



CanmetENERGY

Leadership in ecoInnovation

THE URBAN ARCHETYPES PROJECT

Community Case Study: The City of Coquitlam

The Urban Archetypes Project, initiated by Natural Resources Canada's CanmetENERGY in Ottawa, investigated 31 neighbourhoods¹ in 8 communities² to explore the linkages among urban form, lifestyle patterns of residents and energy consumption.

The project developed energy profiles for average households within each neighbourhood for personal vehicles, household heat, hot water, and electricity for lighting and appliances. It also investigated the influence of urban design, neighbourhood location and lifestyle variables on average household vehicle travel and associated energy consumption. Communities in the project reflected a range of sizes, geographical regions, climates, energy sources and energy efficiency issues.



This fact sheet, one in a series of eight **community case studies**, presents the results for four neighbourhoods in the city of Coquitlam as studied in 2006: Burquitlam, Eagle Ridge, Ranch Park and Westwood Plateau.

This research project used *The Urban Archetypes Project Methodology*,³ which allows for a comparative analysis of energy consumption of typical households in different neighbourhoods in the same community. A further analysis of all of the project's neighbourhoods (31) will be presented in *The Urban Archetypes Project Analysis*. These documents will be posted to www.canmetenergy.nrcan.gc.ca as they become available.

The Urban Archetypes Project is among the first to explore, in an integrated fashion, the energy implications of land use, infrastructure and building decisions through case studies that present quantitative energy information in a neighbourhood context. In so doing, this project begins to address a significant gap in Canadian community energy-planning practice. Building on the findings of this project, CanmetENERGY, with project collaborators, will continue to work to provide energy information to assist Canadian communities in making strategic energy-planning decisions.

Located in British Columbia at 49°17'04" north latitude and 122°47'35" west longitude, **Coquitlam** is a dynamic city with a population of 114 565.⁴ Coquitlam offers the vibrant action of a growing city with arts and cultural venues, multiple recreational facilities and a beautiful natural setting boasting abundant parks

and green space. Approximately a quarter of the employed residents work in sales and service, with another 20 percent in business, finance and administration;⁵ many residents work in downtown Vancouver.

¹ The term neighbourhood, as used in this project, denotes an area approximately 300 dwelling units in size and of relatively homogenous urban form; a neighbourhood could vary in size geographically.

² The term community, as used in this project, refers to the same scale as the municipality.

³ Definitions of measures and indicators can be found in *The Urban Archetypes Project Methodology*. www.canmetenergy.nrcan.gc.ca

⁴ City of Coquitlam. City Profile. www.coquitlam.ca/Visitors/About+Coquitlam/City+Profile/default.htm

⁵ City of Coquitlam. Coquitlam's Labour Force. www.coquitlam.ca/Business/Why+Choose+Coquitlam/City+Profile/Demographic+Data+2006.htm

Centred in the heart of the Lower Mainland, Coquitlam is a 30-minute drive from downtown Vancouver and about 20 minutes from the American state of Washington.⁶ Coquitlam is bordered by the municipalities of Port Moody, Port Coquitlam, Burnaby and New Westminster and by the geographical features of the Fraser River to the south, Pitt River to the east and the Coastal Mountains to the north.

The Coquitlam Town Centre is designated as a regional town centre under Metro Vancouver's Livable Region Strategic Plan.

The climate is mountain-coastal, with average daily temperatures ranging from 17.5°C (August) to 3.4°C (January). Similar to many B.C. communities, the typical heating fuel source is natural gas, and electrical generation is provided primarily by hydroelectricity.

NEIGHBOURHOOD DESCRIPTIONS

BURQUITLAM



Burquitlam is located along the western edge of Coquitlam, adjacent to the City of Burnaby. The study area is bounded by Whiting Way Road to the west, Foster Avenue to the north, Robinson Memorial Park Cemetery to the east and the Vancouver Golf Club to the south. Topographically, it is fairly flat.

