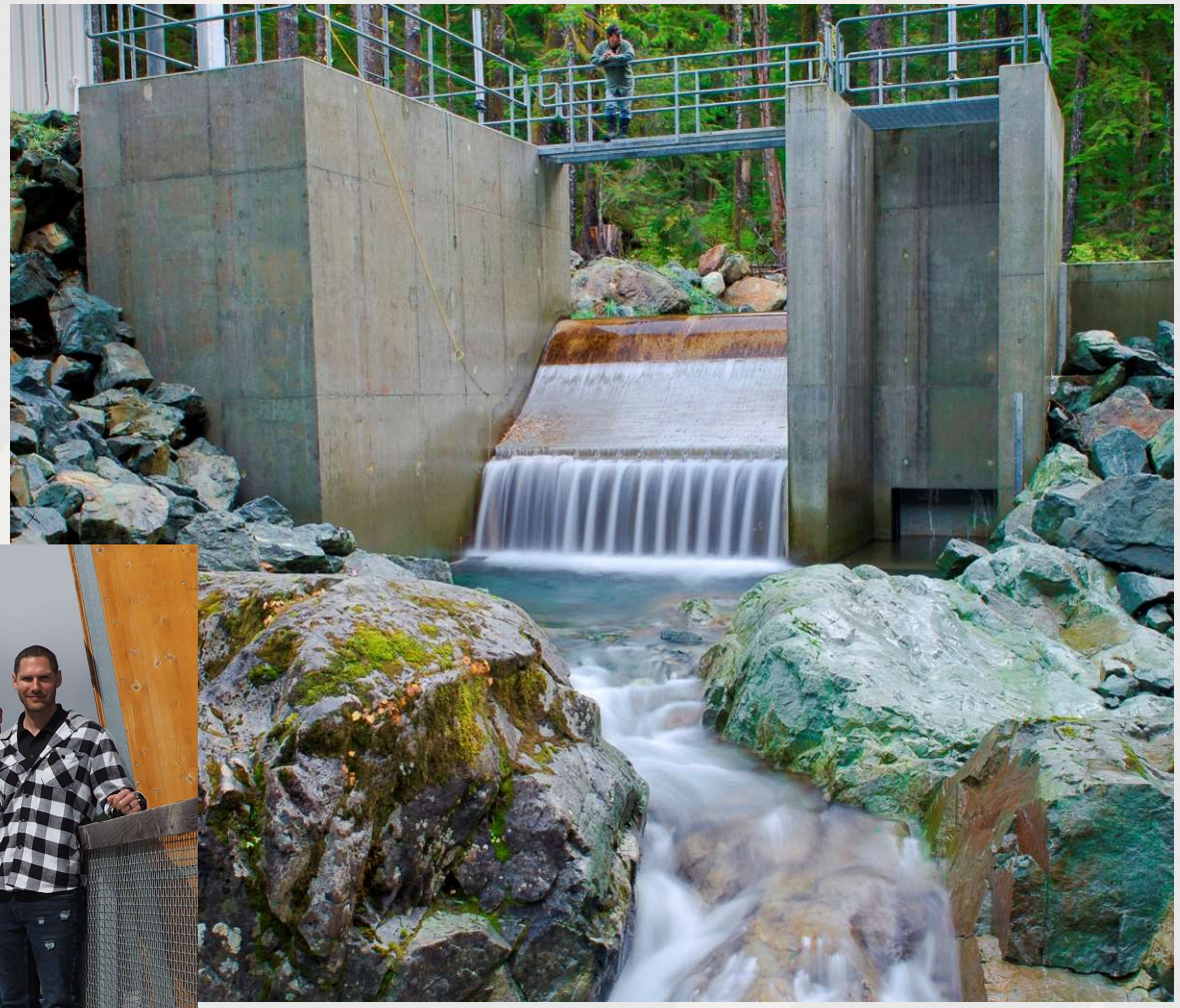
Huu-ay-aht First Nation: Community Energy Planning



Barkley project group

Barkley Project Group

Specializes in renewable energy and community infrastructure for First Nations communities





The Team



Erin Quon, PEng
Barkley
Project Manager



Tonse Suresh, EIT
Barkley
Project Coordinator

Agenda

- ✓ Community Energy Plan (CEP) Overview
- ✓ Energy Policy in BC
- ✓ Renewable Resources Overview
  - ✓ Sarita Hydro
  - ✓ Solar Photovoltaics (PV)
  - ✓ Tidal
  - ✓ Wind
- ✓ Energy Evaluations
- ✓ Next Steps
  - ✓ EnerGuide signup
- ✓ Bingo
- ✓ Questions



Community Energy Plan (CEP) Overview

- ✓ Engaging Community Members
- ✓ Creating community goals and actions
- ✓ Identifying Energy Saving Opportunities
- ✓ Assess Renewable Energy Resources



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CEP Scope and Deliverables

The CEP will focus on these five deliverables



- Community engagement
- Energy & GHG Baseline
- Energy evaluations
- Renewable resource review
- Draft and Final CEP

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Energy Policy in BC

Centralized vs. Decentralized

- ✓ Standing Offer Programs
- ✓ Net-Metering
- ✓ Net-Metering with battery storage
- ✓ Micro Grid

- ✓ Battery energy storage
- ✓ Micro Grid: hybrid systems (solar PV + battery + wind + diesel generator)

Standing Offer Programs (SOP)

Independent Power Program (IPP)

- ✓ Develop and operate projects using renewable resources
- ✓ Generate electricity and sell it at wholesale prices to BC Hydro (other utilities)
- ✓ Priced at lowest energy alternative

Standing Offer Program (SOP)

