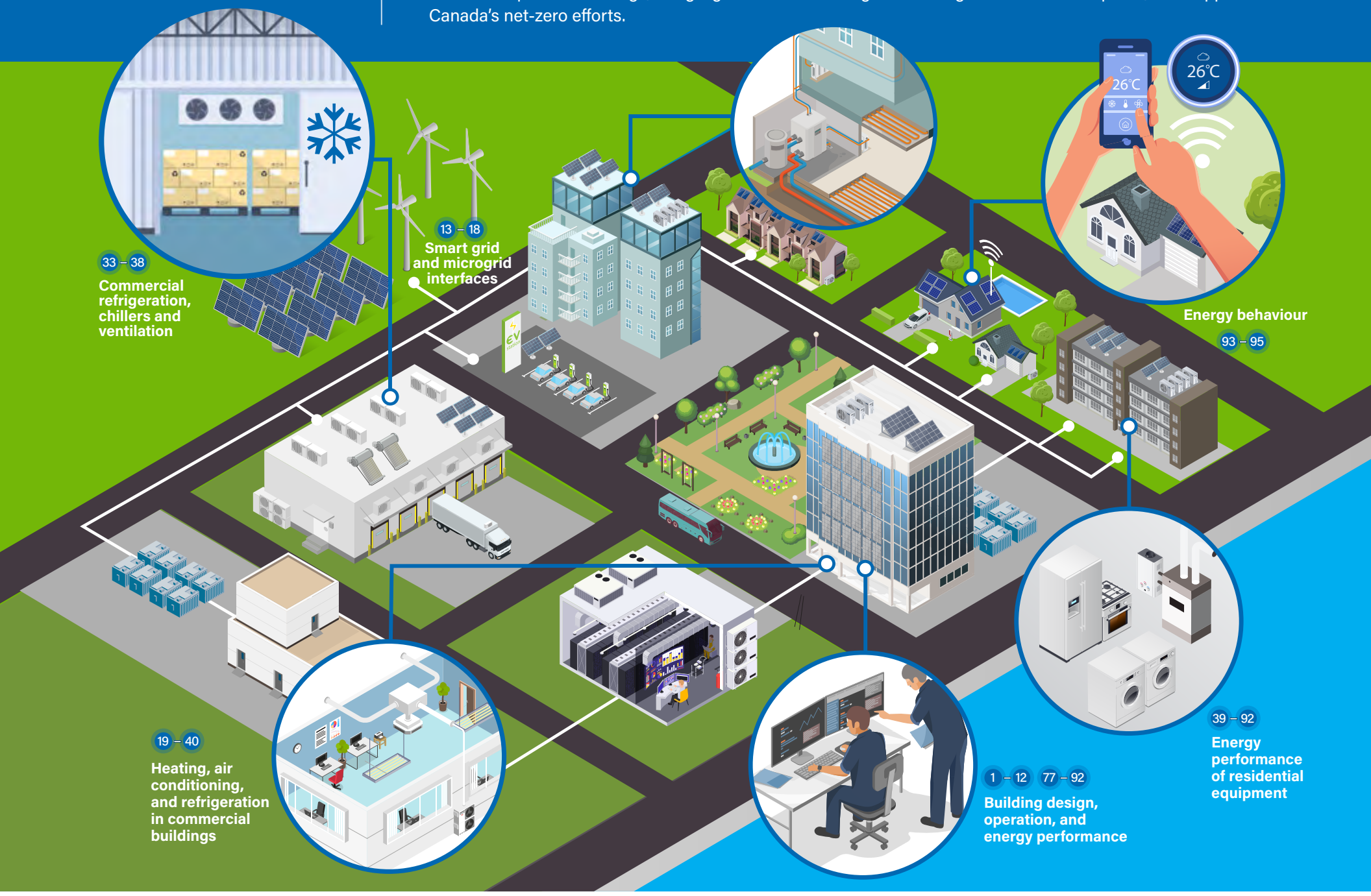
CSA Group research and standards for energy efficient buildings

CSA Group research and standards solutions help improve energy efficiency of building energy systems and equipment. Better energy performance helps reduce greenhouse gas emissions and the operational carbon footprint of buildings, bring significant cost savings to building owners and occupants, and supports Canada's net-zero efforts.