While the larger area has a mix of housing types, those within the study area are single-family dwellings built from the 1950s to the 1970s. Roy Stibbs Elementary School is found within the neighbourhood, and Coquitlam College is within walking distance. Nearby shopping can be found at the Lougheed Town Centre Mall. The Lougheed Skytrain station is also close by.

EAGLE RIDGE



Eagle Ridge is northwest of the Coquitlam Town Centre. The study area is bounded by Falcon Drive to the west, Guilford Way to the north and Hoy Creek Linear Park to the east. Located on the side of Eagle Mountain, the neighbourhood is steep in places.

Homes within the study area are single-family dwellings built in the 1980s, although multi-family apartments and duplexes can be found nearby. Running through the neighbourhood is Eagle Ridge Park, a hydro corridor that provides recreational opportunities in the form of trails, a baseball diamond and a soccer field. Both the City Centre Aquatic Complex and Douglas College are found within a kilometre of the neighbourhood. Numerous strip malls are nearby, including along Johnson Street and the Barnett Highway.

⁶City of Coquitlam. City Profile. www.coquitlam.ca/Visitors/About+Coquitlam/City+Profile/default.htm

RANCH PARK



Ranch Park is located in south-central Coquitlam, south of the Barnett Highway and west of the Lougheed Highway. The study area to the west and north includes homes on both sides of Mariner Way, a major artery, and is bounded by Dory Street to the east and by Mariner Park to the south. The neighbourhood is situated on a hillside that is steep in some sections.

Homes within the study area are single-family dwellings built in the 1970s. Two schools are within walking distance, Ranch Park and Meadowbrook. The neighbourhood has significant green space nearby, with Pinnacle Creek Ravine Park located to the west and Mundy Park to the southwest. Three shopping centres can be found within 2.5 kilometres (km): Coquitlam Centre, Pinetree Village and Westwood Mall.

WESTWOOD PLATEAU

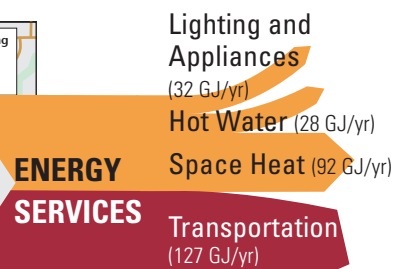
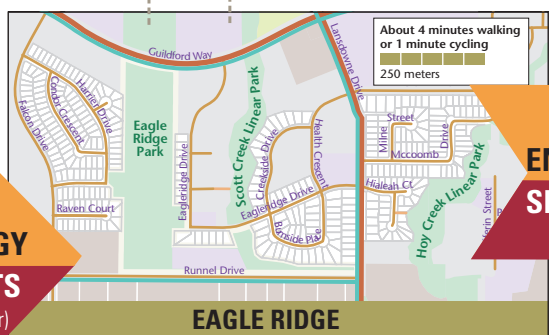
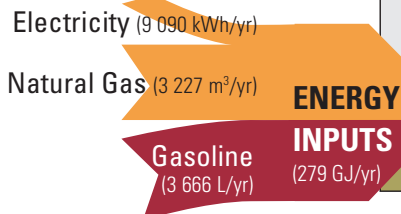
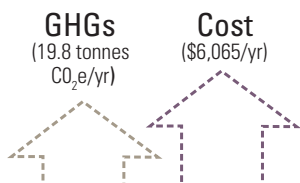
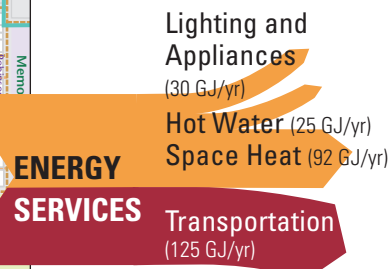
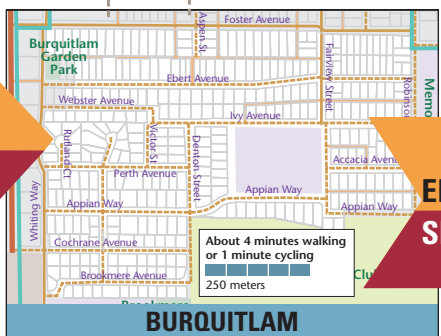
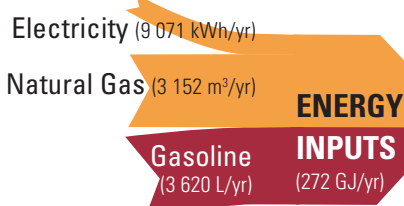
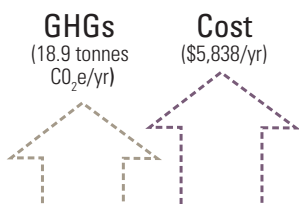