- ✓ 1 MW – 15MW

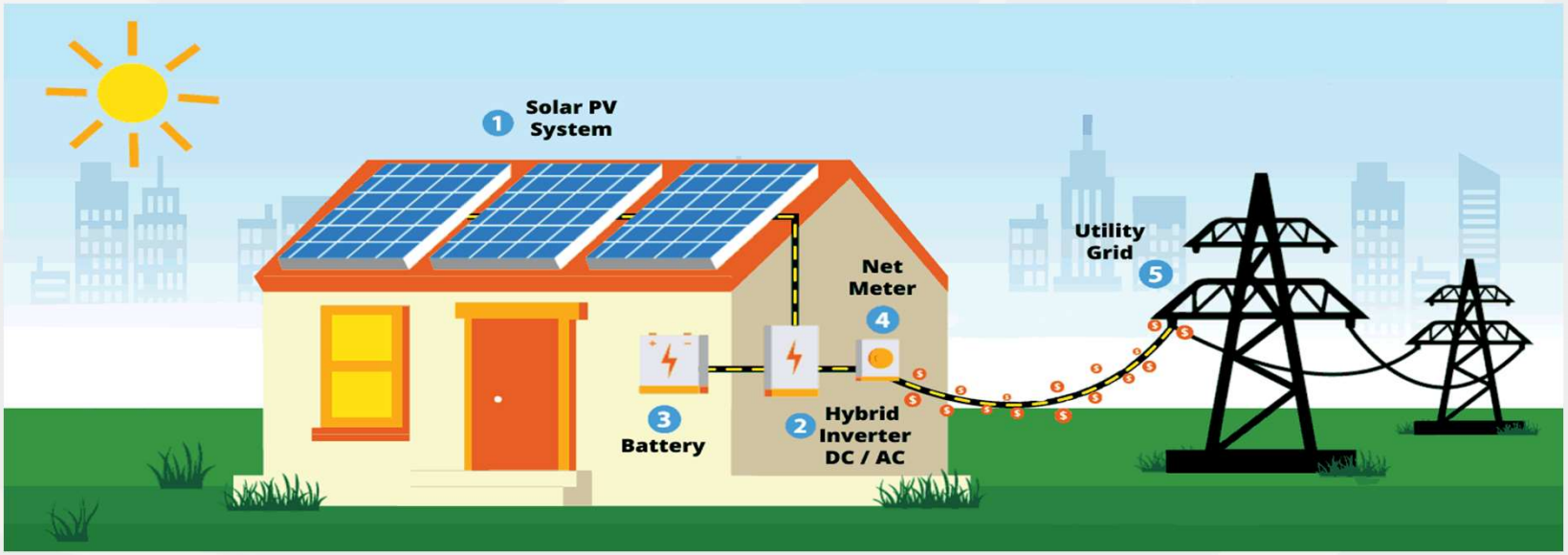
Micro-SOP

- ✓ 100kW – 1MW
- ✓ Streamlined process for First Nation communities

Programs put on hold in February 2019 with no start-up date

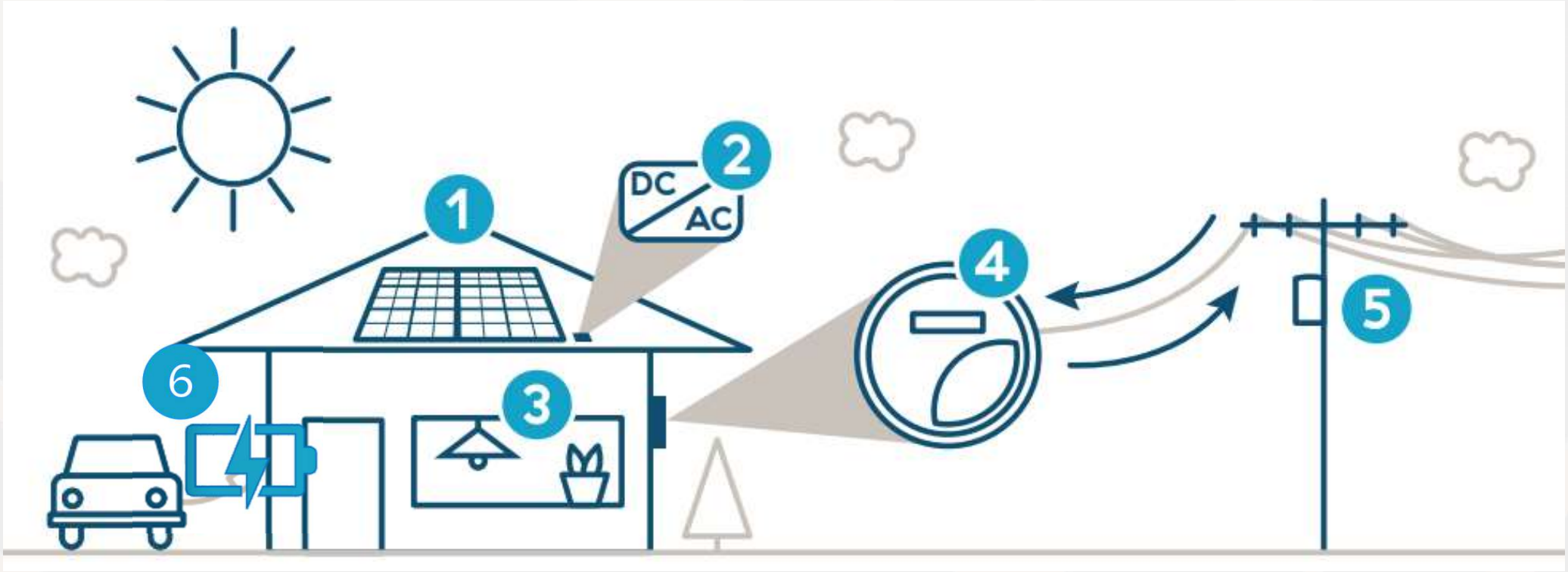
Net-Metering

- ✓ Offset program
- ✓ System can produce as much electricity as building consumes
- ✓ 1:1 BC Hydro account credit (annual)
- ✓ Simple net-metering: up to 27 kW
- ✓ Complex net-metering: > 27 kW – 100 kW



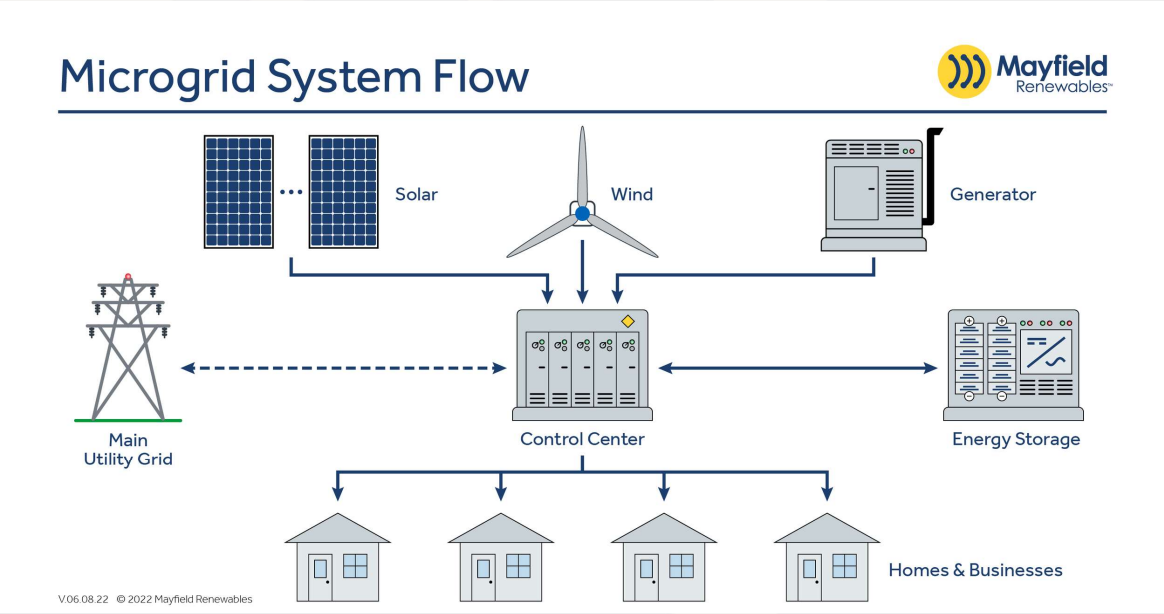
Net-Metering with Battery Storage

- ✓ Use electricity produced for the building's electrical load
- ✓ Send excess power back to battery and/or the grid
- ✓ Can access battery power during outage and recharge with solar



Micro Grid

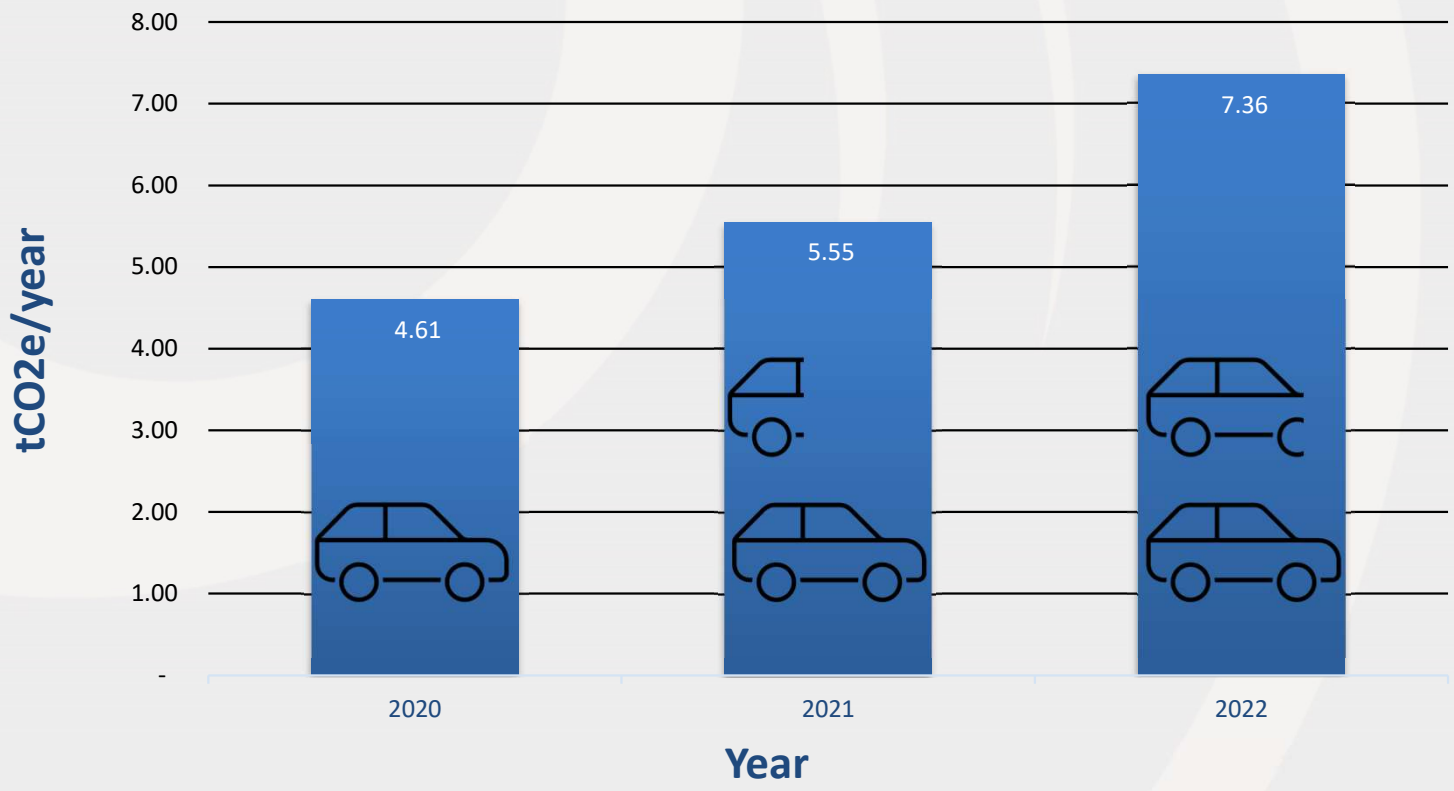
- ✓ Variety of sources
- ✓ Operating on or off grid
- ✓ Power homes, businesses and other facilities
- ✓ Can provide back-up power in emergency situations
- ✓ Low emission



