Advancing Climate Action and Improving Resilience through Land Use Planning in Metro Vancouver

Edward Nichol RPP, MCIP, Stefanie Ekeli, PIBC Candidate Member, Morgan Braglewicz, PIBC Candidate Member

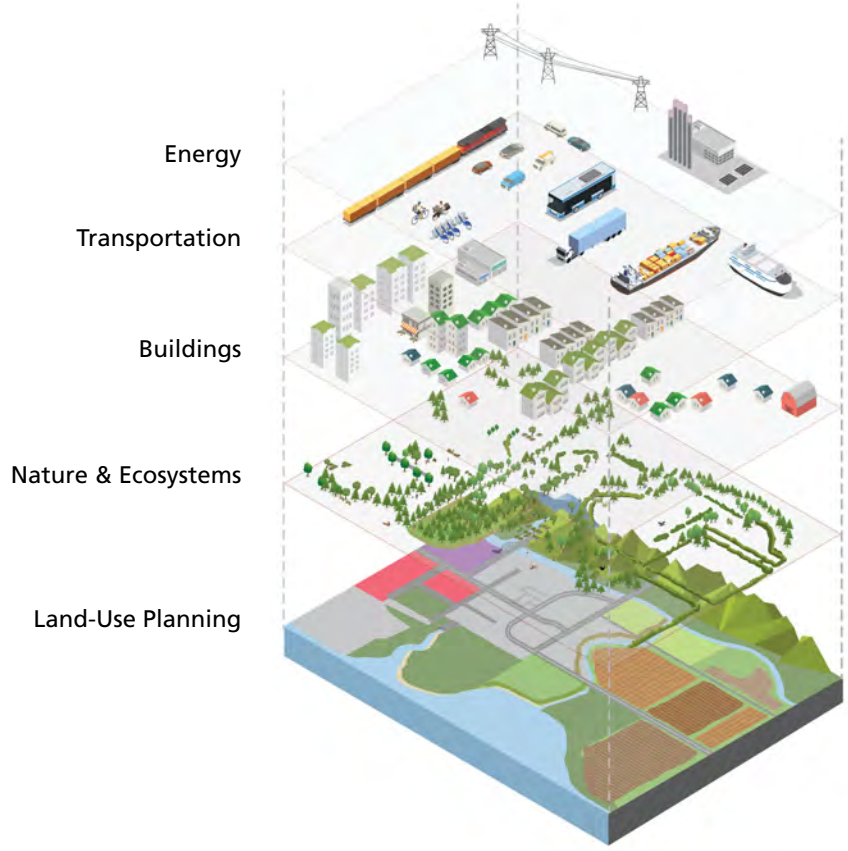
The Metro Vancouver Regional District has committed to becoming a carbon neutral region by the year 2050. Metro Vancouver is the fastest growing region in BC, with over 50% of the province's population. The region is highly susceptible to natural hazards such as earthquakes, wildfires, landslides, and floods, as well as climate change impacts such as extreme heat and sea level rise. Surrounded by mountains, ocean, rivers, agricultural land, forests, steep slopes, and an international border, determining where and how the region grows and develops — while also meeting climate change and resilience objectives — has become increasingly complex and challenging.

Land use planning profoundly shapes the spatial arrangements of communities. It can influence greenhouse gas (GHG) emissions from sources such as buildings and transportation, support the protection of ecosystems that sequester and store carbon (such as those in natural areas and agricultural lands), and determine the degree to which communities are exposed to climate change impacts and natural hazards. Addressing the challenges of climate change will require integrated land use planning paired with a range of other policies and actions.

Metro Vancouver has been collectively working to advance climate action through strategic and integrated land use planning. *Metro 2050*, the Regional Growth Strategy, is the region's vision for how growth will be managed over the next several decades, and the *Climate 2050* strategy guides climate change policy and action for Metro Vancouver over the next 30 years. Within *Climate 2050*, integrated land use planning underpins GHG emission reduction and resilience actions across various issue areas (e.g., transportation, buildings and nature and ecosystems). Many of the actions are holistic in nature and rely on core land use planning practices to assess and respond to hazard, risk, and vulnerability.

GHG Emissions Reduction

There are two key pathways to reduce GHG emissions: using less energy, and transitioning from fossil fuels to low or zero emission energy sources such as electricity. Integrated land use planning is foundational to many *Metro 2050* and *Climate 2050* actions that aim to reduce GHG emissions at the community level, particularly those that reduce energy use. Though land use planning in and of itself is insufficient to achieve deep GHG emission reductions, thoughtful land use planning can enable GHG emission reductions from several sources and can be paired with other actions, such as the transition of energy uses away from fossil fuels.



Land use planning shapes the spatial arrangements of our communities, and influences both GHG emissions and resilience
source: Metro Vancouver

Smoky Air from Forest Fires
source: Metro Vancouver

Though transportation is the largest source of GHG emissions in Metro Vancouver, emission reduction efforts can be supported through land use planning; for instance, *Metro 2050* manages growth within an urban containment boundary, reduces sprawl by directing development to a network of transit-oriented Urban Centres and Frequent Transit Development Areas, and encourages the development of compact, complete communities that offer services and amenities close to home. Local governments can use Official Community Plans, zoning bylaws, and policies on road space and curb use to further shape communities and enable a shift from driving to low-emission and low-cost transportation modes such as walking, cycling, rolling, and transit. Paired with policies and actions to transition remaining trips in cars to electric vehicles, communities can achieve deep reductions in GHG emissions from transportation sources.

