

Residential Building Stock Assessment (RBSA) for Multi-Family Housing

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The Chances of Making A Better Decision Increase With Accurate Data

- Council's load forecast and assessment of conservation potential rely on current and detailed data about housing and appliance characteristics
- Conservation program planners rely on market data to inform program design and evaluations
- Acquisition of statistically meaningful data is both essential and expensive



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RBSA Study Objectives

- **Characterize Residential Sector Building Stock**
 - Single Family (Four-plex and below)
 - Multifamily (Five-plex and above)
 - Manufactured Homes (Federal regulated by US Department of Housing and Urban Development – HUD)
- **Provide Representative Samples**
 - By state or region
 - By BPA customer service area
 - Designed to permit individual utilities to “oversample” to provide utility level representation
- **Characterize Buildings**
 - Detailed On Site Energy Audit, including lighting survey
 - Basic Demographics
 - Billing Histories for both electric and gas consumption



How This Data Will Be Used

- **Supports both Load Forecasting and Assessment of Conservation Potential**
 - Provides Baseline Building Characteristics
 - Updates Heating and Cooling Equipment and Market Shares
 - Updates Appliance Saturations and Characteristics
- **Key input into determination of “non-programmatic” efficiency improvements (i.e., what consumers did on the own)**
- **Assist in conservation program design & implementation and evaluation**



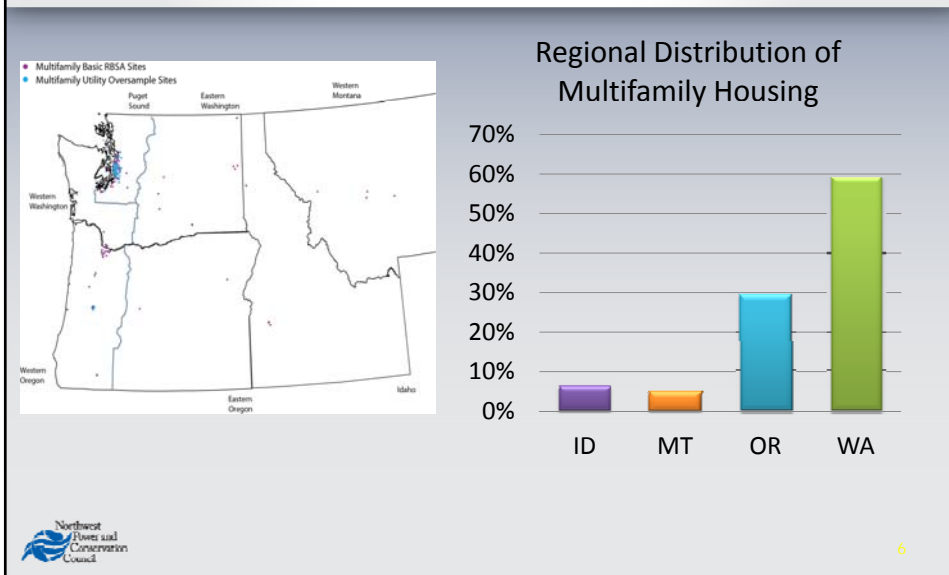
Data Sources on Multifamily Used in the 6th Power Plan

- 1992 Pacific Northwest Residential Energy Survey (PNWRES92)
- NEEA Survey of Baseline Characteristics of the Multi-Family sector NW (New Construction) - 1998
- NEEA Survey of Residential New construction (Single and Multi-family) billing analysis 2007
- NEEA Assessment of Multi-family building stock in the Pacific Northwest(2004-2005)



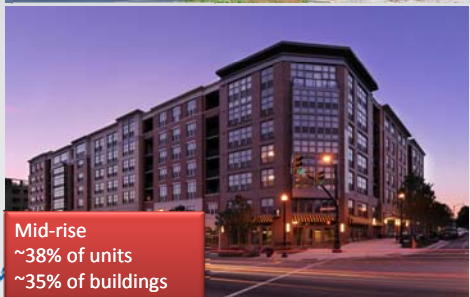
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Regional Distribution of Multi-Family Units and RBSA Study Coverage



