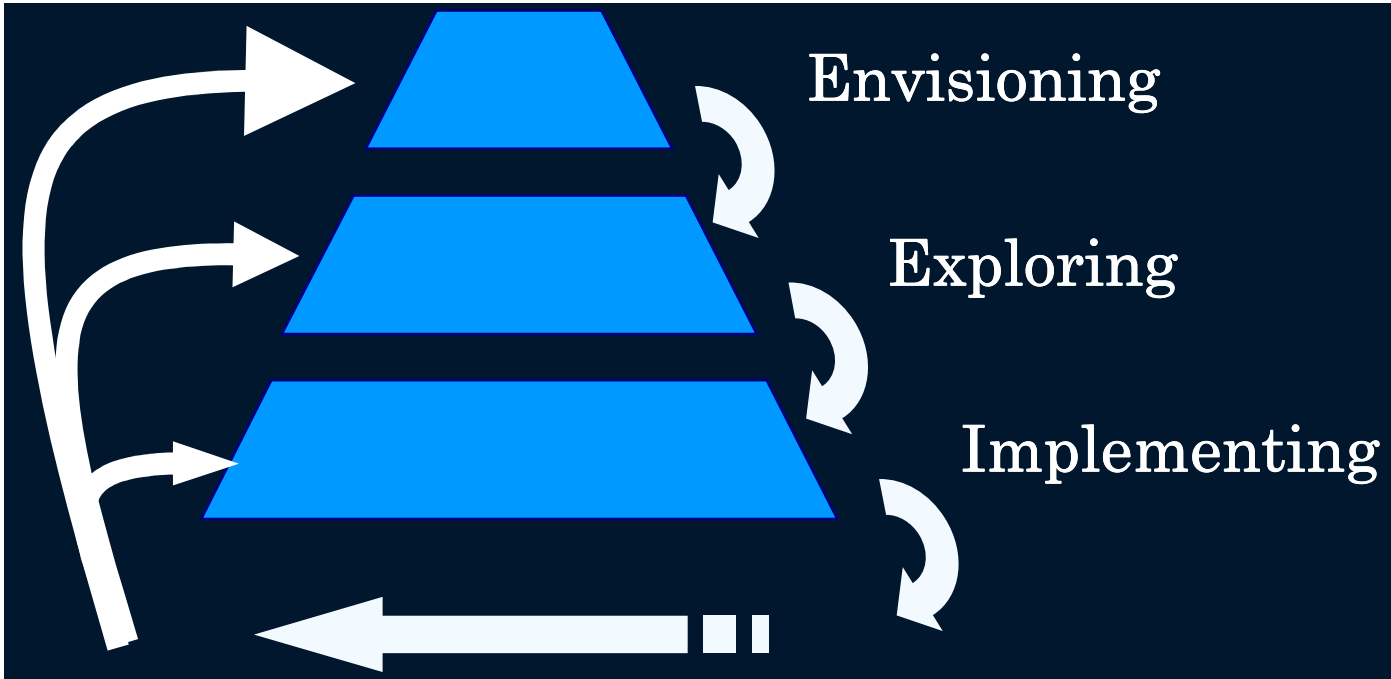
Team Canada 2
How to Make the Dreams a Reality?

BRIDGING to the FUTURE

CONSENSUS INSTITUTE

Scoping

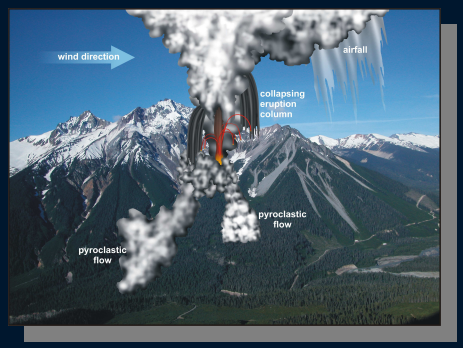


BRIDGING to the FUTURE

Hazards and Vulnerability Risk Assessment

Hazard Assessment

1. **Hazard inventory**
   past event: catalog
2. **Hazard potential**
   future event:
   probability, location



Vulnerability Assessment

1. **Exposure to damage**
2. **Susceptibility to damage**

environment, human, facility

Risk Assessment

1. **Losses**
2. **Costs**

environment, human
facility, economy

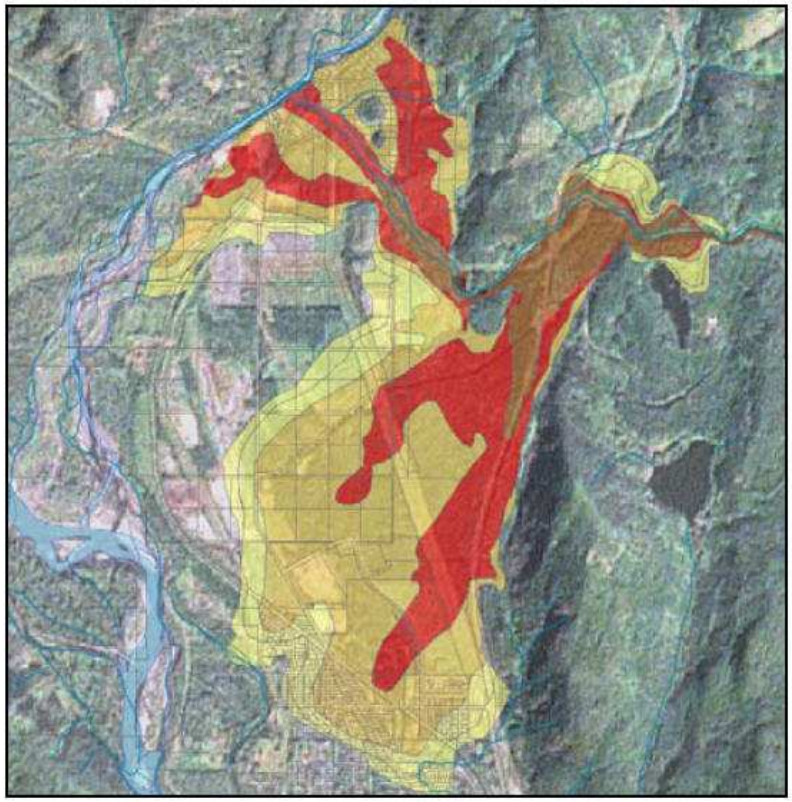
Sustainability Assessment

1. **Land use scenario**
2. **Other scenarios**
   - economic,
   - demographic, etc.