Westwood Plateau is located in northern Coquitlam, just south of the Coquitlam Conservation Reserve. With two parks and a trail system, green space is a significant feature of this hilly neighbourhood.

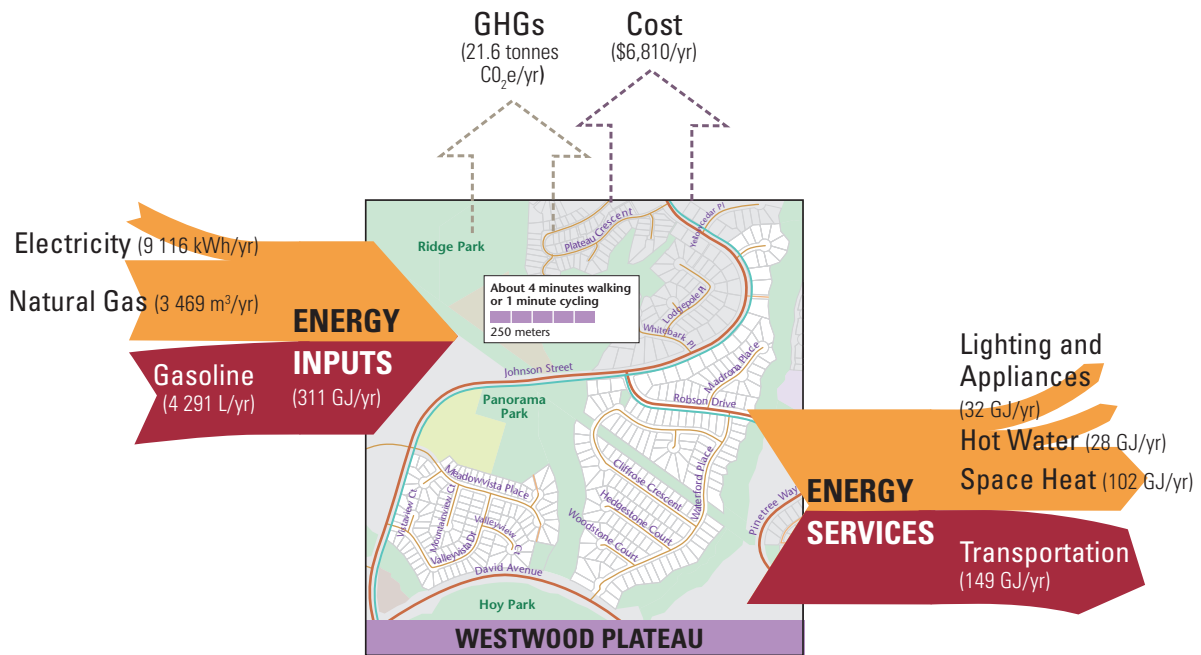
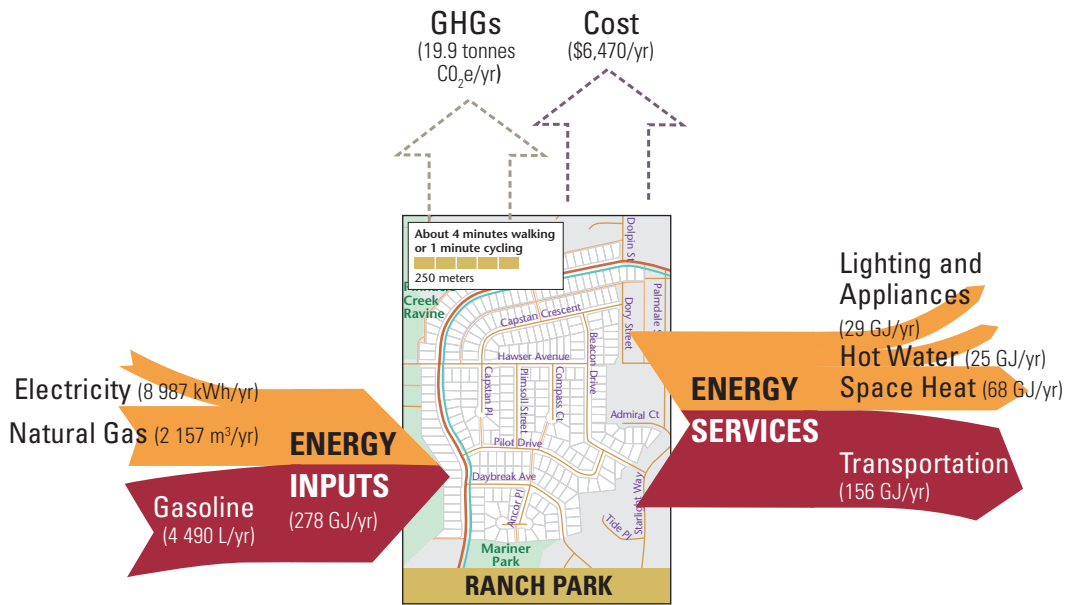
The large single-family dwellings were built in the early 1990s; a small number of them contain secondary suites. A large grocery store is within 250 metres of the neighbourhood, and Coquitlam Centre is approximately 1 km away. Two schools are within walking distance, as are Douglas College and the City Centre Aquatic Complex.

