Planning 4 Climate Change

Changing Land Use to Mitigate Climate Change

A Trans-Atlantic CollaborationDubrovnik, Croatia | May 7-9, 2009

WEB SITES:

Planning for Climate Change

www.sxd.sala.ubc.ca/lincoln_climate_change.htm

Or google Planning for Climate Change Lincoln UBC

Sustainability by Design

☐www.sxd.sala.ubc.ca

Or google sxd ubc

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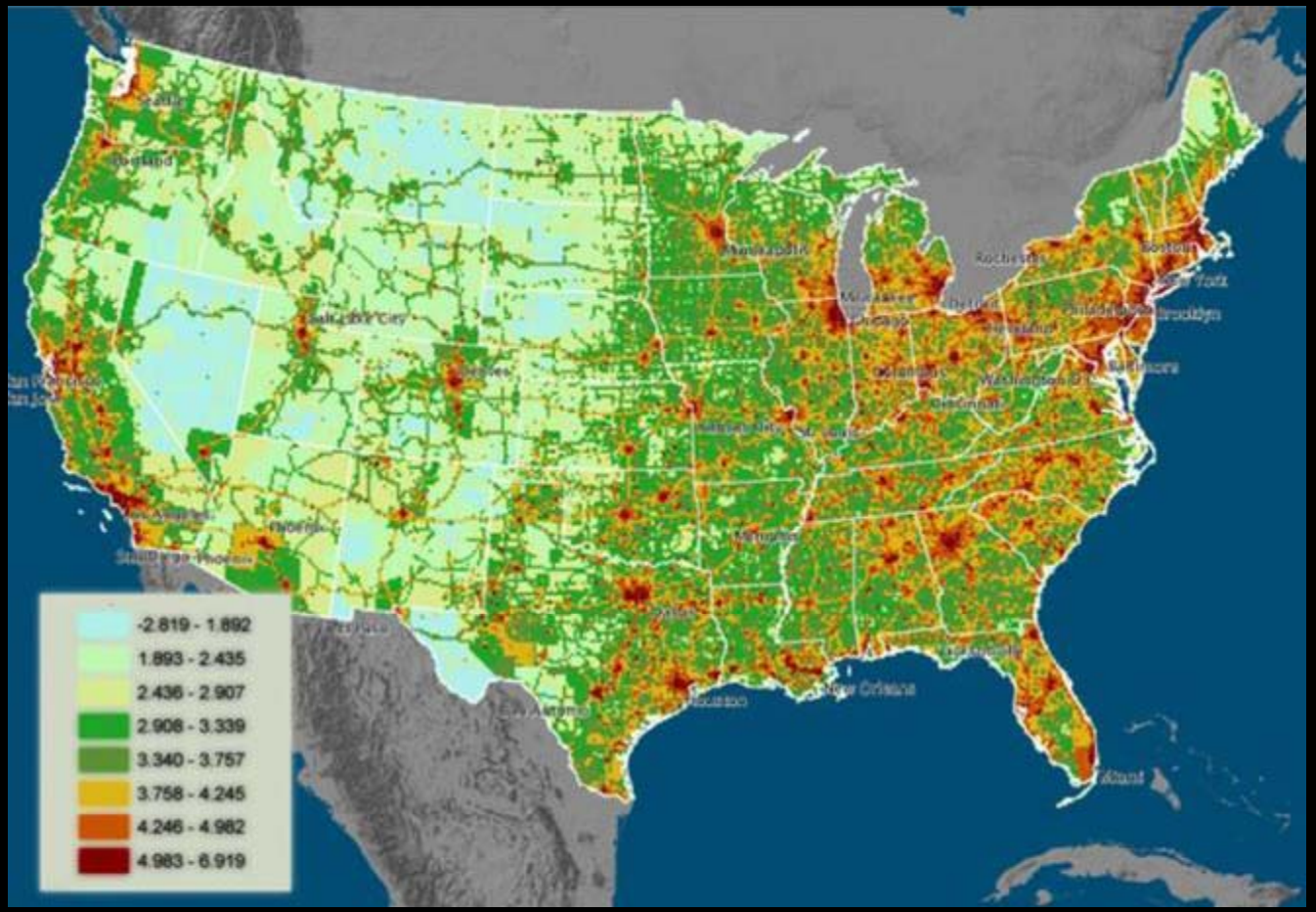
Cities as bad for Carbon

Most analysis shows cities as cause of global warming.
Cities are end users of +/- 80% of US energy
As end users cities are more significant that industry.

From NASA/DOE funded Vulcan project



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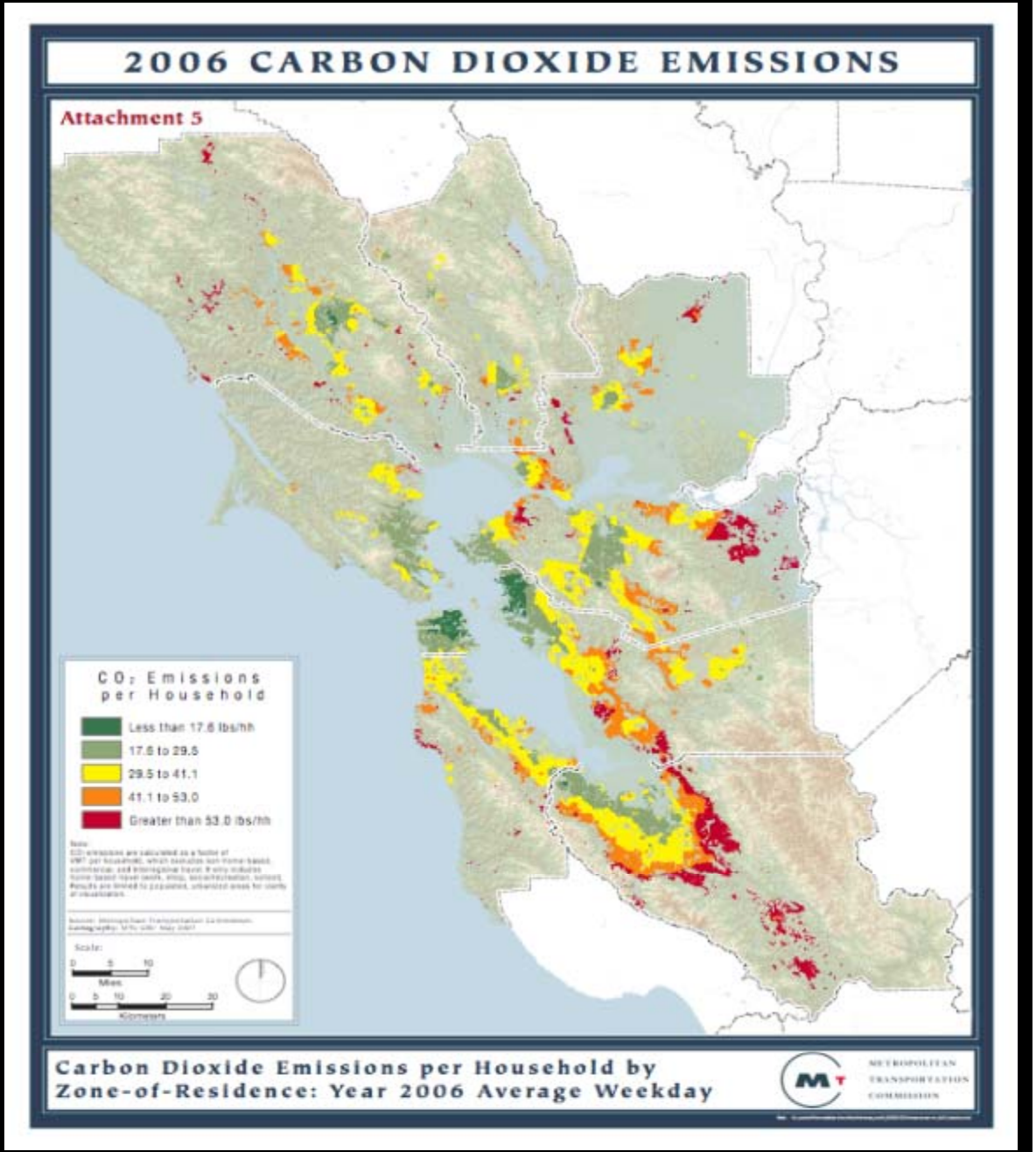
Per Capita Basis provides a different picture

Center city dwellers produce only 25% GHG per capita of third ring suburb dweller.



