



Climate Action in Small Communities

Upper Gibsons District Energy Utility

Presentation for FCM, November 2011

Outline

Welcome to Gibsons



On the Forefront

Policy Responses to a Changing Context



Upper Gibsons Geo-Exchange Utility

Why a District Energy System?

Choice of Energy Source

Planning the System

Setting Up the System

Costs and Benefits



Implementing

Next Steps

Lessons and Conclusions



Gibsons is:

- ~4,200 Residents on 500 ha
- A commercial harbour and tourist destination
- Growing moderately: 1 – 2% / year
- Home to innovators and entrepreneurs: 10% work from home, many in the “intelligent services”
- Privy to an environmentally conscious and engaged population
- Aging– the 60+ age group is projected to increase from 25% of the population in 1996 to 40% in 2026

No. 1 Changing Housing Needs

There is an increasing need for a range of housing at a range of price points suitable for young families, aging in place, and multi-generational living.

No. 2 Planning for Energy Security

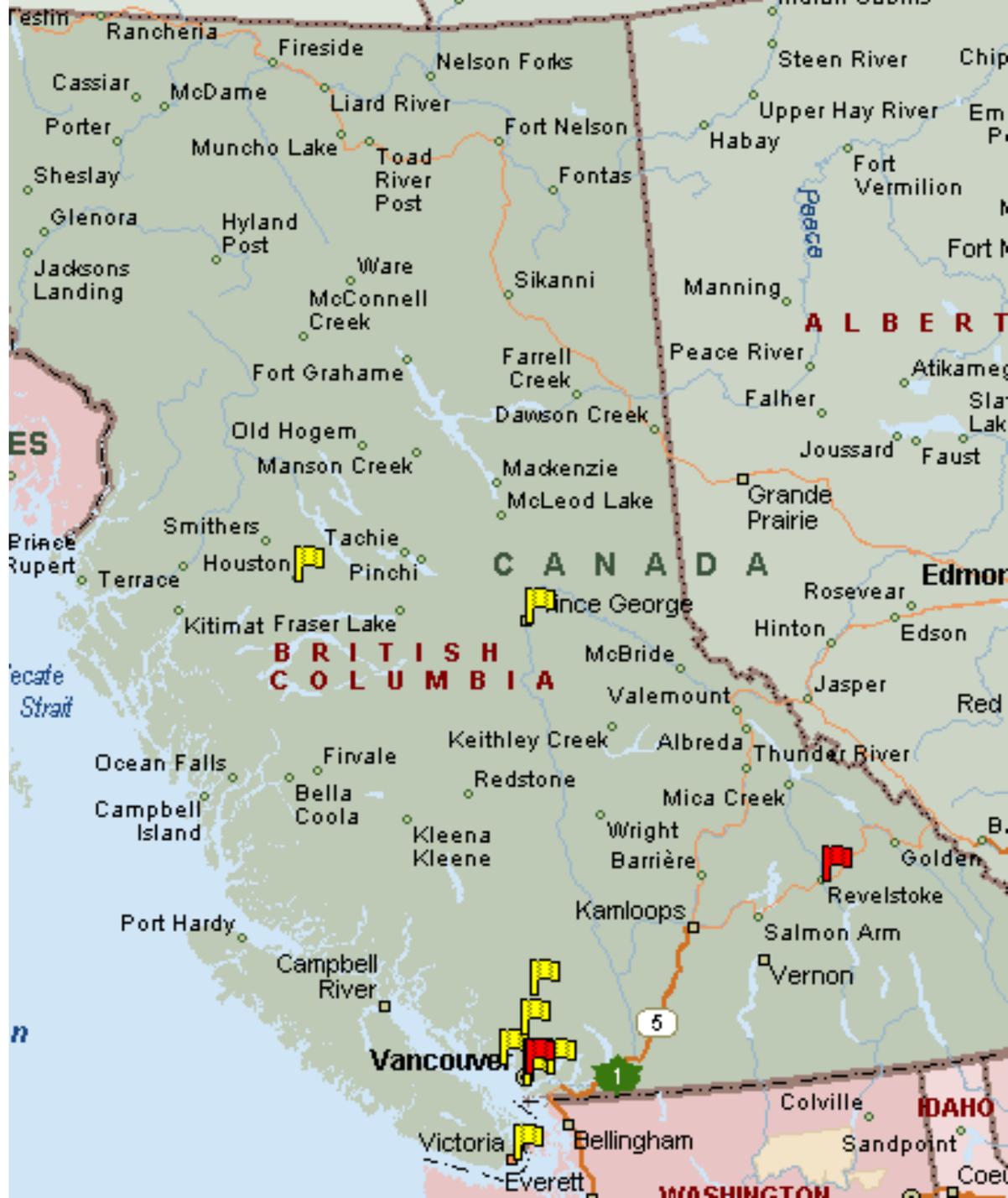
Growing Interest and Recognition

BC Climate Action, BC Energy Plan and Provincial
Mandates

New tools and New Legislation

Growing Interest in District Energy in British Columbia

-  Current Systems
-  Proposed Systems

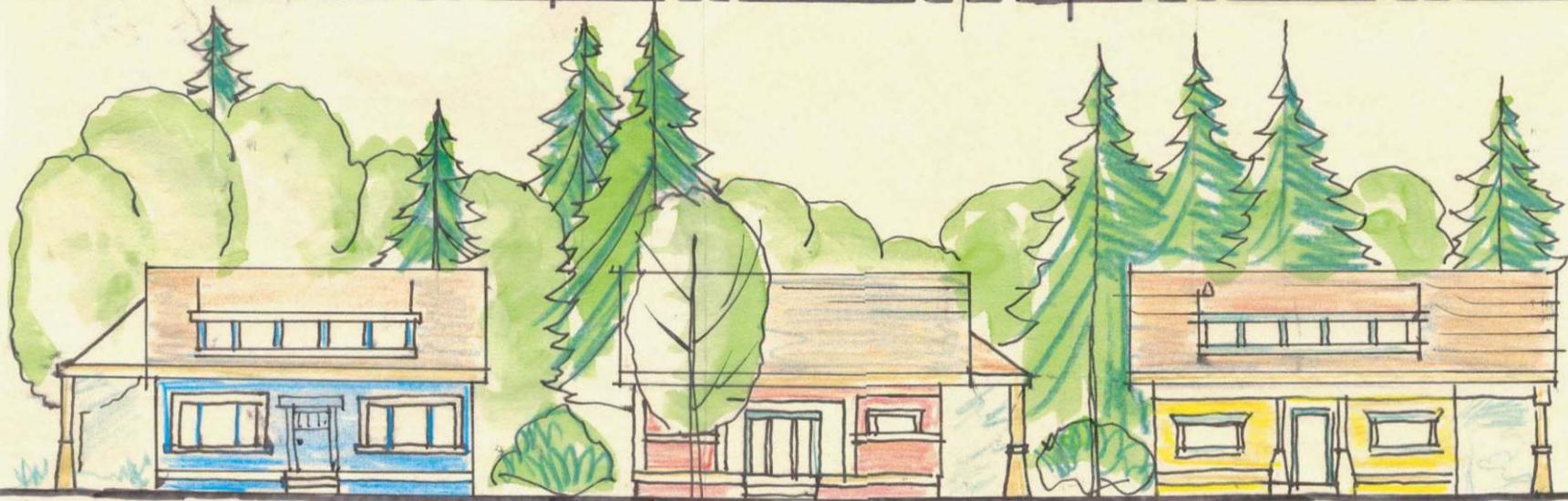
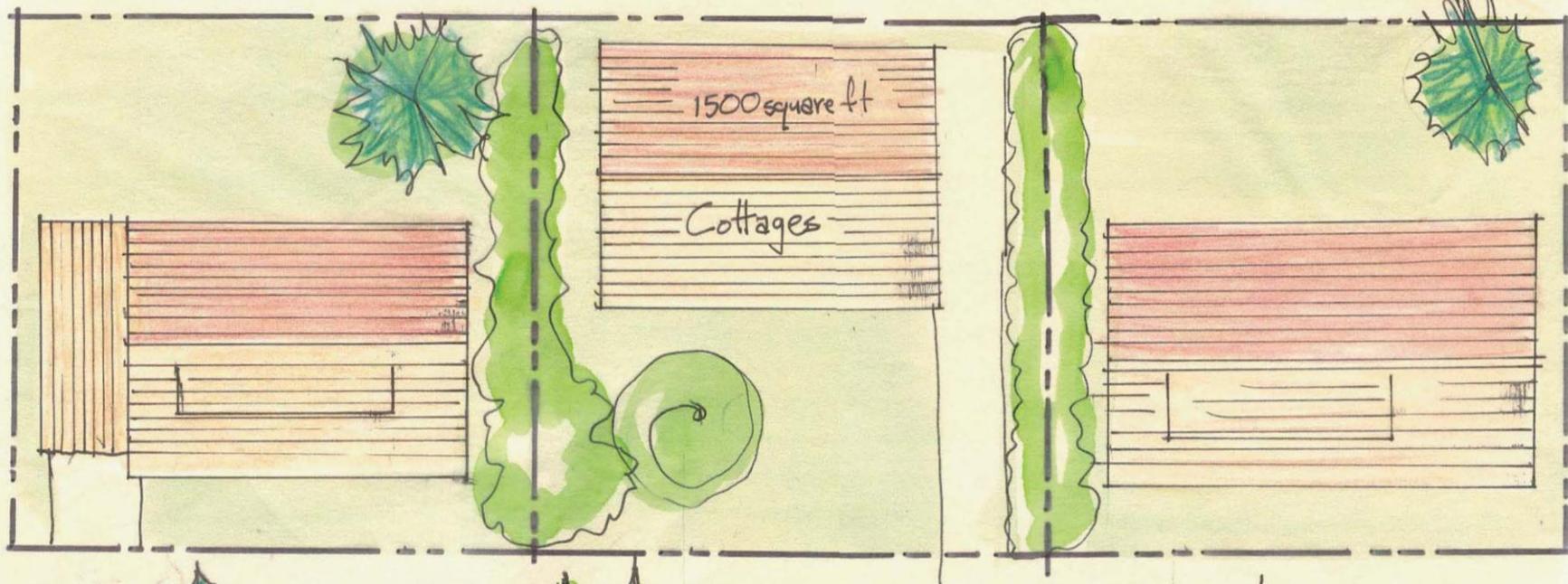


