2014 NORTHWEST COMMERCIAL BUILDING STOCK ASSESSMENT

REGIONAL SUMMARY



ACKNOWLEDGMENTS

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The Commercial Building Stock Assessment (CBSA) is a periodic study of energy use in existing commercial buildings in the Northwest (Idaho, Montana, Oregon and Washington). The study is conducted by the Northwest Energy Efficiency Alliance (NEEA) in partnership with the Bonneville Power Administration, the Northwest Power and Conservation Council, Energy Trust of Oregon and regional utilities.

Results from the CBSA will allow utilities and energy efficiency professionals to more accurately and thoroughly study, analyze and represent the unique energy efficiency needs of the Northwest. Study findings have informed the Northwest Power and Conservation Council's 7th Power Plan conservation targets and provide valuable information for energy efficiency planning and programming across the region. This report is a regional summary of 2014 CBSA findings. The full report and the complete CBSA dataset is publicly available at *neea.org/cbsa*. Please send questions to *cbsa@neea.org*.

NEEA is an alliance of more than 140 Northwest utilities and energy efficiency organizations working to accelerate the innovation and adoption of energy-efficient products, services and practices in the Northwest.

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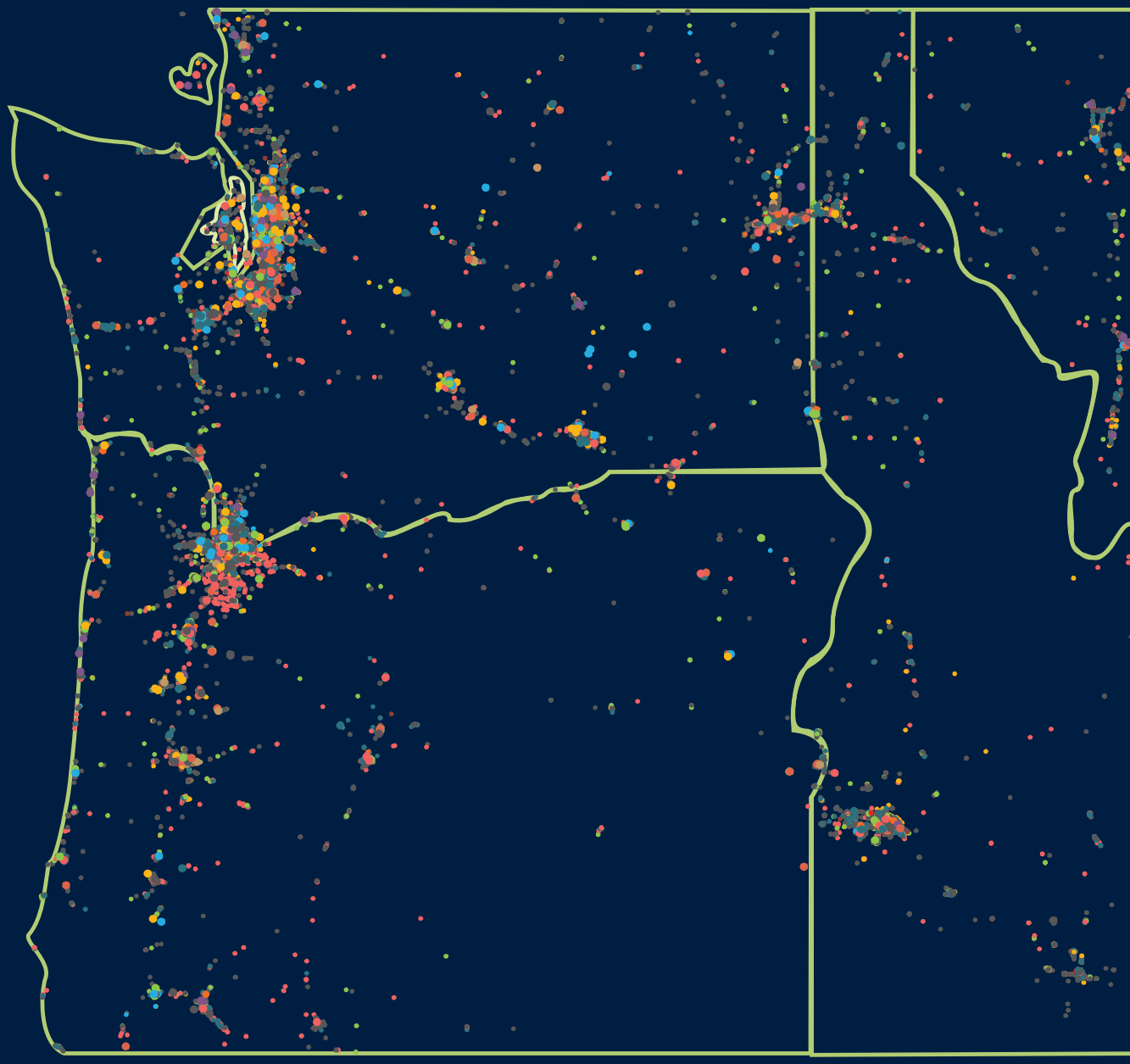
COMMERCIAL BUILDING LOCATIONS IN THE NORTHWEST