SUMMARY OF ENERGY INPUTS AND SERVICES

The Sankey-style graphics summarize a representative household’s energy inputs and services.⁷ The proportional scale between neighbourhoods is accurate and is reflected in the different sizes of the maps and arrows. More detailed source data for housing and transportation follow.



⁷ Values in the Sankey diagrams correspond with total household energy consumption modelled for the following representative house types in Coquitlam: Burquitlam B, Eagle Ridge B, Ranch Park A, Westwood Plateau A



Legend for Area Maps

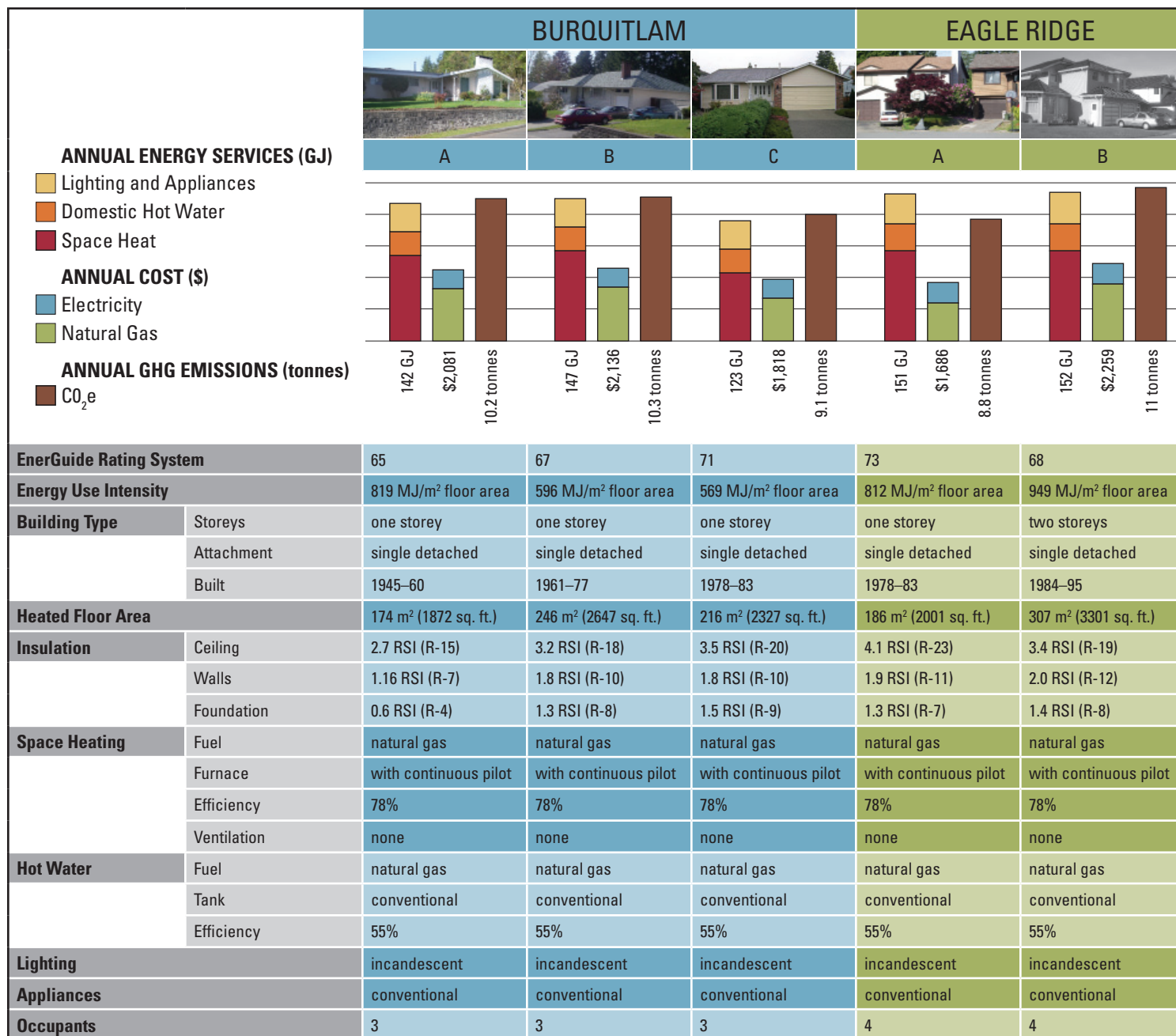
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|----------------------------------|-------------------|--------------|----------------------------|-------------------------|
| Residential | Retail/Commercial | Municipal | Transportation | Roads without sidewalks |
| Study area with residential lots | Industrial | Recreational | Arterial (with sidewalks) | Alleys |
| | Institutional | Parkland | Collector (with sidewalks) | Pathways |
| | | Water | Local (with sidewalks) | Bike lanes, bike paths |
| | | | | Bus routes |

ENERGY USE IN HOUSES

The amount of energy used to provide the energy services of space heating, domestic water heating, lighting and appliances can vary substantially from house to house. Factors influencing household energy consumption include levels of insulation and air tightness, efficiency of mechanical systems for space heating

and hot water, choice of lighting and appliances, size of house, and occupant lifestyles.

Energy use in common house types⁸ within the study areas in Coquitlam ranged from 109 to 162 gigajoules (GJ) per year.