On the Forefront

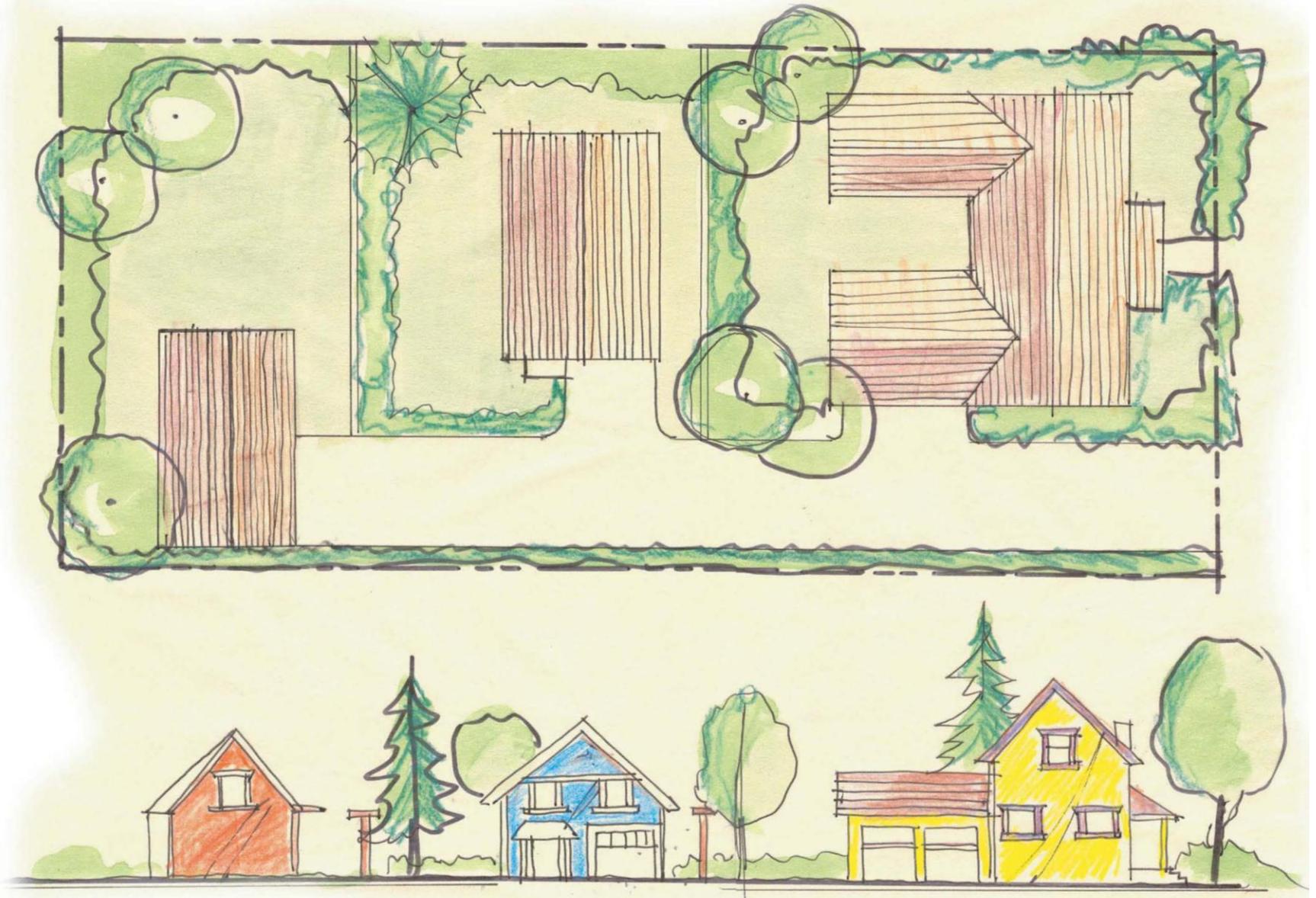
Responding to these imperatives: the Upper Gibsons Neighbourhood Plan.