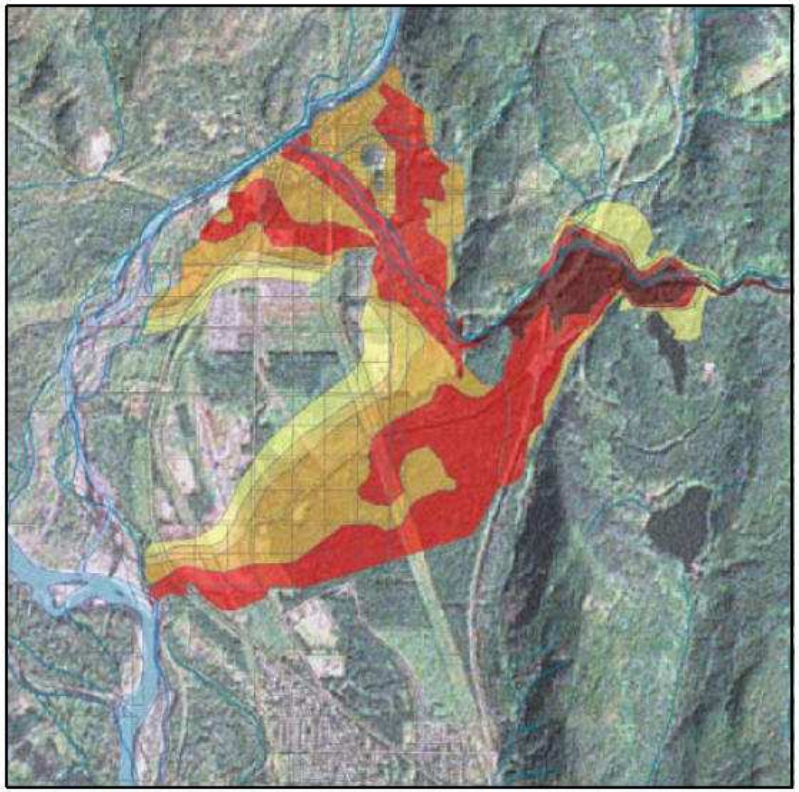
current and future

Landslides

Un-Mitigated Debris Flow Scenario



Mitigation via Deflection Berm Scenario



Kerr-Wood Leidal Study 2003; Maximum Credible Debris Flow Scenario (7Mm3; 15,000 m3.sec)

KWL_Scenario1

0 1.5 3 6

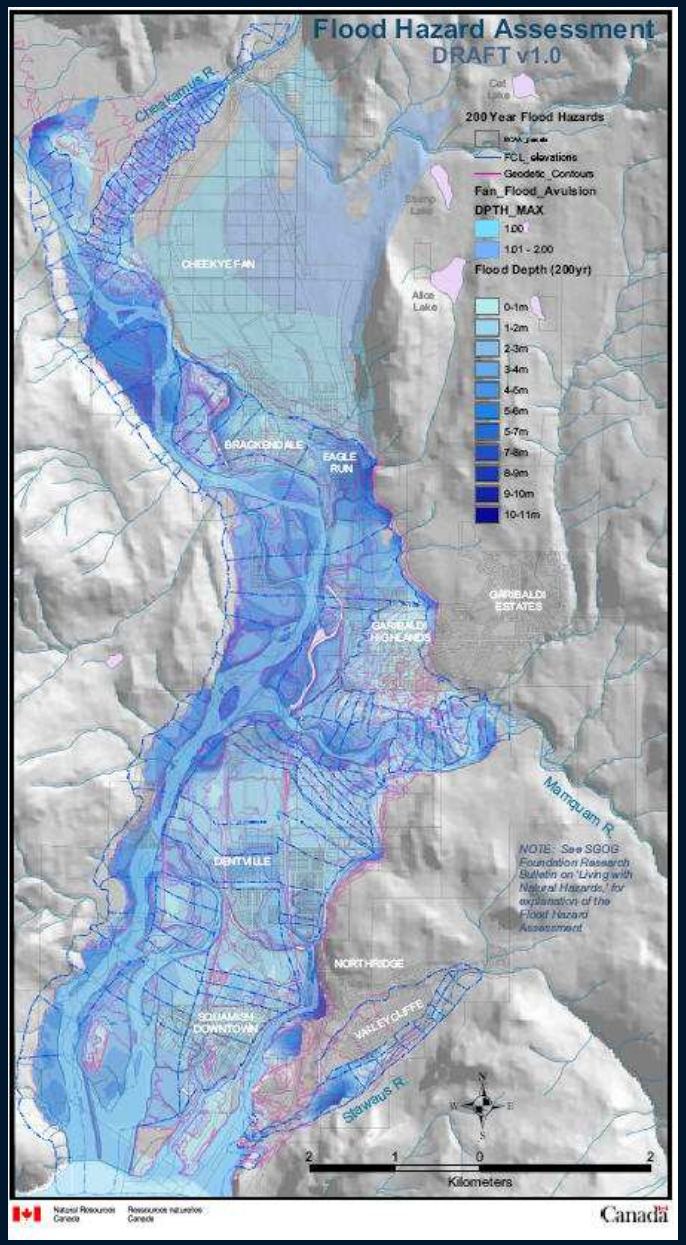
Kilometers

DPTH_MAX

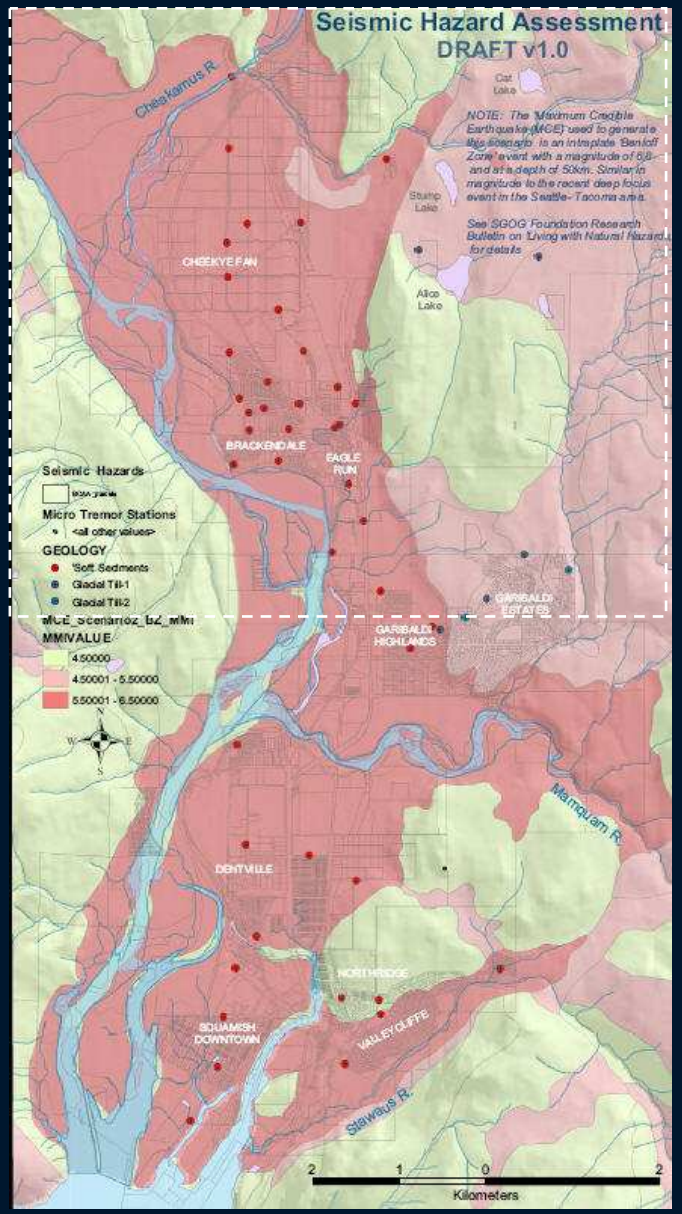
0.30 - 2.00	(0.3-2m) Debris filling the flood plain in some locations, possible temporary landslide dam several metres high, complete change of flow patterns in river, possible small outburst wave, erosion of fan margin scarp.
2.01 - 4.00	(2-4m) Slow movements, thin discontinuous deposits strongly controlled by topographic details and obstructions. Structural damage minor, erosion by water flow in new channels.
4.01 - 6.00	(4-6m) Less rapid but still very destructive debris flow, deposits of variable thickness, preferential flow along open corridors, some forest stands and structures will remain standing
6.01 - 8.00	(>6m) Extremely rapid movement of massive debris trains, deep deposition, forest cover and all structures destroyed, topography changed.
8.01 - 10.00	

