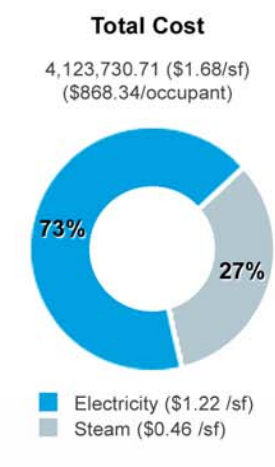
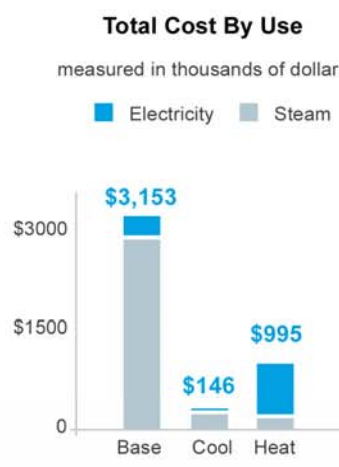
Annual Site Energy Consumption



Annual Carbon Emissions



Total Annual Energy Cost



Utility Data Collection, Management & Benchmarking: Federal Role

- **Data-Driven Policy-Making**
 - ensure utility subsidies are accurately issued
 - understand the needs and opportunities of housing providers
 - understand the potential of each housing development to improve
 - target technical assistance and financial incentives to
 - specific housing providers
 - specific housing developments
 - specific utility types
 - establish performance goals
 - track the results of programs

Utility Data Collection, Management & Benchmarking: Additional Benefits

- Academic Research
- Government Transparency
- Market Transformation

Utility Data Collection, Management & Benchmarking: Current Efforts

- Policy Development
 - Public Housing Utility Benchmarking Pilot
 - Multifamily Rental Assistance 1-time Utility Benchmarking Req.
- Other Interests
 - Secretary of HUD support
 - Voluntary uptake
 - Local benchmarking laws
 - Better Buildings Challenge



U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
THE SECRETARY
WASHINGTON, DC 20410-0001

July 17, 2014

Dear Property Owners and Operators:

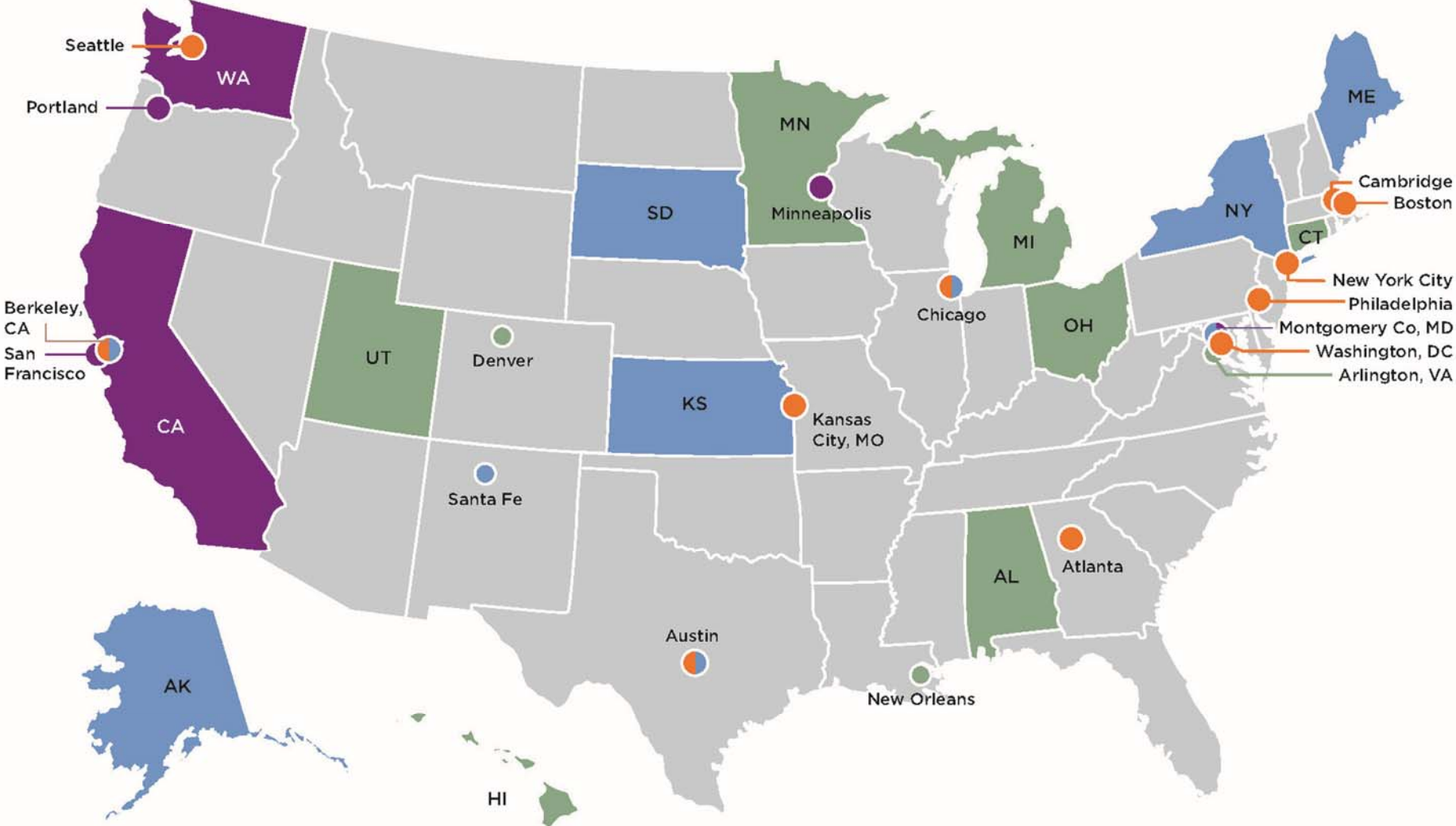
Whether you are a public housing agency or an owner and operator of an assisted multifamily housing development, the management of operating expenses is a constant challenge, especially in today's environment of diminished federal resources. Perhaps the most difficult challenge is managing energy consumption and costs, the most volatile and unpredictable operating costs of all.

