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.

### Playbook Summary: Post-1980 8+ Stories

**Retrofit Strategies**

<table>
<thead>
<tr>
<th>Element</th>
<th>Issues</th>
<th>Recommended Targets</th>
</tr>
</thead>
</table>
| EXTERIOR WALLS   | - Minimal interior insulation  
                  - Often no air barrier  
                  - Major thermal bridges at balconies, corners and parapet walls | → Insulate Roof → Minimum of R-30                         |
| WINDOWS          | - Little thermal resistance  
                  - Air leakage high  
                  - Major comfort issues  
                  - Condensation risk  
                  - Windows allow significant solar heat gain | → Add Interior insulation → Minimum of R-20  
                  → Add Exterior Insulation → Minimum of R-10           |
| HEATING          | - High maintenance costs  
                  - Creates drafty conditions  
                  - Major thermal bridge    | → Replace Existing Windows with High Performance Windows  
                  → Recommended U Value 0.167 Btu/hr.ft².F            |
| COOLING          | - Increases whole building U-value  
                  - Through-wall PTAC units create major thermal bridges  
                  - Winter removal does not occur | → Ensure Air Sealing as part of Exterior Wall and Window Upgrades  
                  → Recommended airtightness 1.0ACH                      |
| DOMESTIC HOT WATER | - Requires running boiler in shoulder and cooling seasons             | → Packaged Terminal Heat Pumps  
                  → Heating: 3.2 COP 47 °F  
                  → Centralized Energy Recovery Ventilation System  
                  → Sensible Heat Factor: 80%  
                  → Max Fan Power: 0.76 W/cfm                           |
| VENTILATION      | - Limited direct fresh air introduction  
                  - System is not balanced, drives infiltration from exterior and adjacent units  
                  - Exhaust or supply not often continuous              | → Air to Water Heat Pump Water Heaters  
                  → Min. COP: >2.2                                       |
| LIGHTING         | - High Efficiency Common Area Lighting                                  | → Heating: 50% Reduction in W/SF                         |
| PLUG LOAD        | - High Efficiency Appliances and Smart Systems                           | → 55% Reductions in Plug Loads                           |

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**Whole Building U-value**: 0.091 Btu/hr.ft².F

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Download Full Playbook ➔
Energy Use Analysis

61% Heating

22% Hot Water

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.

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/