CSA Group research and standards

Building design, operation, and energy performance

1. CSA C510, *Ideal state benchmarking and application of benchmark energy factor for data centres*
2. CSA C873 Series, *Building energy estimation methodology*
3. CSA Z5000, *Building commissioning for energy using systems*
4. CSA Z5001, *Existing building commissioning for energy using systems*
5. CSA Z5010, *Thermal bridging calculation methodology*
6. CSA/ANSI Z5020, *Building energy modelling*
7. CSA C22.2 No. 63092-1, *Photovoltaics in buildings – Part 1: Requirements for building-integrated photovoltaic modules*
8. CSA C22.2 No. 63092-2, *Photovoltaics in buildings – Part 2: Requirements for building-integrated photovoltaic systems*
9. CSA SPE-17, *HVAC guide for Part 9 homes*
10. CSA/ANSI Z5030, *Residential equipment cold load pick up management* (in progress)
11. CSA Z5040, *Guideline for GHG, energy, and water efficiency reporting and upgrades to existing buildings – Part 1 – Standardized method of reporting* (in progress)
12. *Laboratory Ventilation* (research report – in development)

Smart grid and microgrid interfaces

13. CSA Z5060, *Sizing of solar photovoltaic systems coupled with energy storage in new residential construction* (in progresss)
14. Standards to Enable Automated Demand Response in Canada (research report)
15. Automated Demand Response and Efficiency in DC Power Systems for Buildings (research report)
16. Framework for the Design of Residential Photovoltaic with Battery Energy Storage Systems (research report)
17. Charging Ahead: Unlocking Vehicle-Grid Integration in Canada (research report)
18. Other standards for integration of renewable energy generation into electrical grids

Heating, air conditioning, and refrigeration in commercial buildings

Space conditioning

19. CSA C273.5, *Installation of air source heat pumps and air conditioners*
20. CSA C656, *Performance standard for split-system and single-package air conditioners and heat pumps*
21. CSA C700, *Load-based, climate-specific testing and rating procedure for heat pumps and air conditioners* (in progress)
22. AHRI 310/380/CSA C744, *Packaged terminal air conditioners and heat pumps*
23. CSA C746, *Energy performance rating for large and single packaged vertical air conditioners and heat pumps*
24. CSA C750, *Airflow and static pressure measurements in residential ductwork systems* (in progress)
25. CSA C823, *Performance of air handlers in residential space conditioning systems*

For more information, visit CSA Group website
csagroup.org/EfficientBuildings or email EnergyEfficiency@renewables@csagroup.org

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26. CSA P.8, *Thermal efficiencies of industrial and commercial gas-fired package furnaces*
27. CAN/CSA-P.11, *Testing method for measuring efficiency and energy consumption of gas-fired unit heaters*
28. CSA P.12, *Standard for energy performance compliance, verification, and ratings of fuel-burning appliances and equipment*
29. CSA P.15, *Test method for rating micro combined heat and power (mCHP) devices*
30. CSA SPE-07, *Load-based and climate-specific testing and rating procedures for heat pumps and air conditioners*
31. CSA SPE-10, *Variable capacity heat pumps – Air to water*
32. CSA SPE-18, *Load-based, climate-specific testing and rating procedure for commercial heat recovery and energy recovery ventilators (HRV & ERV)*

Refrigeration, chillers, and ventilation

33. CSA C296, *Energy performance of walk-in freezer and walk-in cooler components*
34. CSA C657, *Energy performance standard for commercial refrigeration equipment*
35. CAN/CSA-C742, *Energy performance of automatic icemakers and ice storage bins*
36. CAN/CSA-C743, *Performance standard for rating packaged water chillers*
37. CAN/CSA-C804, *Energy performance of refrigerated bottled or canned beverage vending machines*
38. CAN/CSA-C439, *Laboratory methods of test for rating the performance of heat/energy-recovery ventilators*

Energy performance of residential equipment

39. CSA P.17, *Performance testing of hydrogen-enriched appliances* (in progress)
40. Embodied Carbon Pathways for Canadian Residential Equipment (research report)

Water heaters

41. CAN/CSA-C191, *Performance of electric storage tank water heaters for domestic hot water service*
42. CSA C652, *Installation of electric storage tank and heat pump water heaters for residential use*
43. CSA C745, *Energy efficiency of electric storage tank water heaters and heat pump water heaters*
44. CSA C840, *Performance of pool pumps*
45. CSA C374, *Energy performance of hot tubs and spas*
46. CAN/CSA-P.3, *Testing method for measuring energy consumption and determining efficiencies of gas-fired and fuel oil-fired water heaters*
47. CSA P.6, *Test method for measuring thermal efficiency of gas-fired pool heaters*
48. CAN/CSA-P.9, *Test method for determining the performance of combined space and water heating systems (combos)*
49. CSA P.9.1, *Test method for determining the performance of combined hydronic space and water heating systems (combos)*