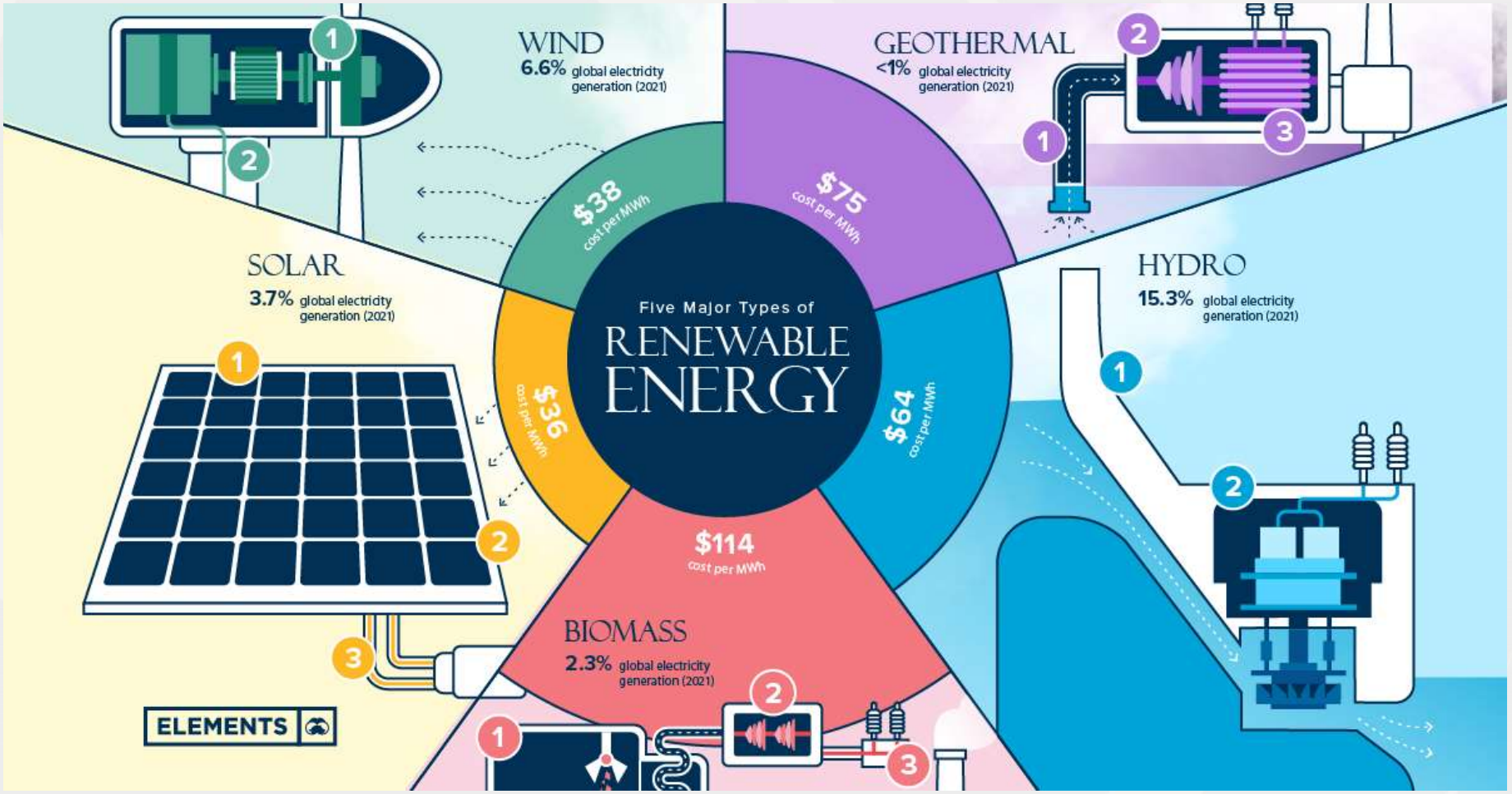
Energy Baseline-Electricity



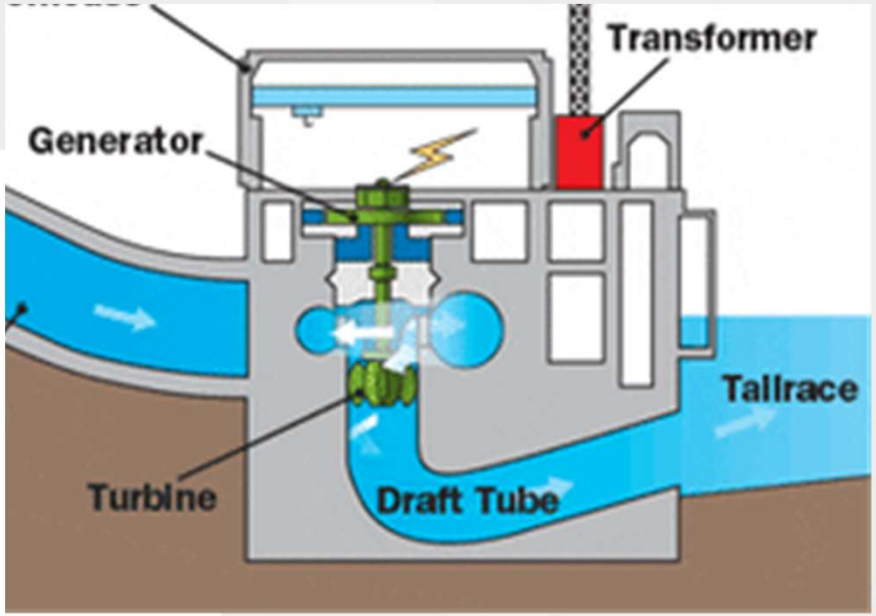
Greenhouse gas Baseline-Electricity

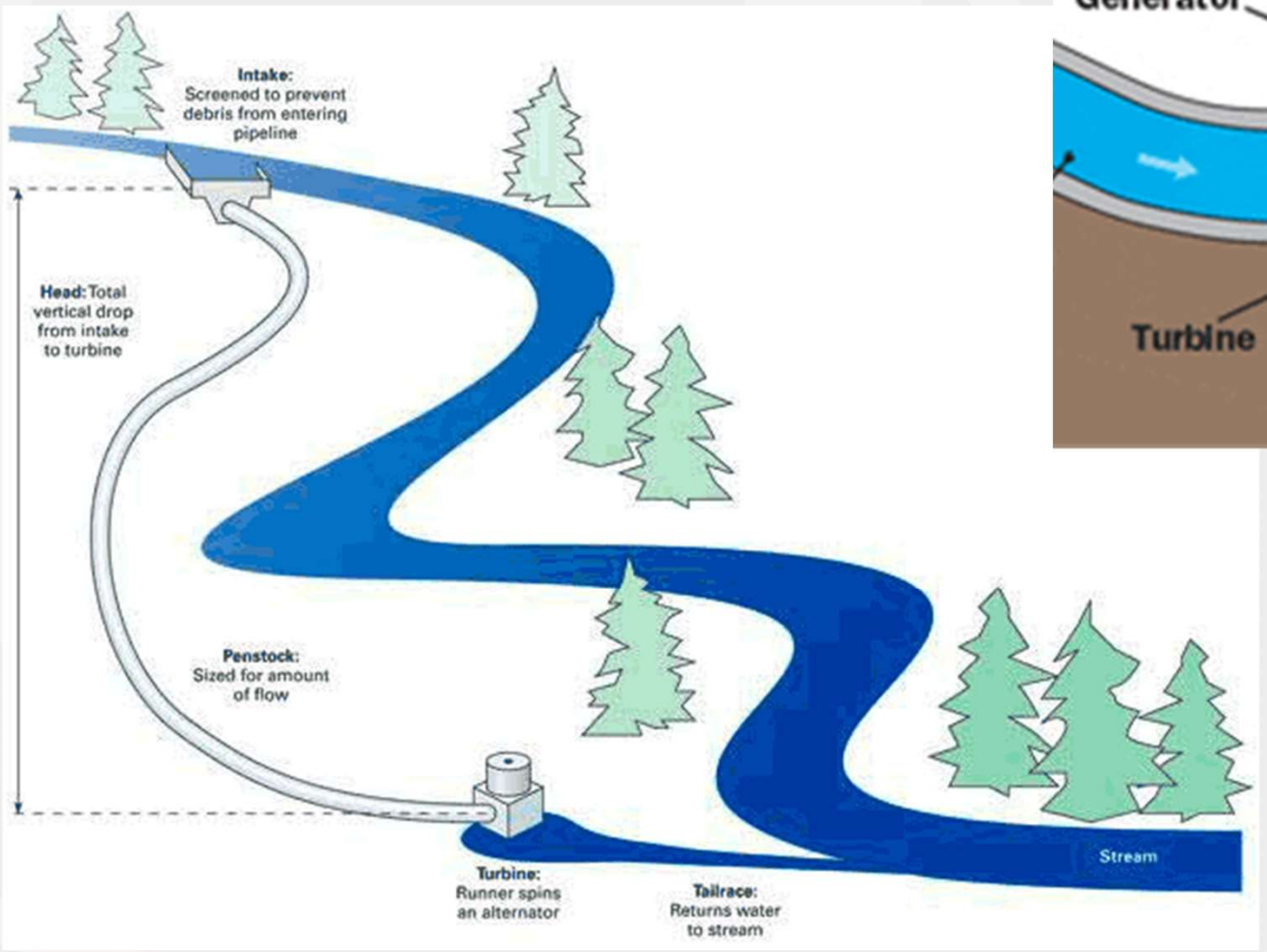


Renewable Resource Overview



Hydro

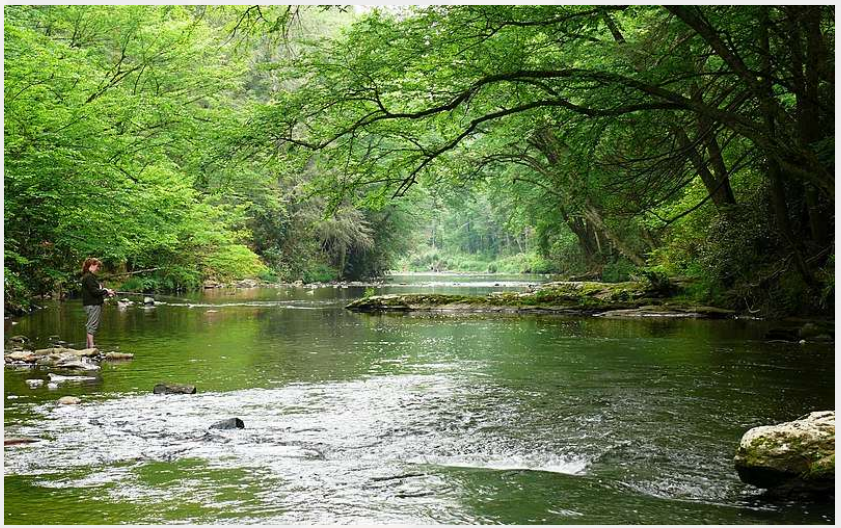

Transformer
Generator
Tailrace
Turbine
Draft Tube


Intake:
Screened to prevent debris from entering pipeline
Head: Total vertical drop from intake to turbine
Penstock:
Sized for amount of flow
Turbine:
Runner spins an alternator
Tailrace:
Returns water to stream
Stream