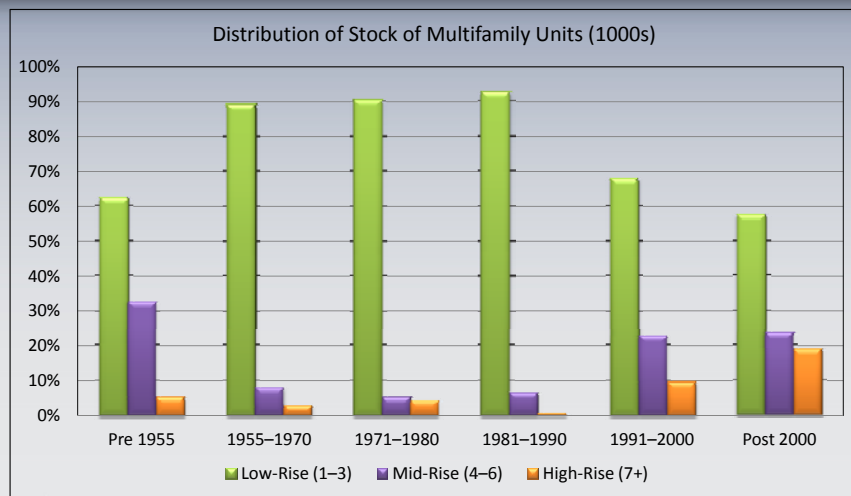
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What is a Multifamily Building?



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Low Rise Multifamily Units Dominant



Since 2000 The Share High Rise Multifamily Units Has Increased Significantly

Distribution of Building Ownership and Tenants Types

Tenant Type

	Low Income	No Income restrictions	All Types
Assisted Living	6%	<1%	1.5%
Senior Housing	28%	2.3%	7.2%
No Restriction	66%	97%	91%
All types	19%	81%	100%

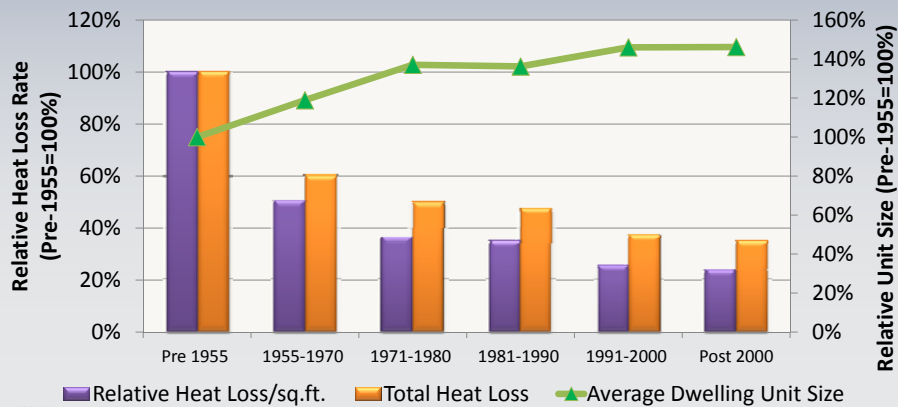
Building Ownership Type

	Low-Rise	Mid-Rise	High-Rise	All
COOP	<1%	5%	2%	1%
Condo	9%	29%	39%	10%
Corporate/REIT	43%	38%	46%	42%
Individual	32%	24%	0	31%
Public non-profit	11%	2%	13%	11%
Public Agency	5%	2%	0	5%



Building Shell Performance

Even With 50% Increase In Average Dwelling Unit Size, Overall Heat Lost Rates Are One-Third Lower Than Pre-1955