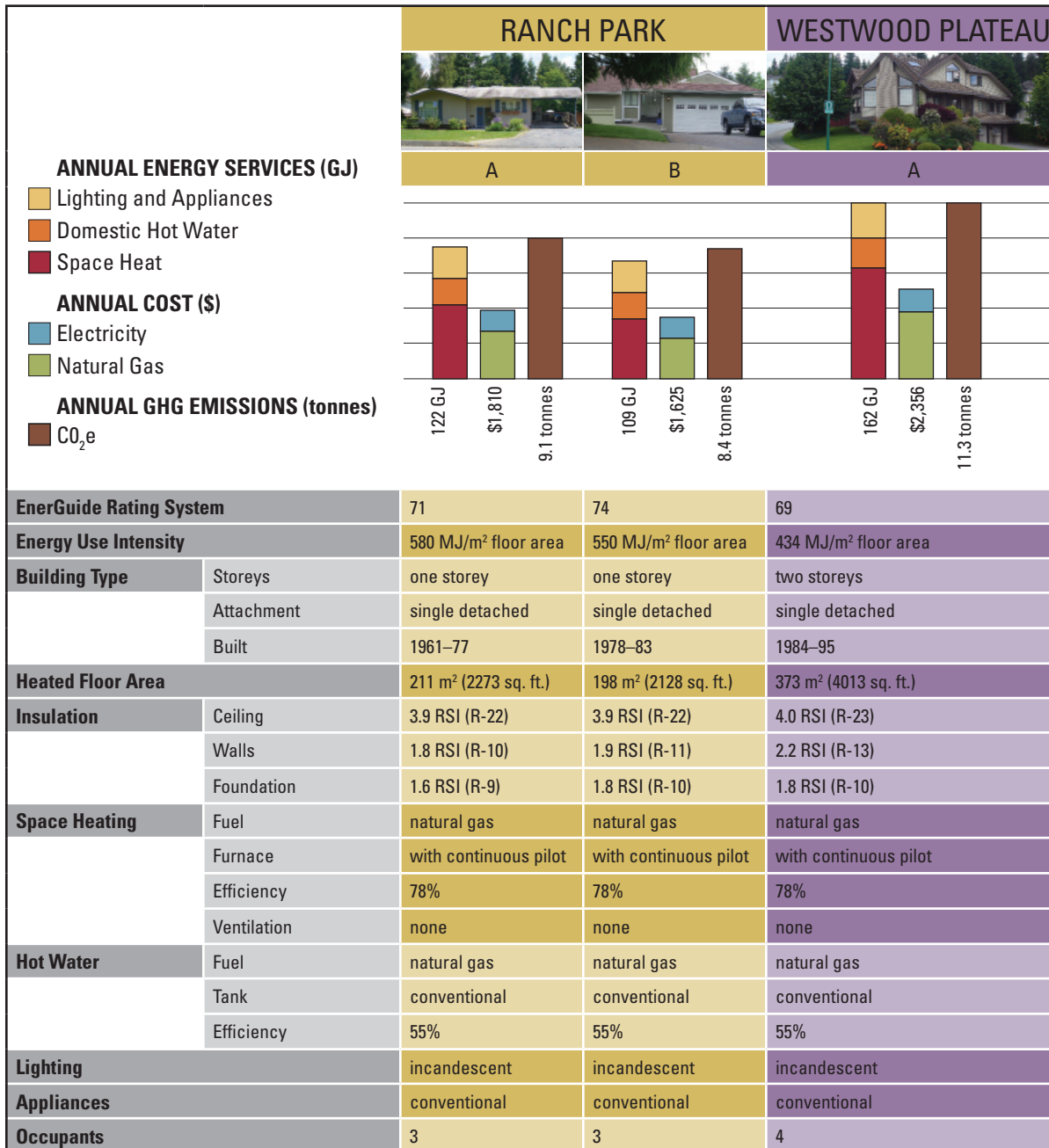


⁸ Analysis was derived from ecoENERGY Retrofit – Homes (formerly EnerGuide for Houses) records within the study areas. A generalized profile for each representative house type was simulated using HOT2000* software and compared with the regional building archetype. Default values for house temperature and internal gains were used, and occupancy was determined by interview; Parekh, Anil, 2005. "Development of Archetypes of Building Characteristics Libraries for Simplified Energy Use Evaluation of Houses." Ninth International Building Performance Simulation Association Conference, Montréal.

