

# Climate Action Co-benefits and Community Planning

## *Uncovering the synergies and trade-offs*



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### CLIMATE ACTION CO-BENEFITS

#### Forest conservation (Spencer et al., 2016)

- **Climate mitigation** occurs through carbon sequestration and reducing emissions from deforestation
- **Co-benefits** include biodiversity, medicinal and nutritional products, water quality, spiritual values, etc.

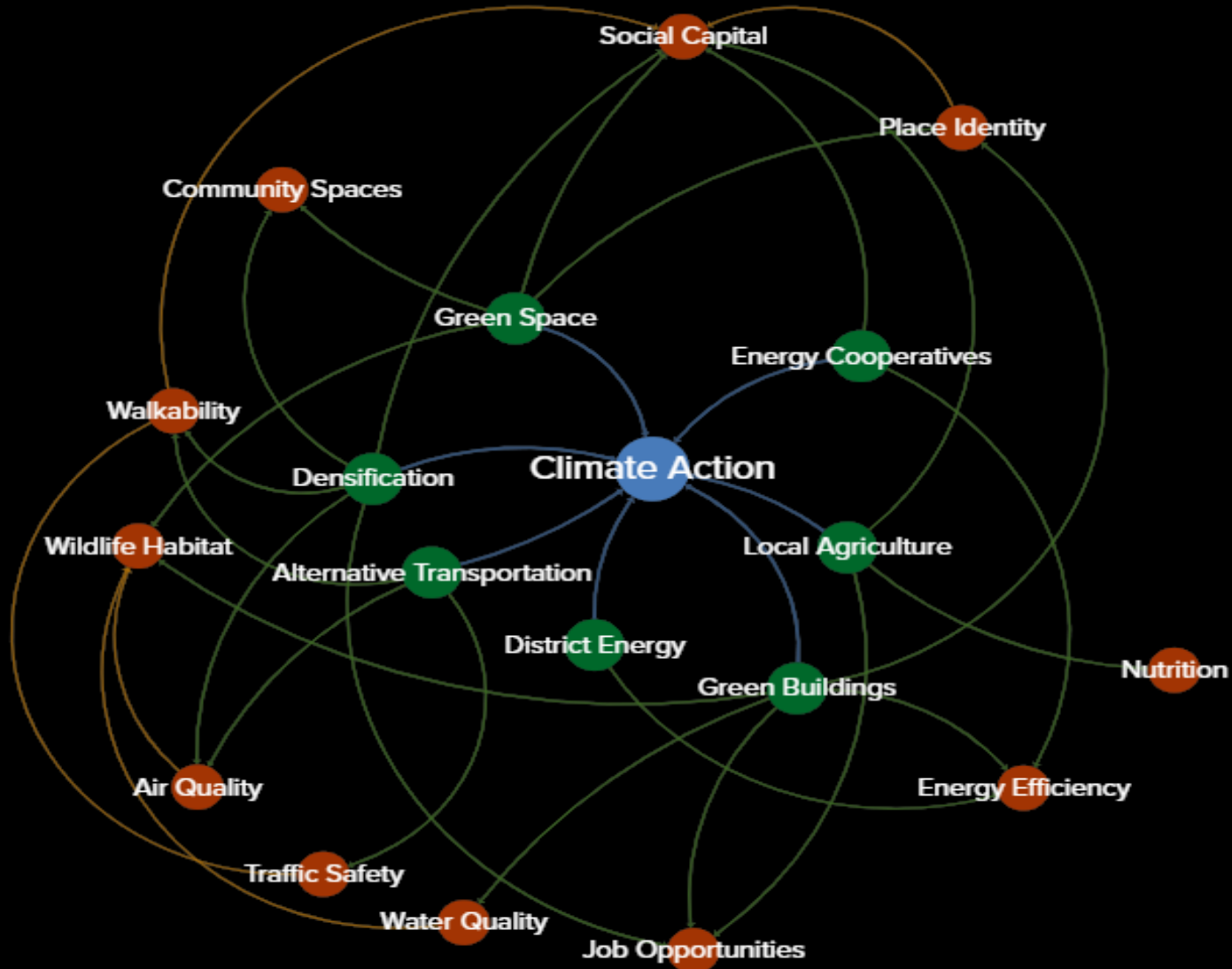
#### Reduced emissions (Nemet et al., 2010)