PACIFIC NORTHWEST

Total Population: 13 million

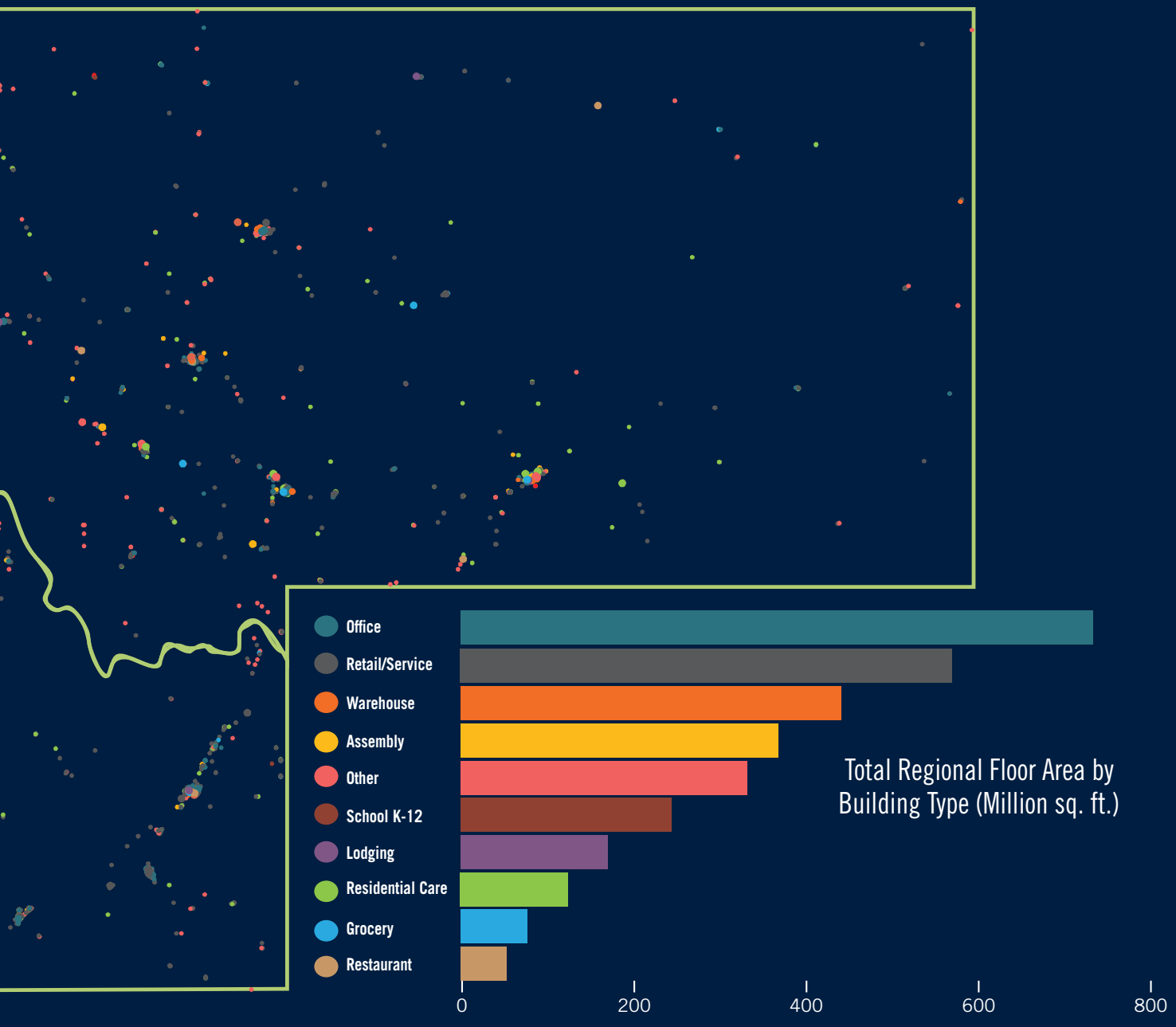
Total Number of Commercial Buildings*: 203,205

Total Floor Area: 3,122 million sq. ft.

Floor Area Heated by Electricity: 767 million sq. ft.

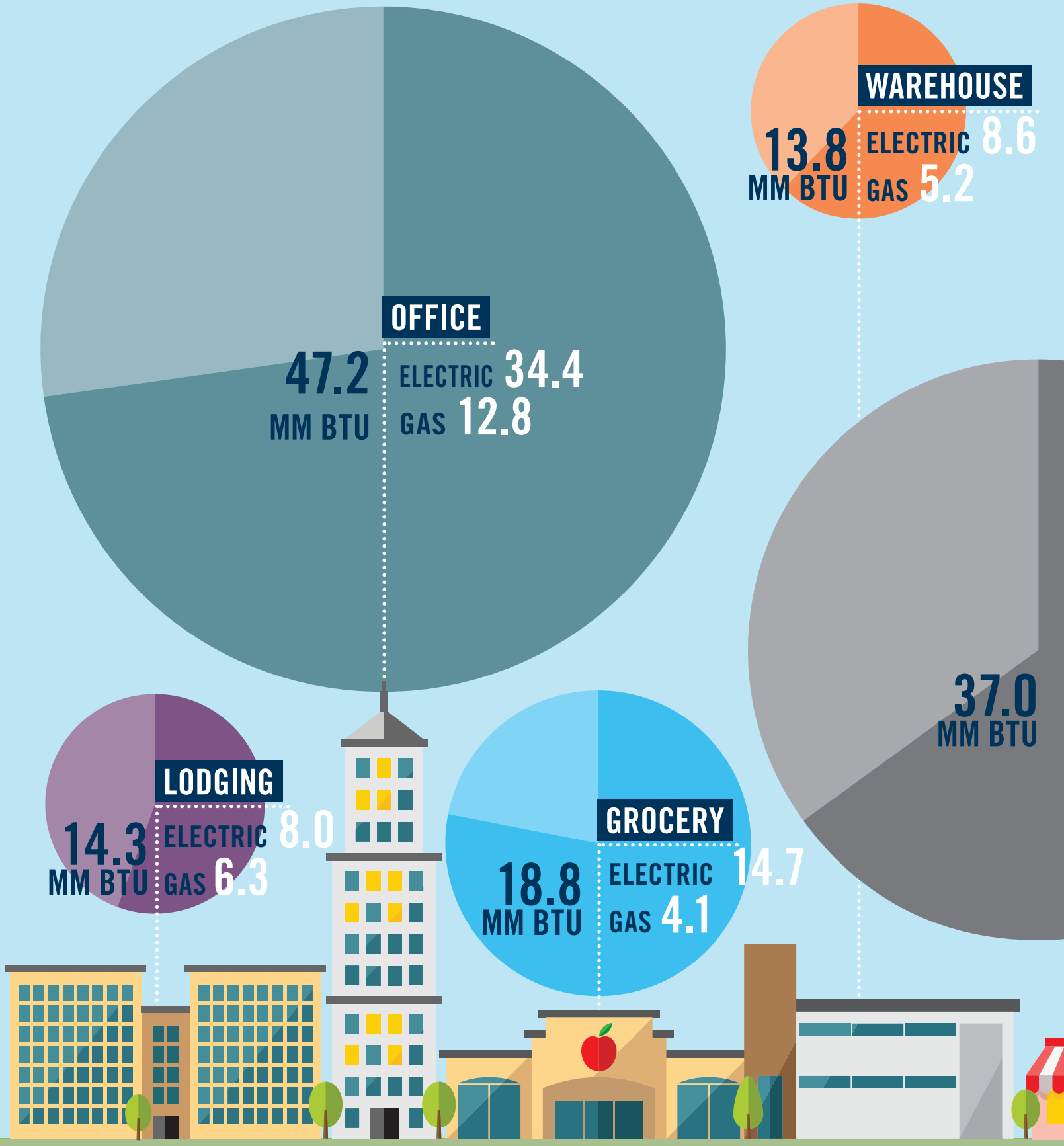
Floor Area Heated by Natural Gas: 1,782 million sq. ft.