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Why here?

Cascadia has unifying climate, ecology, geography, economy, and (despite the national boundary) culture.

Regional planning is more entrenched here than anywhere else in Canada or US.

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Finding 1.

There is no concise frame to bound and ground this work.

"80% to 80% by 50"

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Block Scale

Finding 2

Models must work simultaneously at Block, District, and Regional scales.

ELEMENTS OF NEIGHBORHOOD

A visual database of city building blocks

OPEN SPACES
HOUSING
COMMERCIAL
INDUSTRIAL
CIVIC
STREETS

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District Scale

Finding 2

Models must work simul-taneously at Block, District, and Regional scales.

GROWTH RESIDENTIAL

Growth areas include the greenfield and infill development that will provide places to live and work outside of designated nodes and corridors as the city grows. This "urban fabric" is comprised of many uses, including residential, commercial, and industrial functions.

Patterns	close in view	contextual view		Assumed range of PEOPLE / ha (GROSS)		Assumed range of JOBS / ha (GROSS)	
High Density Residential			*Mix of attached and multi-family development, sometimes including mixed use commercial. Additional commercial uses accommodated along major roads.*	**175**	**250**	**15**	**35**
Medium Density Residential			*Mix of single family, attached and multi-family development. Commercial uses often accommodated along major roads.*	**50**	**100**	**10**	**20**
Low Density Residential			*Mainly single family and low density attached development with minimal multi-family units and small commercial areas.*	**25**	**50**	**0**	**10**

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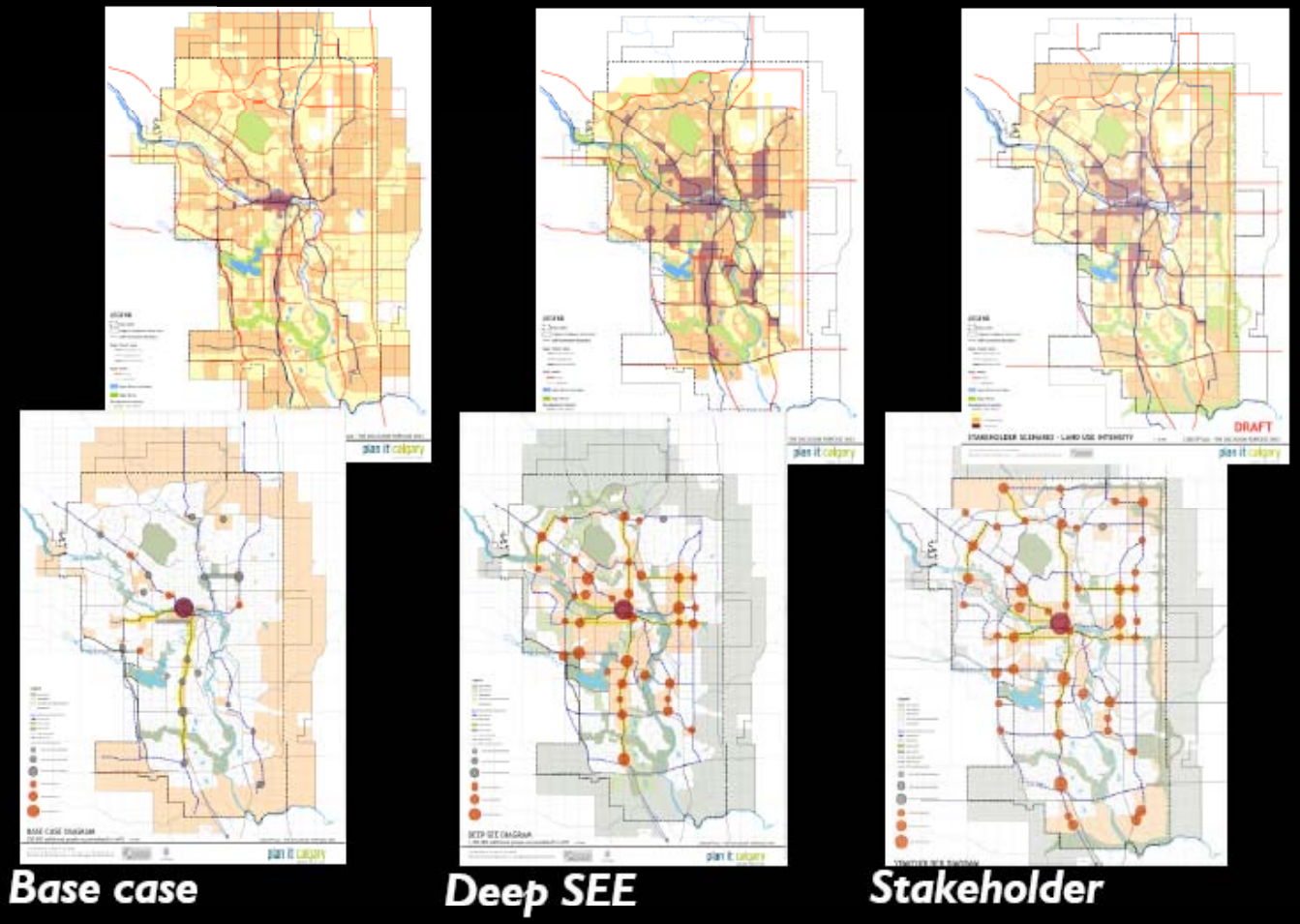
Regional Scale

Finding 2

Models must work simul-taneously at Block, District, and Regional scales.



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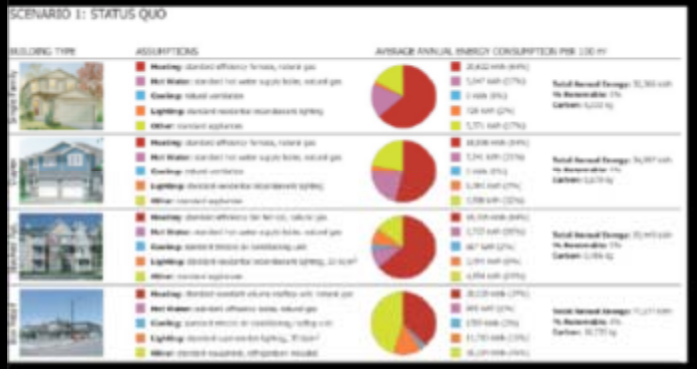
Building type / design assumptions



Energy / Carbon consequences

Water demand consequences

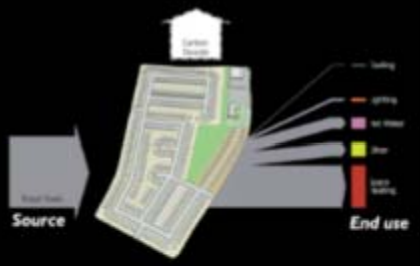
LAND USE

Residential Land Area:	13.2 ha	(67%)
Commercial Land Area:	0.7 ha	(3%)
Institutional Land Area:	0.0 ha	(0%)
Open Space Land Area:	1.6 ha	(8%)
Mixed Use Land Area:	0.0 ha	(0%)
Dwelling Units:	361	
Retail Space:	1572 m²	
Office Space:	0 m²	

ENERGY

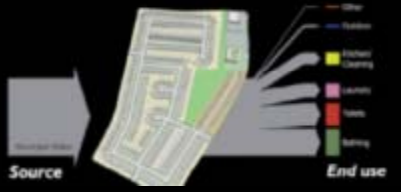
Single use buildings are organized on site according to conventional curvilinear street patterns with no attention to solar orientation. Buildings are designed to meet local building codes, but include no additional measures for energy efficiency. All energy consumed on site is considered to come from non-renewable sources, specifically natural gas and electricity generated through the burning of fossil fuels.