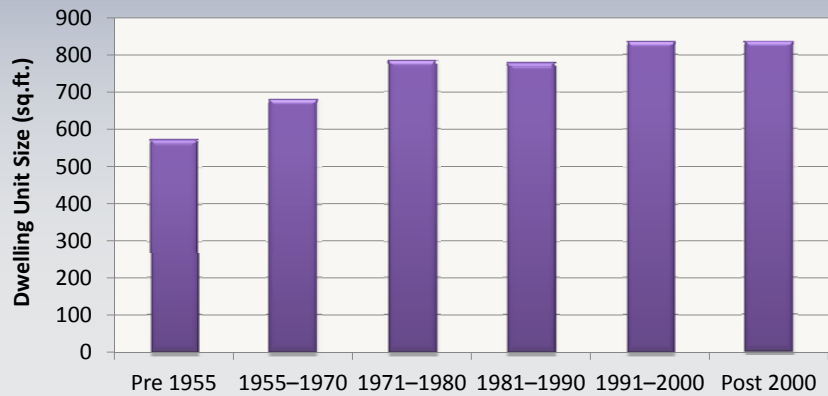
High Rise Units The Lowest Heat Loss Rates

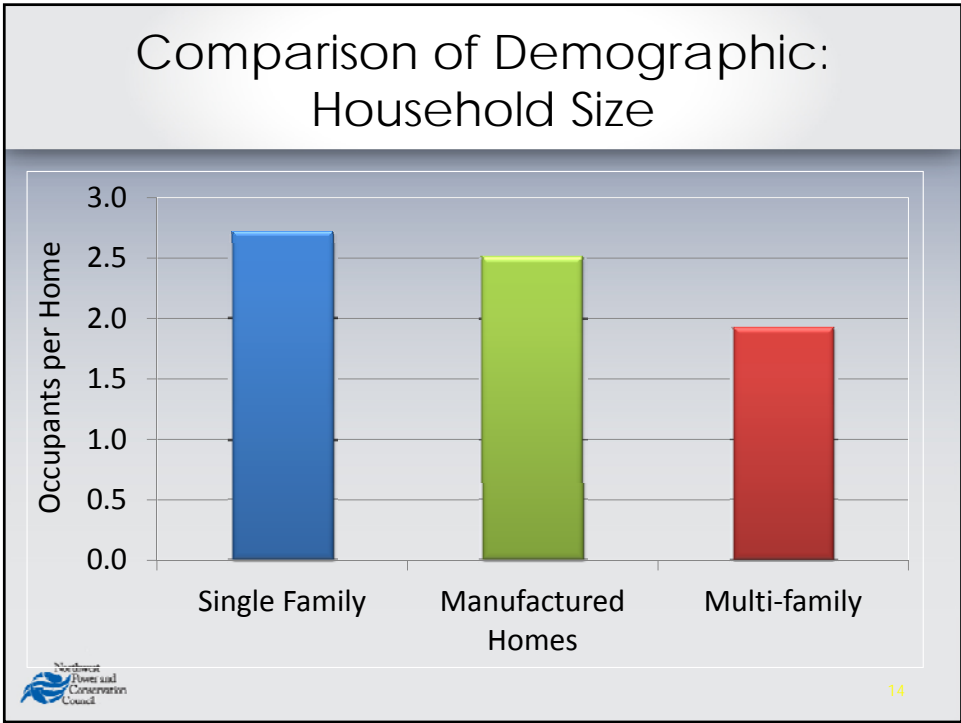
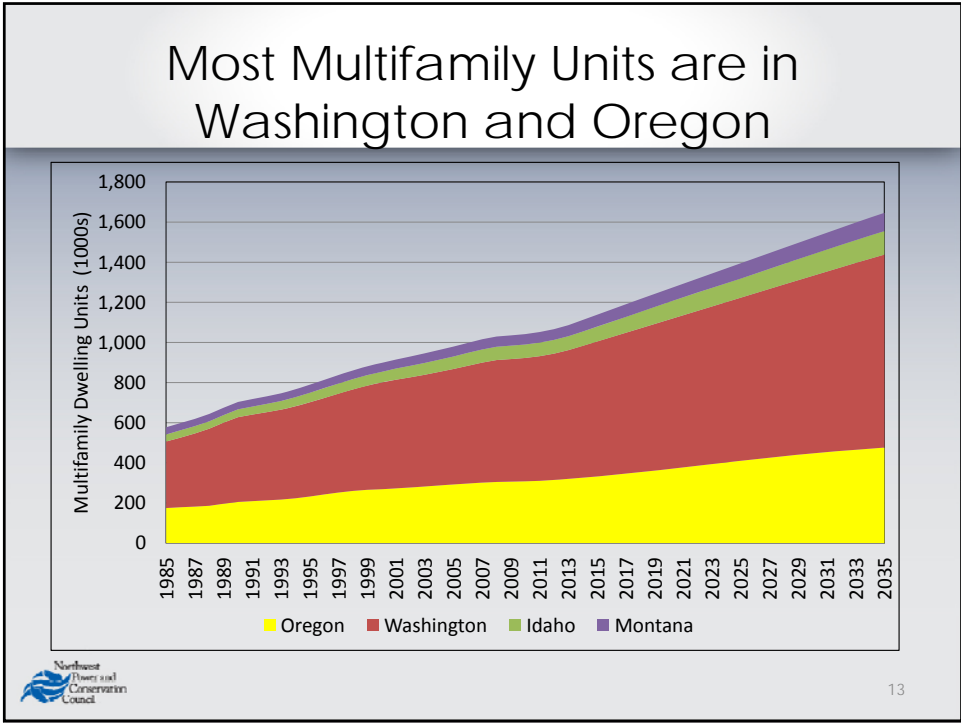
Building Type	Heat Loss/sq. ft. Unit Floor Area
Low-Rise	0.234
Mid-Rise	0.173
High-Rise	0.166