- **Climate mitigation** occurs through reducing emissions in transportation, energy and industrial sectors
- **Co-benefits** are experienced through reduction of air pollutants (sulfur dioxide, particulate matter) and improved air quality

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## INTEGRATED PLANNING



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### **CO-BENEFITS AS 'WIN-WIN'?**

Climate action strategies with co-benefits can result in 'win-win' situations

### **HOWEVER**

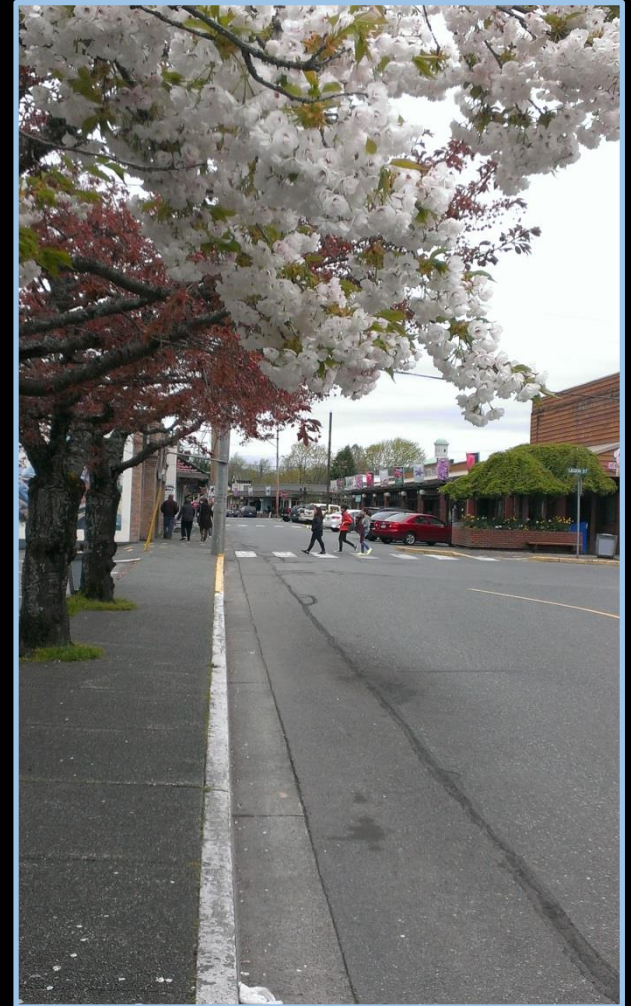
- This approach requires understanding complex relationships between different community development practices
- Barriers exist to achieving certain co-benefits and some co-benefit strategies have associated trade-offs

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### RESEARCH OBJECTIVES

- Advance understanding on integrated climate planning and action through an investigation of relationships between community strategies, co-benefits, trade-offs and challenges
- Use community climate action data to create models that can inform local planning





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### METHODS



- Meeting the Climate Change Challenge (MC<sup>3</sup>)
- Case study communities
  - Vancouver
  - North Vancouver
  - Surrey
  - Eagle Island (West Vancouver)
  - Victoria
  - T'Sou-ke First Nations
  - Campbell River
  - Dawson Creek
  - Prince George
  - Revelstoke
  - Carbon Neutral Kootenays
- Local government and actors
  - 83 people interviewed in 2012
  - 27 people interviewed in 2016

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### METHODS

- Data were coded (NVivo 11) with codes classified as strategy, benefit or problem
- 84 of codes – 36 strategies, 37 benefits and 11 problems