N W E S

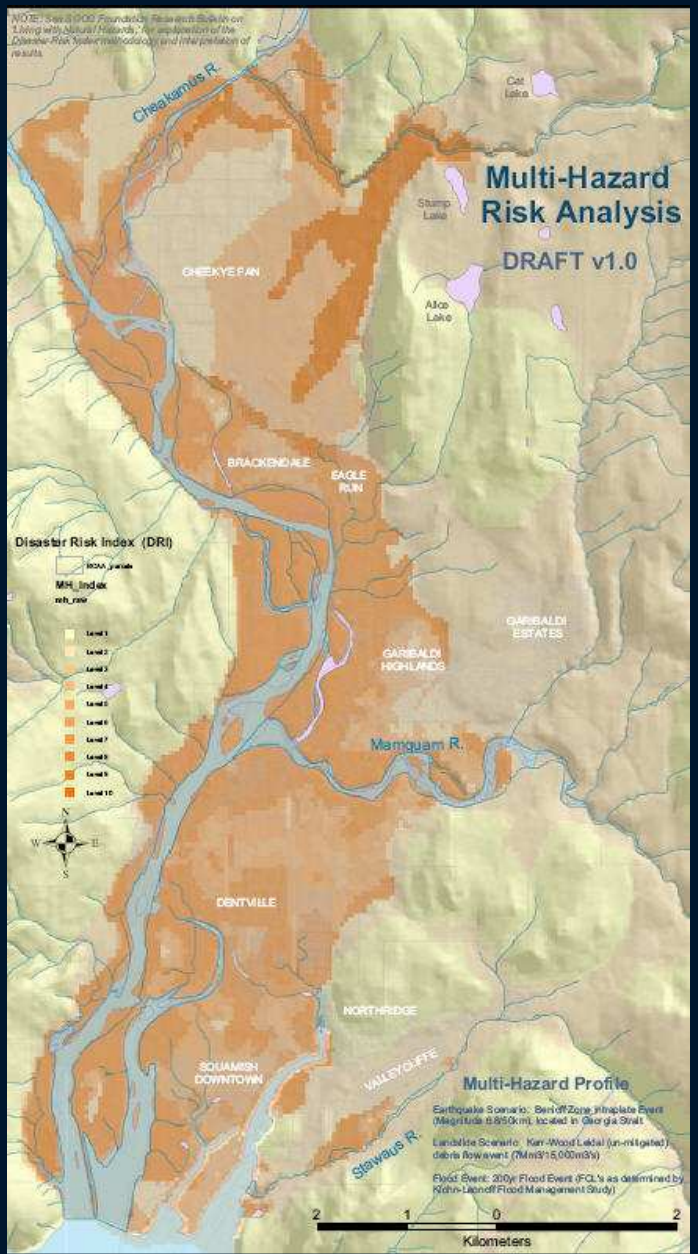
River Flood



Earthquakes



Multi-Hazard Risk Assessment



Scoping Continued

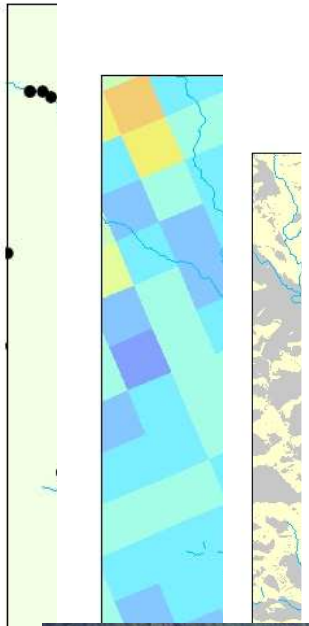
Energy and Water Flows

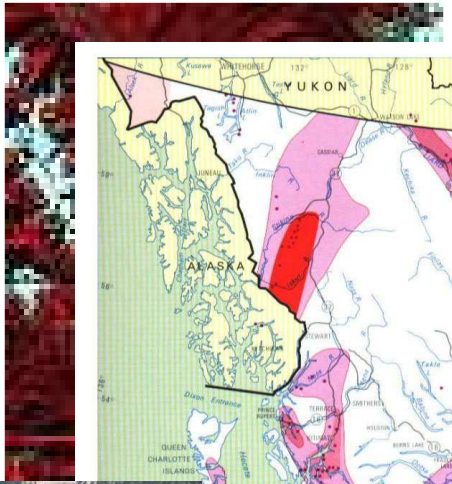
Current Microhydro Sites

Mean Prevailing Wind Speeds

Shaded and Sunlit Areas

Biomass





Envisioning themes

1. Stepping towards Net Positive Energy.

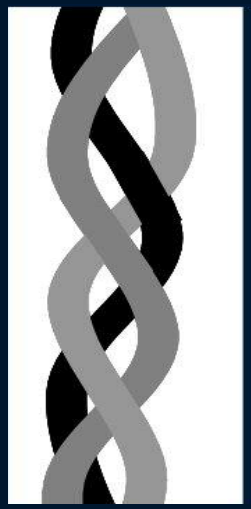
Total renewable energy generation on-site exceeds the total consumption for buildings and for on-site transportation at build out.

2. Self-reliance and security for all critical energy services.

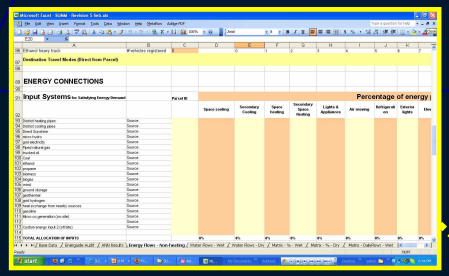
The on-site infrastructure has the capacity to separately satisfy critical energy needs, including lighting, communications, and essential heating and cooling.

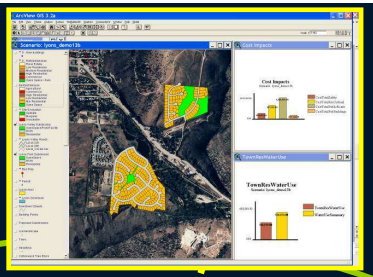
3. Diverse energy sources & technologies provide choice in lifestyles and adaptable families and businesses.

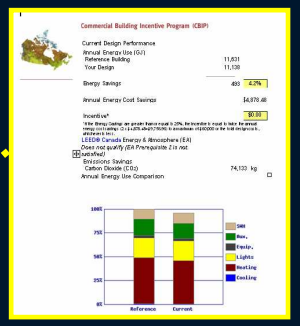
At least five distinct energy sources each provide 5% or more of the total energy for buildings and total for transportation.