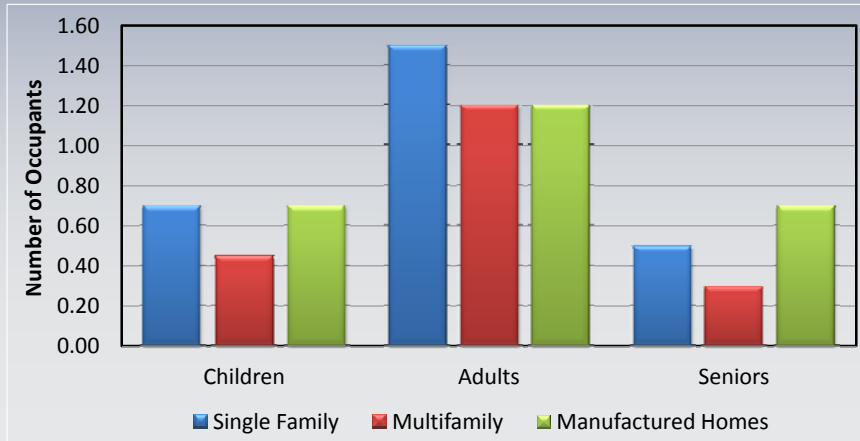
Multifamily Units Are 50% Larger Than They Were in the 1950s

Average Conditioned unit Floor Area (Sq. Ft.)