Hydro – Needs and Challenges

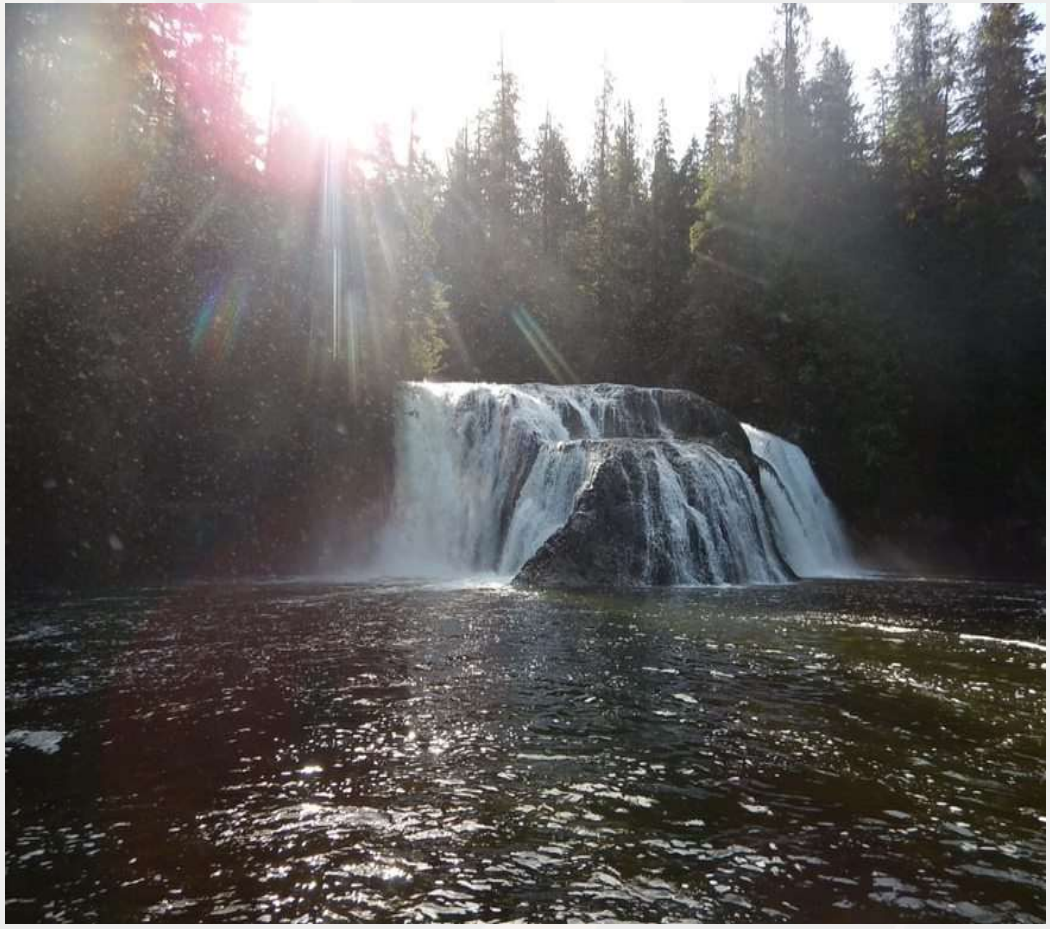
- ✓ Consistent hydro resource (from drainage area)
- ✓ Favourable topography: intake high elevation, and powerhouse low elevation
- ✓ Accessible: construction, operation, transmission line
- ✓ Water licence

- x Fish, sensitive ecosystems
- x High cultural value
- x Existing infrastructure/tenures from others
- x NO current market access



Sarita River Hydro

- ✓ 5.3 MW Hydro project
- ✓ 100 % Huu-ay-aht owned
- ✓ Run of river
- ✓ 16 GWh annually for 40 years
- ✓ Electricity Purchase Agreement negotiation with BC Hydro



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Sarita River Hydro ✓Timeline