Neighbourhood
Planning
Area



Cottage Lot



Single Lot Cluster

Upper Gibsons Geo-Exchange District Energy Utility

Owned, operated and maintained by the Town—a first
for North America



Why a District Energy System?

Why would Gibsons want such a system? Meets many of the Town's strategic objectives simultaneously.

- Economic development
 - Energy \$ remain local, energy security, price stability
- Efficient communities
 - Reduced costs, efficient land use, reduced travel times
- Healthier communities
 - Air quality, livability
- Environmental benefits
 - GHG reductions, healthier ecosystems, air quality

British Columbians pay on average \$4200 per person annually for energy in their communities ... For most communities, 70-80% of money spent on energy leaves town, going to utilities, oil companies, and provincial and federal taxes.

Choice of Energy Sources

Why Geo-Exchange?

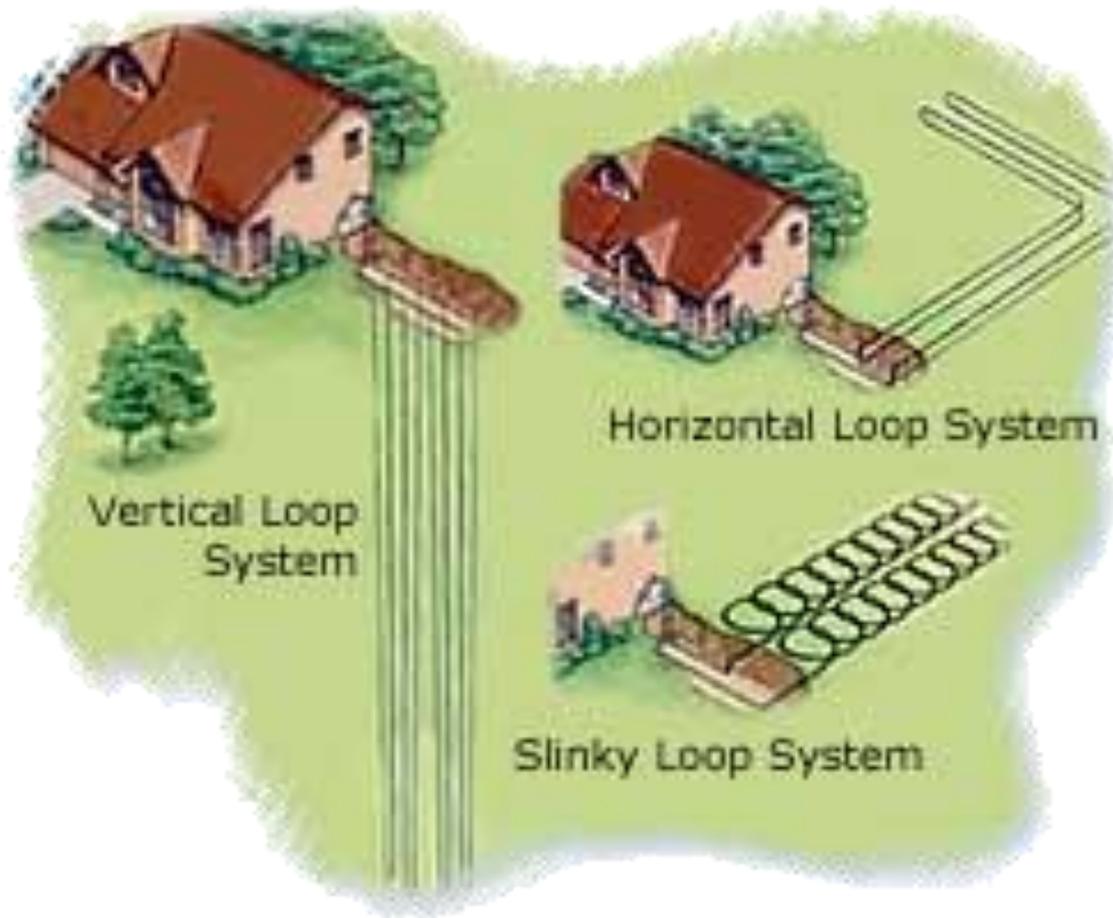
How does it work?



GeoExchange – What is it?

A GeoExchange system transfers heat from house to ground, or from ground to house.