Type	Examples
Strategy	Compost programs, Densification, District energy, Gardens and local agriculture, Green building, Green space and forests, Mixed-use, Public transportation, Renewable energy, Retrofit rebates, Trail network
Benefit	Air quality, Beauty, Economic development, Employment, Energy security, Food security, Health, Land-use efficiency, Local business, Municipal account, Noise reduction, Recreation, Sense of place, Social capital, Tourism, Traffic reduction, Waste reduction, Water quality, Wildlife and habitat
Problem	Community opposition, Empty houses, Inconvenience, Inexpensive natural gas, Loss of developer interest, Loss of heritage, Overwhelmed with the issue, Upfront costs, Transport requirements

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## METHODS

- Arrange coded reference into a coding matrix
- Areas of 'overlap' were used to define relationships (216 in total)
- The nature of relationships differed depending on the type of nodes involved (i.e., strategy, benefit, problem)
- Identified positive and negative relationships

	E : Affordability (neg)	F : Affordable housing	G : Air quality
5 : Affordability (neg)	4	0	0
6 : Affordable housing	0	5	0
7 : Air quality	0	0	15
8 : Attract businesses	1	0	0
9 : Beauty	0	0	1
10 : B - Impacted viewshed (neg)	0	0	0
11 : Biofuel	0	0	0
12 : Branding and exposure	1	0	0
13 : Brownfield redevelopment	0	0	0
14 : Building fire safety	0	0	0
15 : Cheap natural gas (neg)	1	0	0
16 : Comfort	0	0	0
17 : Commercial competition (neg)	0	0	0
18 : Community opposition (neg)	0	0	0
19 : Community support	0	0	0
20 : Participatory planning	0	0	0
21 : Compost	0	0	0
22 : Conservation	0	0	0
23 : Convenience (neg)	0	0	0
24 : Cooling for other buildings	0	0	0
25 : Co-operative	0	0	0
26 : Crime	0	0	0
27 : Data generation	0	0	0
28 : Density	1	3	0
29 : Density bonusing	0	0	0
30 : Developed affordable housing	0	0	0
31 : District energy	0	0	1
32 : Downtown revitalization	1	1	1
33 : Early childhood education	0	0	0
34 : Economic development	1	0	1
35 : Economic diversification	0	0	0
36 : Economies of scale	0	0	0
37 : Ecotourism and tourism	0	0	0
38 : Employment	0	0	0
39 : Energy conservation	0	0	0
40 : Energy efficiency loss (neg)	0	0	0
41 : Energy efficiency upgrades and green bu...	2	1	2
42 : Energy reliability (neg)	0	0	0

