

Commercializing Wind Diesel For the Beaufort Communities

Seeking Partners

*2008 International Wind-Diesel
Workshop April 23-25*

What a Great Place !

- **Thanks to the organizers**
- **Introduce some of the people involved**
 - **Wade Carpenter – Chairs NWT Wind Committee**
 - **Tim Weis - expert**
 - **JP Pinard - expert**
 - **John Carr CEPs and Engagement**
 - **David Connelly – Business Developer**
- **Greetings from Beaufort's MLA Jackie Jacobson**

Business Developer's Role

- Do not know much about wind
- Help First Nations develop successful businesses
- Help Southern businesses work with First Nations
- Rep on NWT Wind Energy Committee
- Structure JVs, Partnerships, Alliances
- Arrange funding, negotiate contracts
- Contracted to Community Dev Corp

Tuk Conference – Making Wind Work in the North – Engaging the Communities Nov 2007

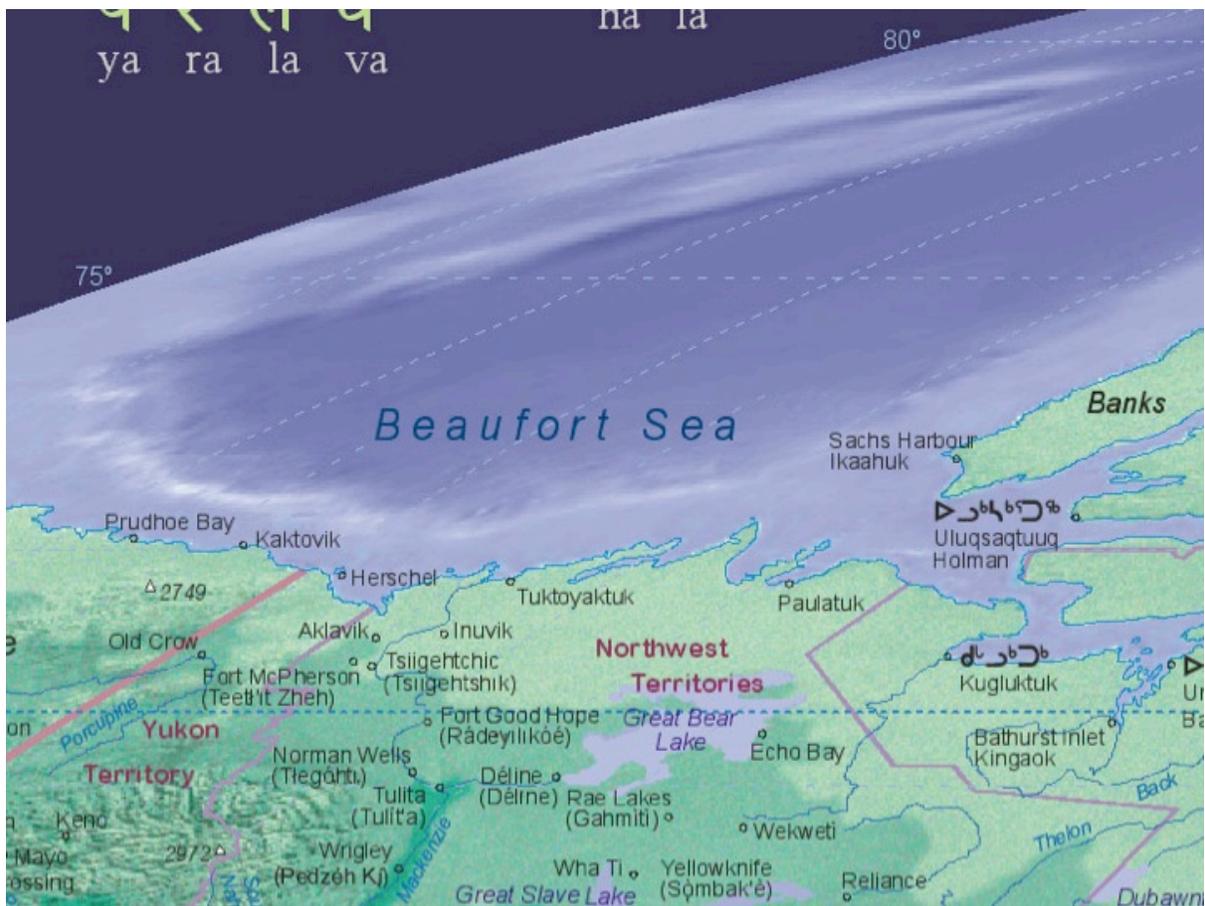


Seeking Partners With Experience

- **Equity**
- **Suppliers**
- **Training & Skills**
- **Research**
- **Customers**
- **Sister Community(ies)**

The Region's Hub and Spoke Vision





Why Hub Tuk?

- **Champion**
- **Community Support**
- **Capacity**
- **Logistics**
- **Infrastructure**
- **Diesel\$\$\$**
- **Wind?**



Addressing the Wind Regime

- **Product Modification Proven by Demo**
 - **Taller Tower (installed without crane)**
 - **Gearing**
 - **Blade Area**
- **Standardized Equipment Package**
- **Volume Potential = Cost Reduction**
- **ECONOMIES OF HUB AND SPOKE**
- **MULTIPLE REVENUE STREAMS**

Phased & Layered Concept

- **Two Phases**
 - **Demonstration**
 - **Commercialization**
- **Hub and Spokes**
 - **Demonstration/Commercial Hub - Tuk**
 - **3 Initial Spokes – Beaufort Communities**
 - **8 Potential Spokes AL, NT, YT, NU**
- **Multi-Component/Revenue Streams**

Timing – Phasing IPPs

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|--------------------------|------|-----------------|-----------------|-----------------|------------------|
| Demo | Plan | Fund Build | Demo | Merge | |
| Commercial Hub | Plan | Finance Plan | Refine Build | Op Train | Operate Merge |
| Commercial Spokes | | Plan Govern | Finance | Refine Build | Operate Train |

Where is the Project at?