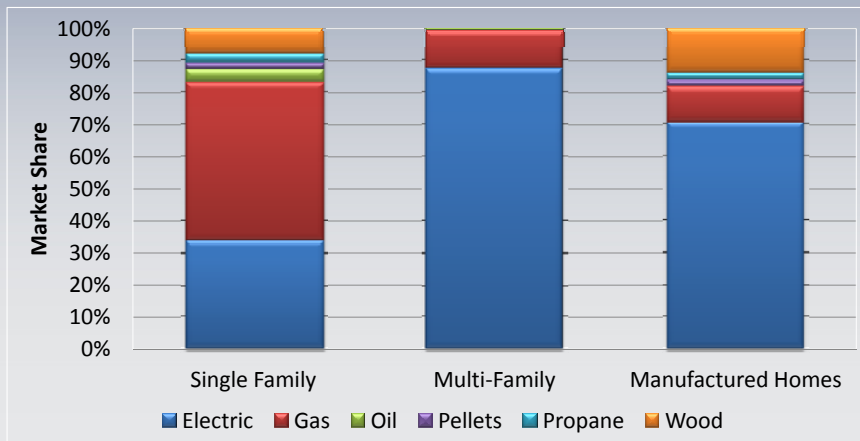


Comparison of Demographics: Occupants by Age Group



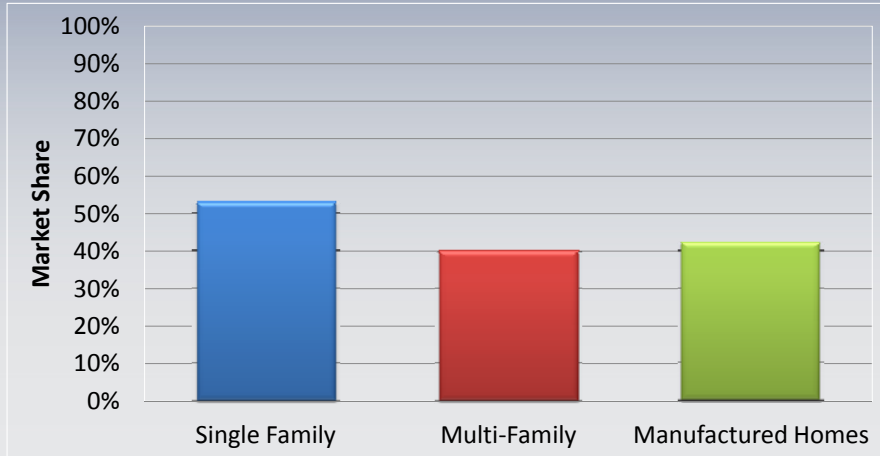
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Fuel Choice for Primary Heating System



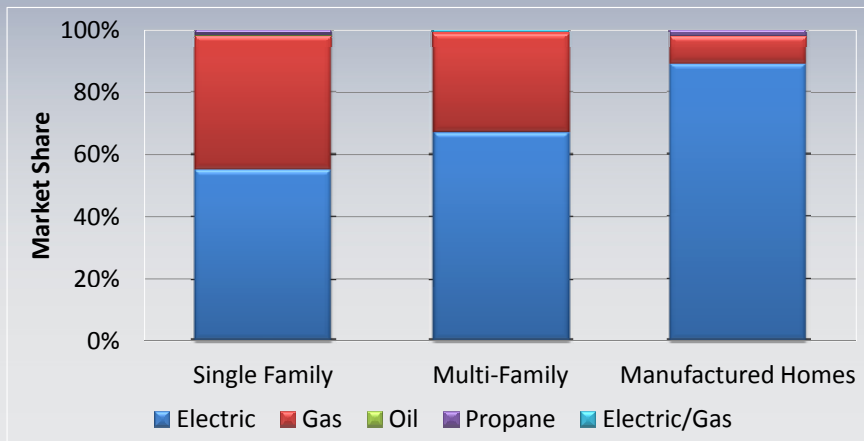
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Saturation of Air Conditioning



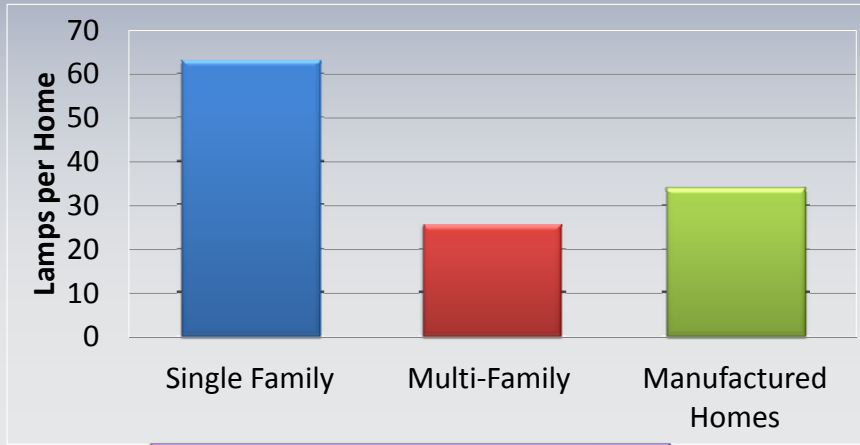
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Fuel Choice for Water Heating