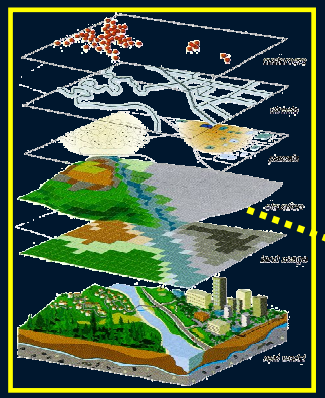


Exploring









Data

Assumptions

Attributes

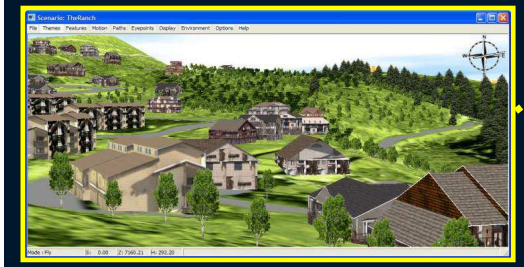
Scenarios

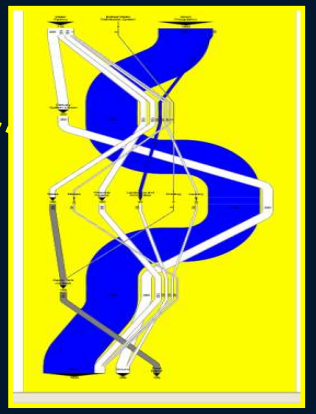
Indicators

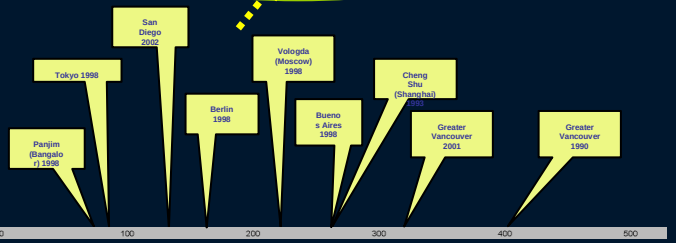
3D

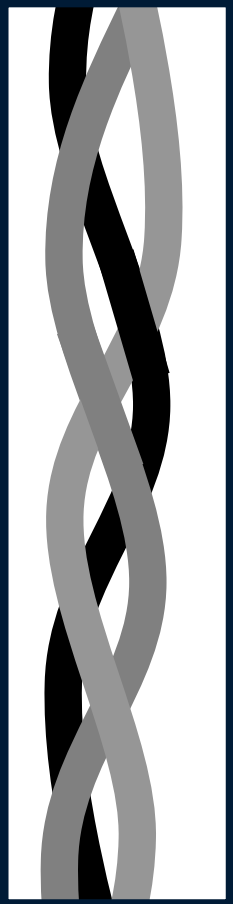
Charts

Reports



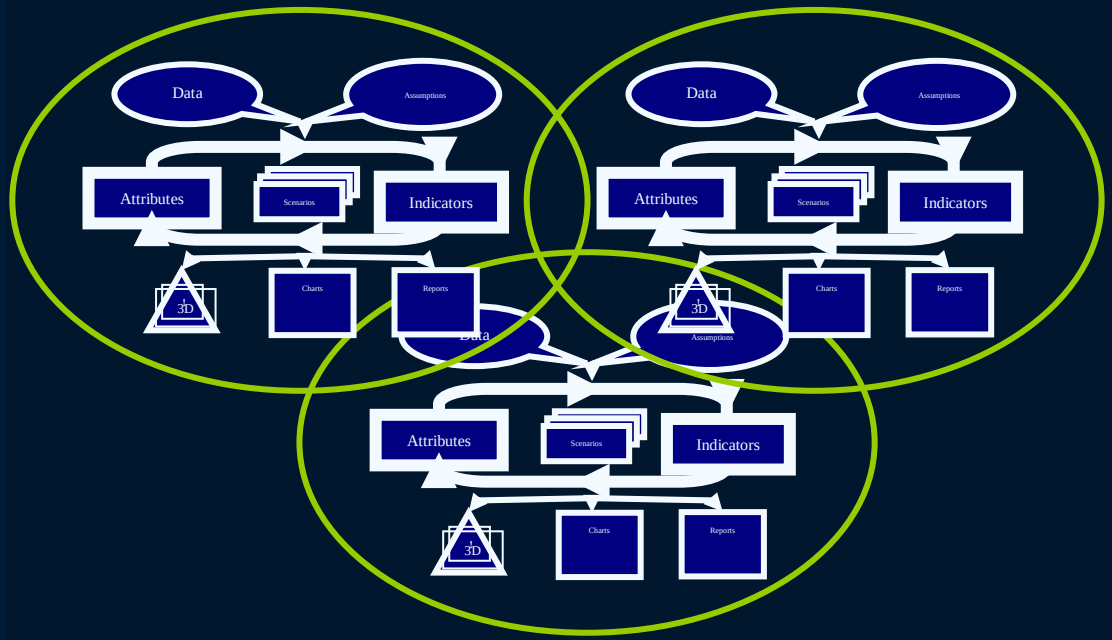






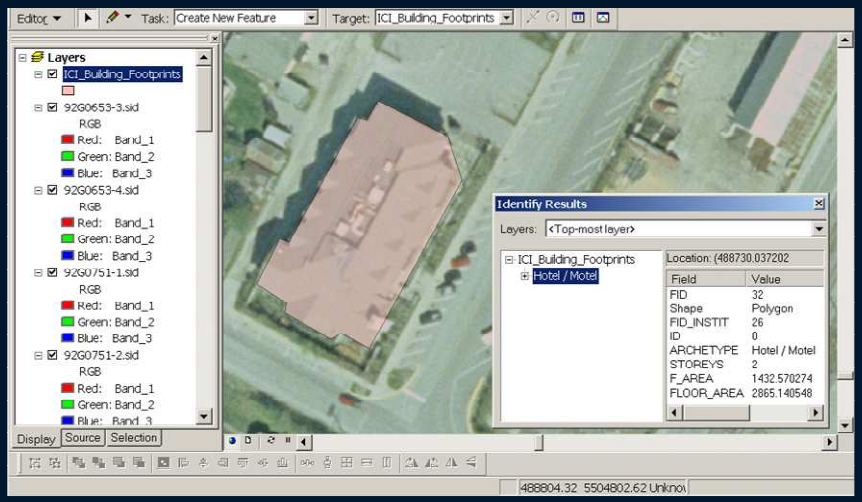
Smart Growth on the Ground

Resilient Urban Systems



Sustainable Urban Metabolism

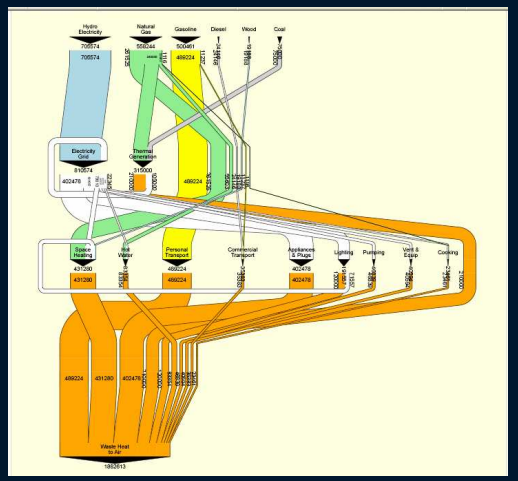
Bottom-up Stock Aggregation Method



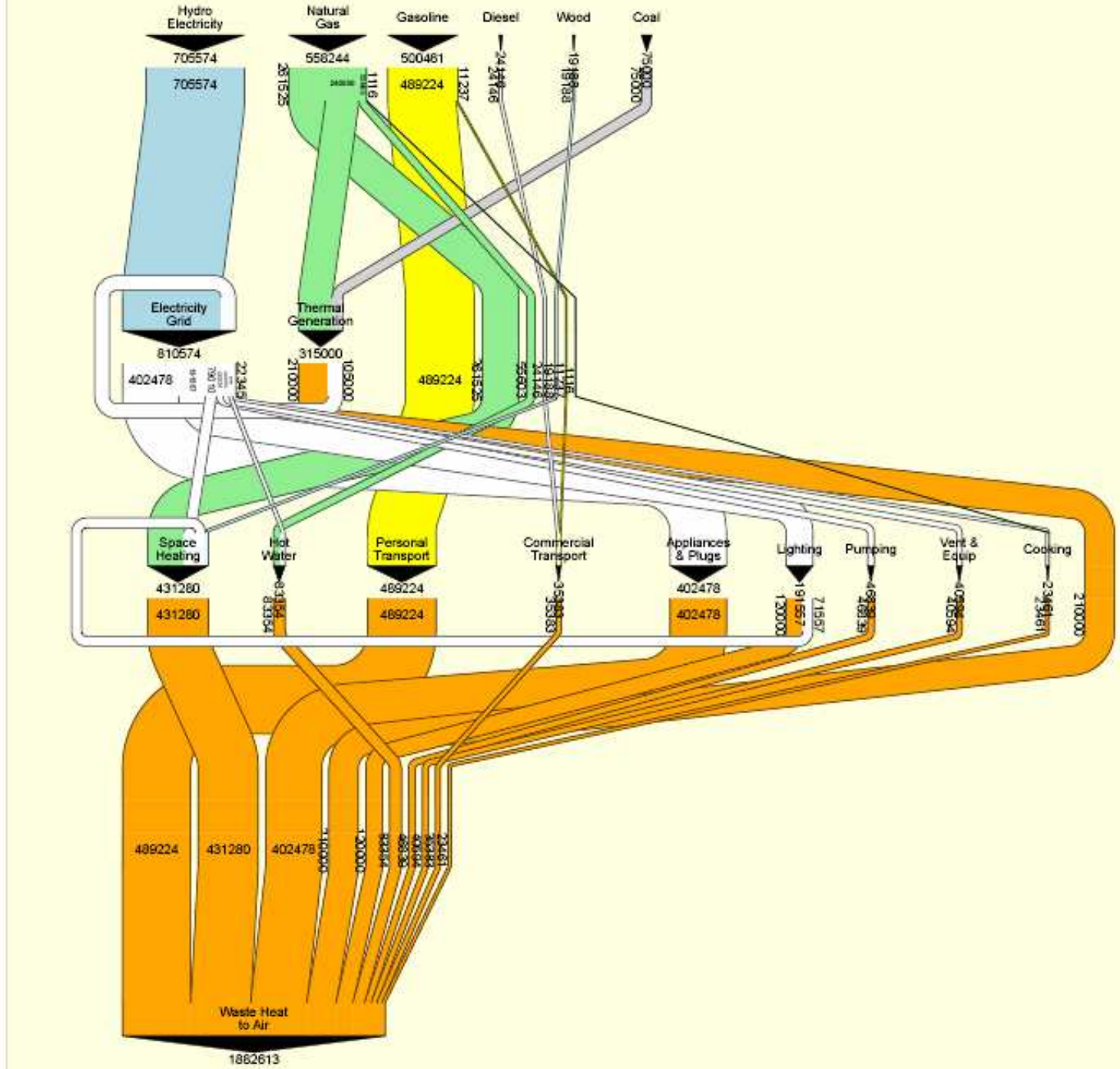