2011
Project Started

2012
Environmental Impact Assessment
Preliminary engineering design

2015
Navigation Impact Assessment
Aviation Safety Assessment
Road Engineering

2017
Access Road Construction, Detailed Engineering

2020
Interconnection Approval
Procurement
Debt financing

Ongoing
Environmental Surveys, EPA plans to be finalized
Clearance from DFO

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Sarita River Hydro

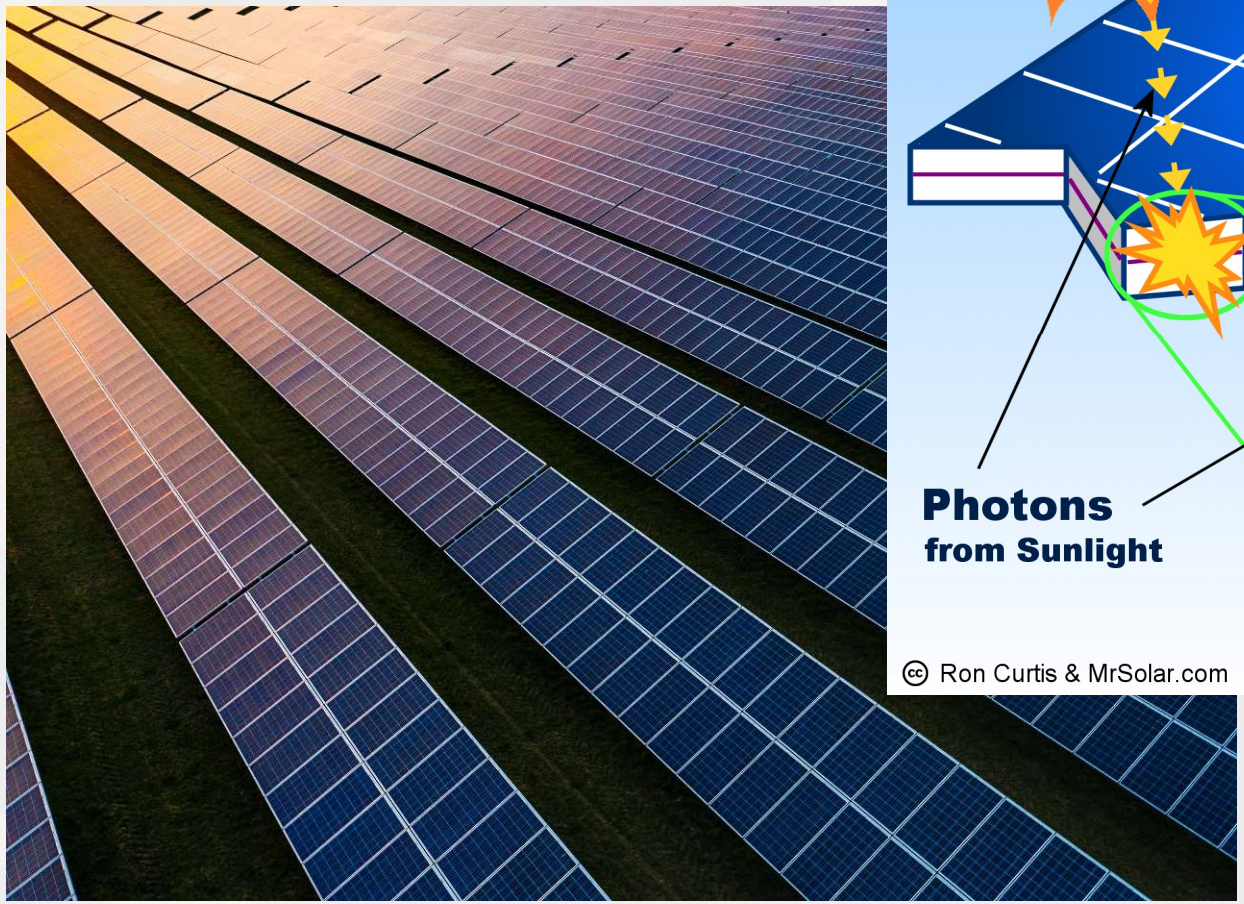
✓ Direct Employment Benefits

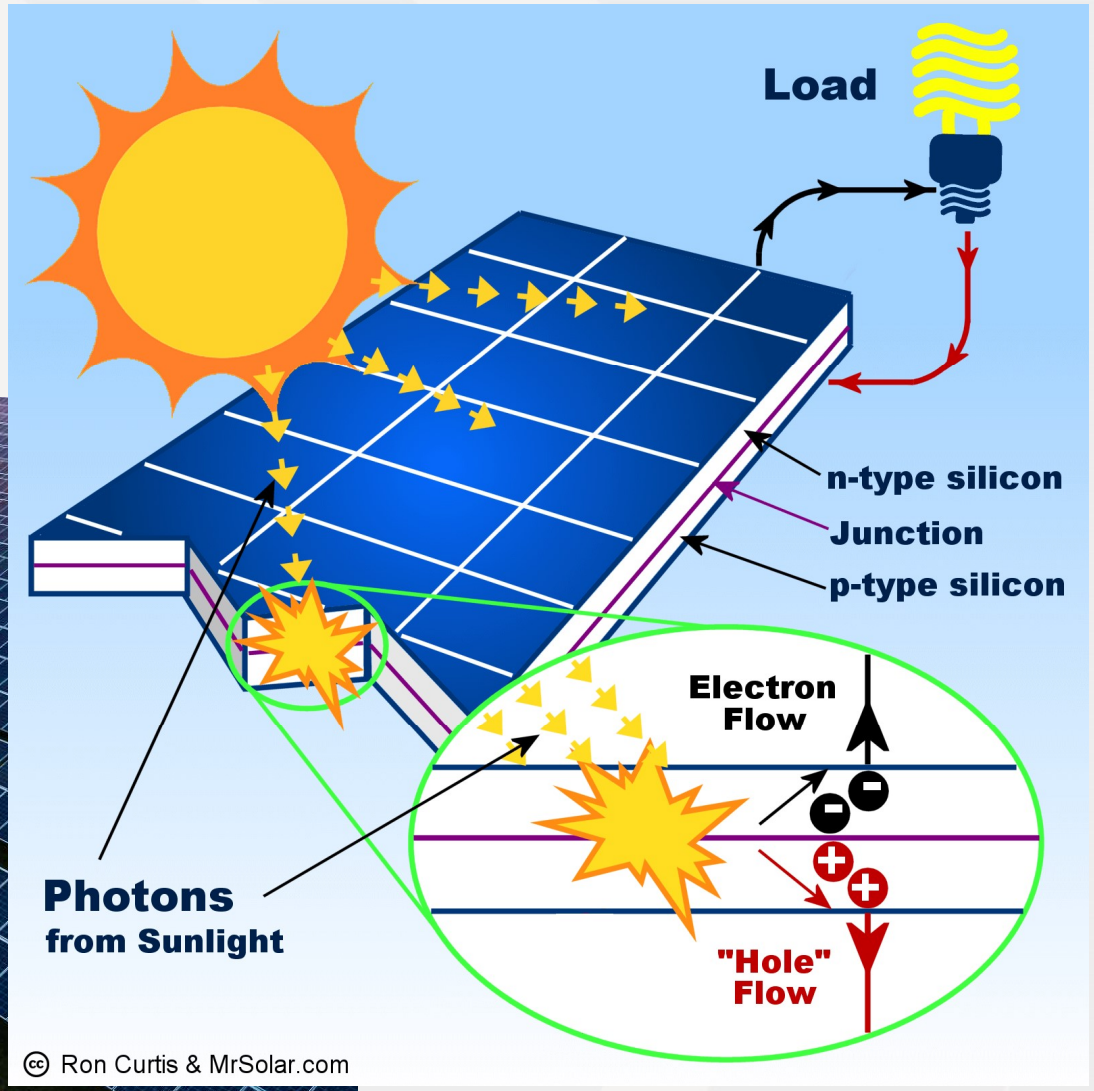
	Pre-Planning/Planning	Construction	Operations	Total
Local Jobs	0.3	22.2	13.5	**36**
Local First Nations Jobs	0.1	8.9	6.5	16
Local non-First Nations Jobs	0.2	13.3	7.0	21
Non-Local Jobs	0.8	7.4	2.8	**11**
Total Jobs Created	1.1	29.6	16.3	**47**

✓ Funders

2016 BEP	236,456	Canada
2016 Clean energy business fund	10,000	Province
2016 BCICEI	150,000	NRT
2016 Rural Dividend	100,000	Province
2017 Direct support	25,000	NRT
2018 Direct support	25,000	NRT
2018 Rural dividend	100,000	Province
2018 BCCEBF Equity	500,000	Province
2019 BC ICEI	500,000	NRT
2022 NRT Nation Building	49,900	NRT
2020 CleanBC	4,699,999	Province
TOTAL	7,527,059	

Solar





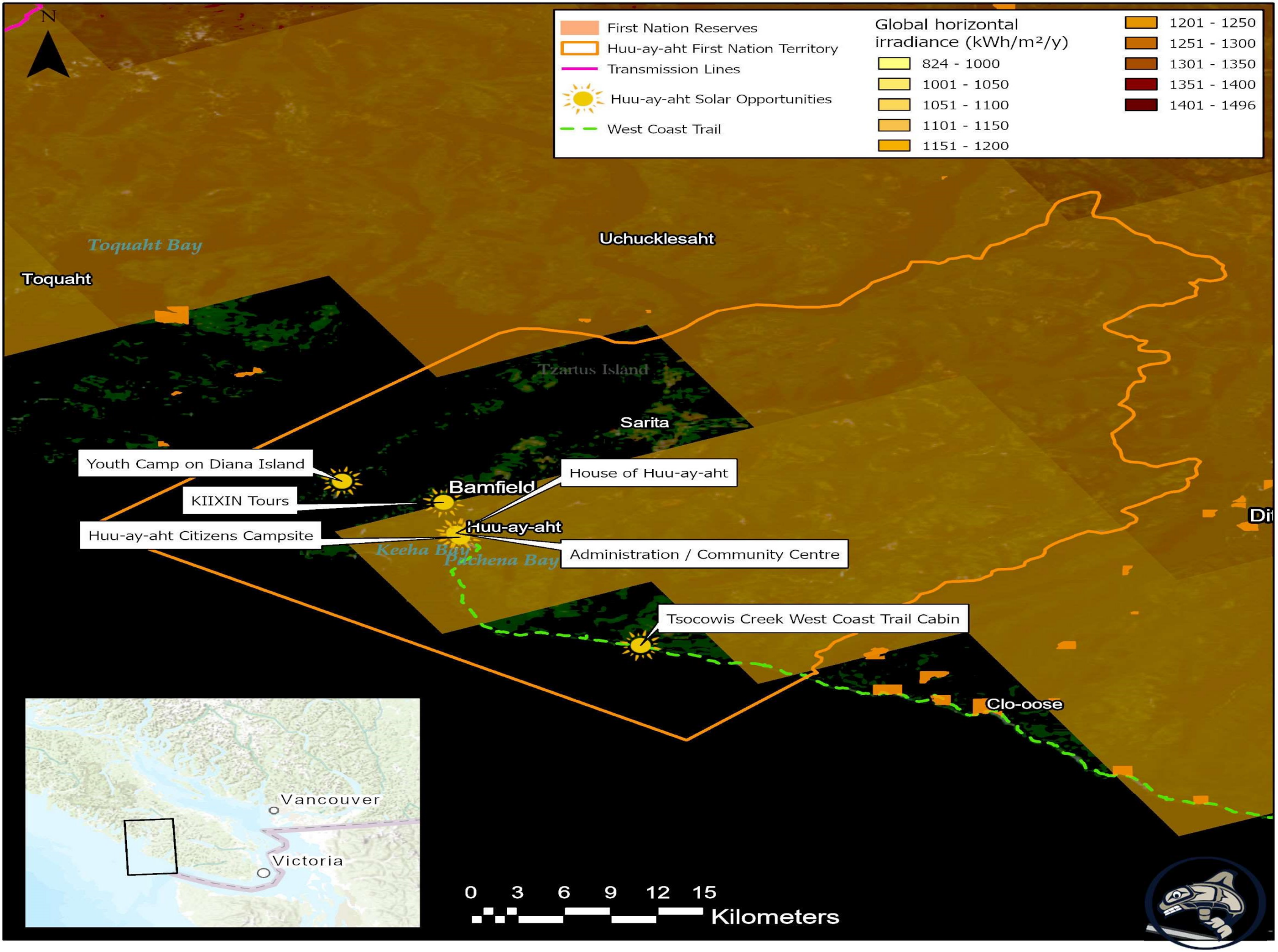
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Solar – Needs and Challenges

- ✓ Easy installation
- ✓ Summer energy production is high
- ✓ Location - height, tilt, shading

- x Winter energy production is minimal
- x Location, existing buildings, trees, or underground infrastructure




N
First Nation Reserves
Huu-ay-aht First Nation Territory
Transmission Lines
Huu-ay-aht Solar Opportunities
West Coast Trail
Global horizontal irradiance (kWh/m²/y)
824 - 1000
1001 - 1050
1051 - 1100
1101 - 1150
1151 - 1200
1201 - 1250
1251 - 1300
1301 - 1350
1351 - 1400
1401 - 1496
Toquaht Bay
Toquaht
Uchucklesaht
Tzartus Island
Sarita
Youth Camp on Diana Island
KIIXIN Tours
Huu-ay-aht Citizens Campsite
Bamfield
House of Huu-ay-aht
Huu-ay-aht
Keeha Bay
Pachena Bay
Administration / Community Centre
Tsocowis Creek West Coast Trail Cabin
Clo-oose
Vancouver
Victoria
0 3 6 9 12 15
Kilometers