It is, in simple terms, a whole lot of fluid filled pipes buried in the ground with distribution pipes constructed in the roads to circulate the fluid throughout a neighbourhood



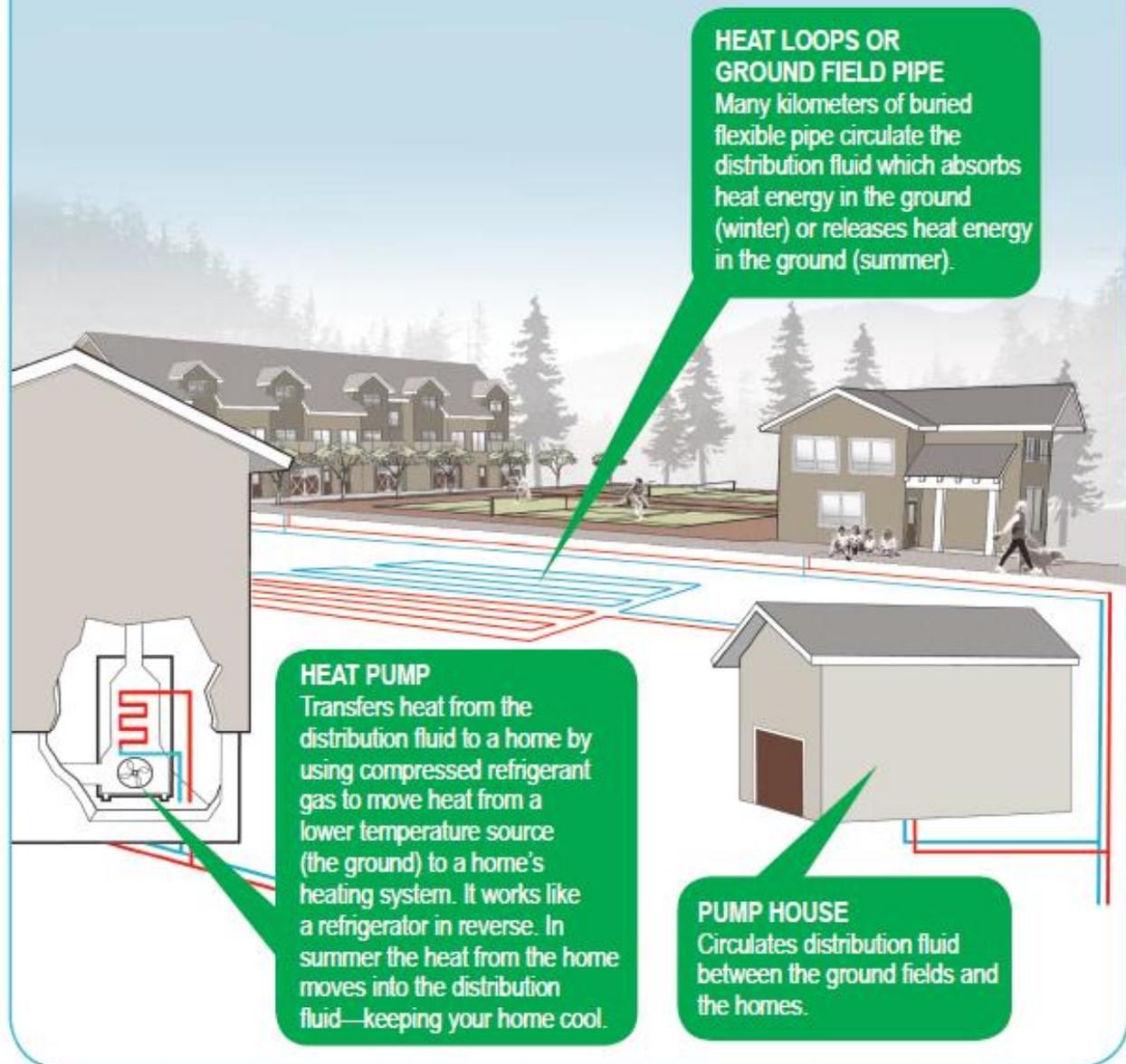
Geo-exchange + District Energy

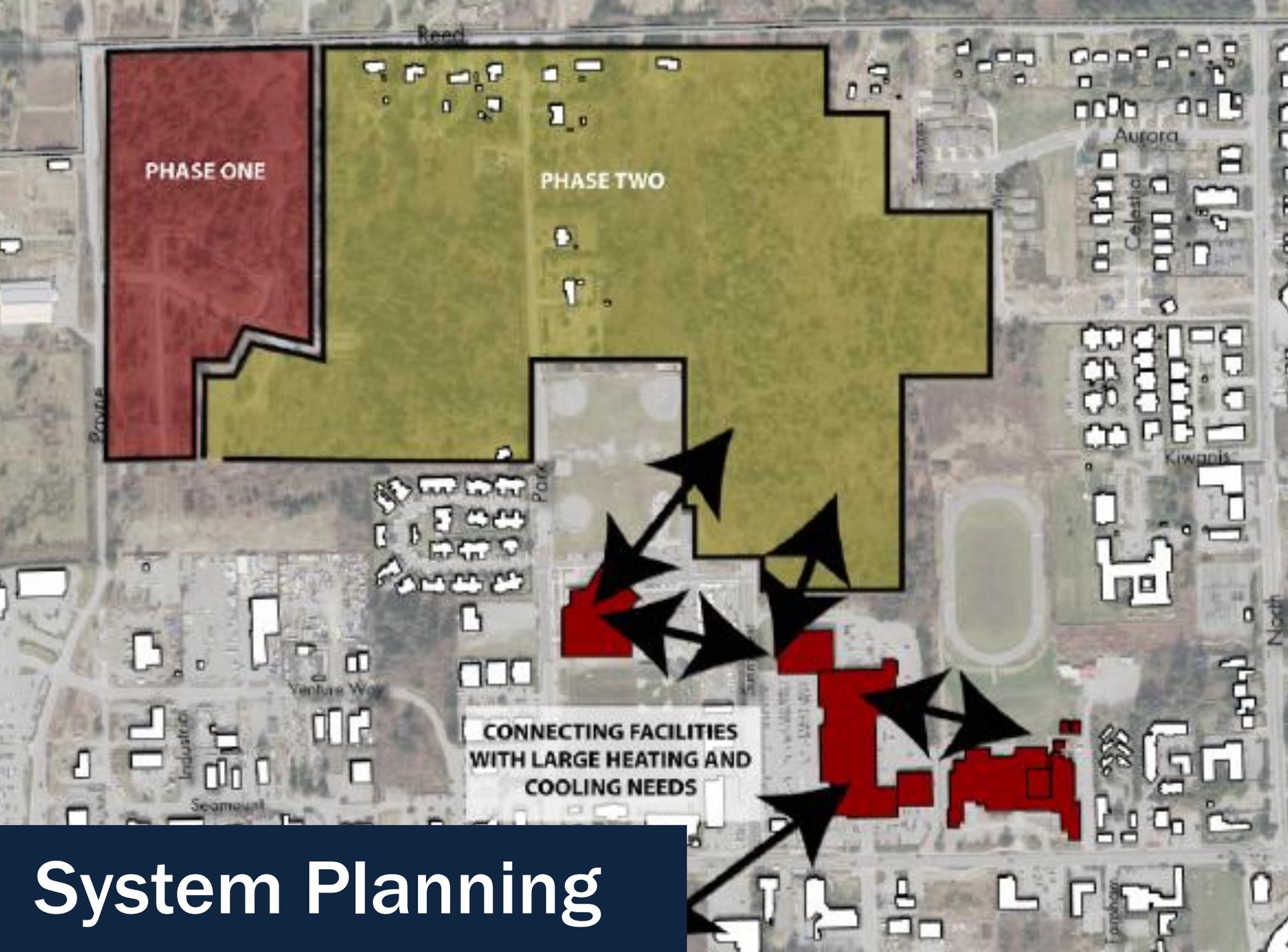
- Renewable energy in a district heating system
- Make use of public greenspace for ground fields
- Take advantage of economies of scale
- Allow heat transfer between buildings

Works well where:

- densities are medium to high (but not too high!);
- development is clustered;
- energy demands are varied.