Total Energy Use per 100 m2:	33,333 kWh
Percent Renewables:	0%
Carbon per 100 m2:	6,234 kg



WATER

Low density single use buildings are designed to meet local building codes, and include no additional measures for water conservation. Landscaping does not consider local climatic conditions and requires additional irrigation during the summer. All water, including outdoor uses, is considered to come from the municipal supply of potable water. Once used, all water is directed to the municipal sanitary sewer system.



Finding 3

Models must account for many variables without getting bogged down.

"Truth" may not be possible. Intelligent guidance for policy makers and education for citizens is.

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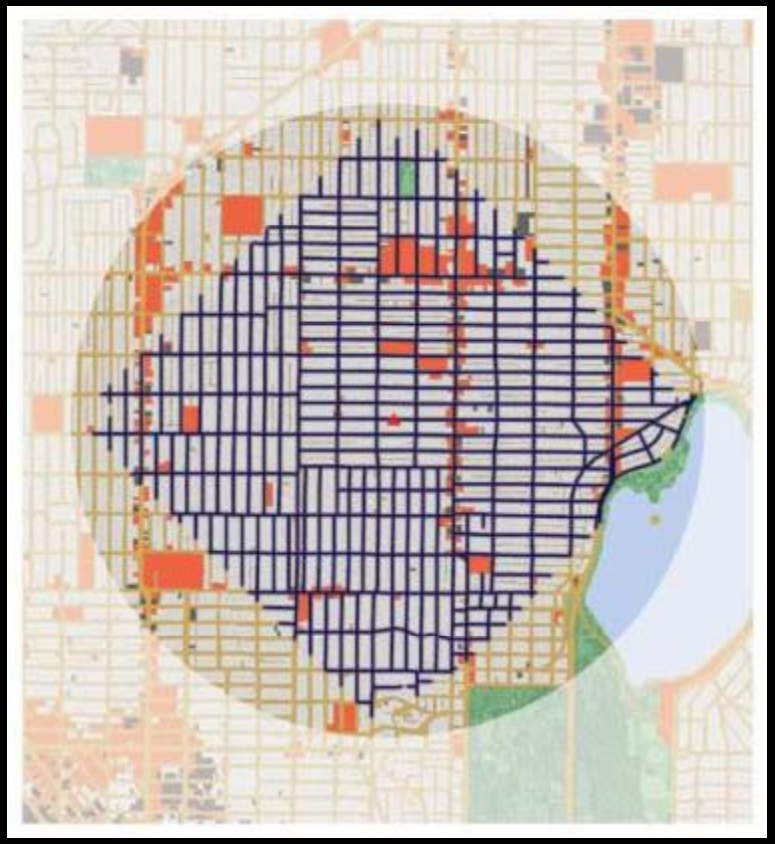

Finding 4.

Models must address the relationship between urban form and urban management.

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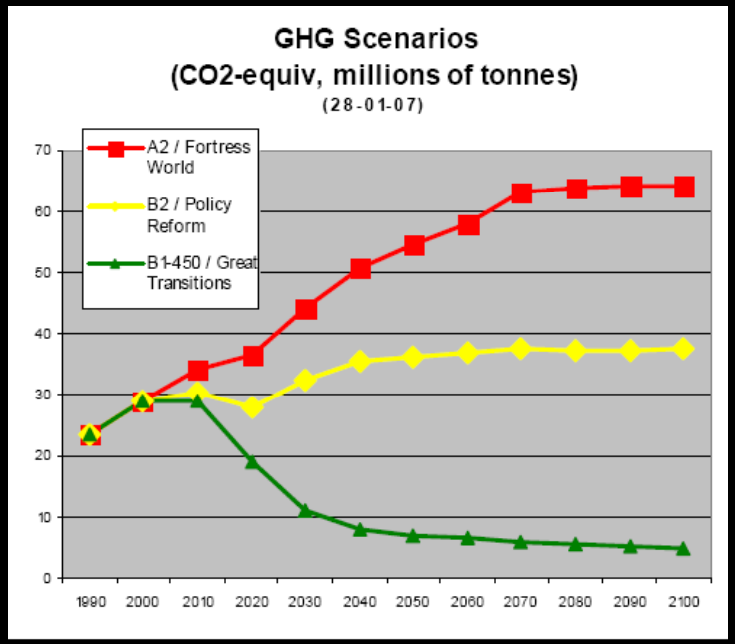

Finding 5

Visualization tools must be an integral part of models. Data alone cannot provide a useful guide for citizens and policy makers.

Data with form can.

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Framework 1: Bending the trend lines.

Start with existing negative trends, understand them, then bend the lines in a more positive direction. Represents the dominant paradigm today.

Example: Growing Cooler

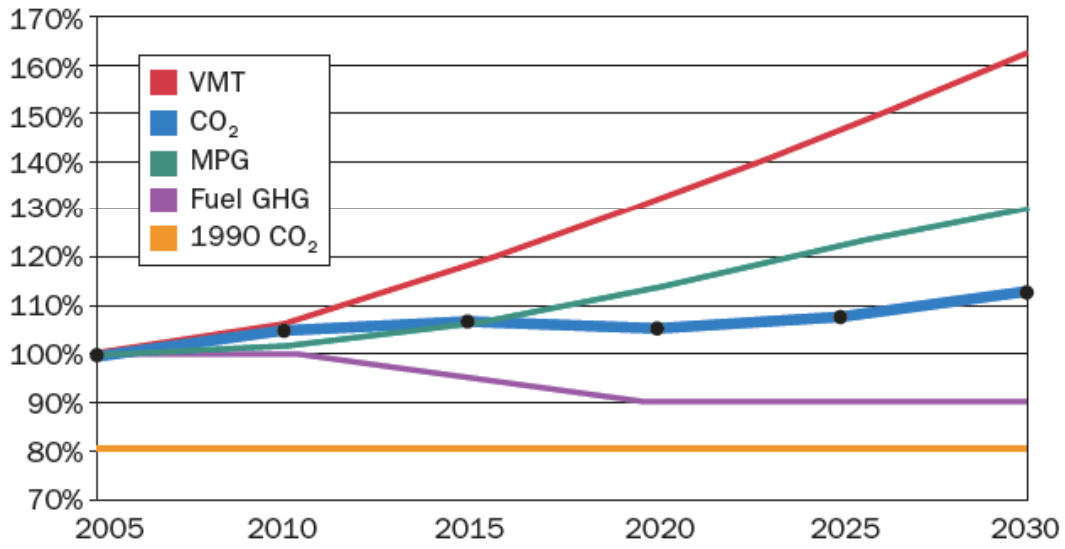
Pro:

Well supported methodology.

Con:

Based on existing behaviors, thus difficult to predict changed behaviors.

FIGURE 2
Projected Growth in CO_2 Emissions from Cars and Light Trucks Assuming Stringent Nationwide Vehicle and Fuel Standards



Source: Ewing et al. (2007)

NOTE: Projected growth with Senate CAFE levels—new passenger vehicle fuel economy of 35 mpg in 2020 and California low-carbon fuel standard of –10% in 2020 applied nationally.

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Framework 2: Inherent Capacity.

