# Remote 'Micro-Grids' in Nemiah Valley, British Columbia CANADA:

# Past, Present and Future Potentials
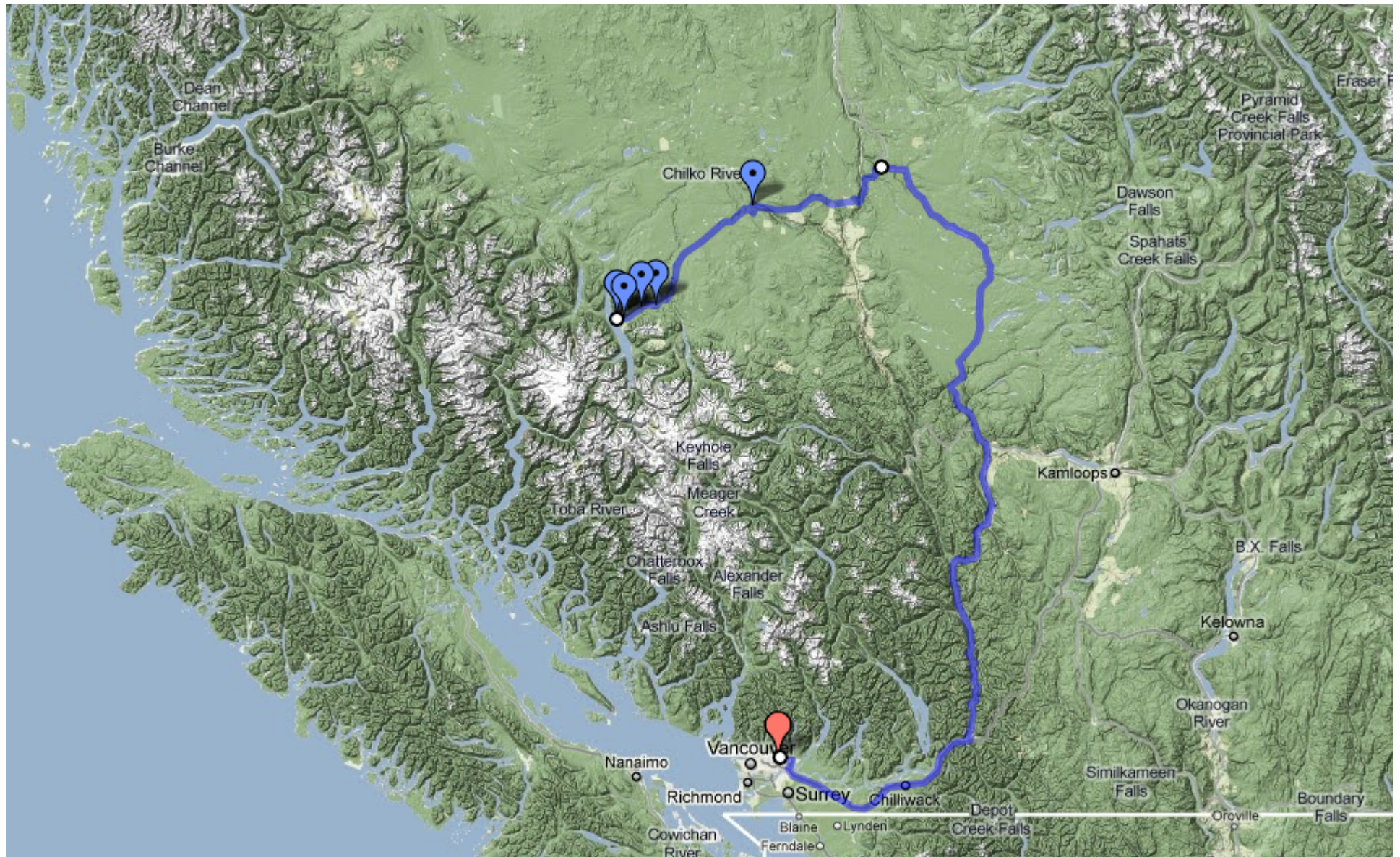
George Colgate (Xeni Gwet'in) & Andrew Swingler (Schneider Electric)

International Micro-Grid Symposium

Vancouver July 2010

**Schneider** Electric

# Where and what is Nemiah Valley?

# Where and what is Nemiah Valley?

- Nemiah Valley is the home of the Xeni-Gwet'in First Nation

- The Xeni Gwet'in First Nation is small community comprised of approximately 250 people in 74 houses widespread between seven community land reserves.