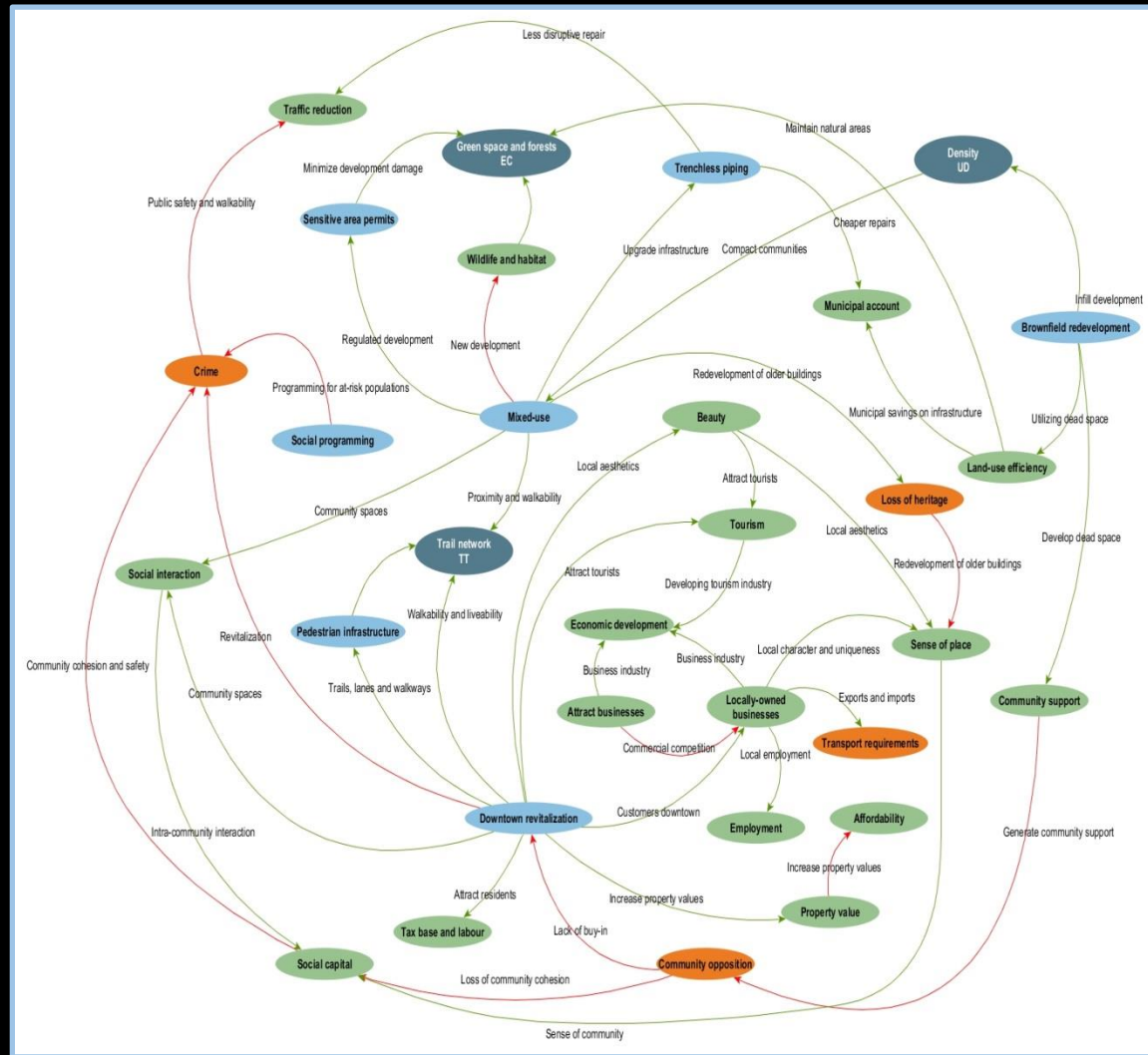


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## METHODS

- Developed a series of models, each centering on a particular climate action approach
- Approaches were defined by strategies with highest number of relationships
- Visualized using yEd Graph Editor (v. 3.17.2)
  - Light blue nodes – strategies
  - Dark blue nodes - strategies linking to another model
  - Green nodes - benefits
  - Orange nodes – problems
  - Green connector – positive
  - Orange connector - negative