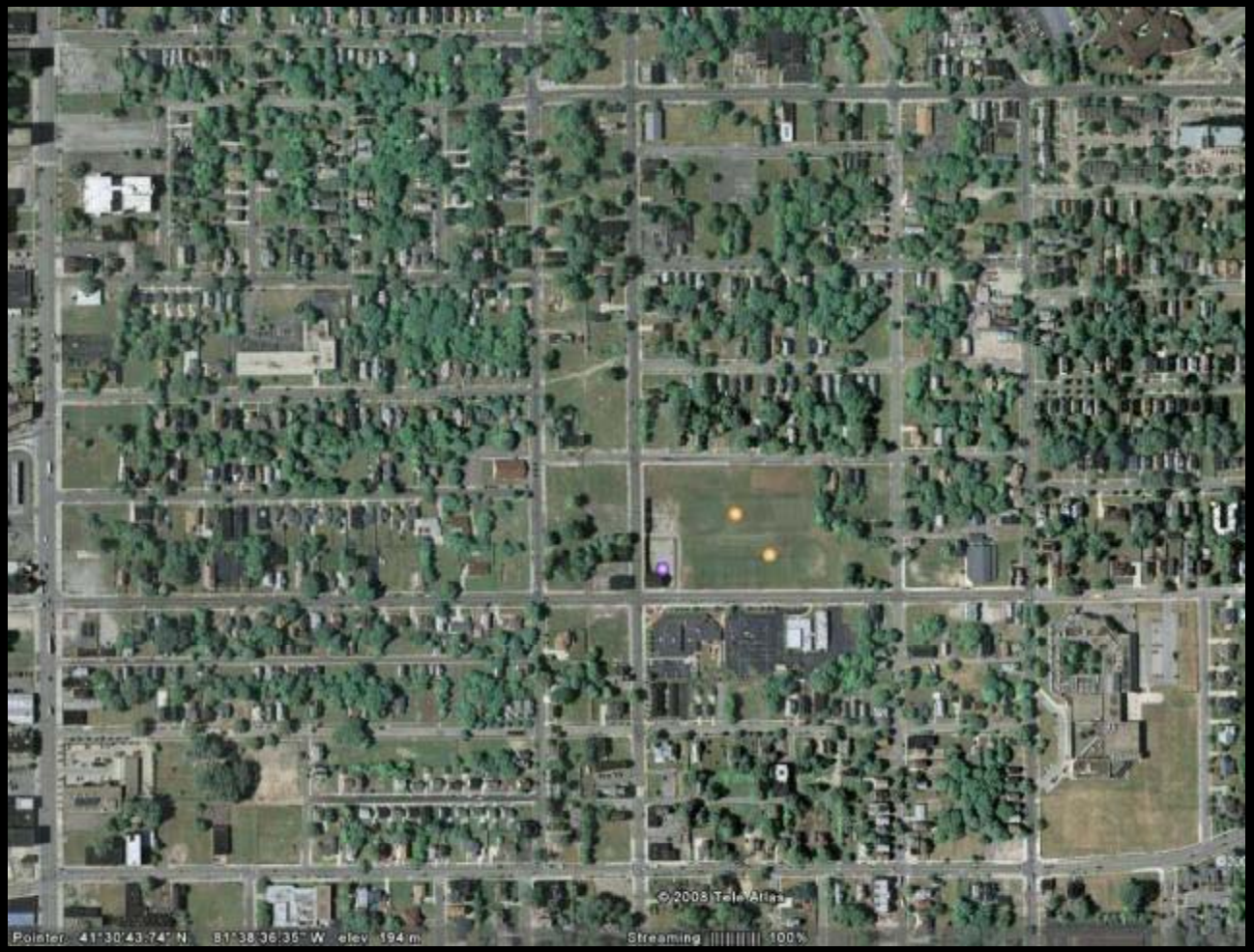
Start with an assesment of the latent capacity of the urban matrix and model strategies to maximize that capacity. Example: Cleveland.

Pro:

Shows better potential results.

Con:

Absent precedents, benefits shown are speculative.



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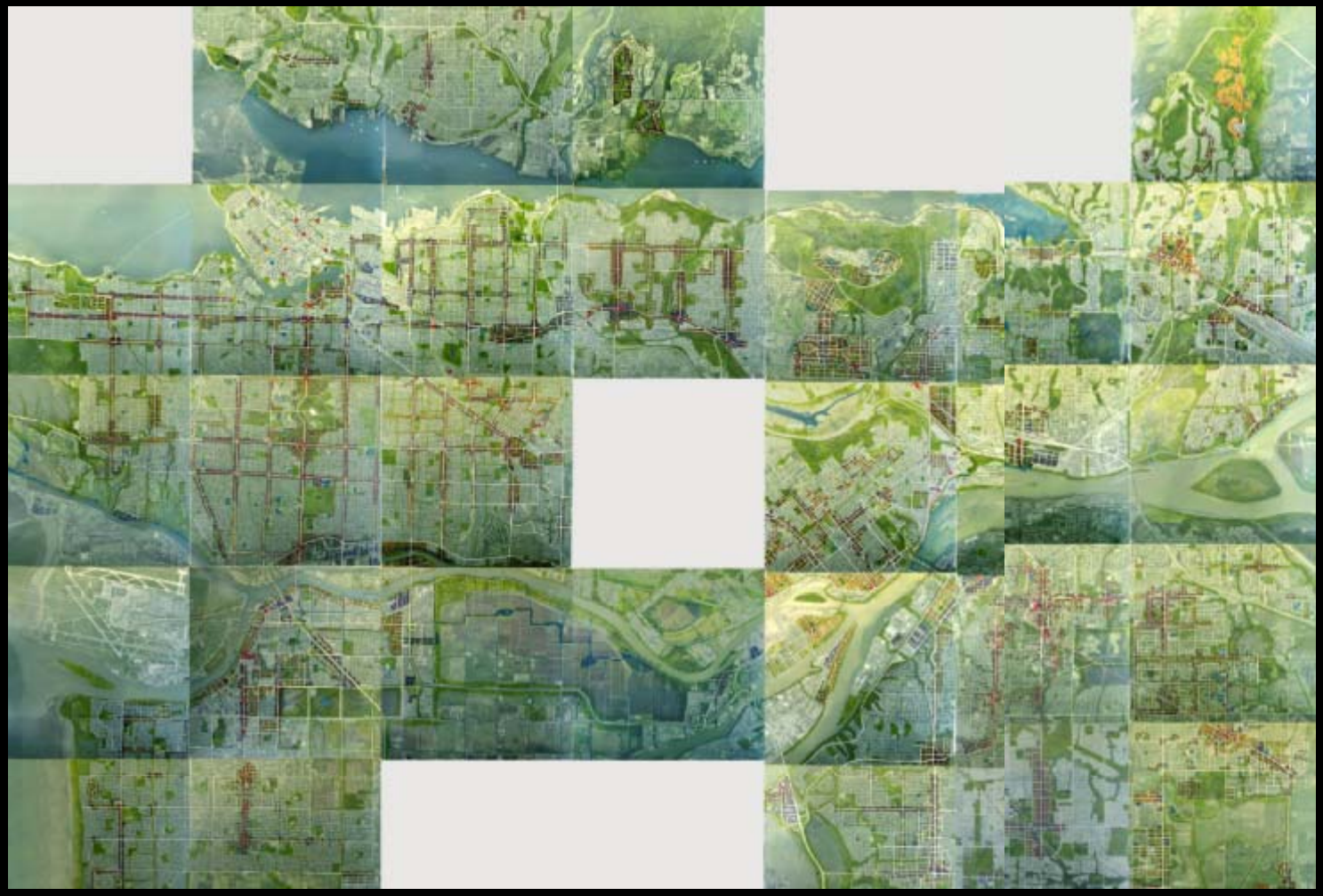
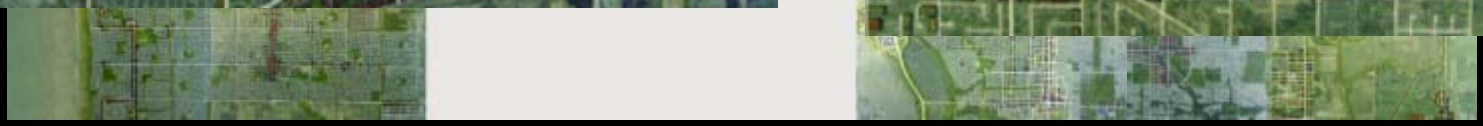
Framework 2: Inherent Capacity.

Example: Vancouver BC. Sustainability by Design Project. Moving From 2 to 4 million people with less carbon.



Sustainability x Design

Regional Vision



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Framework 3: The City as Machine for Carbon Mitigation.

Start with the existing urban matrix but model dramatic changes to the way infrastructure and buildings would interact.

Pro:

Capable of showing 80% reductions in CO_2 using known technologies.

Con:

Would require huge urban development paradigm shift.

There is one precedent.