** Number does not include hospitals or university campuses, which were assessed separately.*

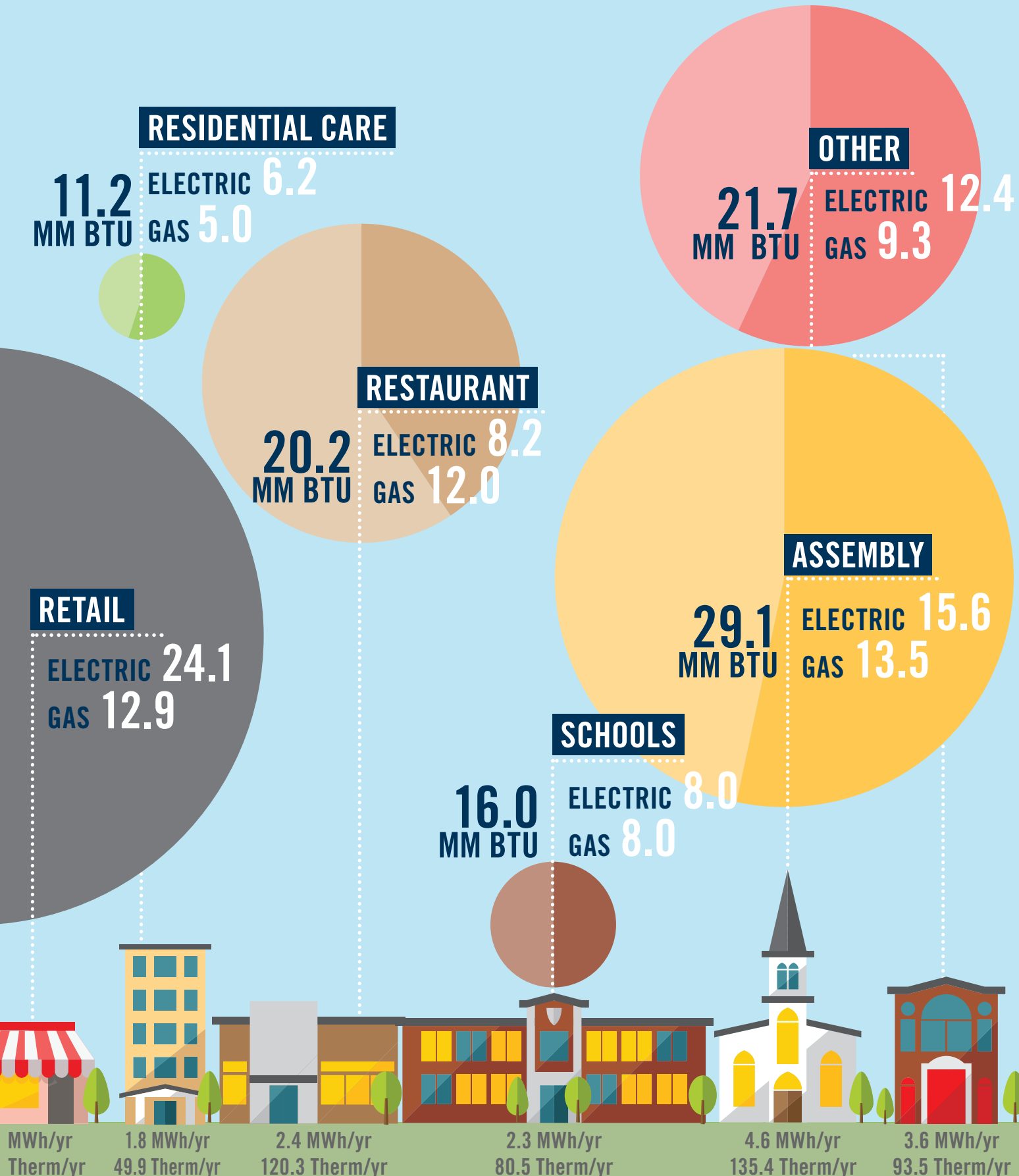


The 2014 Commercial Building Stock Assessment (CBSA) gathered data from commercial sites across 10 building types in Oregon, Washington, Idaho and Montana. The study represents the largest random sample of commercial buildings in the history of the Northwest. According to the data, commercial building floor area increased nearly 27 percent between 2009 and 2014. Over the same period, electrical energy use per square foot decreased by about 11 percent, while natural gas use decreased by just under 15 percent.

ENERGY USE BY BUILDING TYPE (MILLION BTU/YR)



Looking at total energy use as measured in British therm units allows comparison of relative natural gas and electricity use across building types (1 therm = 99,976 BTUs; 1 kWh = 3,412 BTUs). Overwhelmingly, office buildings use the most energy followed by retail and assembly buildings.

