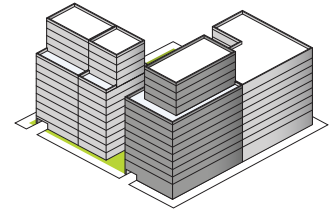








Playbook Summary: Post-1980 8+ Stories

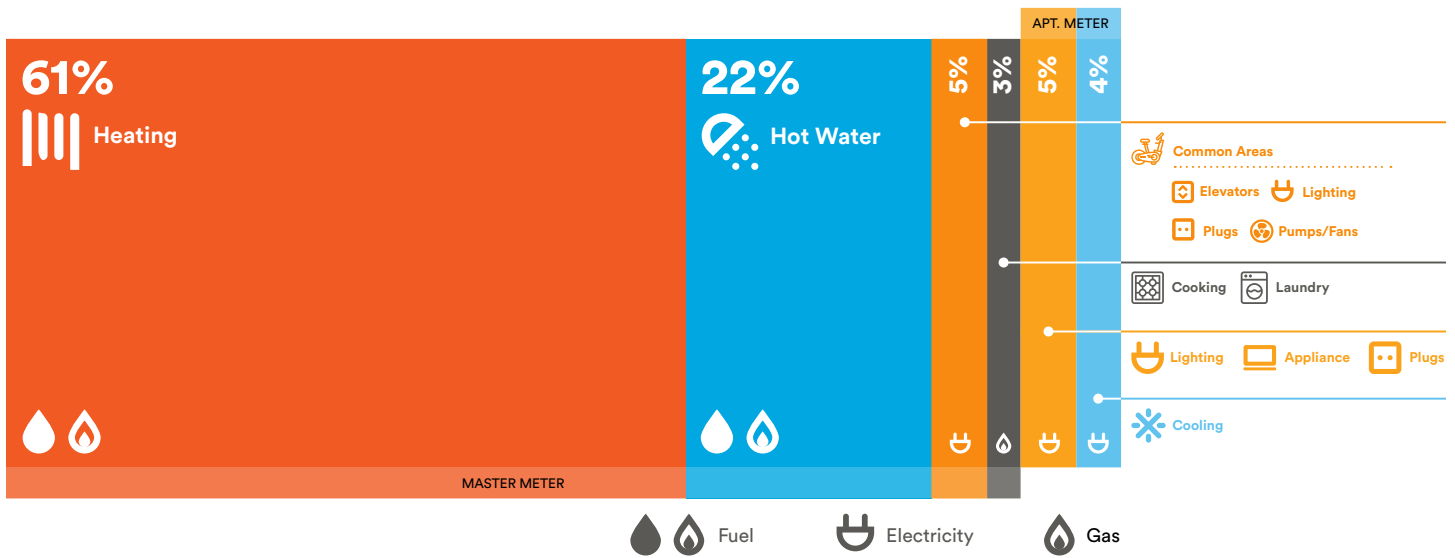
These buildings are typically at a minimum of 8 floors in height and can be found in virtually every context—from lot line buildings to free standing buildings on campuses. Many buildings of this type include mixed uses at the ground floor, such as retail (grocery stores, pharmacies, etc.) and commercial offices (Doctor’s offices, etc.). Tenant amenities are common, such as laundry, gym, lounge, rooftop terrace, and storage. The height and layout of buildings in this typology vary considerably with both simple towers and podium tower arrangements common, both corner and mid-block.

Download Full Playbook → <https://be-exchange.org/report/lowcarbonmultifamily-post80-high/>