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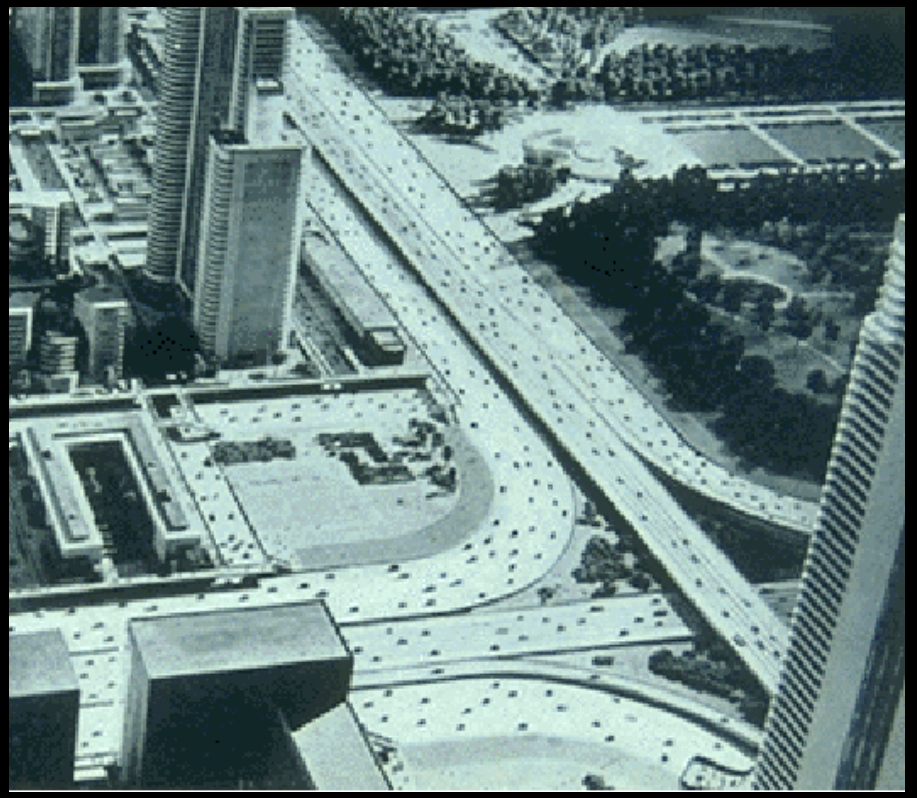
Framework 3: The City as Machine for Carbon Mitigation.

Start with the existing urban matrix but model dramatic changes to the way infrastructure and buildings would interact.

Precedent: *"Futurama" General Motors Pavilion. 1939 NY Worlds Fair.*



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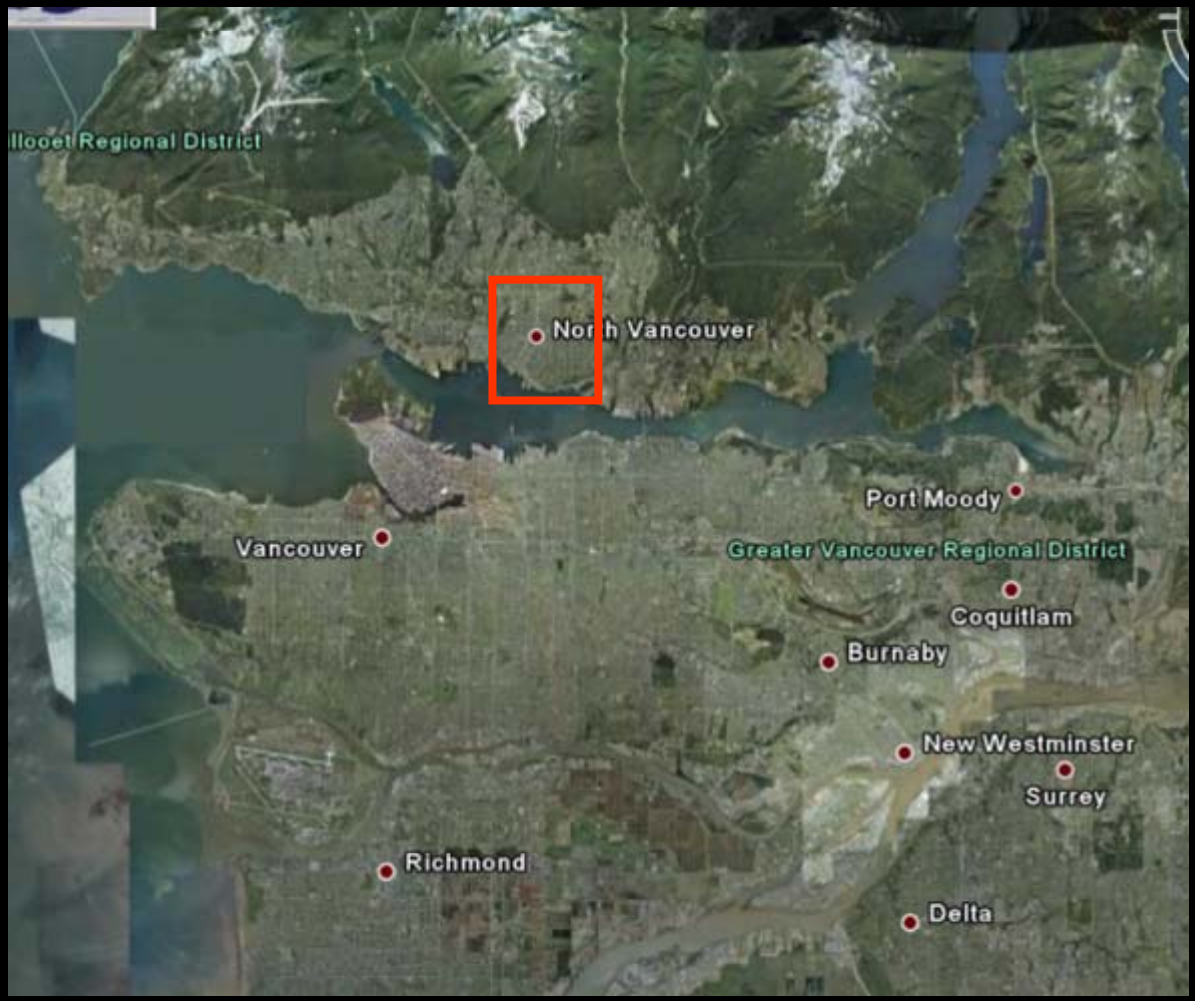
Greenhouse Gas case study:

Sustainability x Design City of North Vancouver.

100 Year Sustainability Vision.



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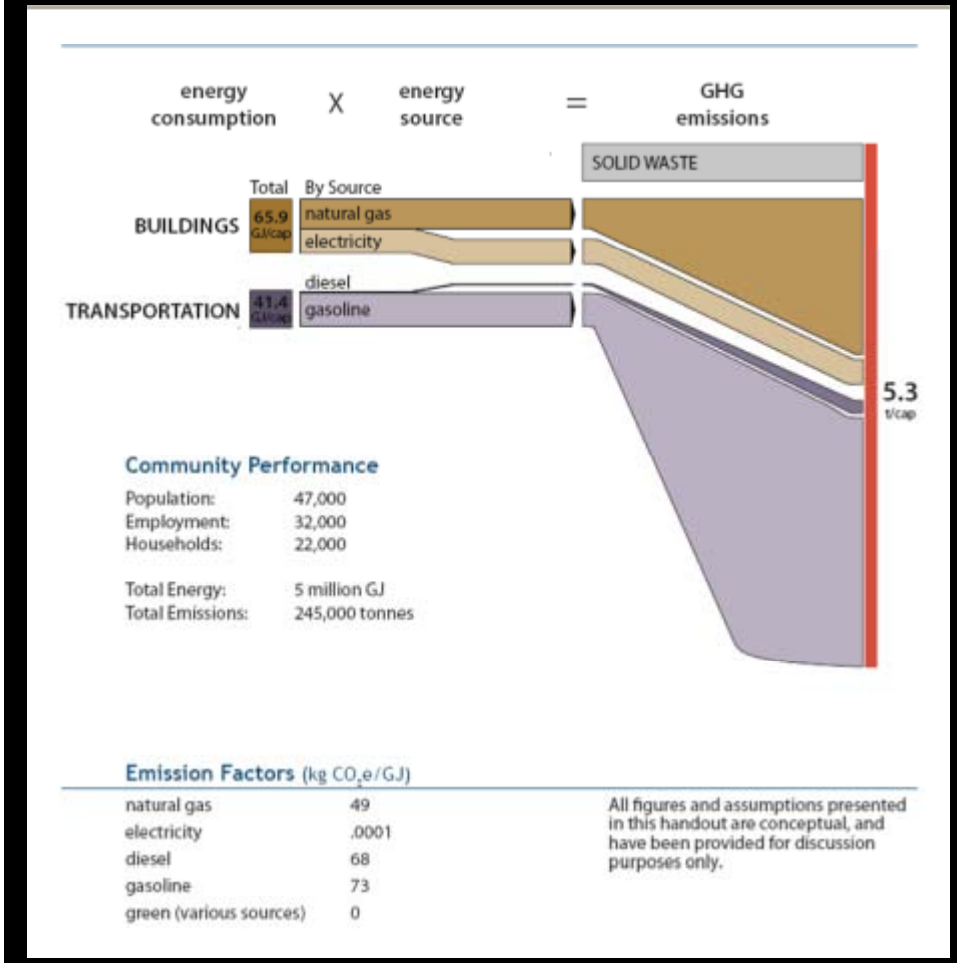