1. Estimate floor area through digitizing building footprints or using assessment data

2. Energy & water audit of representative building archetypes

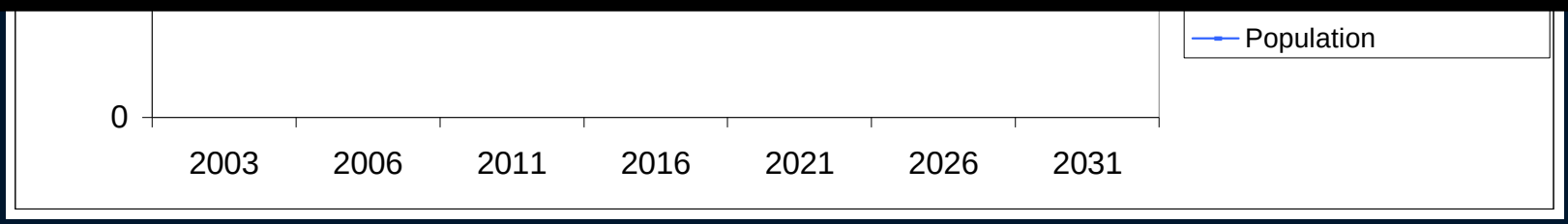
3. ∑ all floor areas for by archetype for baseline year



4. Model urban metabolism


Hydro Electricity
Natural Gas
Gasoline
Diesel
Wood
Coal
706574
558244
500461
706574
489224
Electricity Grid
Thermal Generation
810574
315000
402478
210000
105000
Space Heating
Hot Water
Personal Transport
Commercial Transport
Appliances & Plugs
Lighting
Pumping
Vent & Equip
Cooking
431280
489224
402478
Waste Heat to Air
1862613