*HOT2000 is an official mark of Natural Resources Canada.

For homes heated with natural gas, use ranged from 2162 to 3469 cubic metres (m³) per year for space heating and hot water. Electricity use ranged from 8925 to 9116 kilowatt hours (kWh) per year for lighting and appliances. Given this

consumption, energy costs⁹ ranged from \$1,625 to \$2,356 per year for the combined use of natural gas and electricity. Associated greenhouse gas (GHG) emissions¹⁰ ranged from 8.4 to 11.3 tonnes of carbon dioxide equivalent (CO₂e) per year.



⁹ Average costs were calculated using available price data for British Columbia: oil (89.66¢/L, 2006 average), natural gas (50.285¢/m³, 2006 average) and electricity (6.79¢/kWh, 2006 average).

¹⁰ GHG emissions were determined using the marginal fuel factors for the region developed by Environment Canada, as used in HOT2000.

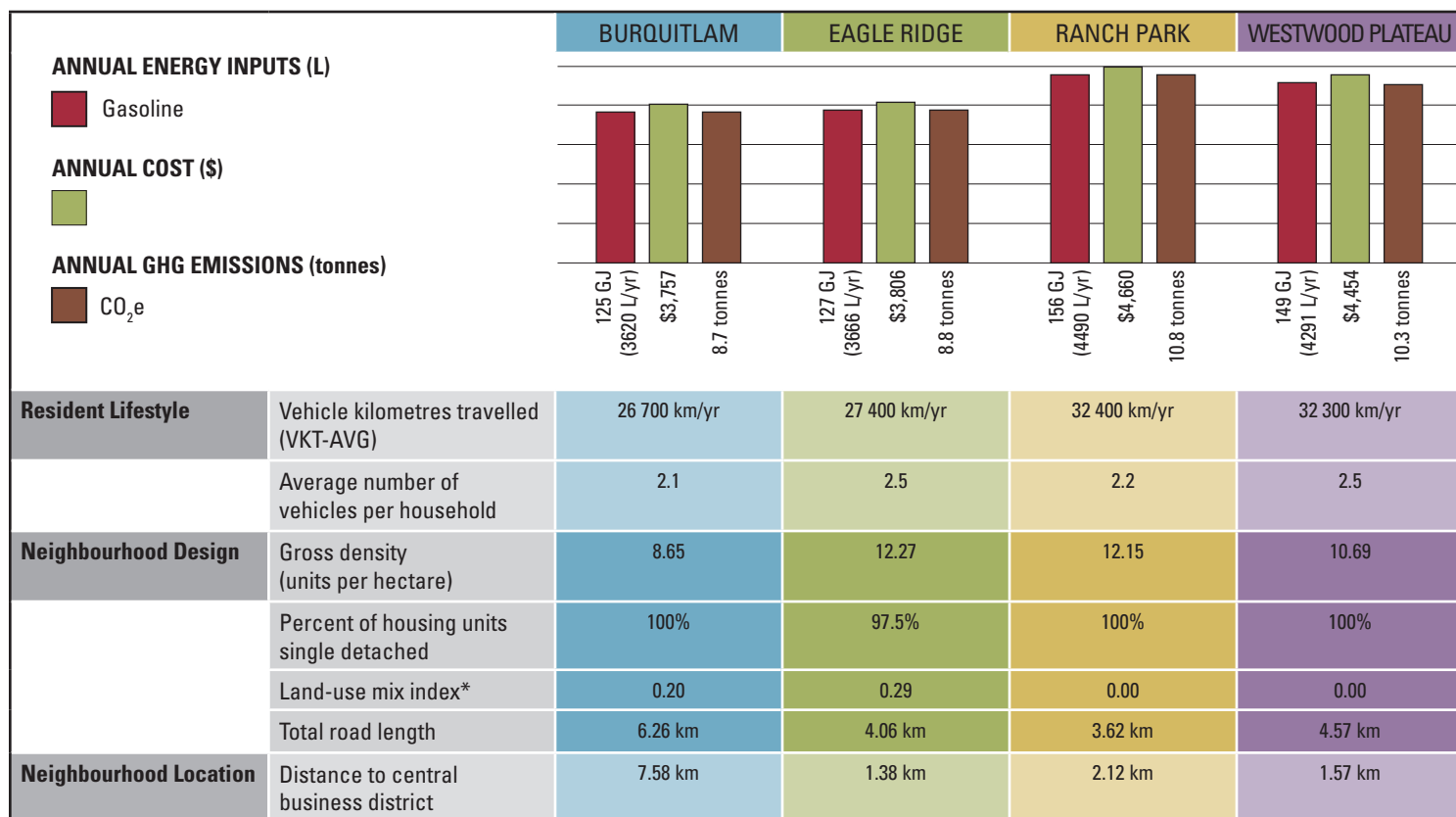
ENERGY USE FOR PERSONAL VEHICLE TRANSPORTATION

Personal transportation helps Canadians accomplish a wide variety of activities and is essential for the functioning of our communities. Personal vehicles are the predominant form of personal transportation, accounting for 78 percent of total passenger transportation energy end-use in Canada in 2005.¹¹ The Urban Archetypes Project calculated energy consumption for personal vehicles¹² and examined public transit and the active modes of walking and cycling.

The factors that influence transportation energy consumption for personal vehicles include distance travelled, vehicle

type and fuel efficiency. Furthermore, the influence of neighbourhood design characteristics, location and lifestyle for all 31 study neighbourhoods was analysed and will be presented in *The Urban Archetypes Project Analysis*.