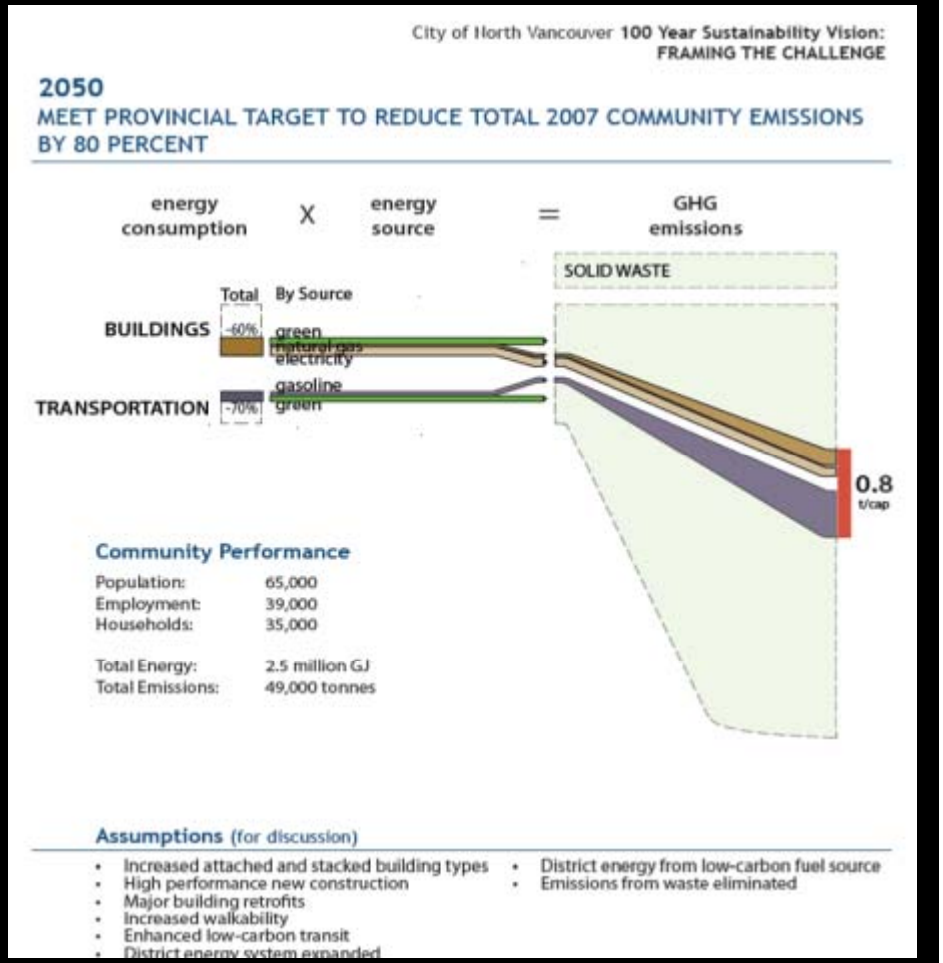

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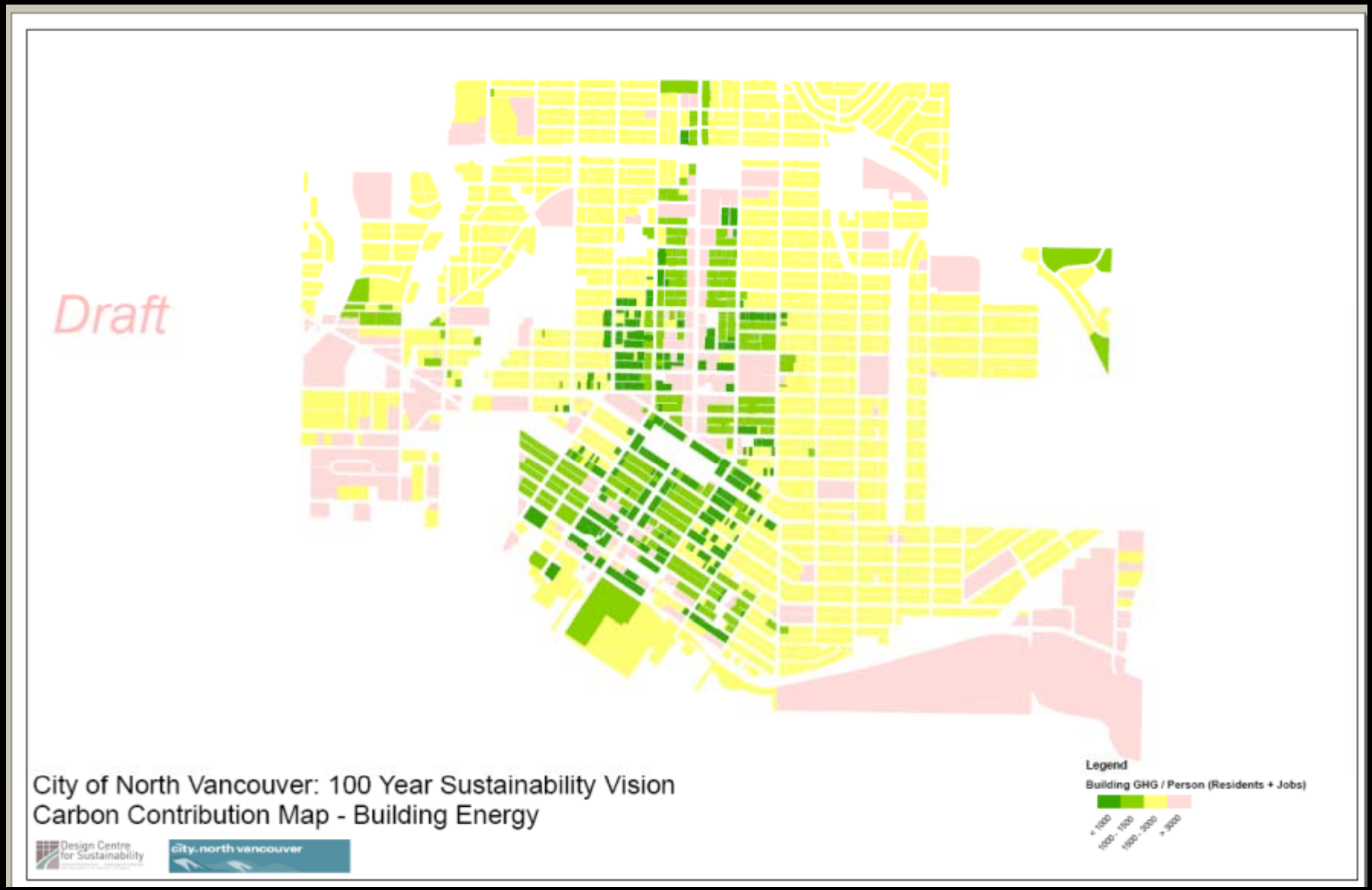