Generate Future Energy & Water Demand for Building Archetypes

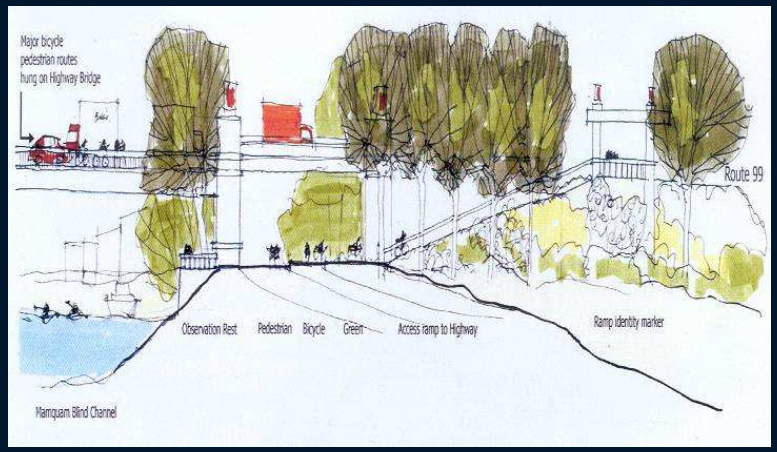


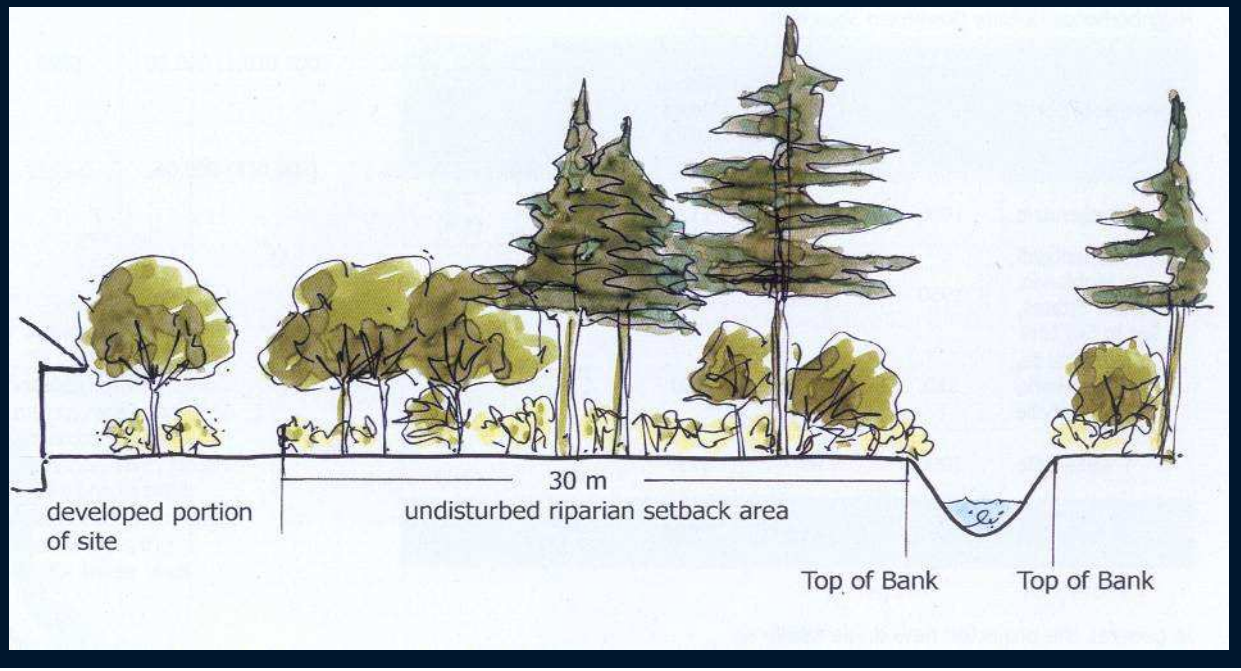
Implementing

1. Adopt a rational ‘one-system’ approach
2. Select catalyst projects
3. Use policy tools to remove the barriers

BRIDGING to the FUTURE

1) From fighting nature to fitting in



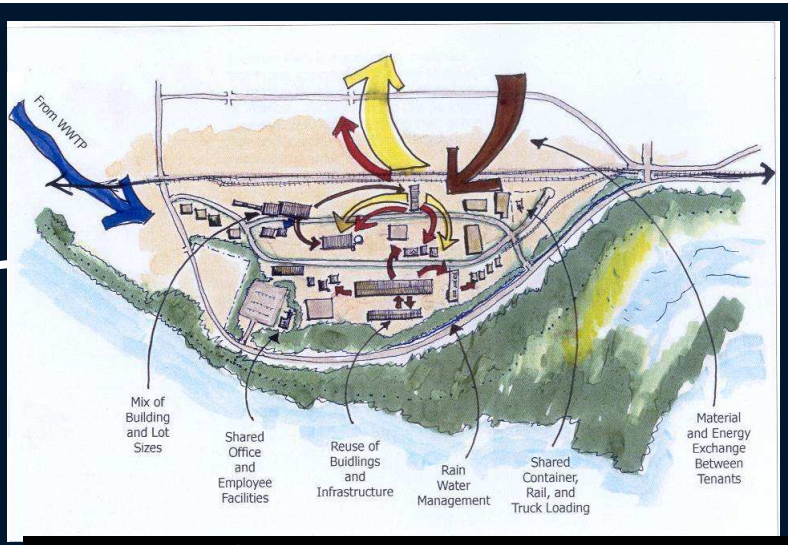


2. From sprawl and mall to compact, mixed-use, complete communities

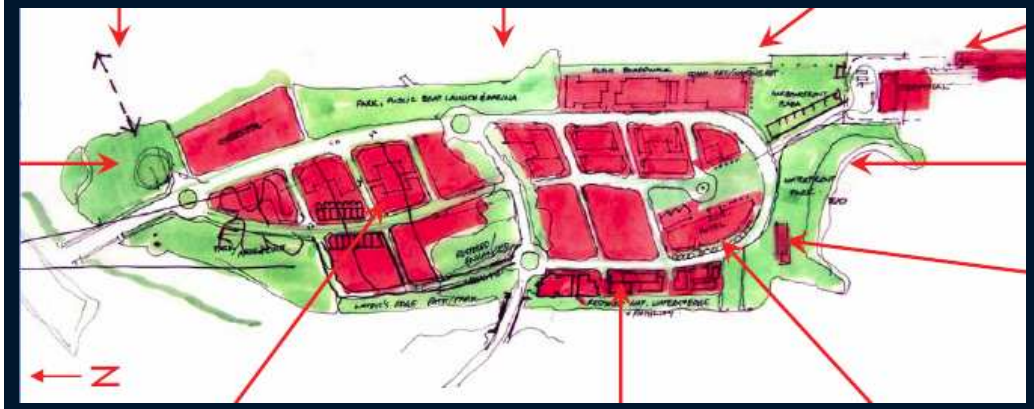
After

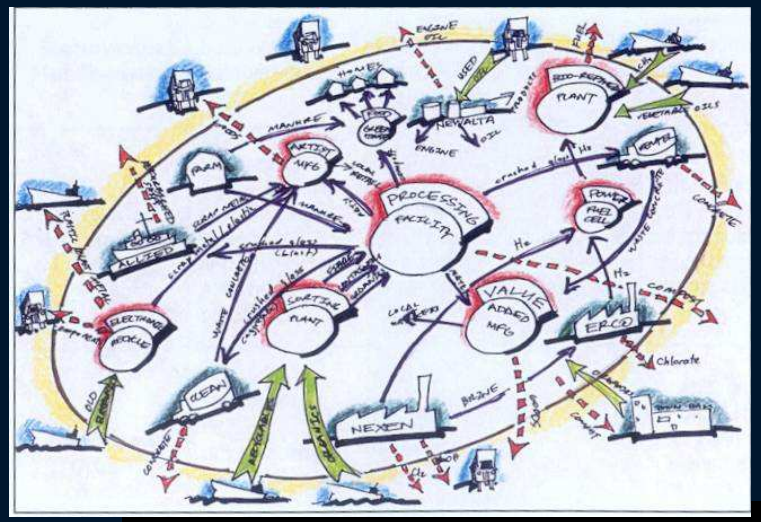
Fig. 4-6: Option 2 (Neighbourhoods & Greenways), c. 2031

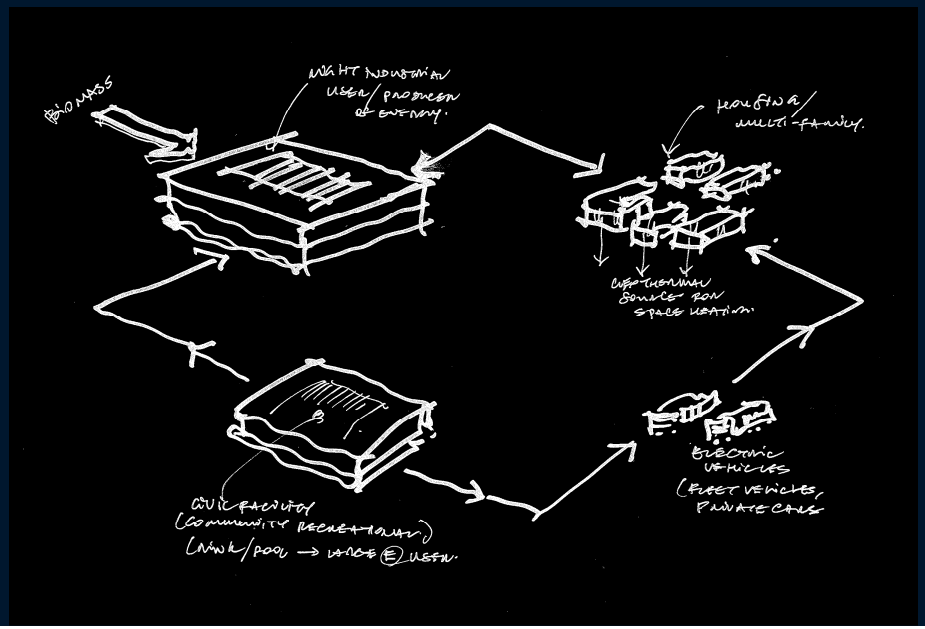
3) **From one-way flows and remote supply to local looping and cascading**