Tidal

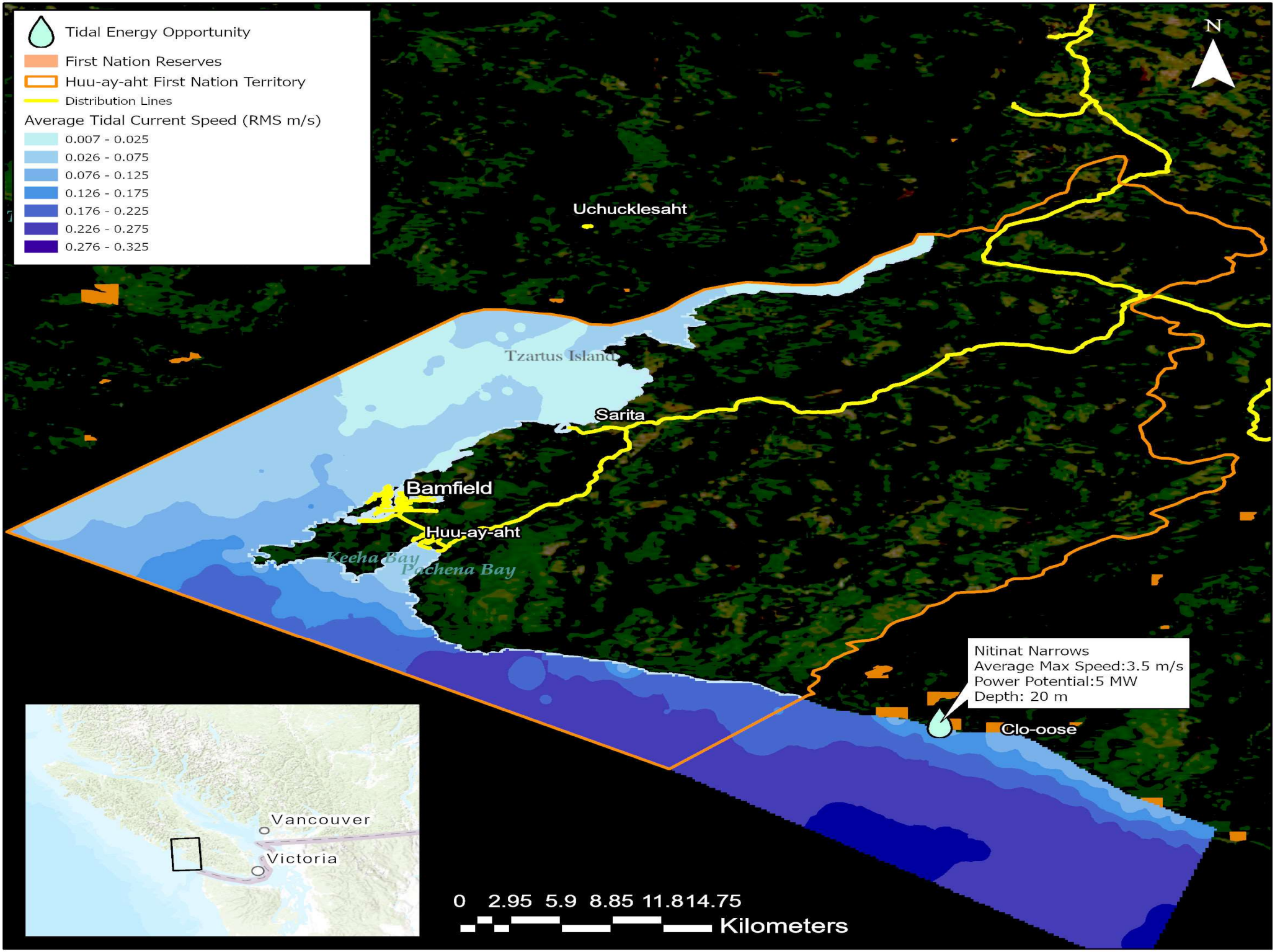


Tidal – Needs and Challenges

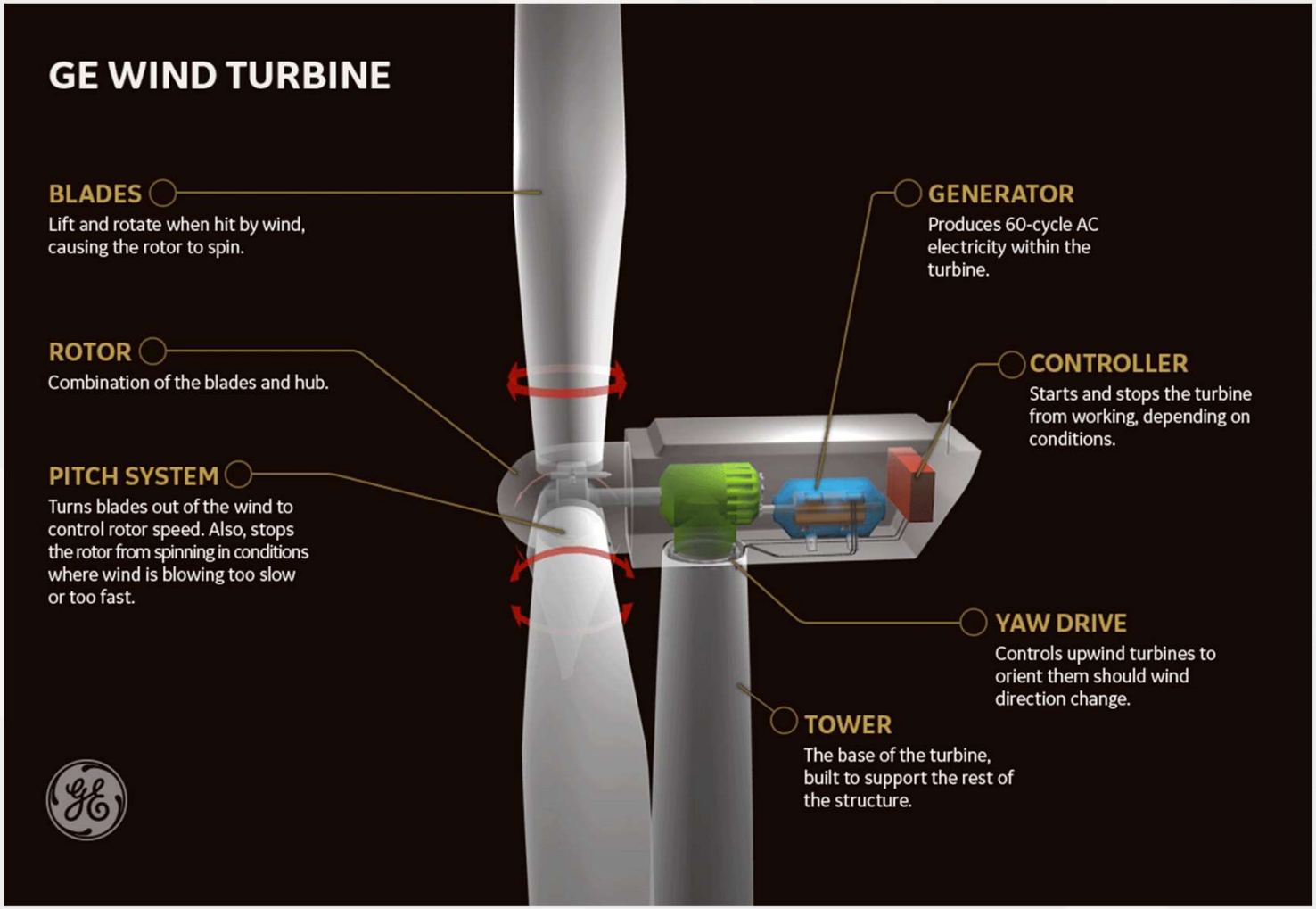
- ✓ Energy security and Reliability
- ✓ Environmental Benefits
- ✓ Energy Diversification



- x High Infrastructure costs
- x Grid Integration
- x Policy hurdles


Tidal Energy Opportunity
First Nation Reserves
Huu-ay-aht First Nation Territory
Distribution Lines
Average Tidal Current Speed (RMS m/s)
0.007 - 0.025
0.026 - 0.075
0.076 - 0.125
0.126 - 0.175
0.176 - 0.225
0.226 - 0.275
0.276 - 0.325
N
Uchucklesaht
Tzartus Island
Sarita
Bamfield
Huu-ay-aht
Keeha Bay
Pachena Bay
Nitinat Narrows
Average Max Speed:3.5 m/s
Power Potential:5 MW
Depth: 20 m
Clo-oose
Vancouver
Victoria
0 2.95 5.9 8.85 11.814.75
Kilometers

Wind


GE WIND TURBINE
BLADES
Lift and rotate when hit by wind, causing the rotor to spin.
ROTOR
Combination of the blades and hub.
PITCH SYSTEM
Turns blades out of the wind to control rotor speed. Also, stops the rotor from spinning in conditions where wind is blowing too slow or too fast.
GENERATOR
Produces 60-cycle AC electricity within the turbine.
CONTROLLER
Starts and stops the turbine from working, depending on conditions.
YAW DRIVE
Controls upwind turbines to orient them should wind direction change.
TOWER
The base of the turbine, built to support the rest of the structure.