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Residential Lighting

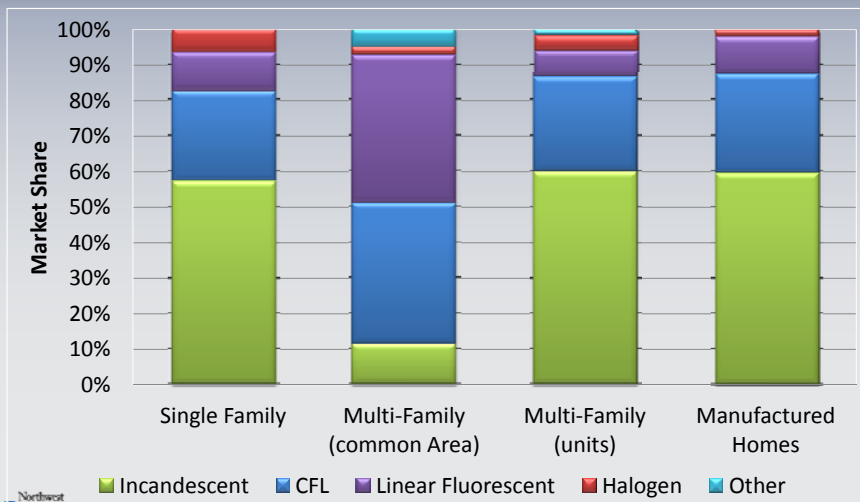


Note: Multifamily Includes Common Area Lighting



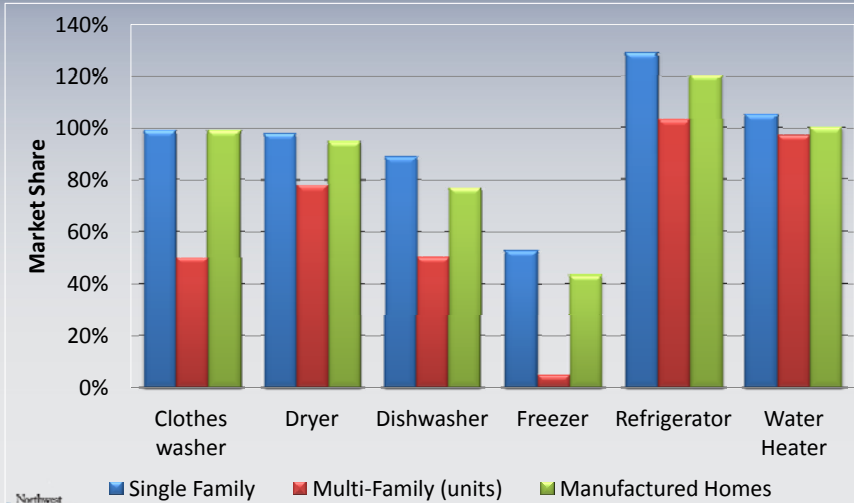
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Multifamily Housing Lighting is Similar to Other Residential Housing – Except in Common Areas



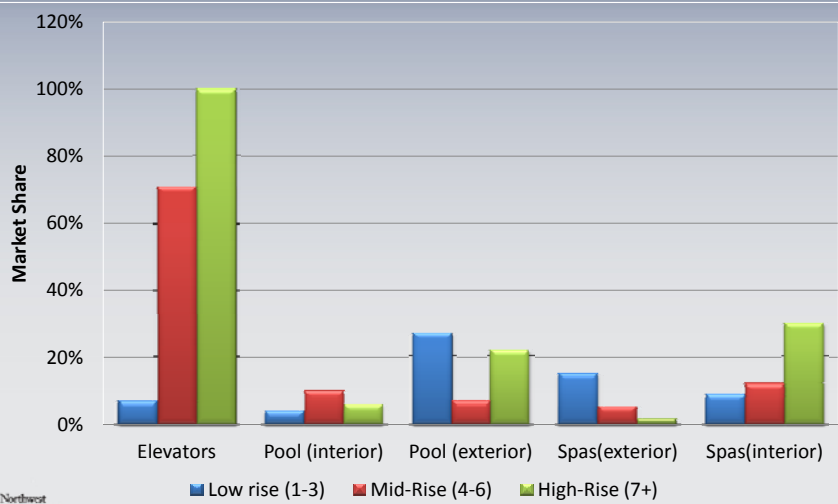
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Multifamily Dwellings Have Fewer Appliances Than Other Residential Housing Types