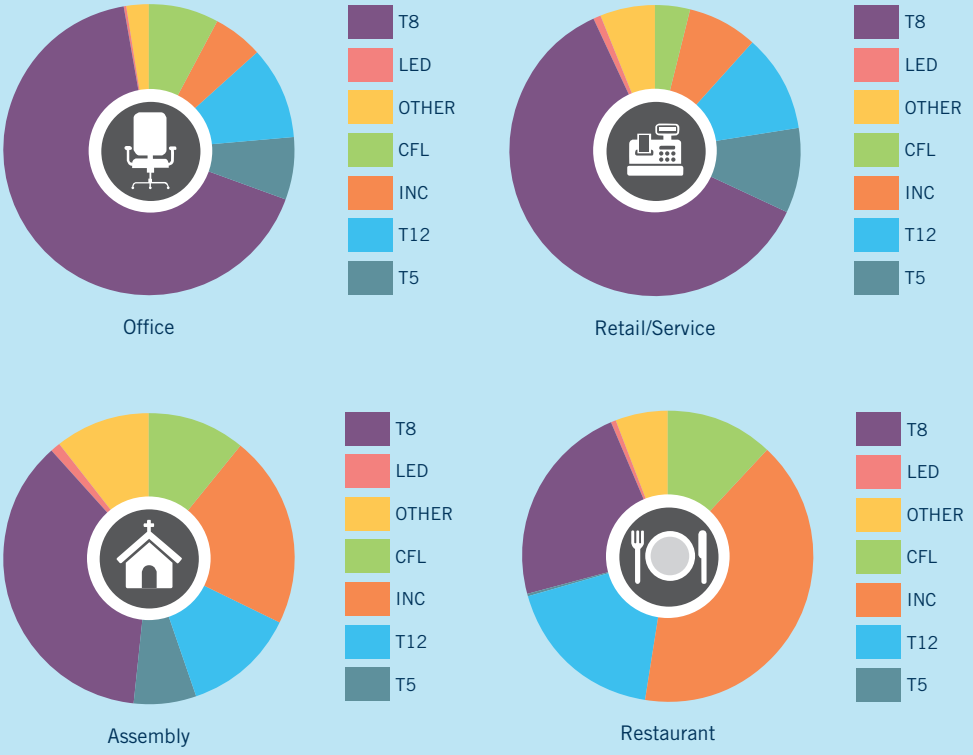


REGIONAL LIGHTING

Commercial lighting uses an estimated 3,000 Megawatts of electricity across the Northwest each year, enough energy to power over 2 million homes. Office and retail buildings make up the bulk of the connected lighting load (24 percent and 23 percent, respectively). Lighting Power Density, measured in watts per square foot, is highest in restaurant and retail buildings and lowest in warehouse buildings. In comparison, total regional installed watts of lighting is highest in office buildings (693 million watts) and lowest in restaurant buildings (62 million watts). Overall, the 2014 Commercial Building Stock Assessment found a downward trend in the average Lighting Power Density across all commercial buildings in the region since 2009.

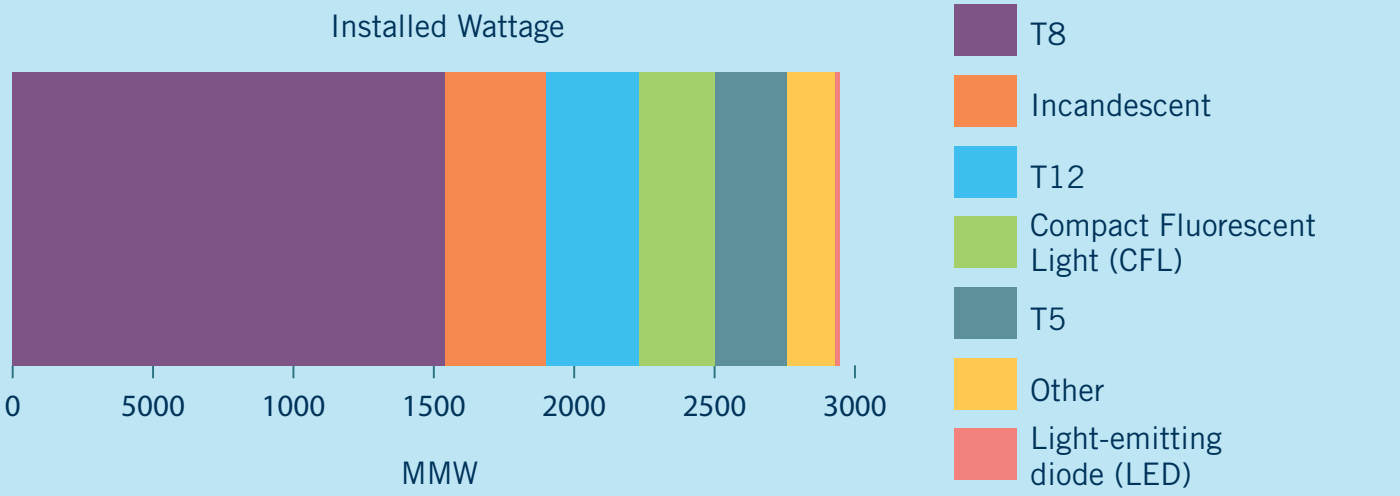
Regional Lighting by Building Type

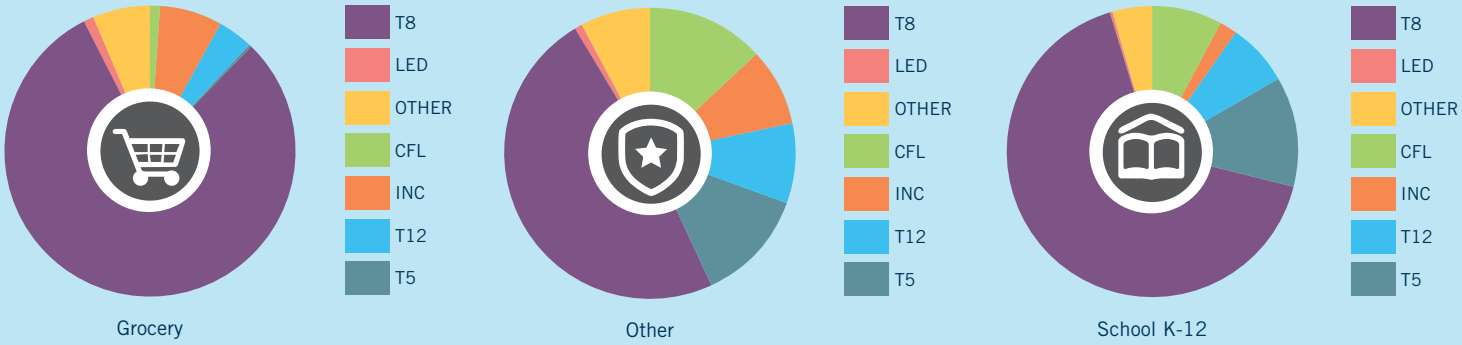
Office, grocery, school and retail buildings primarily use T8 lighting fixtures, while inefficient incandescent bulbs remain a significant portion of the installed wattage for assembly, lodging, residential care and restaurant buildings. Compact Fluorescent Light (CFL) bulbs make up about a third of the lighting load in lodging buildings.