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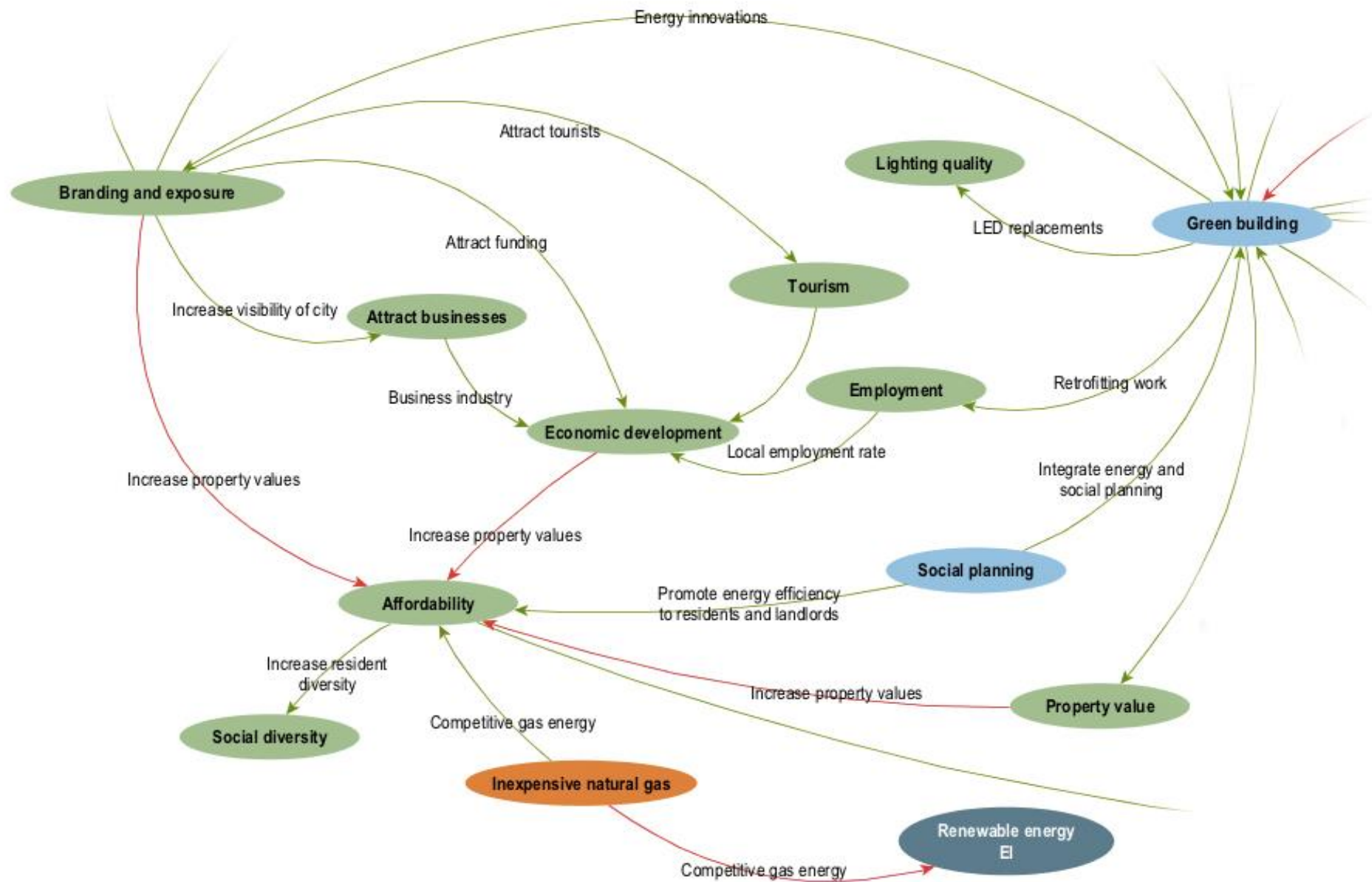
### MODELS

Model	Climate action relevance
Densification	Mitigation due to efficiencies experienced with transportation and residential energy usage in areas of urban density
Mixed-use and downtown revitalization	Mitigation through encouraging active transportation (similar to urban densification, but refers to composition rather than concentration)
Buildings	Mitigation through reduced energy consumption associated with green building and retrofiting strategies
Energy innovation	Mitigation strategies focused on transitioning from fossil fuels to green energy sources (e.g., renewable energy, district energy)
Trails and transportation	Mitigation strategies centered on reducing vehicle traffic
Ecological	Mitigation benefits received from carbon sequestration, and adaptation benefits associated with flood control and temperature regulation
Waste and water	Mitigation benefits related to waste diversion, and adaptation strategies such as stormwater and flood management