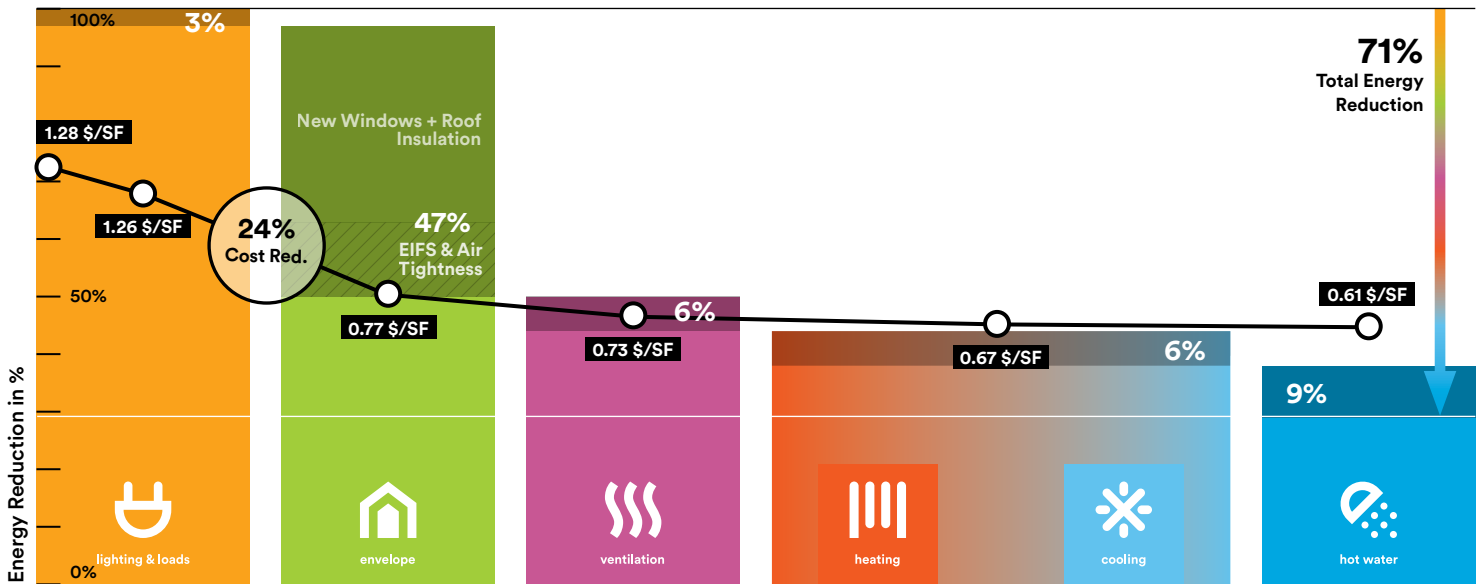
ELEMENTS		ISSUES		Retrofit Strategies		Recommended Targets	
EXTERIOR WALLS Typically steel frame and stud with some cavity insulation and punched window openings.	<ul style="list-style-type: none"> - Minimal interior insulation - Often no air barrier - Major thermal bridges at balconies, corners and parapet walls 	ROOF → Insulate Roof		→ Minimum of R-30		Whole Building U-value 0.091 Btu/hr.ft².F	
		EXTERIOR WALL → Add Interior insulation → Add Exterior Insulation		→ Minimum of R-20 → Minimum of R-10			
WINDOWS Window walls with casement or slider windows common without thermal breaks, single glazing or weak double glazing common.	<ul style="list-style-type: none"> - Little thermal resistance - Air leakage high - Major comfort issues - Condensation risk - Windows allow significant solar heat gain 	WINDOWS → Replace Existing Windows with High Performance Windows		→ Recommended U Value 0.167 Btu/hr.ft².F			
		HEATING Commonly PTACs served by steam or hotwater from a central oil or gas fired boiler. Some buildings have WSHPs served by oil or gas fired boiler.		<ul style="list-style-type: none"> - High maintenance costs - Creates drafty conditions - Major thermal bridge 			
COOLING PTAC units or WSHPs	<ul style="list-style-type: none"> - Increases whole building U-value - Through-wall PTAC units create major thermal bridges - winter removal does not occur 	 → Packaged Terminal Heat Pumps		→ Heating: 3.2 COP 47 °F Cooling: 4.4 COP			
		 → Centralized Energy Recovery Ventilation System		→ Sensible Heat Factor: 80% Max Fan Power: 0.76 W/cfm			
DOMESTIC HOT WATER Heat exchange at boiler with constant recirculation loop.	<ul style="list-style-type: none"> - Requires running boiler in shoulder and cooling seasons 	 → Air to Water Heat Pump Water Heaters		→ Min. COP: >2.2			
		 LIGHTING → High Efficiency Common Area Lighting		→ 50% Reduction in W/SF			
VENTILATION Mixture of partial kitchen/bath exhaust and natural ventilation; corridors typically have supply	<ul style="list-style-type: none"> - Limited direct fresh air introduction - System is not balanced, drives infiltration from exterior and adjacent units - Exhaust or supply not often continuous 	PLUG LOAD → High Efficiency Appliances and Smart Systems		→ 55% Reductions in Plug Loads			

Energy Use Analysis



Energy & Cost Reductions by Phase

■ = Energy use
 ■ = Energy reduction per phase
 ▼ = total Energy Reduction
 ○ = Energy cost per SF



Takeaways:

To meet future stringent efficiency and carbon regulations, buildings' upgrades should be approached proactively and not as a response to a system's failure or tenant's turnover. Building owners must also consider the long-term advantages of planning, scheduling, and testing based on recommended performance targets that work in concert with the envelope, HVAC systems, water, lighting controls, and other systems. Taking the initiative

to actively ensure each component is working at its intended operating capacity while providing continuing maintenance to the building's equipment is critical, cost-effective, and most likely result in health and comfort benefits.

Resources

Other Playbooks → <https://be-exchange.org/lowcarbonmultifamily-main/>