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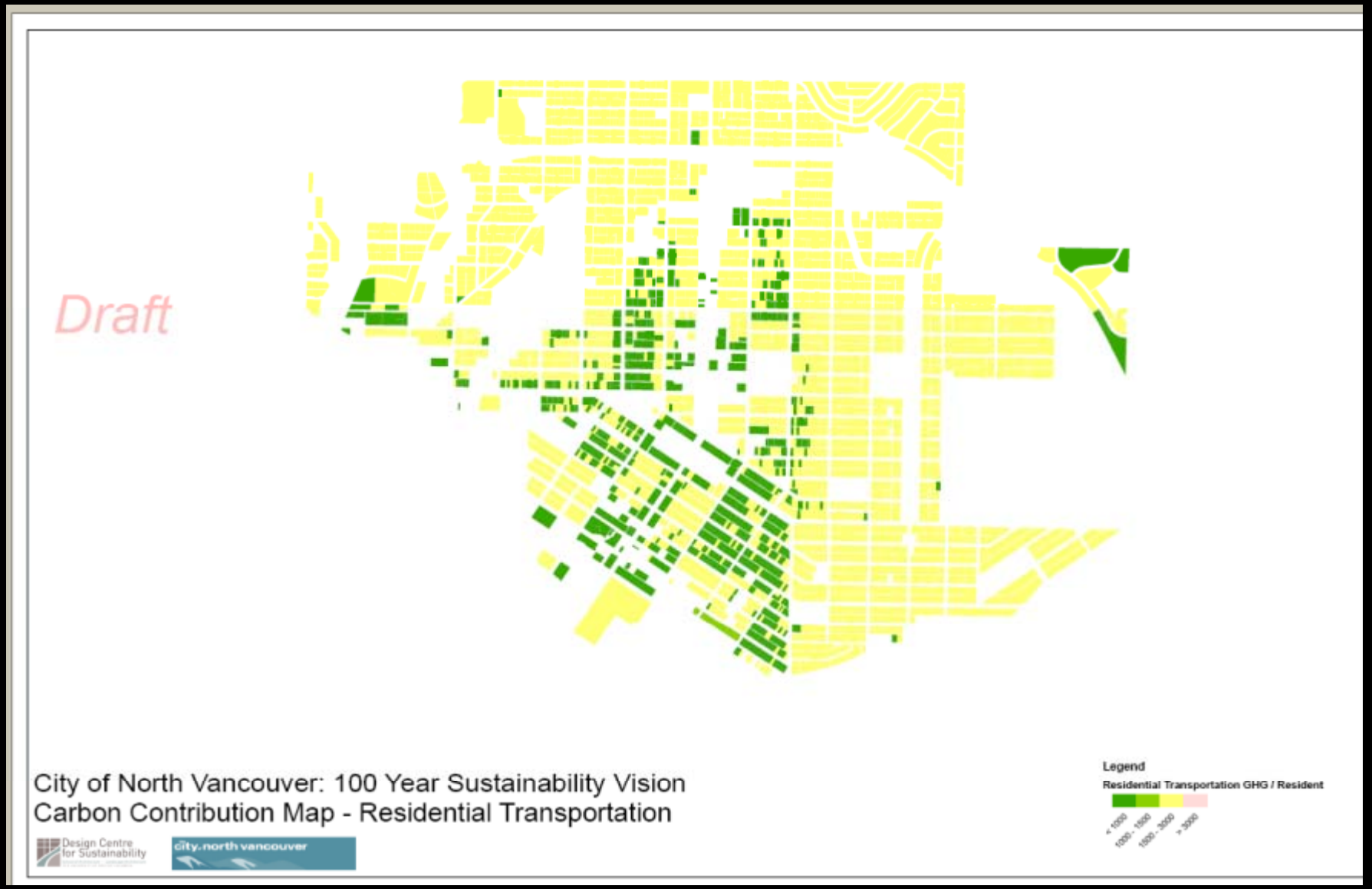

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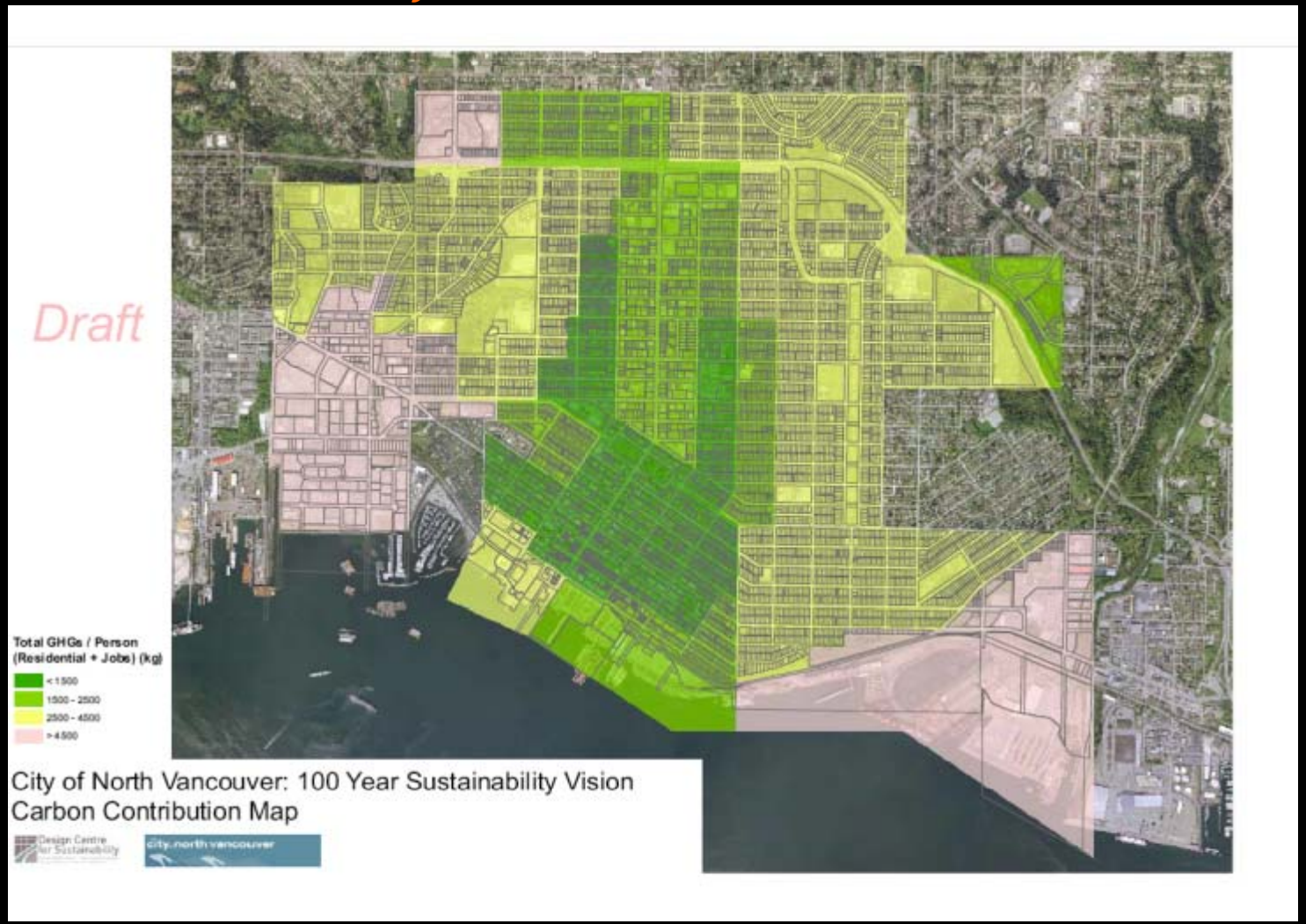