- The Xeni Gwet'in First Nation has signed no treaties with either the Provincial of Federal Government and will not give up their rights or title to their land. A primary goal of the Xeni Gwet'in is to keep the beauty of the land and to keep the land, air, and water clean.

# Xeni Gwet'in Electrification History



- 1998 New diesel-electric powerhouse constructed to serve band office, Daycare Building, XG Enterprise building, water pumps, maintenance yard, community gas station and laundromat. (3 x 35 kW gensets)

- 2000 With support of the David Suzuki Foundation a community energy plan was developed

- 2006 Electrical powerhouse upgraded to 3 x 75 kW gensets

- 2006 Discussion with BC Hydro regarding its Remote Community Electrification Program (RCE) began.

- 2006 Xantrex/Schneider-Electric /NRCan smart-mini-grid project research began (more on this later)

- 2010-XGFNG conducts survey to determine if membership wants electrical mini-grid extended to unserviced reserves and possible BC Hydro RCE service involving mini hydro power supply from Augers Lake



Schneider Electric's Renewable Energies Business

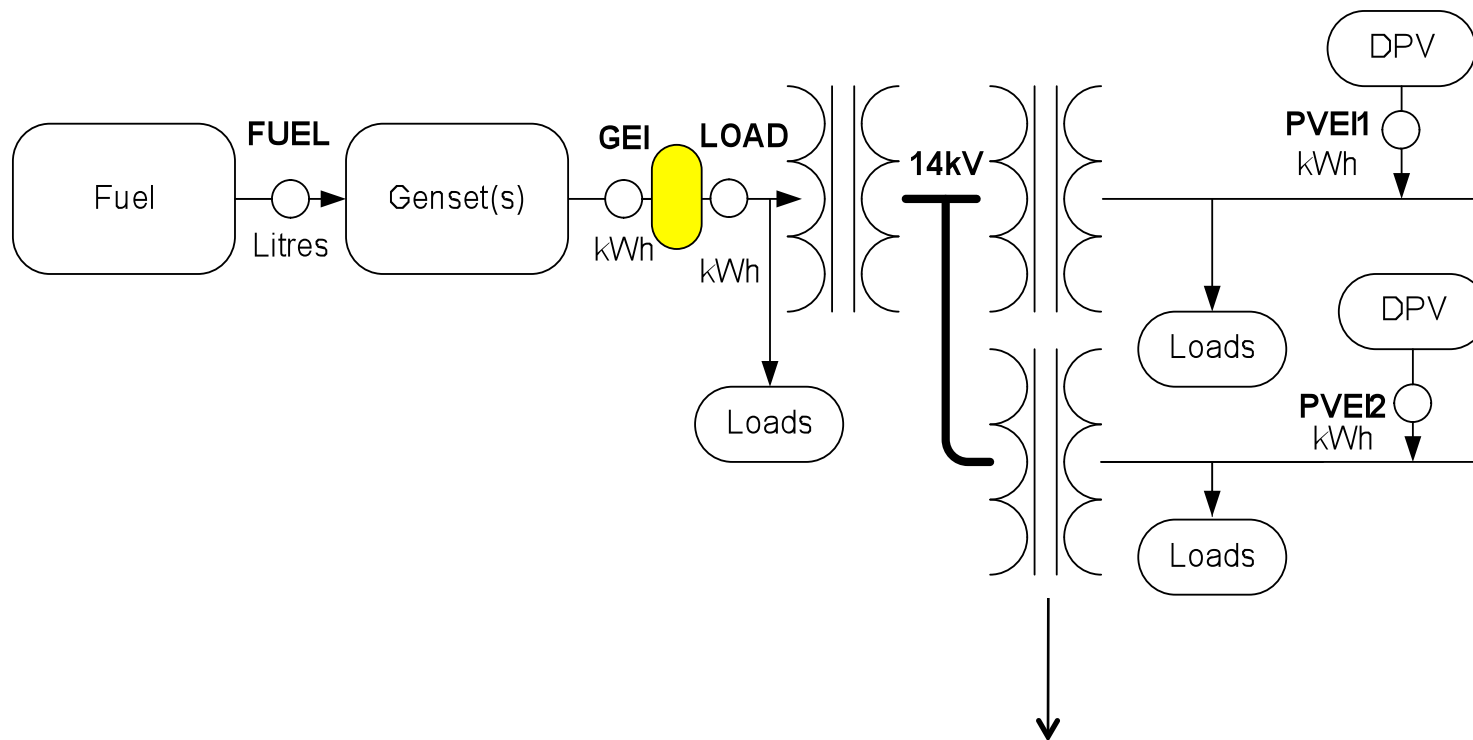# Xeni-Owned and Operated Mini-Grid(s) Evolution