- **Lessons studied from past failures**
- **1-2 years monitoring complete**
- **CEP's incorporating wind**
- **Community schools engaged**
- **2007 Wind Conference in Tuk**
- **Power Corp has published purchase terms**
- **Independent Demo feasibility completed**
- **TOR for Commercialization being drafted**
- **Solar panels being installed in Communities**
- **Plans to fund economic gap proceeding**
- **Partnering search/discussions begun**

Recommended Demo Project

- **Multiple turbines**
- **250-320 kWh Installed**
- **Expandable low penetration**
- **Procurement 2009 subject to funding**
- **Technical study completed by John Maissan, JP Pinard and Tim Weis**

Anticipated Governance of Commercial Project

- **For Profit Incorporated IPP**
- **Owned by Hub and Spoke Communities**
- **Through their Development Corps**
- **Will consider experienced equity partners including existing wind operators, suppliers and/or distributors**
- **May acquire Demo project as Hub base**
- **Multiple related revenue streams**

Multi-Component Commercial Revenue Streams

- **IPPs for Communities**
- **Third Party O & M**
- **Pan Northern Training**
- **Research**
- **Sale of Heat & Carbon Credits**
- **Accommodation and Facilities**

Pan Northern Training Partners?

- **Aurora College in Inuvik**
- **Aurora College Learning Centre in Tuk**
- **Tuk Dev Corp Owns Residence/Dinning Hall**
- **Northern Colleges Can't Do it All**
- **Yukon College Pan Northern Justice Prg**
- **Renewable Energy – Diesel Technician?**
- **YK, NT, NU, Northern Que, Ont, AL??**

Looking for Research Partners

- **Aurora Research Institute Inuvik**
- **Polar Shelve Research Facilities in Tuk**
- **Accommodations in Tuk**
- **Seeking partners that want to collaborate with a road accessible truly cold test site**
 - **Research Institutes?**
 - **Developers?**
 - **Manufacturers?**

NWT - Skills Canada Partner

- Provide youth in northern communities with opportunities to learn about skills
- Supplemental to schools
- Wants to include renewable energy employment skills
- Considering events such as Renewable Energy or Wind Energy Competition for youth
- Asking for YOUR ideas or experience

Community Profiles - Selected Socio-Economic Indicators

| | Territory | Hub | Spoke Communities | | |
|------------------|-----------|-------------|-------------------|-------|------------|
| Community | NWT | Tuktoyaktuk | Paulatuk | Sachs | Ulukhaktok |
| Population | 41,861 | 967 | 321 | 123 | 416 |
| Pop 2021 | 47,825 | 956 | 336 | 124 | 427 |
| Households | 13,902 | 279 | 81 | 45 | 144 |
| Families | 9,705 | 220 | 65 | 25 | 105 |
| Grade 12 + | 82% | 37% | 41% | 41% | 33% |
| Unemployment | 10.4% | 27.2% | 24.0% | 30.5% | 16.0% |
| Personal Income | \$46,170 | \$33,055 | \$24,438 | N/A | \$27,470 |
| Hunt, Fish, Trap | 22% | 65% | 63% | 84% | 82% |
| Non-Aboriginal | 48.9% | 3.5% | 15.6% | N/A | 2.9% |

Looking for Sister Community

- Our political leadership looking for a sister community in Alaska
- Elders and Leadership to visit
- Learn from Alaskan experience
- Please talk to me if your community could be interested

Community Energy Profiles

| | Hub Demo | Hub Commercial | Spoke Communities Commercial | | |
|--------------------------------------|----------|----------------|------------------------------|--------|------------|
| Community | Tuk | Tuk | Paulatuk | Sachs | Ulukhaktok |
| Peak (kW) 2007/8 | 851 | 851 | 254 | 209 | 469 |
| Max Wind Gen (kW) Proponents | 250-320 | 500 | 150 | 125 | 280 |
| Diesel Cdn\$/ltr 2007 | \$1.06 | \$1.06 | \$1.23 | \$1.17 | \$1.19 |
| Diesel Cdn \$/kWh 2007 | \$.30 | \$.30 | \$.35 | \$.37 | \$.33 |
| Diesel Cdn \$/kWh 2008 | \$.40 | \$.40 | \$.46 | \$.49 | \$.44 |
| Max Wind Gen (kW) Distributor (NTCL) | 250 | 250 | 80 | 60 | 100 |

Distributors' current RFP - Proponents propose 60% penetration for commercialization following demo. All models use last year's fuel prices. 2008 est is based on a 33% YOY Increase.

Wind Resource

| Community | Tuk | Paulatuk | Sachs | Ulukhaktok |
|------------------|-----|----------|-------|------------|
| Wind 30 m m/s | 5.2 | 5.8 | 7.5 | 6.5 |

Seeking Partners and Experience – Wrap up

- Equity
- Suppliers
- Training and Skills
- Research
- Customers
- Sister Community(ies)

Supported from and Hubbed in Tuktoyaktuk that:

- **Builds on GNWT Demo Project;**
- **Supports communities with less capacity, better wind more expensive diesel;**
- **Builds community capacity;**
- **Transfers technology;**
- **Develops community pride;**
- **Reduces GHG 10% to 20%**