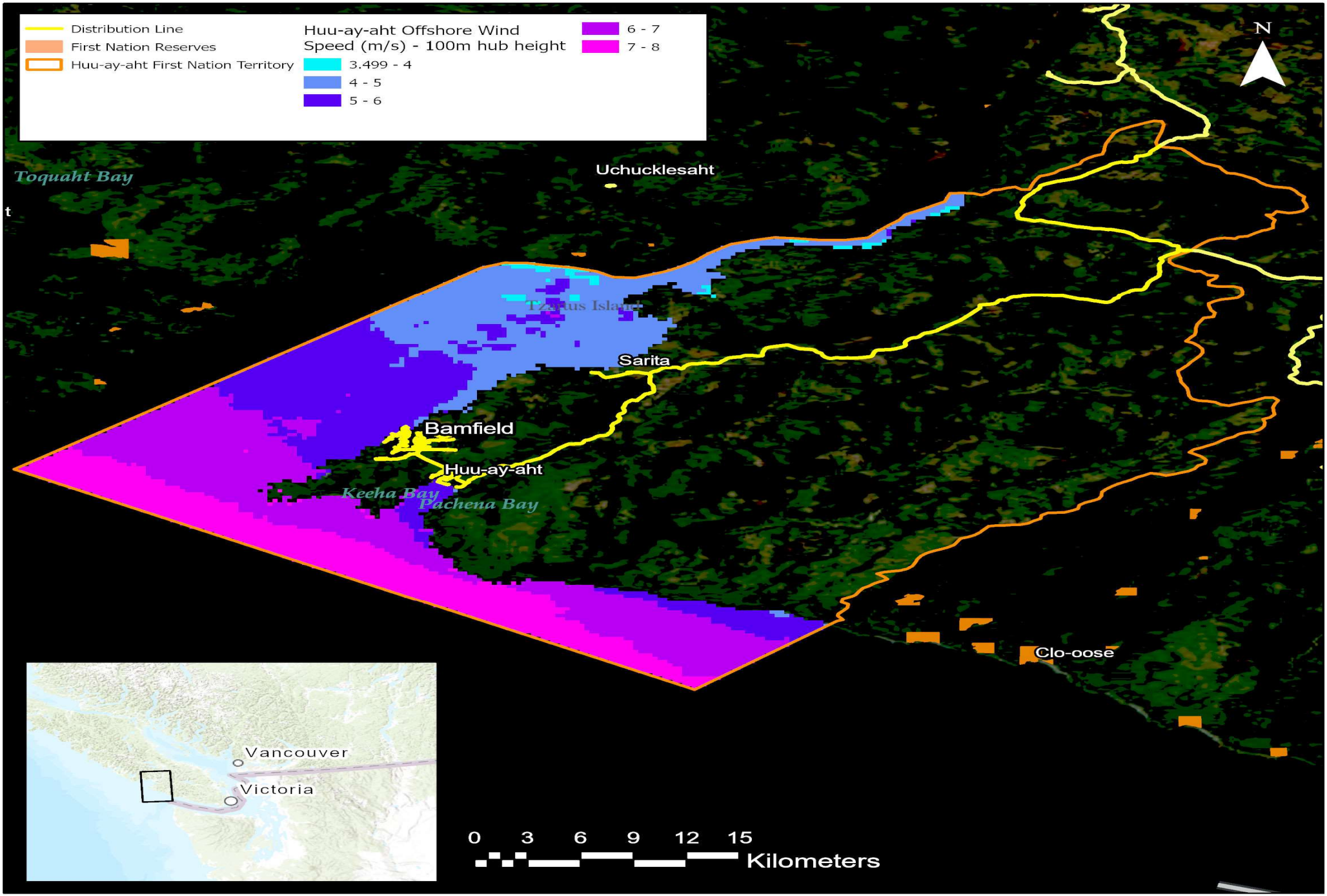
Wind – Needs and Challenges

- ✓ Consistent Small wind speed (4m/s+)
- ✓ Consistent commercial wind speed (7 m/s+)
- ✓ From one direction
- ✓ Accessible: construction, operation

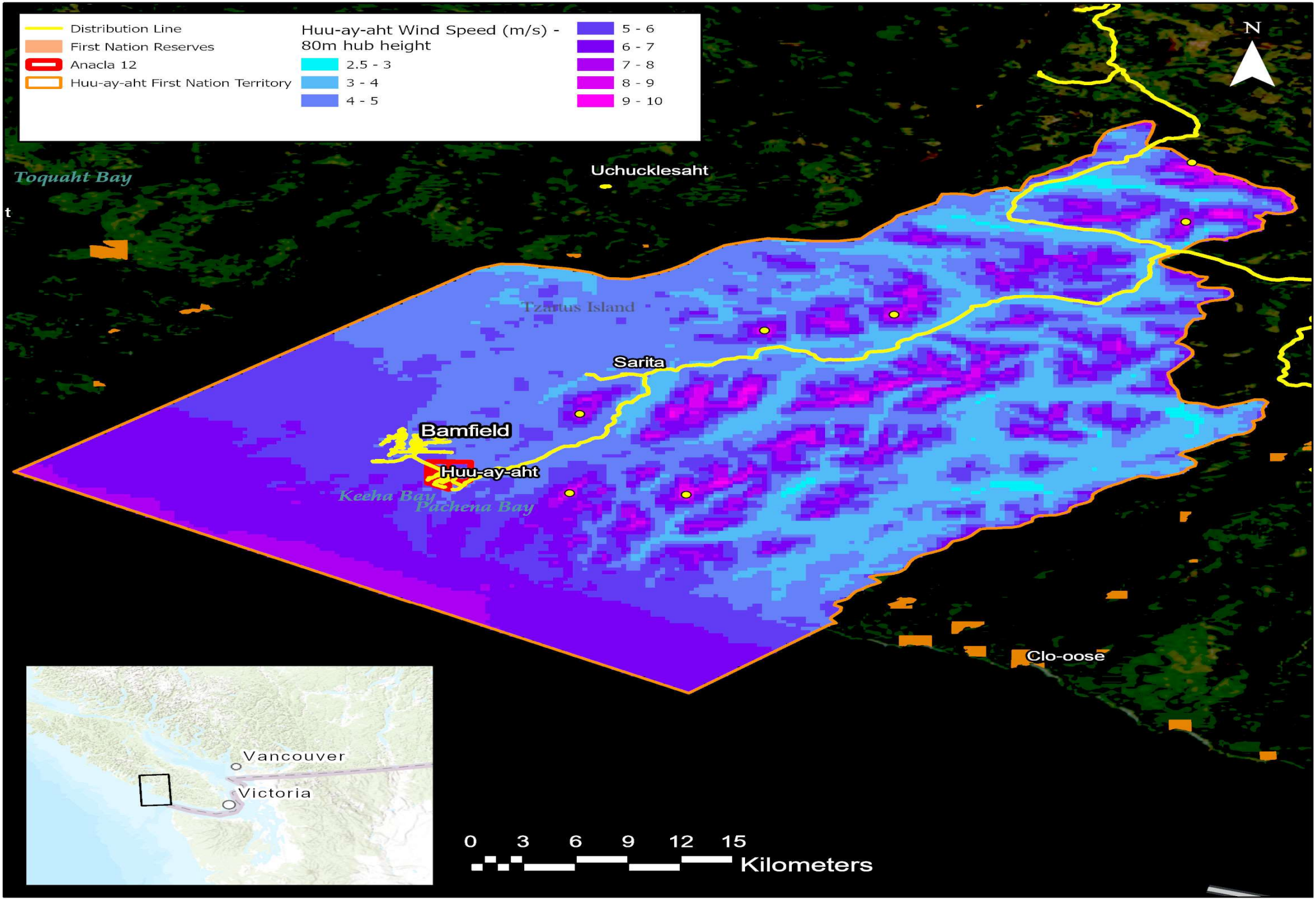
- x Wildlife impact
- x O&M costs
- x No current market access



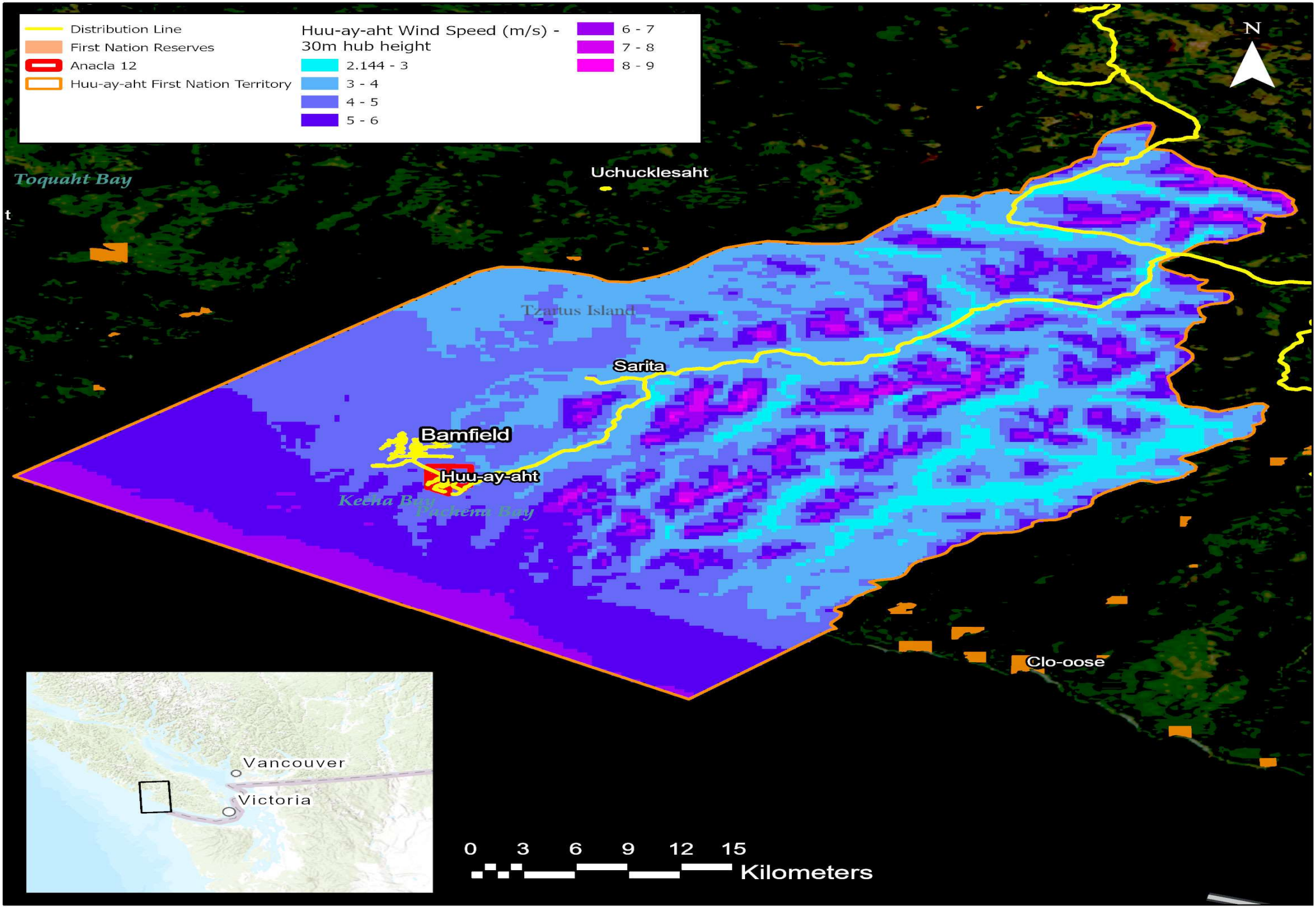
Wind- Commercial (100m)