Space conditioning

50. CSA C368.1, *Energy performance of room air conditioners*
51. CSA/ANSI C715, *Test method and climate-based ratings for the performance of combination space and water heating heat pump systems* (in progress)
52. CSA C749, *Energy performance of dehumidifiers*
53. CAN/CSA-C814, *Energy performance of ceiling fans*
54. CAN/CSA-C370, *Cooling performance of portable air conditioners*
55. CSA C828, *Performance requirements for line voltage thermostats used with individual room electric space heating devices*
56. CAN/CSA-P.2, *Testing method for measuring the annual fuel utilization efficiency of residential gas-fired or oil-fired furnaces and boilers*
57. CSA P.4.1, *Testing method for measuring fireplace efficiency*
58. CSA P.10, *Performance of integrated mechanical systems for residential heating and ventilation*
59. CSA TS-002, *Dual-energy systems performance rating method*
60. CSA B415.1, Performance testing of solid-biofuel-burning heating *appliances*

Refrigeration

61. CSA/ANSI Z21.40.4/CSA 2.94, *Performance testing and rating of gas-fired air conditioning and heat pump appliances*
62. CSA C300, *Energy performance and capacity of household refrigerators, refrigerator- freezers, freezers, and miscellaneous refrigeration products*
63. CAN/CSA-C815, *Energy performance of drinking water coolers*

Cooking equipment

64. CAN/CSA-C358, *Energy consumption test methods for household electric ranges*
65. CAN/CSA-C380, *Test procedure for the measurement of energy consumption of set-top boxes (STBs)*
66. CAN/CSA-C388, *Energy performance and capacity measurement of household microwave ovens*

White goods

67. CAN/CSA-C360, *Energy performance, water consumption and capacity of household clothes washers*
68. CAN/CSA-C361, *Energy performance and drum volume of household electric clothes dryers*
69. CAN/CSA-C373, *Energy performance and water consumption of household dishwashers*
70. CSA P.5, *Test method for measuring per-cycle energy consumption, energy factor, and low power mode energy consumption of residential gas clothes dryer*

Power supply

71. CAN/CSA-C381.1, *Energy performance of external ac-dc and ac-ac power supplies*
72. CAN/CSA-C381.2, *Energy performance of battery-charging systems and uninterruptible power supplies*
73. CAN/CSA-C62301, *Household electrical appliances – Measurement of standby power*
74. CSA C872, *Power consumption of small network equipment (SNE)*

Displays

75. CAN/CSA-C382, *Energy performance of televisions and displays*
76. CSA C383, *Energy performance of displays*

Energy performance of lighting equipment

77. CSA C63103, *Lighting equipment – Non-active mode power measurement* (in progress)
78. CSA C654, *Fluorescent lamp ballasts efficacy measurements*
79. CAN/CSA-C819, *Performance of general service fluorescent lamps*
80. CAN/CSA-C860, *Performance of internally lighted exit signs*
81. CAN/CSA-C861, *Performance of self-ballasted compact fluorescent lamps and ballasted adapters*
82. CAN/CSA-C862, *Performance of incandescent reflector lamps*
83. CAN/CSA-C863, *Energy efficiency of high-intensity discharge (HID) and low-pressure sodium (LPS) lamp ballasts*
84. CSA C866, *Performance of LED luminaires*
85. CSA C870, *Performance of general service lamp*
86. CSA C871, *Performance of LED replacement lamps*
87. CSA C875, *Performance of general service directional lamps*
88. CSA C880, *Energy performance of stationary electric signs*
89. CSA C881, *Performance of general service integrated lamps*
90. CSA C865.1, *Light-emitting diode drivers – Methods of measurement*
91. CSA C865.2, *Light-emitting diode drivers* – Performance characteristics
92. CSA C868, *Performance of LED replacements for tubular fluorescent lamps*

Energy Behaviour

93. CSA/ANSI C555, *Definitions and minimum requirements for energy behaviour programs* (in progress)
94. Energy Behaviour: Considerations for Standardization (research report)
95. Energy Behaviour Programs: Analysis and Strategic Recommendations (research report)

For more information, visit CSA Group website
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