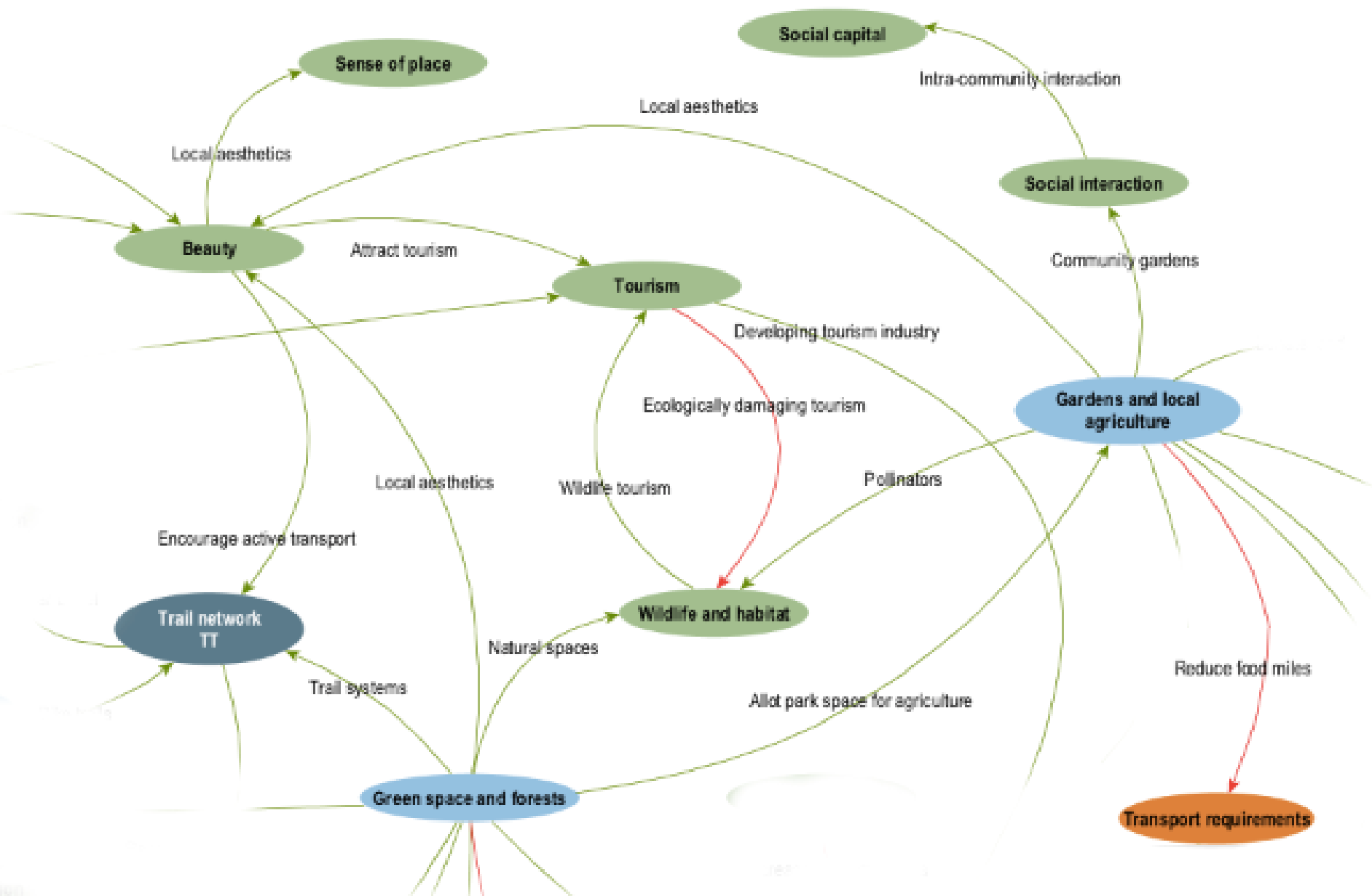
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