Wind- Commercial (80m)



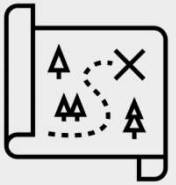
Wind- Small Scale (30m)



Community Input – Renewable Resource Maps

✓ Walk around and look at maps





✓ Ask questions




✓ Add comments




Energy Evaluations

- ✓ **What**: assessing home and building energy use and ability to retain heat
- ✓ **Why**: identifying ways to decrease energy use and save money on utility bills



Energy Evaluations

- ✓ **When**: TBD
- ✓ **How**: Up to 2 hours with minimal interruptions and equipment
- ✓ **Who**: Certified Energy Evaluator through EnerGuide – Tonse Suresh, BPG and Darell Eason, FEA



Energy Evaluations

✓ **Benefits**

- Improved comfort and indoor air quality
- Explore solutions for drafts, mold, stuffiness, and outside noise
- Cost savings
- personalized advice on making your home more energy efficient.



Energy Evaluations

✓ **Process**:

- Model the house in HOT2000 software
  - Size and geometry
  - Wall composition
  - Insulation of Attic
  - Windows and doors
  - Heating systems
  - Hot water systems



Home Energy Evaluations Report

HOMEOWNER INFORMATION SHEET

Your EnerGuide* rating and this report are based on data collected and, where necessary, presumed from your evaluation. Rating calculations are made using standard operating conditions.



ENERGUIDE

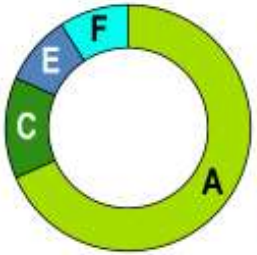
Rating: 67 gigajoules per year (GJ/year)

Heated floor area: 97.6 m² (1050.6 ft²)
Rated energy intensity: 0.69 GJ/m²/year
Evaluated by: AUSTIN TOKAREK
Quality assured by: CITY GREEN SOLUTIONS
File number: 7972D00033
Data collected: September 22, 2022
Year built: 1990

NRCan.gc.ca/myenerguide

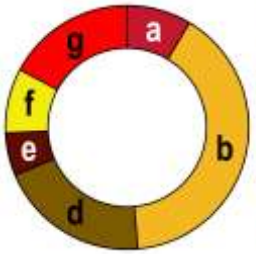


HOW YOUR RATED ENERGY IS USED:



A.	Space heating	67%
B.	Space cooling	0%
C.	Water heating	13%
D.	Ventilation	0%
E.	Lights & appliances	9%
F.	Other electrical	11%

WHERE YOUR HOME LOSES HEAT:

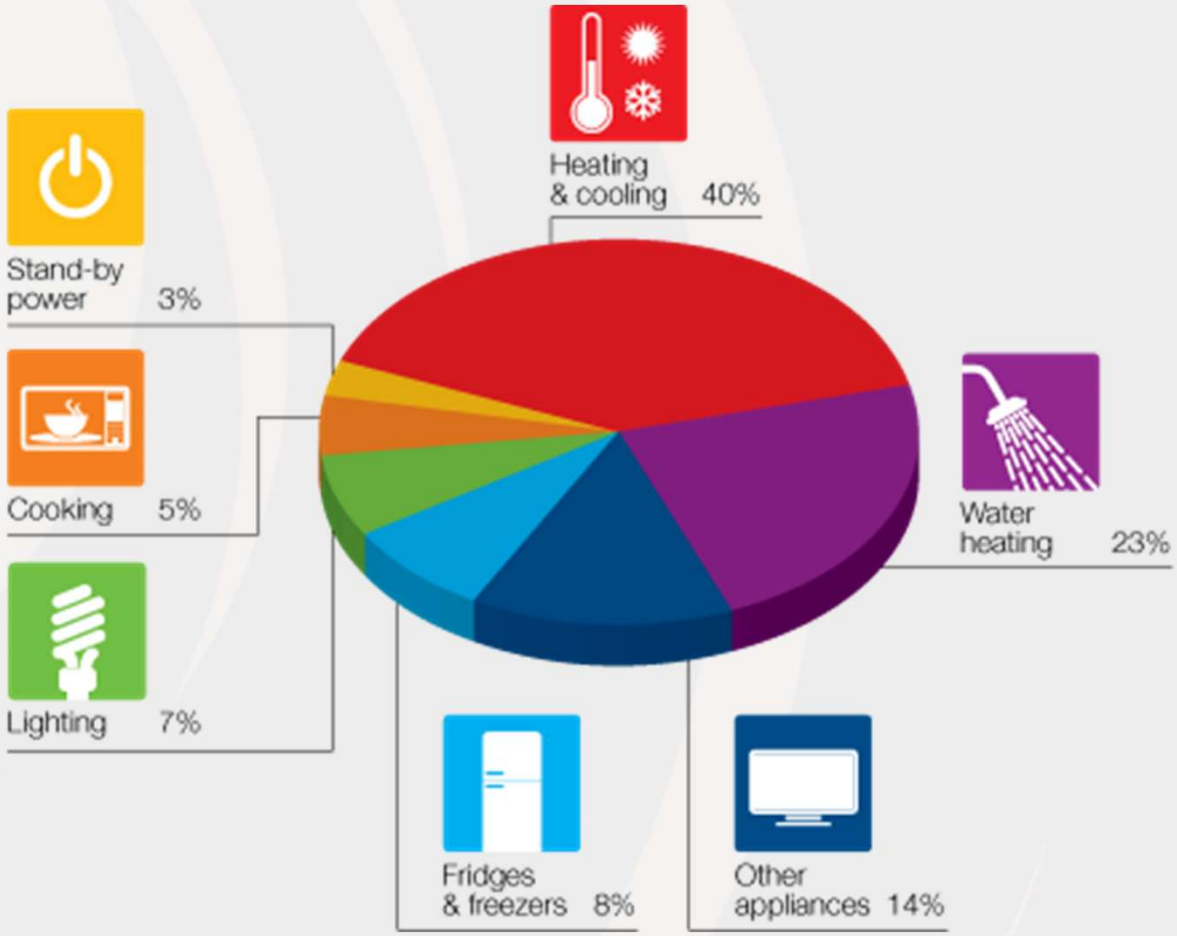


a.	Attic/Ceiling	9%
b.	Main Walls	42%
c.	Exposed floors	0%
d.	Windows	21%
e.	Exterior doors	1%
f.	Basement/Foundation	9%
g.	Air leakage/ventilation	18%

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Home Energy Upgrades

- ✓ Heat pumps
- ✓ Insulation – attic, walls, and crawlspace
- ✓ LED lighting
- ✓ Energy Star Appliance
- ✓ Heat Pump Water Heater
- ✓ Windows and doors



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Energy Evaluations

✓ **Call to Action**

Contact

- Housing Coordinator- Tiana Peters or maintenance and Asset Manager- Kurt Kranz



Chance to Win Exciting Prizes for Sign Up

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Next Steps – Short-term

- ✓ Collect community input → today!
- ✓ Complete home and building evaluations, and reporting
- ✓ Draft CEP deliverables
- ✓ Prepare Draft CEP and webmap
- ✓ Prepare Final CEP and webmap



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Next Steps – Long-term

- ✓ Secure funding to implement CEP recommendations
- ✓ Complete home and building energy upgrades



Questions



Contacts

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Danielle Tramer
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Erin Quon, P.Eng
Project Manager
Erin.Quon@barkley.ca

Tonse Suresh, EIT
Project Coordinator
tonse.suresh@barkley.ca

Funding Opportunities

Funder and Program	Funder	Intake	Funding
Clean BC Income Qualified Program	Province of British Columbia	May	Bulk applications without proof of income are possible
Infrastructure Planning Grant Program	BC Ministry of Municipal Affairs and Housing	Year-round- January review	Up to $10,000
Residential Rehabilitation Assistance Program	Canadian Mortgage and Housing Corporation	Ongoing	Up to $60,000 per home
Emergency Repair Program	Canadian Mortgage and Housing Corporation	Ongoing	Up to $20,000 per home
First Nations Clean Energy Business Fund	**Ministry of Indigenous Relations and Reconciliation**	**Bi-annual**	**Capacity funding up to $50,000 Equity Funding up to $500,000**
BC Indigenous Clean Energy Initiative	New Relationship Trust	January	Up to $500,000
Direct Support Program	New Relationship Trust	May	Up to $25,000 ($50,000 if 3+ Nations collaborating)
Nation Building	**New Relationship Trust**	**June**	**Up to $50,000**
Green and Inclusive Community Buildings	Infrastructure Canada	Ongoing	From $100,000 up to $25,000,000
Greener Homes Initiative	Natural Resources Canada	Ongoing	Rebates up to 95% of energy retrofits
Housing Support Program	Indigenous Services Canada	Ongoing	TBD energy efficiency, health & safety, capacity building