Reducing energy consumption is a goal that all of us at the Department of Housing and Urban Development share with you. We estimate that HUD subsidizes the spending of more than \$6.4 billion annually on utility bills between public housing and multifamily assisted portfolios, with residents directly paying millions in addition to that. I want to make you aware of a free tool that is available to help with energy management.

The Environmental Protection Agency (EPA) has developed a free, helpful on-line program, ENERGY STAR Portfolio Manager. Portfolio Manager enables multifamily operators to track their entire building energy and water consumption and costs over time, and provides feed-back of analytic information that assists in identifying energy inefficient buildings. By using Portfolio Manager, operators may compare a building's performance against both similar buildings across the country and within their portfolio. Operators can then use the information to make strategic decisions regarding the best course of action to increase efficiency and contain costs.

EPA has just announced that a 1-100 ENERGY STAR score for multifamily housing properties will be available in the Portfolio Manager tool in the fall of 2014. The scores will

U.S. Building Benchmarking and Transparency Policies



- Commercial policy adopted
- Commercial & multifamily policy adopted
- Public buildings benchmarked
- Single-family transparency adopted

Utility Data Collection, Management & Benchmarking: Technical Barriers

- Inconsistent housing project boundaries
 - project definitions reported to HUD inconsistent w/ asset management
 - street addresses provided to HUD represent a single point in project
- Inconsistent meter & account set-up
 - every combination of master-metered & tenant-metered utilities
 - individual meters covering multiple buildings / partial buildings
 - utility provider & building owners unaware of meter location / scope
 - building owner's project-based HUD reporting inconsistent with reality
- Inconsistent timing & billing issues
 - billing periods do not align with calendar, fiscal, or reporting years
 - billing periods sometimes skip days or overlap
 - utility bills can be repeatedly revised for up to 4 years by util. provider
 - utility accounts change hands with tenants & vacancy, leaving gaps

Utility Data Collection, Management & Benchmarking: Technical Barriers

- Limited access to utility data from utility providers
 - need project-based utility data, regardless of artificial boundaries established for HUD reporting, meter location, or account holder
 - cooperation of utility providers can be a problem; privacy & cost
- Lack of data automation and standardization
 - many building owners still hand-entering utility data from paper bills
 - vast differences in utility bill content and format across providers
 - typos & misunderstanding of bills -> poor data
- Unintuitive software user interfaces -> poor data + general frustration
- Desire by building owners for EPA Portfolio Manager & financial management software to be fully integrated or at least compatible
- Need for systems integration at HUD
- Need for software training for building owners

Utility Data Collection, Management & Benchmarking: Early Outcomes

“More than 70% of facility managers surveyed use benchmarking information to guide energy efficiency upgrade plans, and 67% use it to help justify energy efficiency improvements.” -- IMT

“Global organizations that track and analyze their energy use have reported taking 3 times more energy efficiency actions than those that do not regularly track energy use.” -- IMT

“In Washington, DC, buildings that benchmarked from 2010 to 2012 under the District’s ordinance have reduced energy use by 9% on average, adjusting for weather, over that 3 year period.” -- IMT

**If the same can be assumed for the HUD-Assisted Housing Stock,
universal adoption of utility benchmarking could lead to
over \$500 Million / year in utility cost savings**

Voluntary Initiatives: Better Buildings Challenge



- Make a voluntary pledge to reduce energy and/or water consumption by 20% portfolio-wide within 10 years
- Start utility data collection, management & benchmarking to establish a baseline and a goal for energy and/or water use and to find housing projects with greatest potential for improvement
- Take action by showcasing efficiency projects and implementation models; report results



Denver Housing Authority, 2.5 MW Power Purchase Agreement

Contact: julia.b.hustwit@hud.gov

Renew300

- Make a voluntary pledge to install on-site or community-based renewable energy technology by 2020
- Establish a goal in MW, therms, or BTU
- Take action by implementing renewables projects; report results



Denver Housing Authority, 2.5 MW Power Purchase Agreement

Contact: crystal.a.bergemann@hud.gov

Voluntary Initiatives: Better Buildings Challenge & Renew300

- Take advantage of HUD incentives for participation in the BBC and Renew300, including:
 - Technical Assistance from HUD & DOE Contractors to assist with diagnostic building assessments, developing design specifications, structuring financial agreements, conducting O&M training, etc.
 - Expedited processing for certain government applications
 - Eligibility for existing utility cost reduction incentives
- BBC: ~ 80 partners
- Renew300: ~50 partners



Denver Housing Authority, 2.5 MW Power Purchase Agreement

Questions?

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