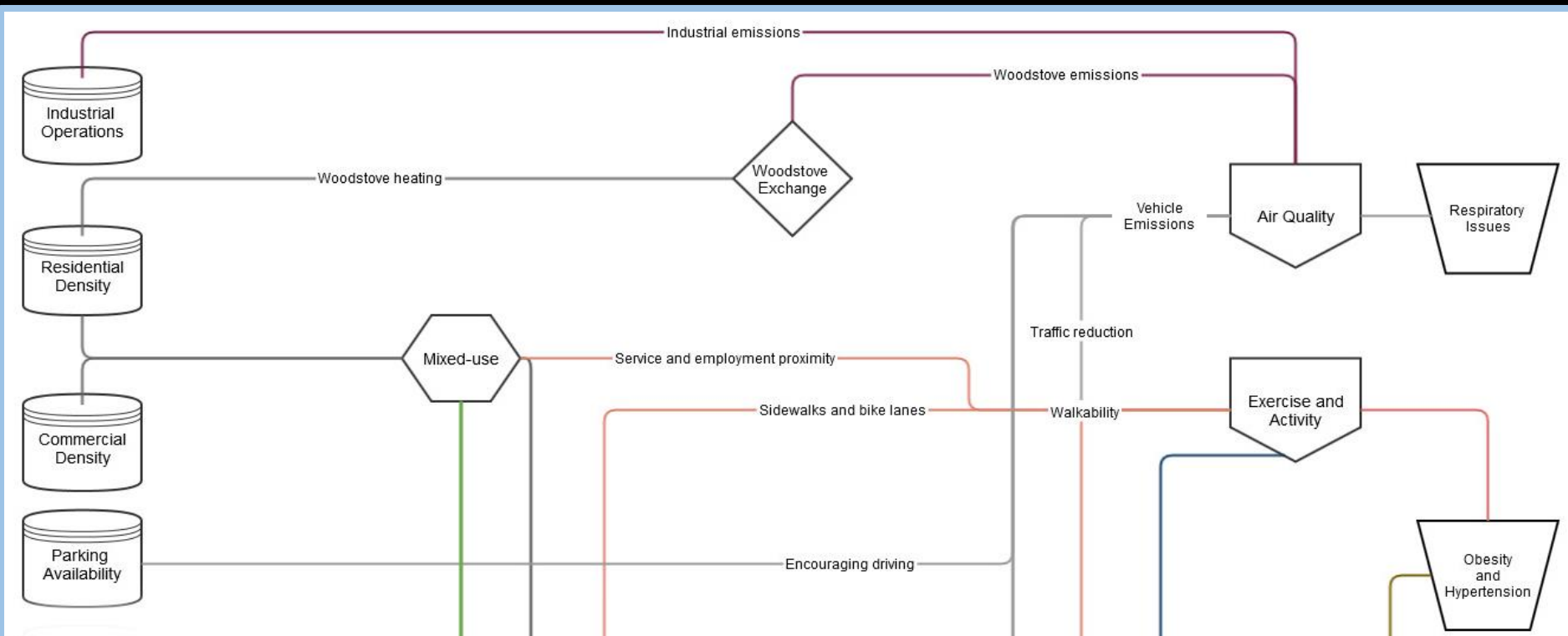