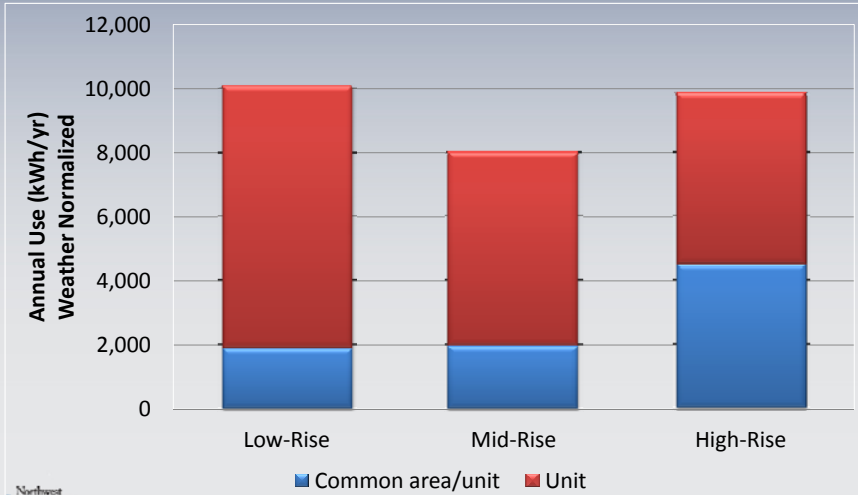


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Common Area Equipment

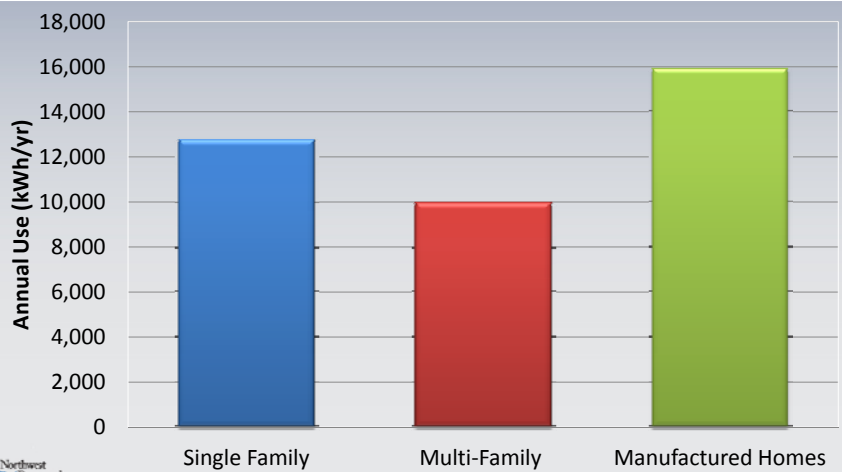


Low-Rise and High-Rise Multifamily Buildings Use More per Dwelling Unit Than Mid-Rise