In the Coquitlam study areas, average annual household Vehicle Kilometres Travelled (VKT-AVG)¹³ ranged from 26 710 to 32 443 km. In 2006, the average study-area household consumed between 3620 and 4490 litres of gasoline that cost¹⁴ between \$3,757 and \$4,660 and produced GHG emissions of between 8.7 and 10.8 tonnes of CO₂e.



*Land-use mix variables include the number of retail/commercial units, retail/commercial buildings, industries, institutions and municipal buildings. The higher the score, the more mixed the land use in the neighbourhood.

PROJECT COLLABORATION

Natural Resources Canada recognizes the contribution of the City of Coquitlam, Douglas College, BC Hydro and Terasen Gas.

FOR MORE INFORMATION

To learn more about the Urban Archetypes Project or to access companion documents (methodology, analysis and case studies), visit www.canmetenergy.nrcan.gc.ca (Buildings & Communities, Communities section) or contact Jessica Webster by telephone at 613-992-9532 or by e-mail at jessica.webster@nrcan.gc.ca.

¹¹ Passenger Transportation Secondary Energy Use by Energy Source and Transportation Mode. oee.nrcan.gc.ca/corporate/statistics/neud/dpa/tableshandbook2/tran_00_4_e_2.cfm?attr=0

¹² Personal vehicles include small and large cars and light trucks.

¹³ Based on total estimated household Vehicle Kilometres Travelled (VKT) data collected from the study areas' residents in 2006. To account for possible under-reporting, neighbourhood household average VKT was substituted in cases of non-response, producing the Vehicle Kilometres Travelled-Average (VKT-AVG) figure. See *The Urban Archetypes Project Methodology* for more details.

¹⁴ Average costs were calculated using available price data for Coquitlam: gasoline (\$1.038/L, 2006 average).