Introduction To Tulalip Tribes

- Conglomeration of Tribes Formed under the Treaty of Point Elliott 1855
- The Tulalip Tribes Reservation
  - 30 miles north of Seattle
  - Membership 3500 +
  - Reservation Population ~ 10,000
- Successful Business Track Record
  - Quil Ceda Village
Treaty of Point Elliott

- Includes Reserved Rights for Fish and Wildlife
  - On and Off-Reservation Rights
  - Co-Management
  - Harvest
  - Habitat Protection
Regional Trends

- Settlement Trends – Turn of Century Farming & Logging caused habitat damages. As the area population increased so has habitat damages from development.

- Water Quality – Exceeds State Water Quality Standards for Bacteria and Nutrients

- Habitat – Severely Degraded Conditions

- Chinook Salmon, Bull Trout, Northern Spotted Owl & Marbled Murrelet listed under the Endangered Species Act
In April 2003 the Tulalip Tribes was awarded a $250K DOE grant to investigate the feasibility of constructing a regional biogas plant that would run on manure from local dairies.

The study began in June 2003 and a final report will be released by the end of this month.

Comprehensive assessment of all dairies (over 100) in Snohomish County completed.

We found favorable technical and economic conditions and are moving forward with plans to build a 320-500 kW biogas plant.
Food Waste: > 80 Ton/Day
Flush Dairies: 1,572,000 GPD
Scrape Dairies: 26,775 GPD

Project Location

Ten-Mile Radius

Honor Farm
Snohomish Basin Biogas Partnership

“Turning Waste into Energy,
Conflict into Cooperation”

- Cooperative Agreement signed April 11, 2003
  - Tulalip Tribes of Washington State
  - Lower Skykomish River Habitat Conservation Group
  - Northwest Chinook Recovery
  - Washington State Dairy Federation
# Feasibility Project Partners

<table>
<thead>
<tr>
<th>Partner</th>
<th>Role</th>
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</thead>
<tbody>
<tr>
<td>Tulalip Tribes</td>
<td>Coordination of Project Management</td>
</tr>
<tr>
<td>- Dave Somers</td>
<td></td>
</tr>
<tr>
<td>The Clark Group</td>
<td>Project Management and Technical Coordinator</td>
</tr>
<tr>
<td>RCM Digesters</td>
<td>Resource Assessment, Technical Studies and Economic Studies</td>
</tr>
<tr>
<td>Lower Skykomish River Habitat Conservation Group</td>
<td>Public outreach and liaison with farming community</td>
</tr>
<tr>
<td>Horne Engineering</td>
<td>Preliminary design documents</td>
</tr>
<tr>
<td>Stella</td>
<td>Power purchase and green tags</td>
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<tr>
<td>Atwater</td>
<td>Business Plan</td>
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Objectives of the Snohomish Basin Biogas Partnership

- The parties to this agreement intend to work together to
  - Protect water quality, restore salmon habitat, and support agriculture in Snohomish County
  - Determine whether development of a dairy waste biogas project is feasible
  - Develop reports for the partnership among all levels of government
  - Seek participation of other individuals or organizations
  - Obtain funds to support the objectives of the SBBP
Accomplishments

- DOE-funded Biogas Feasibility Study completed;
- Honor Farm Property conditionally assigned to tribe;
- Business plan draft outlining relationships between tribe and farmers;
- Short-list of qualified developers;
- Discussions with purchasers of power and green tags;
- Preliminary site assessment and preparation for NEPA Environmental Assessment.
Cows – 2,005 mature Holstein equivalents (MHE) from 4 dairies within 1.5 mile radius of Monroe Honor Farm site.

Fish and Other Food Wastes – adds revenue and improves Plant performance (29,084 pounds per day of food wastes).

Farms – will rely on Plant for planned herd increases. New dairies can locate on land in area if Plant can manage their waste.

Revenue Streams – green energy, carbon credits, compost, tipping fees

By-Products – value-added fertilizer and soil amendments
Plant Parameters

Manure Collection: Pressure Sewer
- Collection/mix tank with pump at each dairy
- Central Plant will pump 4 hours a day, 100 gallons per minute
- Central mix tank will concentrate manure to 6-7% solids

Digestion System: Mesophilic Complete Mix
- Operating temperature: 99 degrees F
- Hydraulic retention time: 4 days
- Non-manure waste streams – 17-25% solids
# Digester System Design Values

<table>
<thead>
<tr>
<th>Digester Type</th>
<th>Complete Mix</th>
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<tbody>
<tr>
<td>Total Cow Number</td>
<td>2,005 MHE influent</td>
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<tr>
<td>Volume</td>
<td>51,506 gal/d total</td>
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<tr>
<td>Digester Volume</td>
<td>165,261 ft³</td>
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<tr>
<td>Length</td>
<td>103 ft</td>
</tr>
<tr>
<td>Width</td>
<td>100 ft</td>
</tr>
<tr>
<td>Depth</td>
<td>16 ft cover</td>
</tr>
<tr>
<td>Dimension</td>
<td>11,362 ft²</td>
</tr>
<tr>
<td>Engine-generators</td>
<td>320 kW</td>
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</tbody>
</table>
Biogas System Outputs

- Biogas consisting of 60-70% methane
- Methane will fuel two Caterpillar G3406TA engines with generators rated at 160 kW continuous duty
- Average energy production: 292 kWh
Outstanding Issues

- Create business and project structure
- Evaluate financing options
- Conduct environmental review
Future Plans

- Identify the benefits of a biogas facility
- Continue to build coalitions and partnerships
- Consult with the public and complete NEPA EA
- Develop a consortium to design, build, and develop
- Secure funds for development
- Determine the worth of carbon credits
Benefits

- Off reservation land for restoration
- Experience in emerging technology and new industry
- Improve water quality
- Restore salmon runs
- Increased production at dairies
Preserving two cultures ....