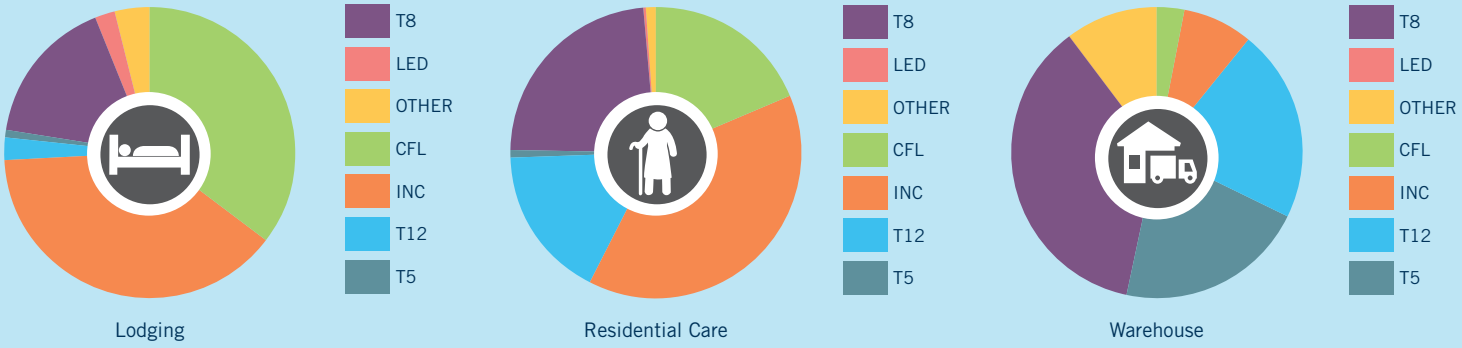


Regional Lighting by Lamp Type (Million Watts)

Fluorescent T8 lights make up 52 percent of the region's total connected lighting load, while LEDs comprise only 1 percent. Across the region, inefficient incandescent light bulbs are 12 percent of the total lighting load.





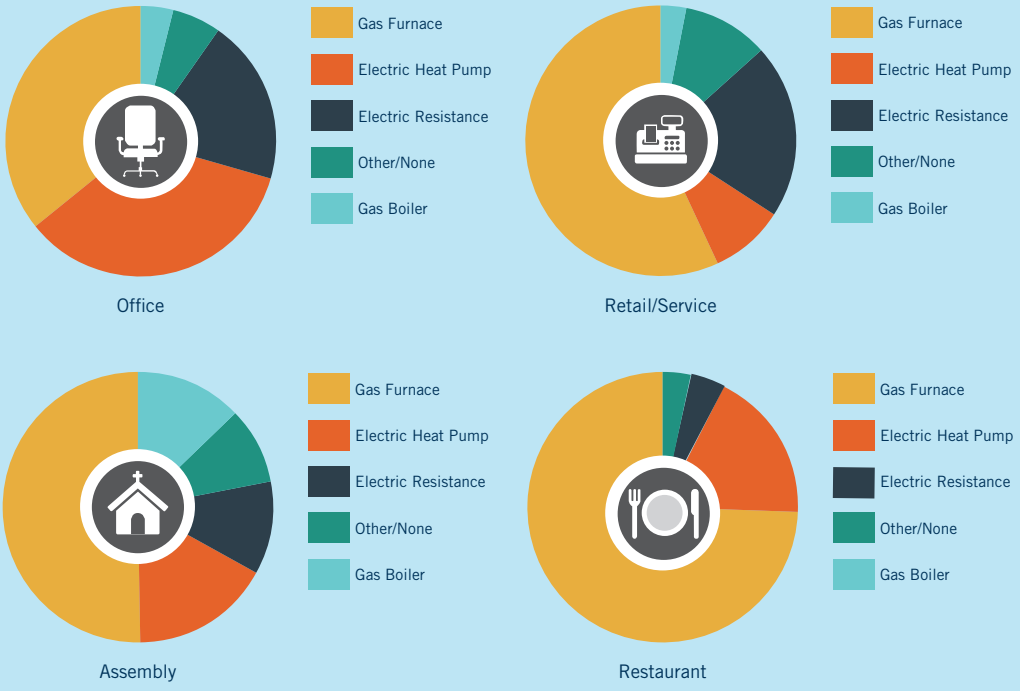


REGIONAL HEATING SYSTEMS

The 2014 Commercial Building Stock Assessment found a great deal of diversity in the heating and cooling systems of commercial buildings across the region. Restaurant and lodging buildings are dominated by a single heat source, whereas office and residential care buildings have more diverse heating systems. Natural gas is the most popular heating fuel, followed by electricity (66 percent and 30 percent, respectively). Though rare, fuel oil and propane are still used to heat about 2 percent of Northwest buildings (primarily K-12 schools and assembly buildings). Most of the heating equipment in the region is 5-19 years old with the exception of mini-split heat pumps (0-4 years) and electric resistance systems (20+ years). Single-zone ducts are the primary heat distribution method.