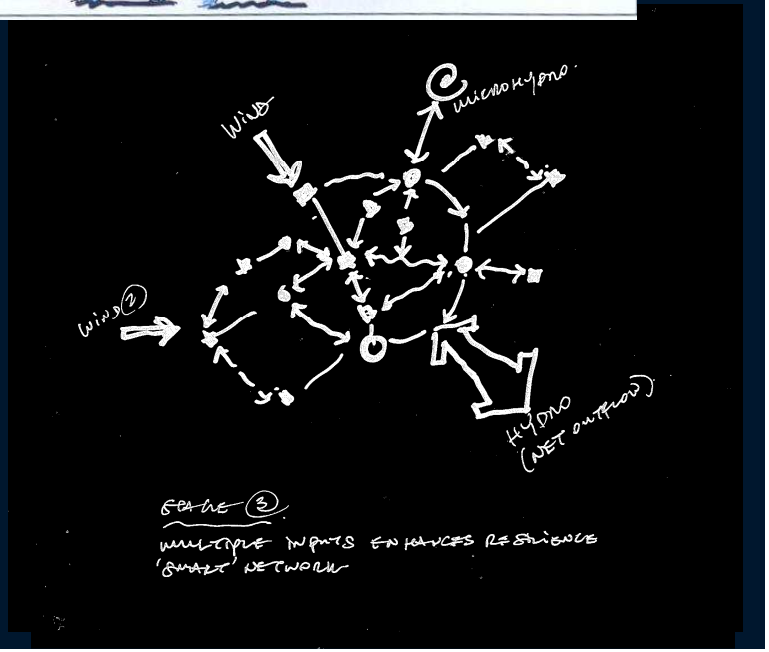


4) From hierarchical fixed grids to responsive, self-organised networks

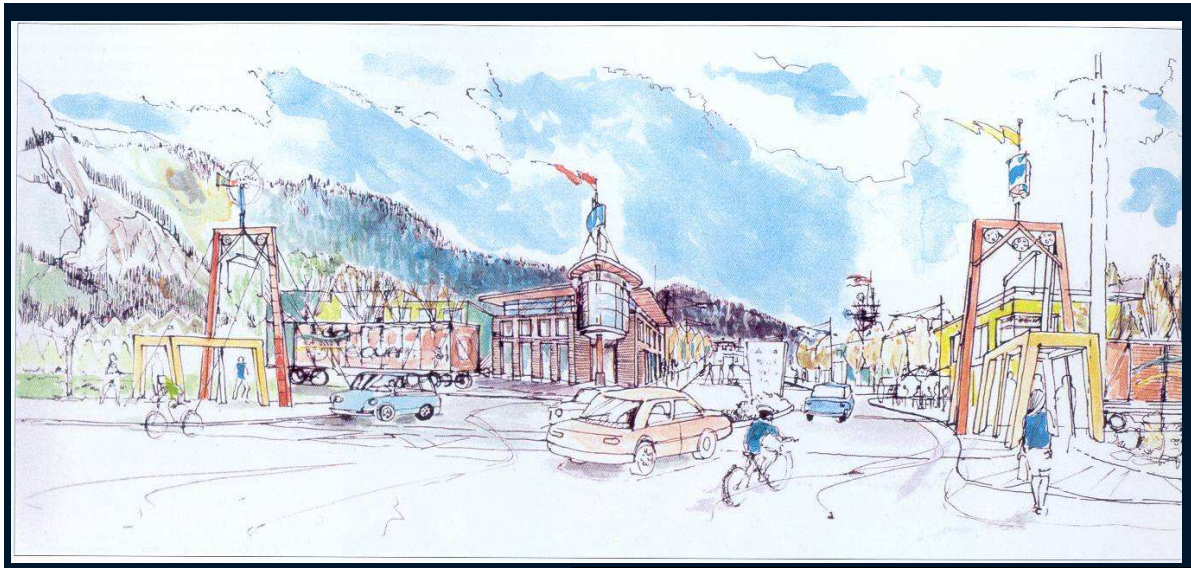


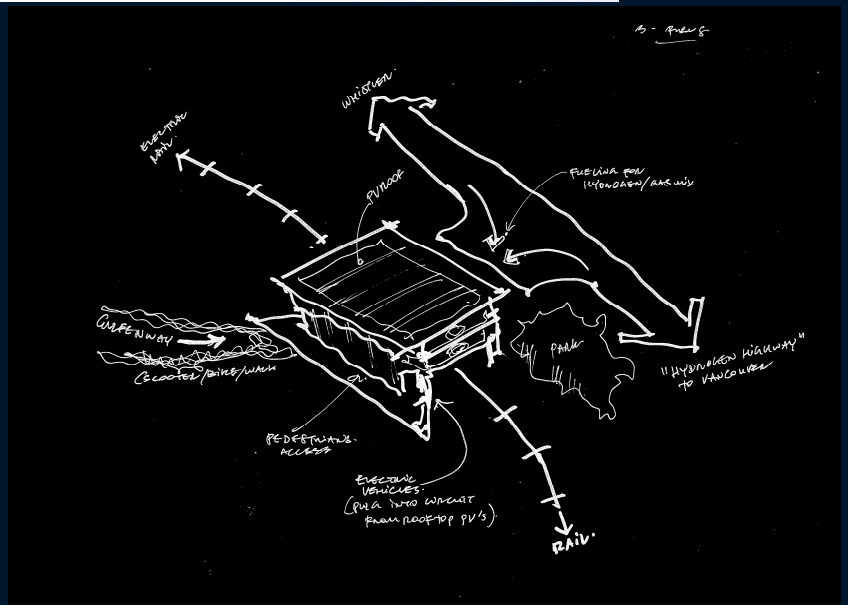






5) From fossil fuels to renewables





Efficiency

Community Economic Development

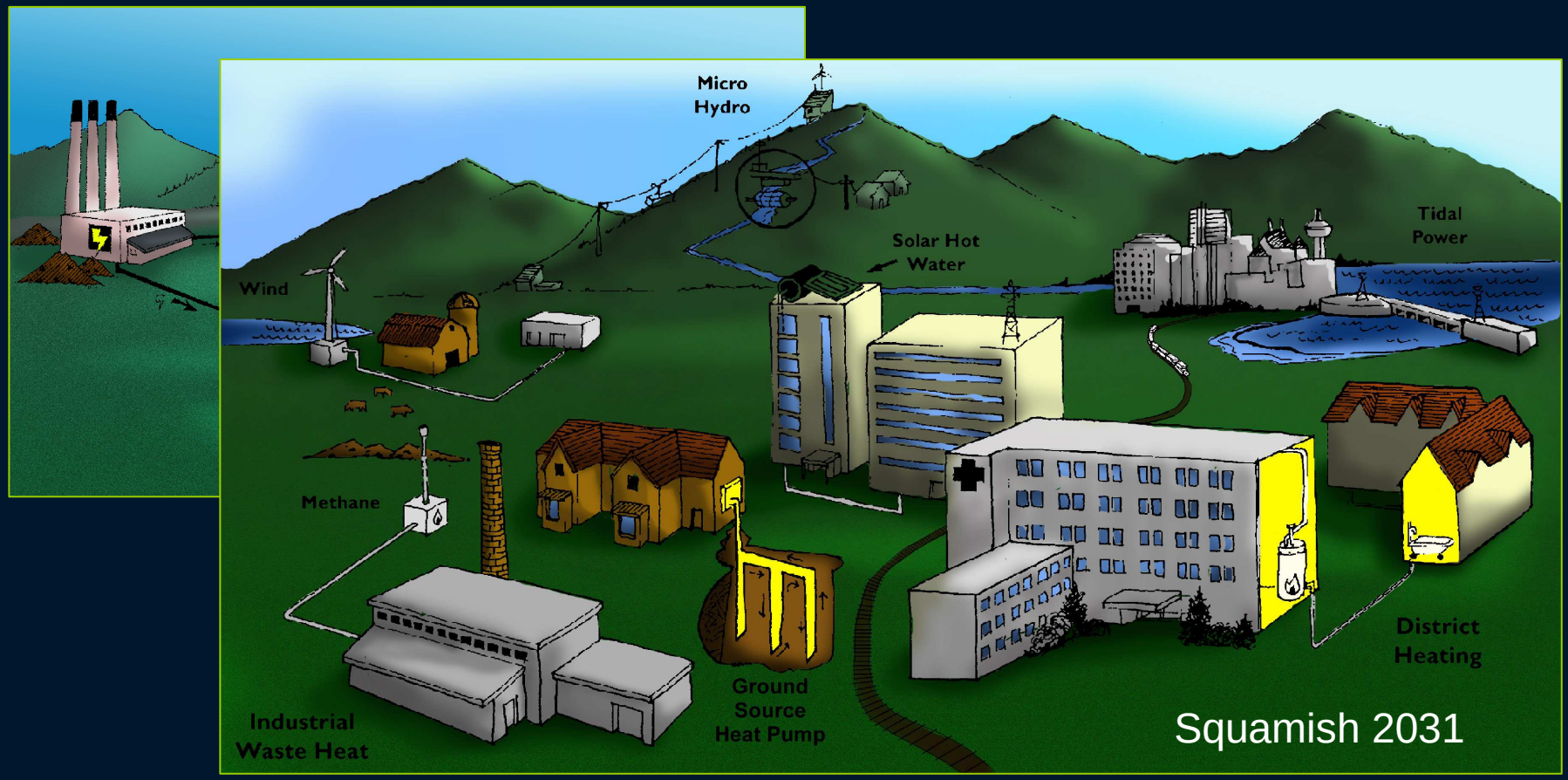
Affordability

Dependability

Resiliency

Long-term sustainability

Demand Response



How to overcome the Barriers?

Institutional Structures

Political Cycles

Inappropriate regulations

Time Preferences

Capital vs Operation

Market Failures

Human Inertia

This is the function of a collaborative process at the implementation stage

District of Squamish

Squamish Sustainability Corporation

CONSENSUS Institute

The Sheltair Group

BC Ministry of Environment

BC Hydro, Distributed Generation

Terasen Gas, Community Energy Systems

Design Centre for Sustainability at UBC,

School of Architecture & Landscape Arch.

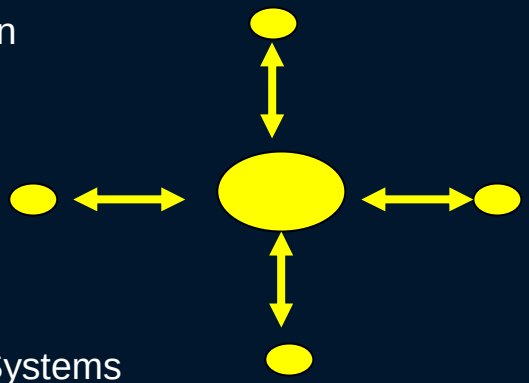
Resort Municipality of Whistler

Natural Resources Canada