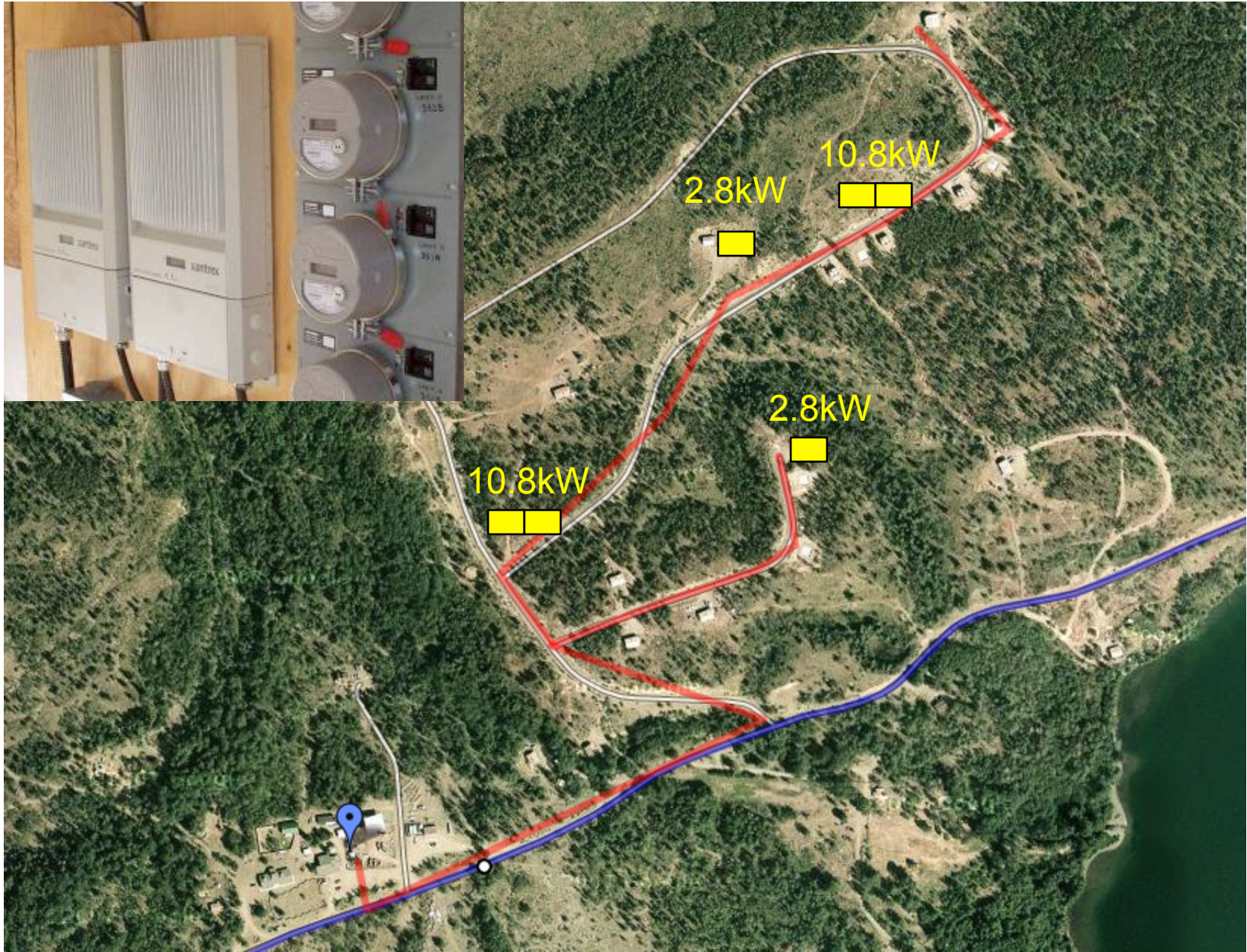Isolated multi micro-mini-grid architecture
Extensive use of PV resources to offset fossil fuel consumption