Representation of the Upper Gibsons GDEU Heat System





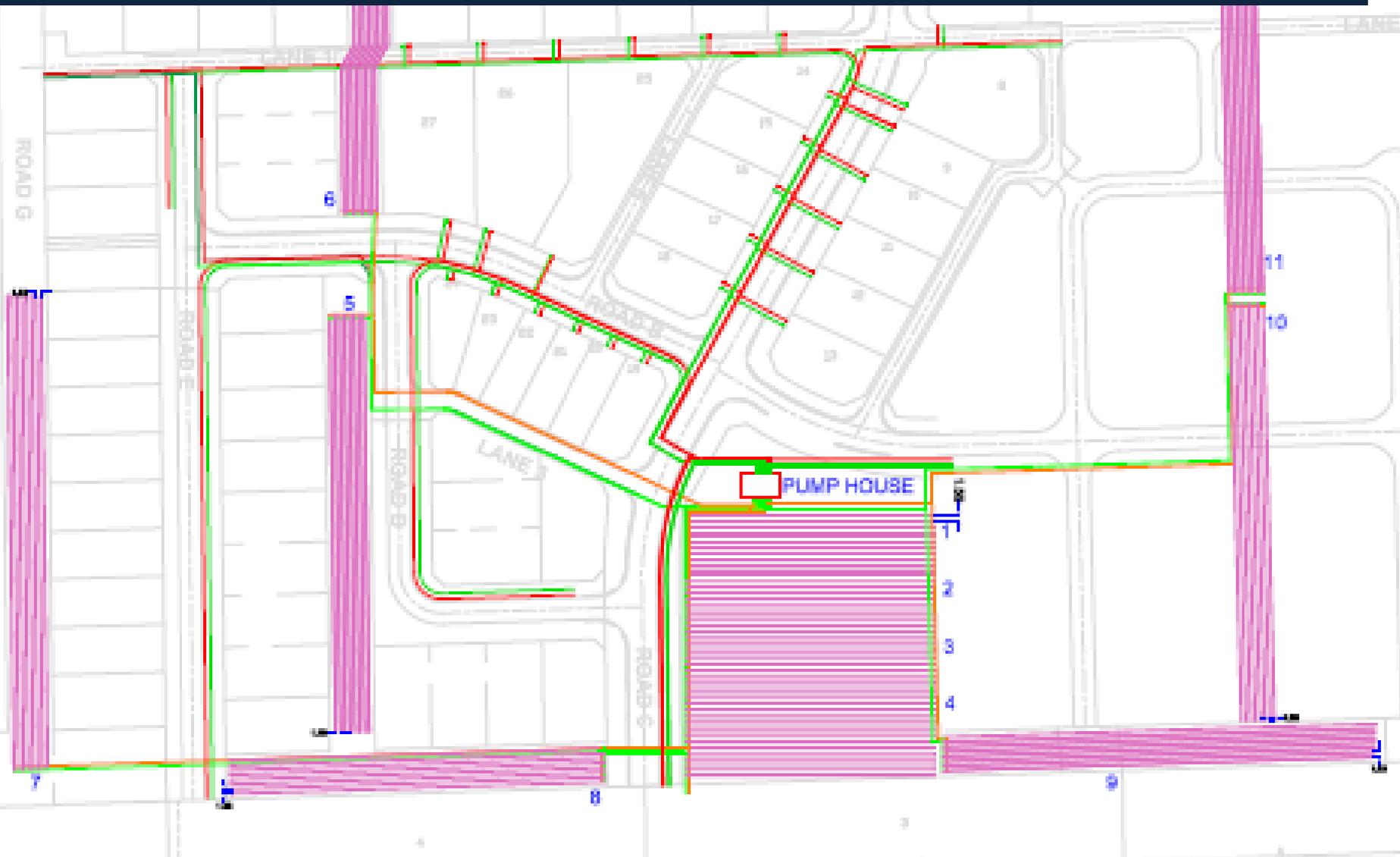
PHASE ONE

PHASE TWO

CONNECTING FACILITIES
WITH LARGE HEATING AND
COOLING NEEDS

System Planning

Layout



Financing

- Attractive project for funders
- Town contributions not financed through borrowing



	Phase 1A
Net cost of installing GHX system (after grants):	\$406,800
Net revenue:	\$39,098
Simple payback:	10.4 years
Net present value:	\$201,595

Timeline

- Feasibility study 2008 – GeoXergy
- Grants obtained spring 2009 - \$569,000
- Development started – fall 2009
- Project design – fall 2009 / winter 2010
- Tender – March 2010
- Distribution piping installed – March/April 2010
- Re-design & contractor negotiation – April/May 2010

Consultants



Setting up the System

Assembling the Slinkies

These coils, called 'slinkies' are buried in trenches and are filled with fluid to gather the heat from the earth



Setting up the System

Slinky Installation



The first slinky is buried in the ground. These slinky trenches are dug at 1.5 metre spacing



Final clean up after slinky field installation. Note the slinky ends which will be connected to 'header pipes'



Pumphouse construction. On a future municipal Park.



Heat transfer fluid is pumped into the system.

