

JESSE F. DILL
jesse.dill@dal.ca

OPEN-SOURCE TOOLS TO SUPPORT LOCAL GOVERNMENT CLIMATE CHANGE MITIGATION POLICY

A comparative study of two models that assess the greenhouse gas impacts of future residential settlement patterns for the District of Sechelt

The Province of British Columbia is taking action to mitigate greenhouse gases causing climate change. Central to this commitment is *Bill 27 (2008)*, requiring local governments to include greenhouse gas reduction targets in their Official Community Plans and Regional Growth Strategies. The province's vision for mitigating land use and transportation greenhouse gas emissions is compact communities. A compact community displays three primary characteristics: medium to high density, centred and connected land use and advanced building design.

Acting on climate change to positively influence these factors requires local governments to revisit land use policies and regulations. Better information and tools can support local government policy decisions that aim to reduce greenhouse gases. My research evaluates two models that assess the greenhouse gas impacts of existing land use patterns and future policy scenarios to support local governments in scoping open source climate change tools. Planning practice needs simpler, more transparent transportation-land use models that differentiate between policy options available to local governments (Allen 2008).

The ideal transportation-land use model is:

- *Affordable*: inexpensive to acquire, learn and operate (Batty 2008).
- *Accessible*: uses standard software available to a range of stakeholders (Moore 2008)
- *Relevant*: variables are under the influence of local government policy (Moore 2007)
- *Transparent*: capable of linking each variable to certain impacts (Klosterman, 2008)
- *Real-time*: capable of altering scenarios quickly for interactive use (Ingram 2009)
- *Comprehensive*: capable of incorporating all major factors contributing to greenhouse gas impacts (Deal et al. 2008)
- *Simple*: flexible to the limited data available to local governments (Klosterman 2008)

I evaluate the Sustainability Solutions model and the UBC Development Pattern model using two primary methods. The first method involved completing a statutory analysis of local government powers demonstrating that the models' endogenous variables are directly tied to local government functions. There are extensive powers for local governments to regulate or provide incentive for compact, energy efficient development. In the second method, I apply both models against the same datasets using the District of Sechelt as a case study. The District is a small municipality within the Sunshine Coast Regional District, a coastal region approximately 50 kilometres northwest of Vancouver.

The case study reveals opportunities and challenges for local government scoping models that are inexpensive to acquire, learn and operate. Local governments can effectively measure energy reductions in future scenarios with limited data. Both models illustrate energy

consumption based on the energy efficiencies of compact housing types. The Sustainability Solutions model assesses the feasibility of alternative low-carbon community energy systems.

The Sustainability Solutions model measures transportation greenhouse gas emissions with two primary variables: reduction in average trip length and modal shifts to alternative transportation. The lack of accessible transportation data is the main obstacle for local governments with limited resources to integrate land use and transportation impacts. Considering transportation impacts is important because the reduction in average trip distances associated with compact development scenarios is the most influential variable in reducing transportation greenhouse gas emissions.

I offer recommendations for further research to benefit the future generation of open source models. Senior levels of government can show leadership by continuing to provide and advocate for better data that is available to local governments. If further research can demonstrate cost-effective ways for local governments to acquire data on transportation behaviour, the open source models provide an affordable and effective tool for local governments to meet legislative requirements and effectively plan for greenhouse gas reductions.

Sources

Allen, Elliot (2008). Clicking Toward Better Outcomes: Experience with INDEX, 1994 to 2006. In Richard Brail (ed.) (2008) *Planning Support Systems for Cities and Regions* (139-166). Cambridge: Lincoln Institute of Land Policy.

Hopkins, Lewis and Marisa Zapata (2007). Engaging the Future: Tools for Effective Planning Practice. In Lewis Hopkins and Marisa Zapata (ed.) (2007) *Engaging the Future: forecasts, scenarios, plans and projects* (1-19). Hollis: Puritan Press Incorporated.

Klosterman, Richard (2008). A New Tool for a New Planner: The What if? Planning Support System. In Richard Brail (ed.) (2008) *Planning Support Systems for Cities and Regions* (85-99). Cambridge: Lincoln Institute of Land Policy.

Moore, Terry (2008). Planning Support Systems: What Are Practicing Planners Looking For? In Richard Brail (ed.) (2008) *Planning Support Systems for Cities and Regions* (231-257). Cambridge: Lincoln Institute of Land Policy.

Moore, Terry (2007). The Use of Forecasts in Creating and Adopting Visions for Regional Growth. In Lewis Hopkins and Marisa Zapata (ed.) (2007) *Engaging the Future: forecasts, scenarios, plans and projects* (19-39). Hollis: Puritan Press Incorporated.