Buildings are also a major source of GHG emissions due to the use of fossil gas for heating and hot water. High-density housing forms typically use less energy and have lower emissions than low-density forms due to their smaller floor and exterior wall areas. Additionally, high-density and mixed-use areas can support low carbon energy and thermal networks, such as district energy systems that leverage waste heat. Higher-density housing, mixed-use forms, and tools such as development permit areas can reduce GHG emissions from buildings.

Resilience

The term "natural disaster" is in some ways a misnomer – it implies that the outcomes from a hazard event are random and beyond our control, when in fact, land use decisions made about where growth and development occurs, critical infrastructure is sited, and investments in hazard mitigation measures are made are well-within our collective control, and all of these decisions influence vulnerability.

Land use planning can be a powerful catalyst for enhancing resilience by ensuring that communities, property, infrastructure, and ecosystems are safeguarded from the worsening impacts of climate change and natural hazards. *Metro 2050* includes policy actions that protect the region's natural areas and other important lands (essential for buffering communities from hazards and climate impacts), minimize risk in existing communities, discourage new growth in at-risk areas, and establish a role for Metro Vancouver to collaboratively develop and share information related to hazard, risk, and vulnerability. This policy direction spurred the development of regional multi-hazard mapping, which can

be integrated into regional and local land use planning analysis, projects and models. *Metro 2050* also includes policy actions that encourage integration between land use planning and emergency management.

Opportunities for Integration: Land Use Planning and Emergency Management

Collaboration between land use planners and emergency managers can be challenging. Each discipline may have different legislative requirements, backgrounds, roles, and mandates within an organization. Emergency managers have traditionally focused on response and recovery efforts, rather than efforts to prevent, mitigate, or prepare for hazards[1]. Conversely, the planner's primary role tends to be focused on managing urban growth and development, with less emphasis on hazard mitigation efforts.

However, coordinated planning between the two disciplines can create mutually supportive outcomes. Zoning regulations, bylaws, and development permit areas can be implemented to limit development in hazardous areas, and hazard and risk assessments (and associated mapping) can help governments make informed choices about the future use of land, opportunities to avoid or reduce potential risks, and integration opportunities with emergency response plans. Public open spaces (e.g., parks) – which are important for community health and liveability – can also be used as evacuation points, shelters, or supply distribution centres in a disaster scenario[2]. Planning mechanisms already in place to protect parks and greenspace also contribute to resilience, since ecosystems provide shading, cooling, floodwater absorption and other benefits. Planners are also capable of coordinating 'building back better' approaches after a hazard event occurs, given their knowledge of the communities they operate in and their proficiency engaging and communicating with stakeholders, managing long-term growth and development, integrating social equity concerns, and navigating legislation[3].

Land use planning is a well-established, economical, and efficient tool for supporting both community GHG emission reduction efforts and efforts to reduce the risks associated with climate change and natural hazards. Planners are well-suited to advance these objectives by recognizing and championing the role of land use planning as a pillar for climate action, collaborating between departments, organizations, and professions to achieve mutually supportive outcomes, and leading the implementation of progressive plans and policies.

Transit Oriented Development, Metrotown Burnaby
source: Metro Vancouver

Storm Surge in the District of West Vancouver
source: District of West Vancouver

Further Reading

Metro 2050:
https://metrovancouver.org/services/regional-planning/metro-2050-the-regional-growth-strategy

Metro Vancouver's *Climate 2050* Roadmaps:

Buildings Roadmap:
https://metrovancouver.org/services/air-quality-climate-action/Documents/climate-2050-buildings-roadmap.pdf

Transportation Roadmap:
https://metrovancouver.org/services/air-quality-climate-action/Documents/climate-2050-transportation-road-map.pdf

Nature and Ecosystems Roadmap:
https://metrovancouver.org/services/air-quality-climate-action/Documents/climate-2050-nature-and-ecosystems-road-map.pdf

Stefanie Ekeli, PIBC Candidate Member, is a Regional Planner for Metro Vancouver and is a PIBC Candidate Member. She is leading the development of Metro Vancouver's *Climate 2050 Land Use and Urban Form Roadmap* and brings experience from both local and regional governments with practice in land use and transportation planning.

Edward Nichol, RPP, MCIP is a Senior Planner for Metro Vancouver. Edward leads and supports a variety of regional planning initiatives related to environmental protection, climate change, urban forestry, and natural hazards. Edward is the policy lead for climate change and natural hazards content in *Metro 2050* and is co-leading the implementation of the *Climate 2050 Nature and Ecosystems Roadmap*.

Morgan Braglewicz, PIBC Candidate Member, is an Air Quality Planner with Metro Vancouver's Air Quality and Climate Action Services team, working on region-wide climate action to reduce greenhouse gas emissions. She is leading the implementation of the *Climate 2050 Transportation Roadmap* and co-chairs the BC Electric Mobility Peer Network for local governments.

---

[1]Ministers Responsible for Emergency Management. (2017). An emergency management framework for Canada (3rd ed). Available online: https://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/2017-mrgnc-mngmnt-frmwrk/2017-mrgnc-mngmnt-frmwrk-en.pdf

[2]Jayakody, R., Amarathunga, D., & Haigh, R. (2018). Integration of disaster management strategies with planning and designing public open spaces. Procedia Engineering, 212, 954-961. https://doi.org/10.1016/j.proeng.2018.01.123

[3]Kim, K., & Olshansky, R. B. (2014). The theory and practice of building back better. Journal of the American Planning Association, 80(4), 289–292. https://doi.org/10.1080/01944363.2014.988597