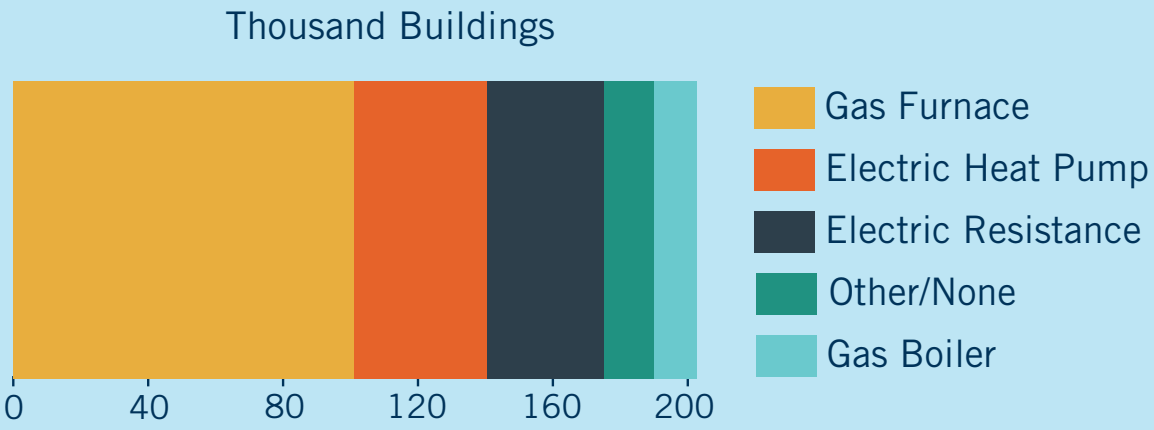
Regional Heating Mix by Building Type

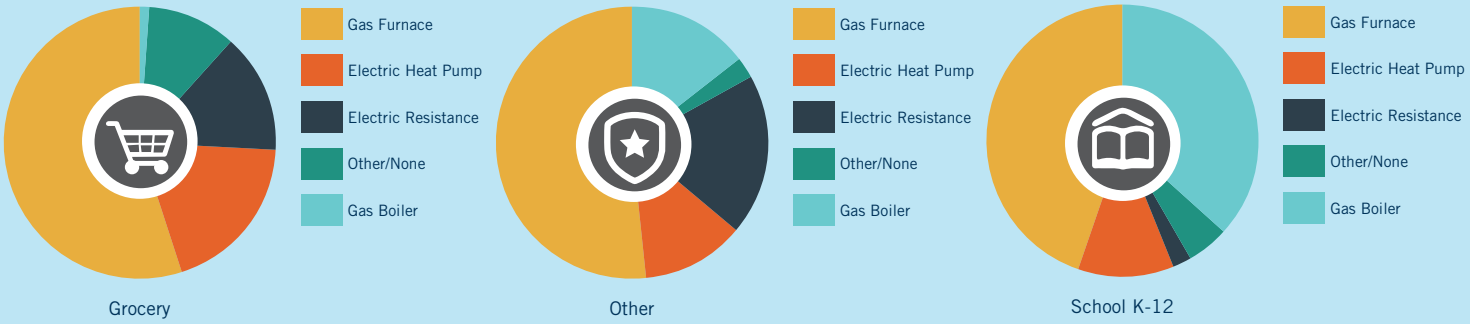
Gas furnaces are the most popular heating system in most commercial building types, while gas boilers and electric heat pumps are more common in offices and schools. Electric resistance heat is still the most common heating type in lodging buildings (e.g. hotels and motels).

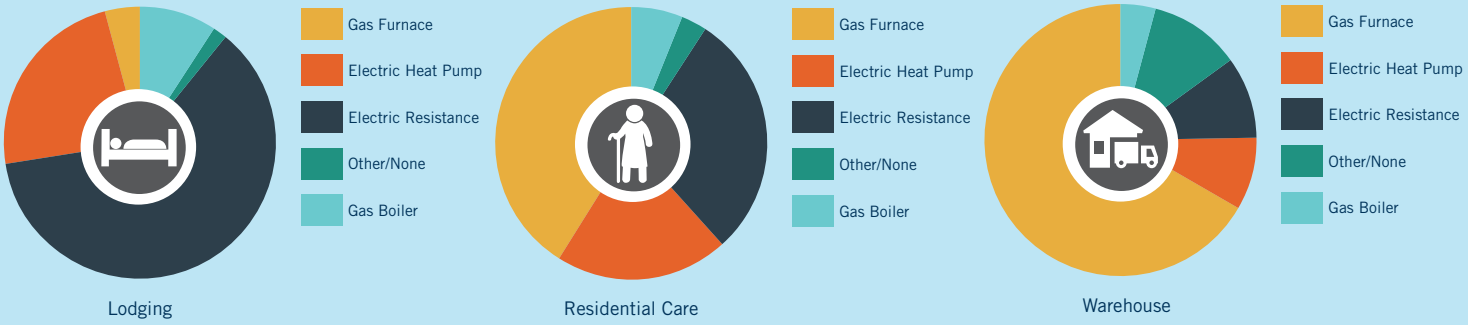


Regional Heating Mix by System Type

Across the region, 91 percent of commercial building square footage is heated (75 percent is cooled). Furnaces heat 50 percent of commercial square footage, while electric resistance heats 18 percent. Heat pumps are responsible for heating only 12 percent of commercial square footage in the Northwest.