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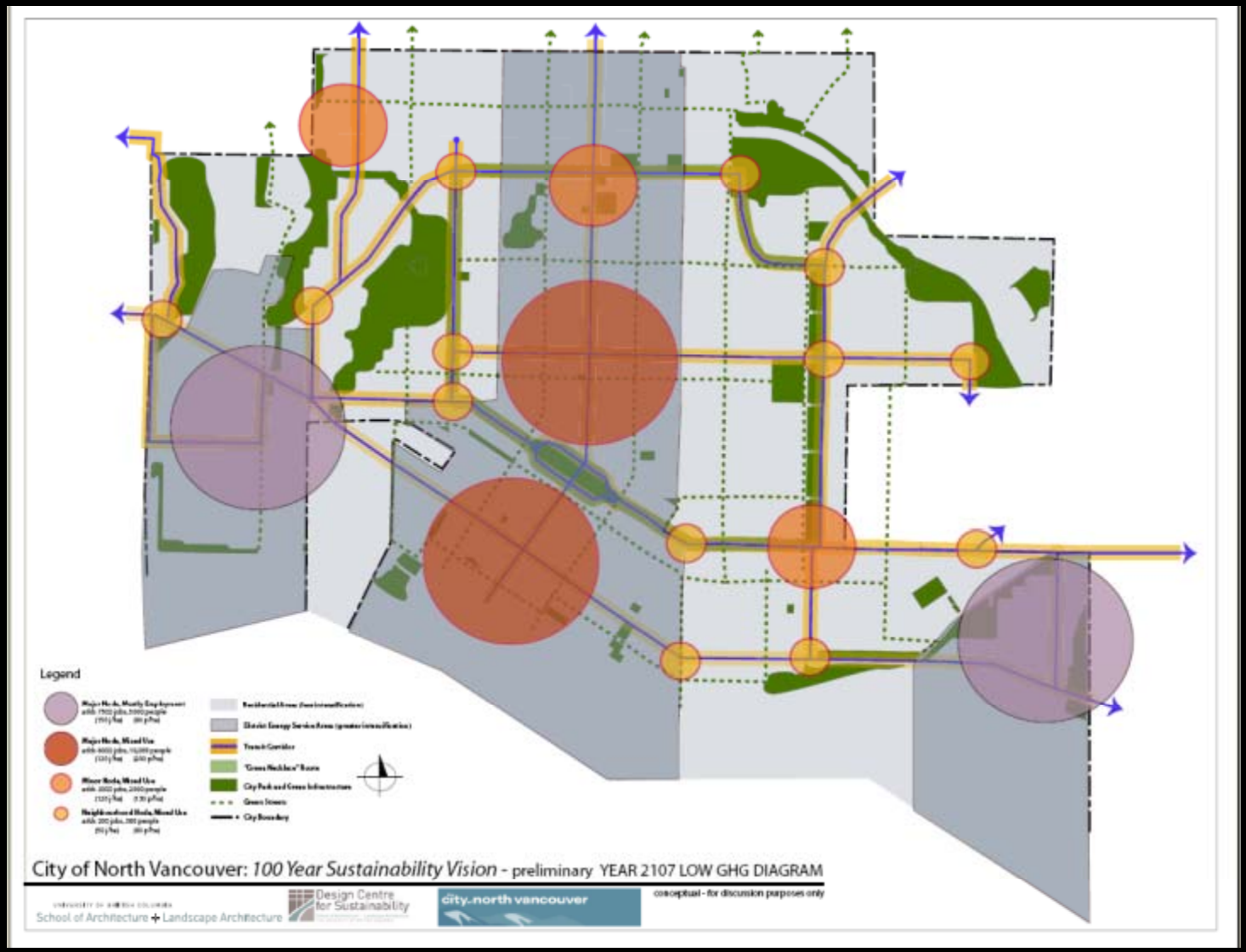

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Sustainability *by* Design

City of North Vancouver
100 Year Sustainability Vision

Two types of urban landscapes:

Corridors

Design Centre for Sustainability
School of Architecture + Landscape Architecture
The University of British Columbia

the city of north vancouver

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City of North Vancouver
100 Year Sustainability Vision

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Two types of urban landscapes:

The Stuff in Between Corridors

Sustainability *by* Design

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100 Year Sustainability Vision

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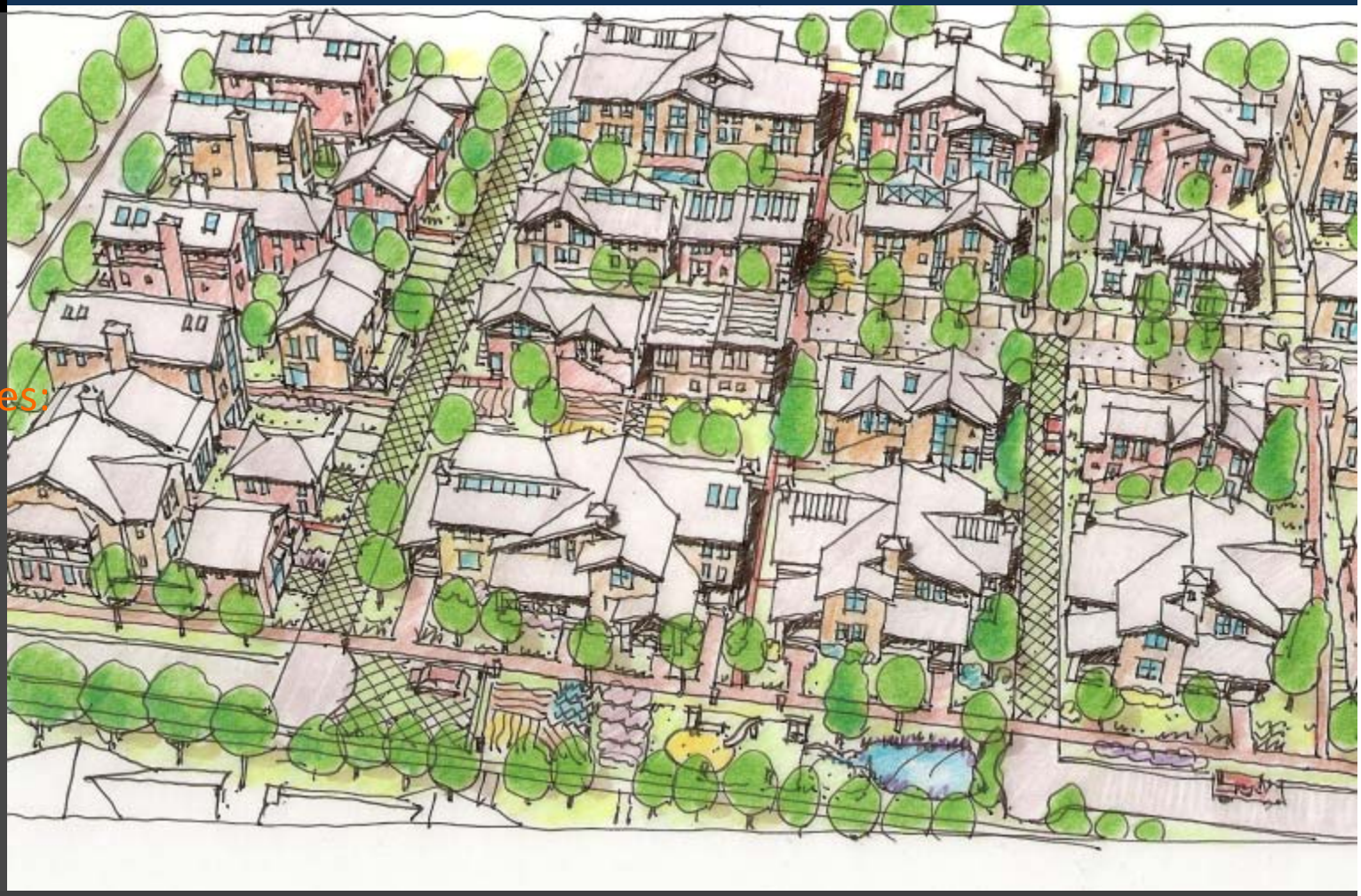

Design Centre for Sustainability
School of Architecture + Landscape Architecture
The University of British Columbia

the city of north vancouver

Sustainability *by* Design

City of North Vancouver
100 Year Sustainability Vision

Existing energy use per capita. Transportation and building conditioning

Design Centre for Sustainability
School of Architecture + Landscape Architecture
The University of British Columbia

the city of north vancouver

Proposed energy use per capita. Transportation and building conditioning