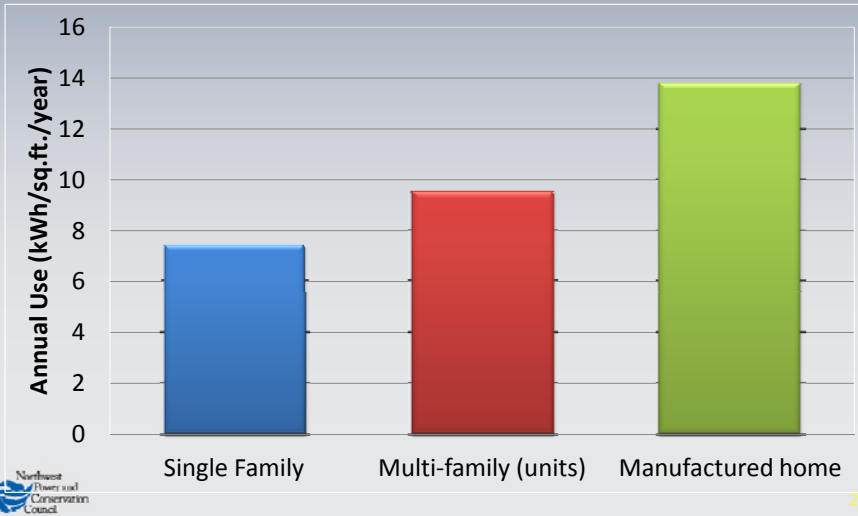
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Multifamily Dwellings Use the Least Space Heating Energy



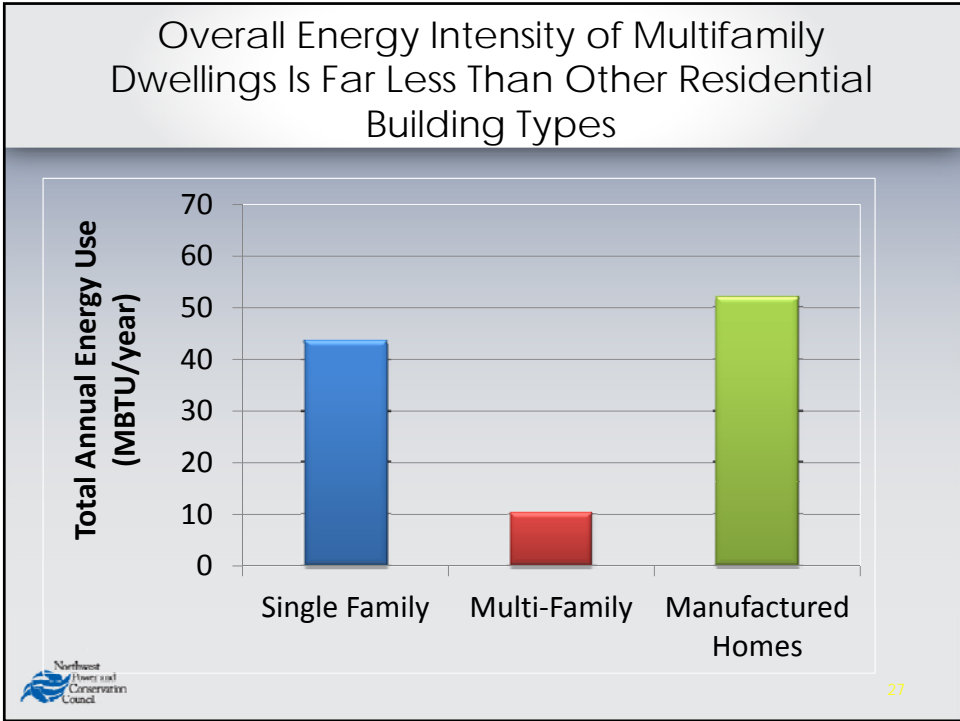
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Multifamily Dwellings Use the Least Electric Space Heating Energy Even After Accounting for Their Smaller Size



Multifamily Dwellings Use the Least Natural Gas Space Heating Energy Even After Accounting for Their Smaller Size





In summary

Residential Building Stock Assessment 2012 provides Council and the Region with:

- Better Baseline for 7th plan
- Improved Load Forecasting
- Enhanced Conservation Assessment
- Help in Program design & implementation

Special Thanks To:
NEEA RBSA Team
Utility RBSA Teams
NEET (working group 1) - Measuring What Matters

Northwest Power and Conservation Council