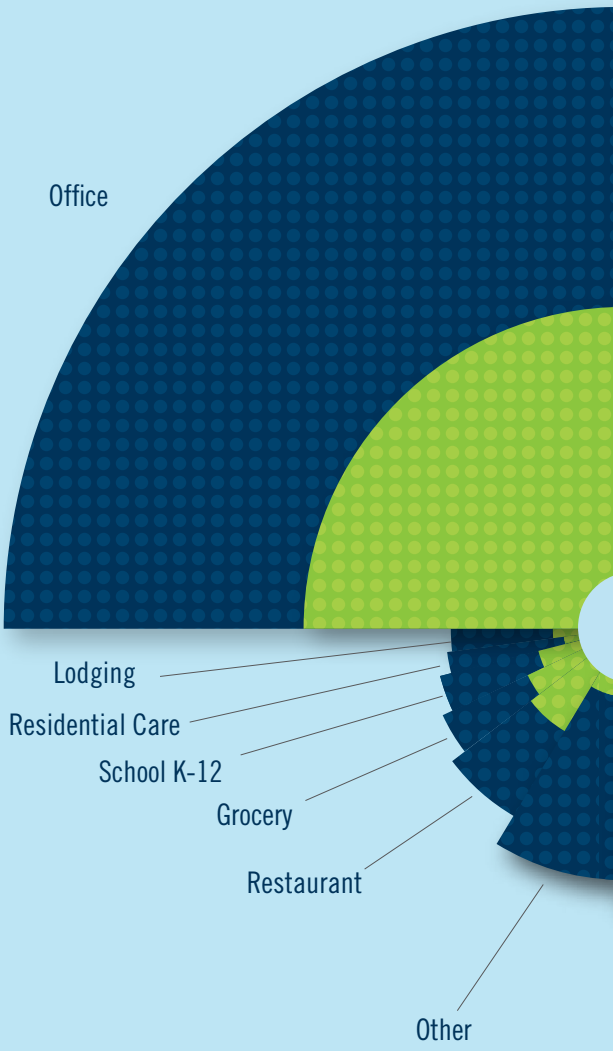


BUILDING TYPE CHARACTERISTICS

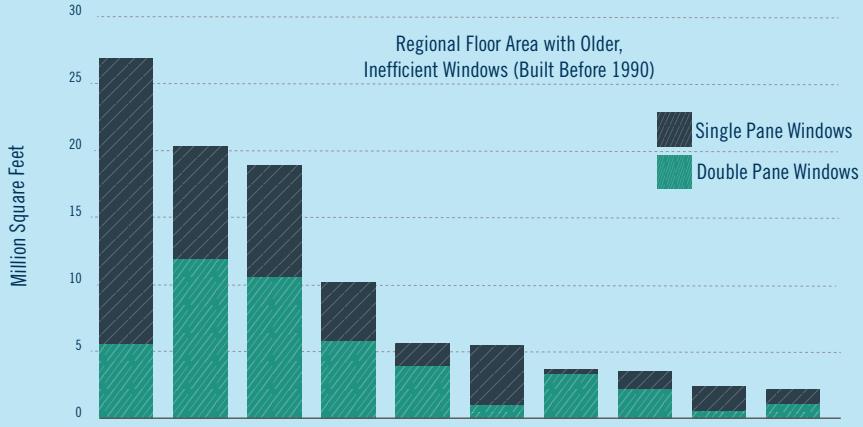
Professional office, call center, retail banking, City Hall, dental office, urgent care clinic, outpatient rehab, veterinarian, medical office

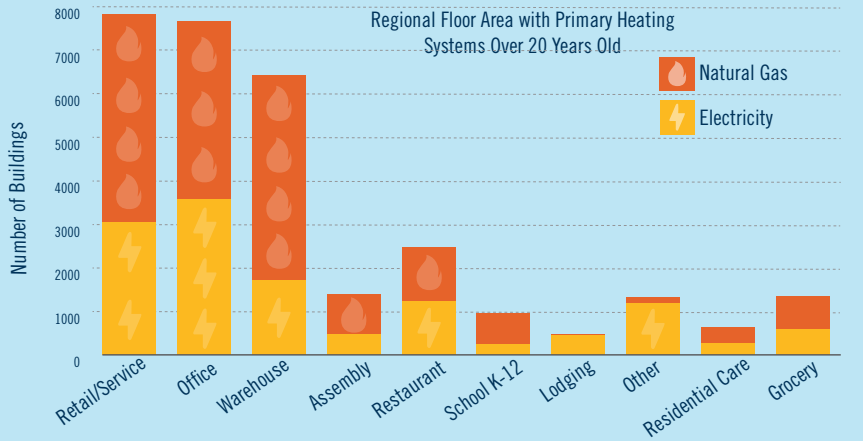
Auto parts, hardware, beauty, clothing, liquor store, dry cleaner, pharmacy, post office, laundromat, studio, florist, electronics, department store

Total Regional Floor Area



Targets for Regional Replacement or Upgrade Programs

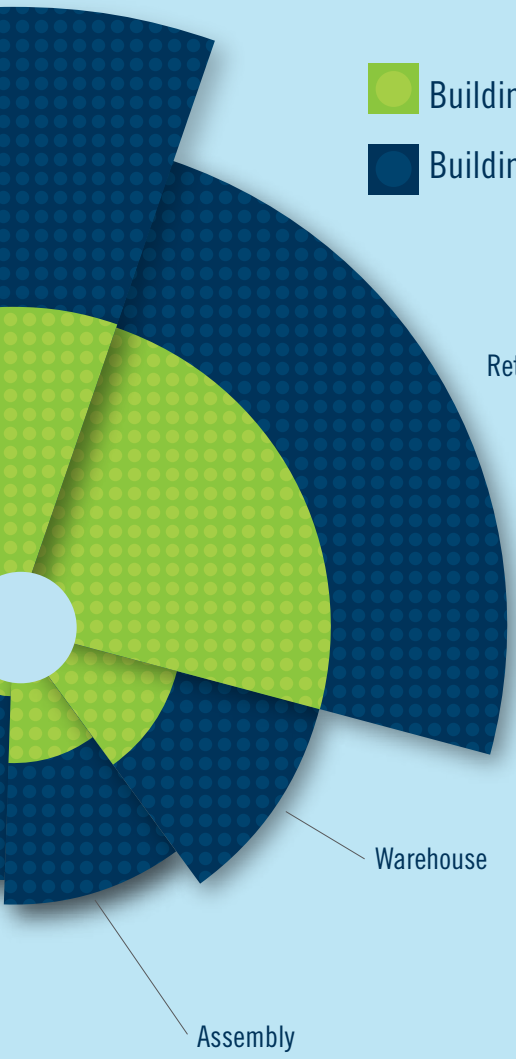




Assisted living, in-patient rehab, nursing home, retirement home

Storage (both mini-storage and cold-storage) and distribution facilities

(3,122 million square feet)



Airplane hangar, asylum, courthouse, crematorium, data center, server farm, police and fire, prison, telephone switching, adult education, vocational training

Religious assembly buildings, arenas, convention centers, performing arts theaters, auditoriums, gyms, marinas, bowling alleys, ice skating rinks, casinos, libraries, museums, community centers and movie theaters

Cafeteria, fast-food, sit-down, take-out, truck stop, bar, catering service, coffee shop, ice cream shop

Hotel, motel, bed and breakfast, boarding house, dormitory, shelter orphanage, resort, convent, half-way house, fraternity/sorority

Convenience stores, grocery stores, gas station with convenience stores

Elementary schools, middle schools, high schools, pre-schools, other K-12 schools