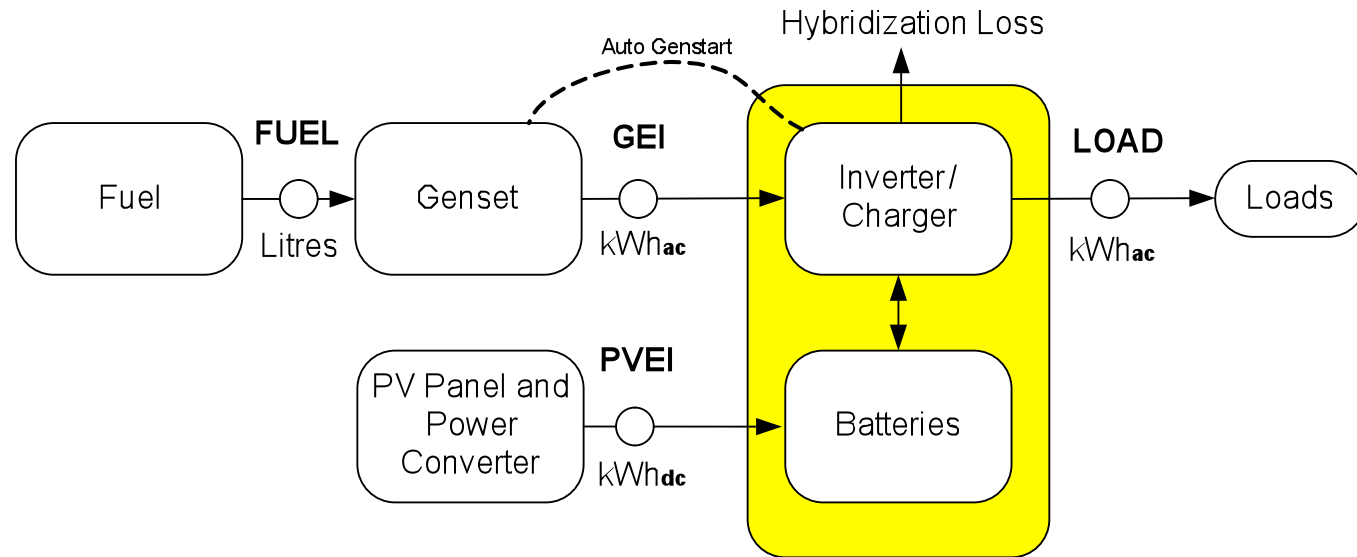All power stations are owned and operated by the community government
All customers operate on pre-paid pay-as-you-go meters