UBC (Ph.D. student involved with energy modeling in Squamish)

BCIT

Community Energy Association



Altek Hotab (company specializing in District Energy)

Planning Consultant to the Fraser Basin Council

Terasen Gas, Community Energy Systems

Natural Resources Canada

UBC (Ph.D. student involved with energy modeling in Squamish)

BCIT

Community Energy Association

BC Hydro

Willis Energy Services

Ministry of Environment

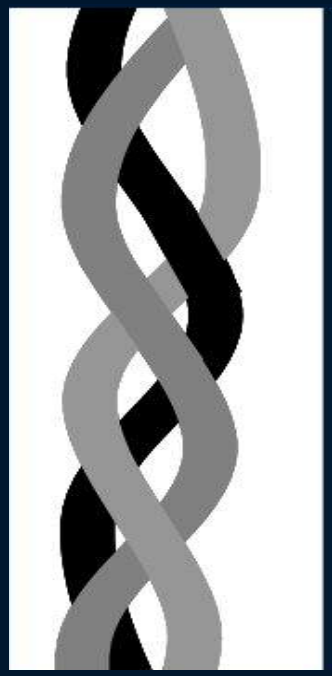
Stantec

Cloudworks Energy

Canadian Hydro Developers

Squamish Lillooet Regional District

Squamish…Bridging to the Future

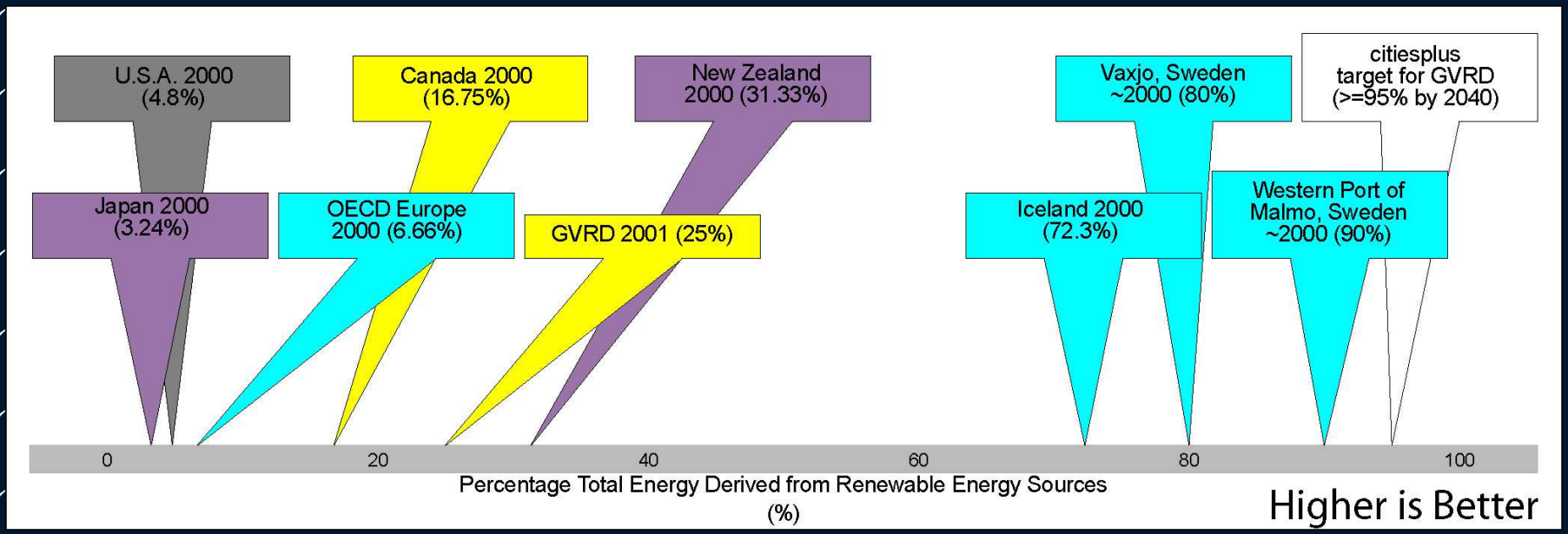


One-System Approach

1. **From fighting with nature - to fitting in;**
2. **From sprawl and mall - to compact, mixed-use, complete communities;**
3. **From one-way flows and remote supply - to local looping and cascading;**
4. **From hierarchical fixed grids - to responsive, self-organised networks;**
5. **From fossil fuels - to renewables.**

BRIDGING to the FUTURE

Core Indicators



- **SUSTAINABILITY**