Benefits

To Homeowners and Businesses

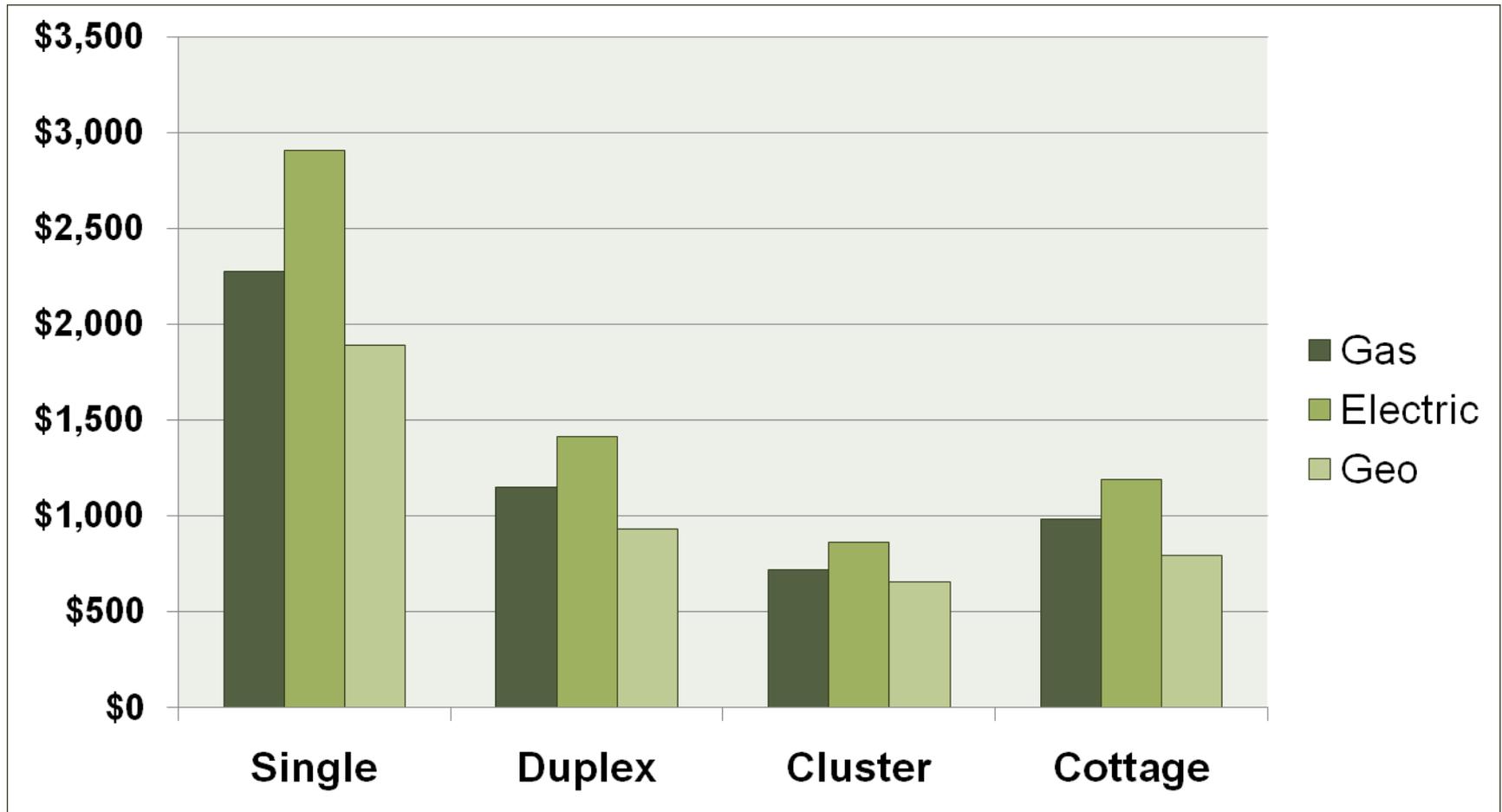
- Reduced utility costs for heating.
- Reduced carbon tax expenditure.
- Long-term energy cost stability.
- Reduced environmental footprint through reduced GHG emissions.

Benefits

To the Town of Gibsons

- Reduced environmental footprint through reduced community Green house Gas (GHG) emissions.
- A future source of long term, non-taxation revenue to the town.
- Economic development as a result of infrastructure investment within the town.
- • Helping to promote energy and climate change action with Sunshine Coast residents.

Total Cost including Access Fee



Total cost of electricity & access fee is 15% lower than gas

Cost to Homeowner

	Gas	Geo
Furnace:	\$7,000	\$7,750
Connect to system:	\$250	\$500
Ductwork / radiant floor:	\$4,500	\$4,750
Total:	\$11,750	\$13,000
Total additional cost:	---	\$1,250
Average homeowner savings:	---	\$154
Simple payback:		8.1 years

Implementing: Policies

- Official Community Plan
- Re-zoning policy
- Service area bylaw
- DPA guidelines
- Tax exemptions
- DCC reductions

Implementing: Utility Charges



Homeowner pays for electricity to operate heat pump.

Meters are an option to charge for energy extracted from and rejected to GHX – but are expensive and must be calibrated.



Gibsons simply charges a flat GHX access fee.

Challenges, Lessons and Conclusions

Like the Beach Boys “we get there fast and then we take it slow.”

Absorption Rates



Getting Tested Along the Way...

- Proceed with project at revised cost
 - Requires additional \$325,000 in 2010.

- Delay project one year, re-tender
 - Puts ICE funds at risk
 - Some homes would not get connected
 - Some fields may be lost

- Abandon project
 - Refund developer distribution costs

“An invention has to make sense
in the world in which it is
finished, not the world in
which it is started.”

Ray Kurzweil

BUT to work politically, it
has to make sense in BOTH.

It's Better to Beg for
Forgiveness than to Ask for
Permission?

Next Steps: Master Plan, Connecting Facilities and Phase II



Aquatic Center



Community Center



Thank you.

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