# Climate Action Co-benefits and Community Planning

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### USING MODELS FOR COMMUNITY PLANNING

- Informs integrated systems model design for community modelling projects
- Provides guidance on variable selection (quantitative) and insight on other considerations (qualitative)



Source: Model retrieved from Sustainability Solutions Group; HealthProof project ([www.ssg.coop/portfolio-item/5549](http://www.ssg.coop/portfolio-item/5549))

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### USING MODELS FOR COMMUNITY PLANNING

- Provides insight on what types of tools and strategies should be used in community planning processes (e.g., sense of place and visualization)



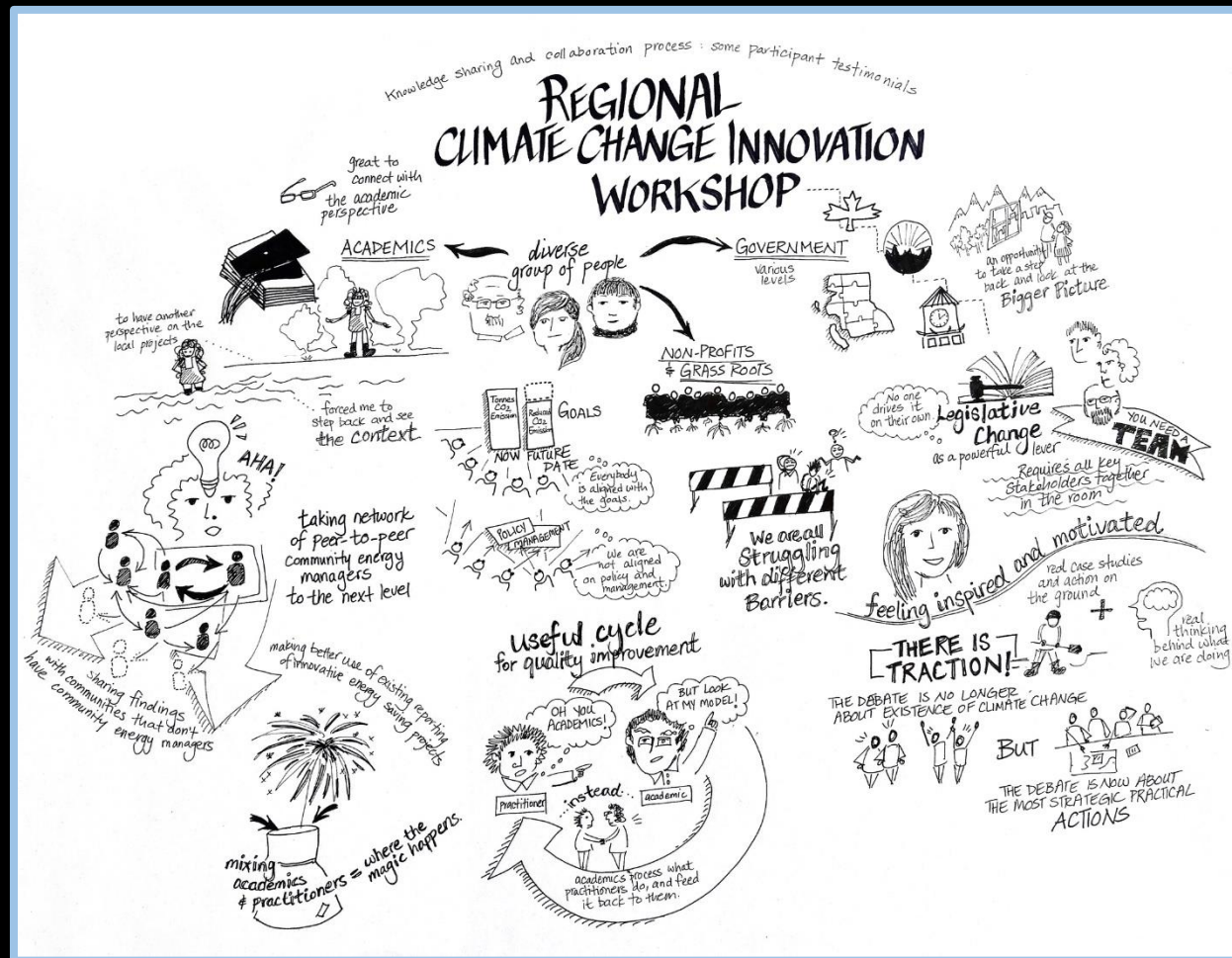
*Source:* Terrain and satellite data from Google Earth. Models retrieved from Trimble Sketchup 3D Warehouse contributors – WTComplete, laxfan91, and 3D Condo Explorer

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## USING MODELS FOR COMMUNITY PLANNING

- Tools for community engagement (e.g., stakeholder workshops)



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[www.changingtheconversation.ca/co-benefits](http://www.changingtheconversation.ca/co-benefits)

