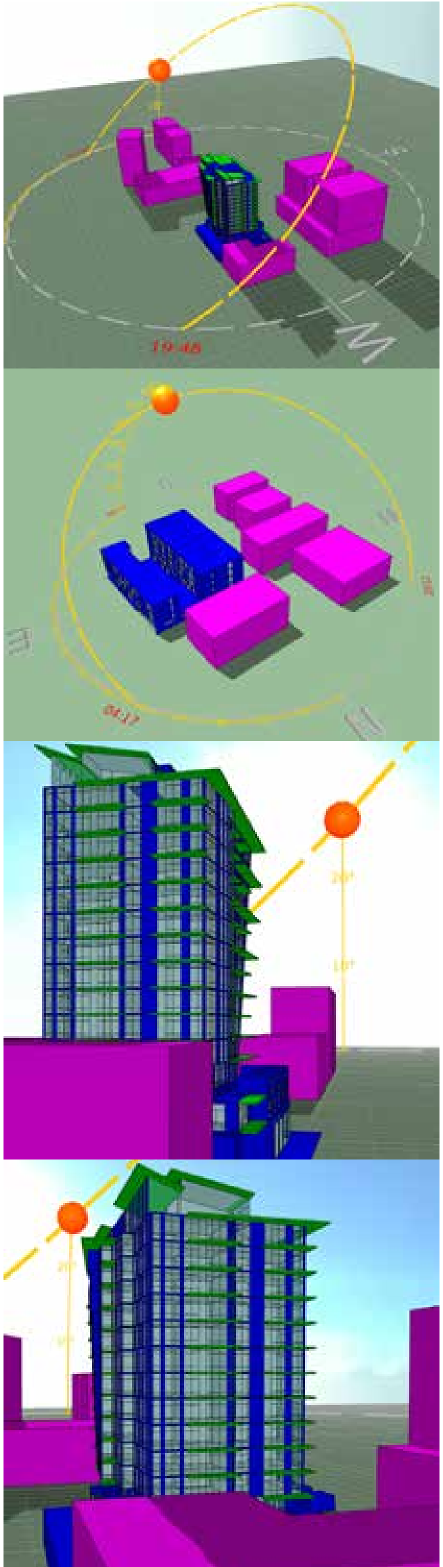
ENERGY MODELLING

determines conservation measures at schematic design stage



The images are examples of the graphical output from modelling software (IES VE - https://www.iesve.com/), and convey the relationship of buildings to surrounding structures while taking into account solar effects on the building form and façade.

Buildings account for approximately 30% of total Greenhouse Gas (GHG) Emissions in Canada. As a result, Canada has pledged to reduce carbon emissions 30% below 2005 levels by 2030 under the Paris Climate Action Plan.

As such, different provinces across the country are adopting more contemporary energy codes and standards to advance the energy performance of buildings towards the ambitious 2030 energy efficiency goals. For example, the Province of British Columbia and City of Toronto have adopted new stringent energy standards: the BC Energy Step Code and the Toronto Green Standard V3, respectively. These new standards have a passive house philosophy with the goal of “net-zero ready” buildings by 2030.

Energy modelling and commissioning are now of crucial importance considering a building as an integrated system of structural, building enclosure, mechanical, and electrical elements. As advocates for sustainable design, RJC has conducted energy studies for existing buildings, whole building energy modelling for new constructions, and whole building air-tightness testing for a wide range of projects across Canada. RJC Engineers has helped clients to meet their energy and GHG targets for a variety of projects from commercial/institutional buildings to multi-unit residential towers for both new construction and existing buildings.

As a case study, RJC Engineers was retained as structural, building envelope, and energy consultants for a new 15-storey high-rise concrete tower in Victoria. The project must demonstrate 15% energy and GHG emissions reduction over NECB 2015 baseline building. The energy modelling was performed at the Schematic Design stage to determine the energy conservation measures (ECMs) that must be implemented to synergize the thermal characteristics of the structural, enclosure, mechanical and electrical systems of the building.

The developed ECMs include utilization of high-performance building enclosure assemblies (overall R-10+ effective), high-performance glazing systems with multiple low-e and hard coatings (as opposed to triple-glazing), energy recovery ventilators to supply fresh air, balcony slab to envelope area reduction, and highly efficient electrical systems. In addition, a comprehensive thermal comfort study was carried out, and several passive cooling strategies were determined to meet the thermal comfort criteria of the BC Energy Step Code.

Creative Thinking
Practical Results

www.rjc.ca