# PV-diesel uMini-Grid

10.8kW

2.8kW

2.8kW

10.8kW

# PV-LPG-Battery stand-alone hybrids



Hybridization Loss

Auto Genstart

**FUEL** — Fuel — Litres — **Genset** — **GEI** kWh**ac** — Inverter/Charger — **LOAD** kWh**ac** — Loads

**PVEI** — PV Panel and Power Converter — kWh**dc** — Batteries

Pumped Hydro Ready
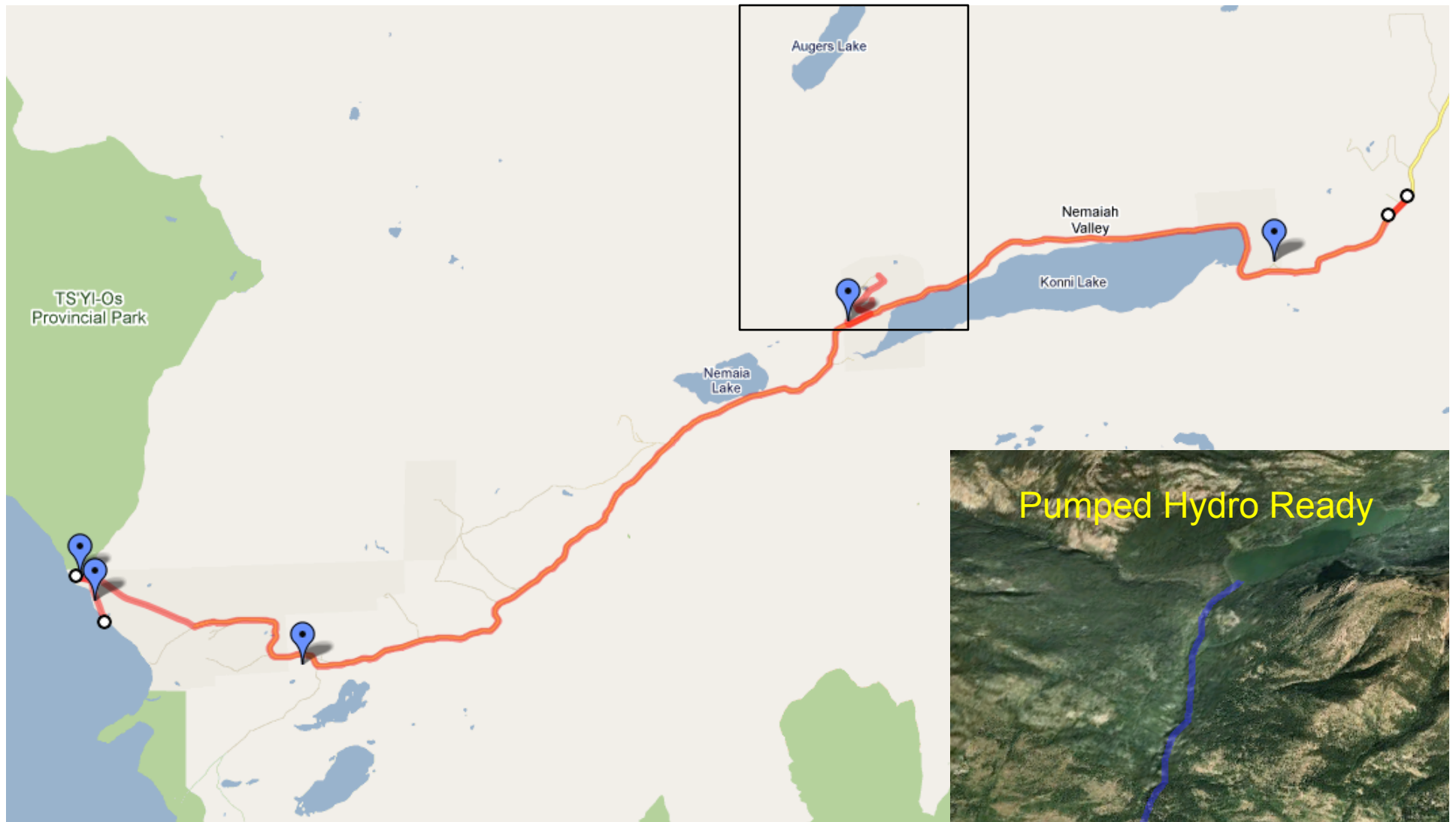
# Potential Future Grid Expansion
Some expansion of grid infrastructure is likely.
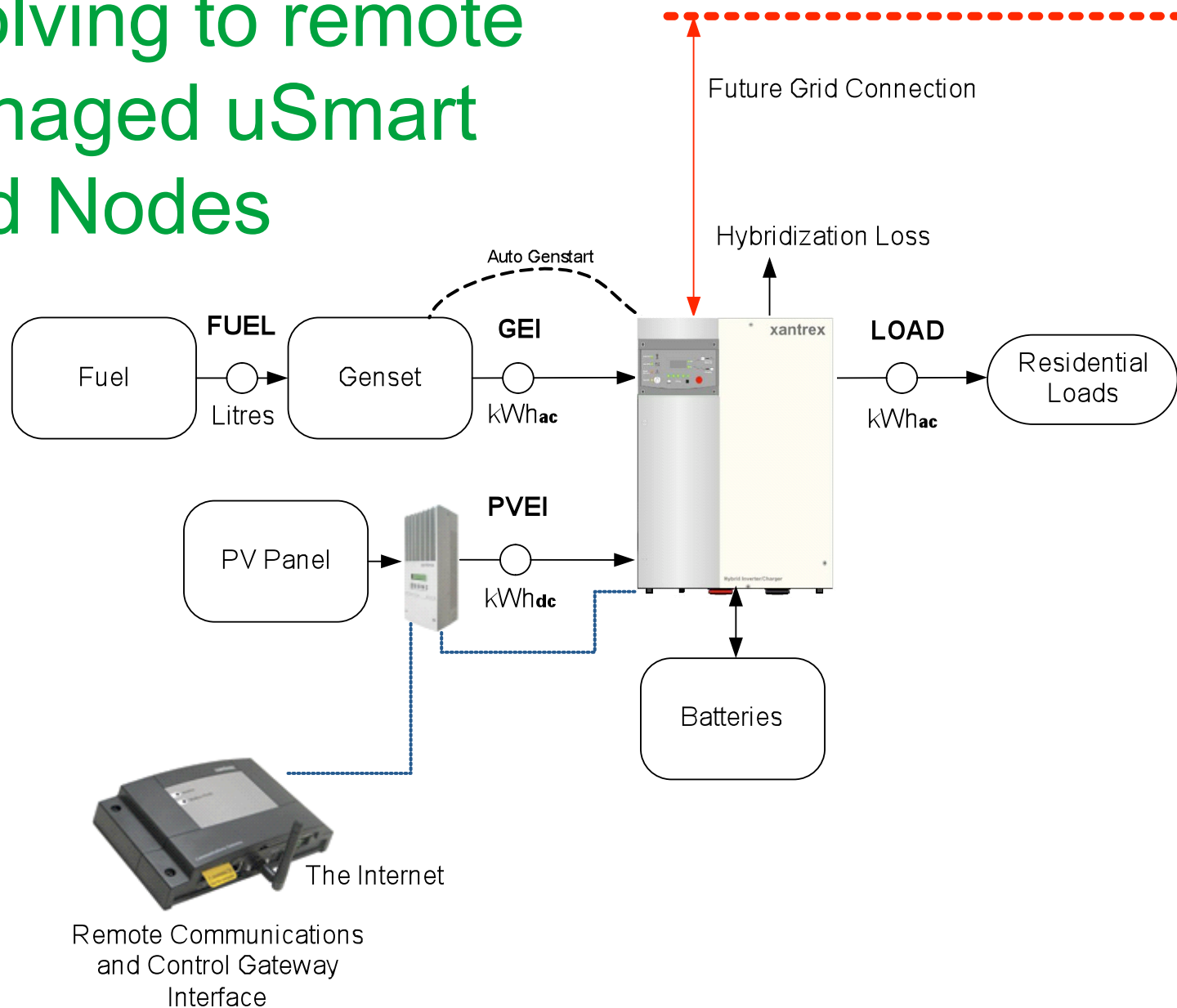Main source of energy yet unknown.

# Natural Smart uGrid Evolution
Fully Managed Schneider-Electric Smart-uGrid
ION Enterprise: intelligent power system management, data archive and report generation.

# Evolving to remote managed uSmart Grid Nodes

Future Grid Connection

Hybridization Loss

Auto Genstart

**FUEL**

Fuel

Litres

**GEI**

Genset

kWh**ac**

xantrex

**LOAD**

kWh**ac**

Residential Loads

**PVEI**

PV Panel

kWh**dc**

Batteries

The Internet

Remote Communications and Control Gateway Interface

# No interconnected grid scenario (today):

Remote monitoring and control of stand-alone systems.
Optimal power curtailment of PV-MiniGrid Inverters.

# Expanded Mini-Grid scenario:

Active Management of remote PV generation nodes with energy storage.

Optimal power curtailment of PV-MiniGrid Inverters.

Increasing PQ and R.

# Interconnect with main Grid scenario:
Increasing PQ and R.

# Thank-you!

George Colgate (Xeni Gwet'in) & Andrew Swingler (Schneider Electric)

International Micro-Grid Symposium

Vancouver July 2010

Schneider Electric