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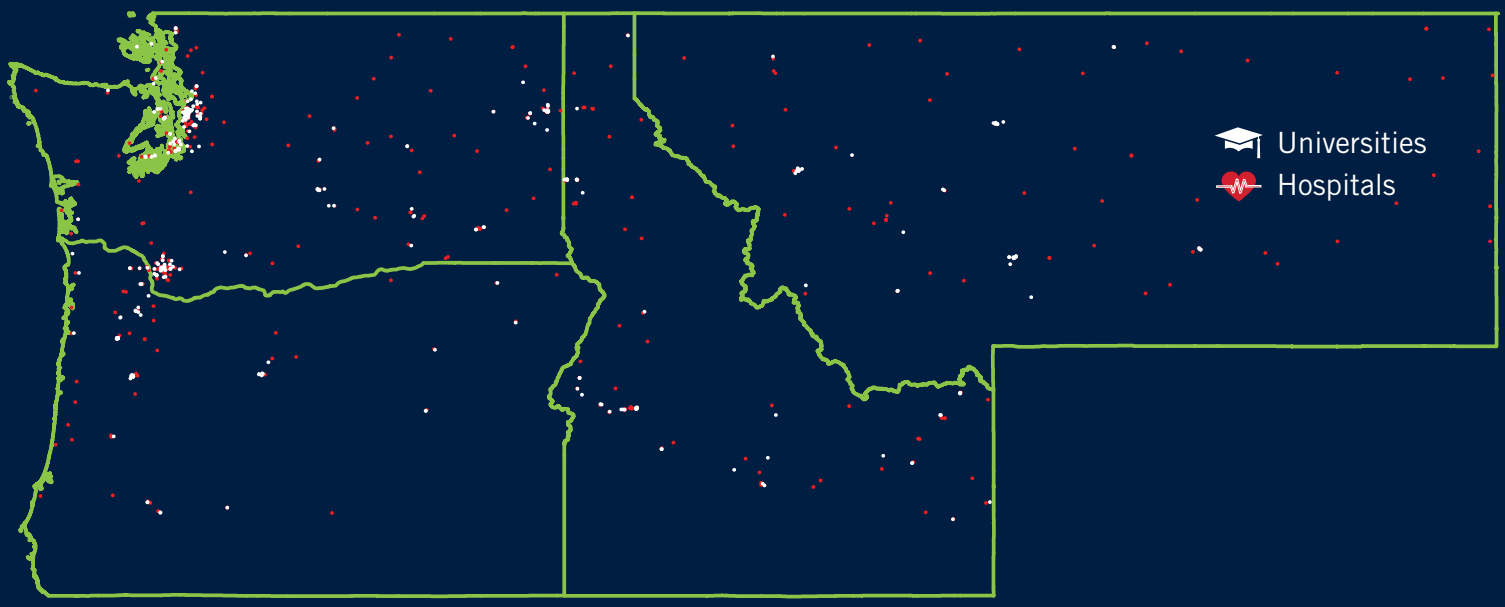
HOSPITALS AND UNIVERSITIES

To provide an accurate and current picture of hospital and university energy use in the Northwest, the 2014 Commercial Building Stock Assessment gathered data on over 250 variables from 31 hospitals and 21 universities. Total regional floor area for hospitals and universities is 228 million square feet.

Hospital and University Building Locations in the Northwest



HOSPITALS

Total Annual Electricty Use: 2.2 Million MWh

Total Annual Gas Use: 89 Million Therms

Total Hospitals: 134

Total Beds: 21,164 (56% avg. occupancy)

Total Floor Area: 103.75 Million sq. ft.

UNIVERSITIES

Total Annual Electricity Use: 2.1 Million MWh

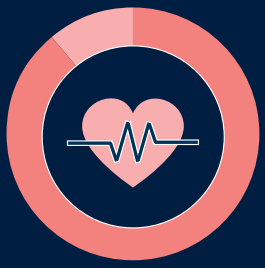
Total Annual Gas Use: 92 Million Therms

Total Universities (and Colleges): 260

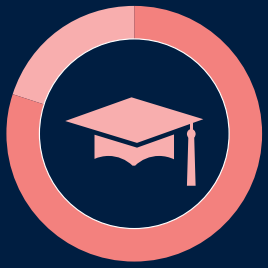
Total Students: 788,000 (Full and Part-time)

Total Floor Area: 124 Million sq. ft.

Building and Energy Use Characteristics

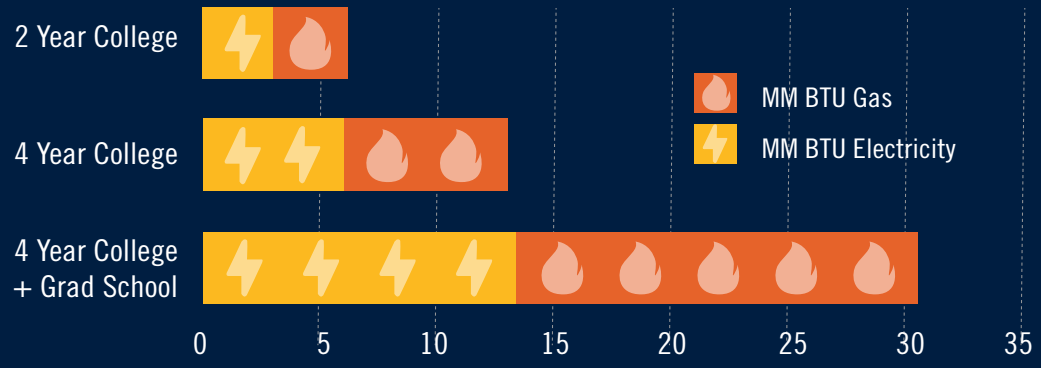


89% of hospitals use natural gas as the primary heating fuel

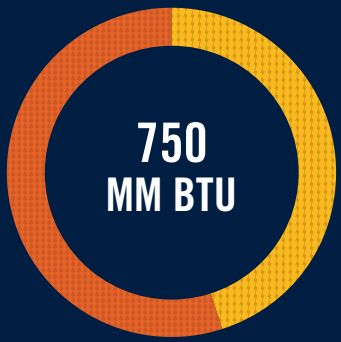


72% of universities have programs in place to replace inefficient lighting with T-8s or LEDs

Daily Energy Use Per Student



Daily Energy Use Per Hospital Bed



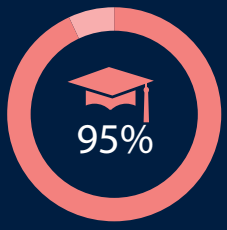
11.5 therms/day

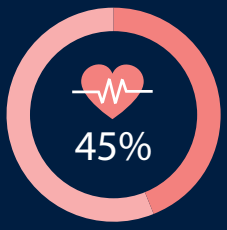
290 kWh/day

MM BTU Gas/Student

MM BTU Electricity/Student

Buildings Built Before 1990





TOGETHER *We Are Transforming the Northwest.*

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