Samish Indian Nation
Long-Term Strategic Energy Plan

Prepared for the
Samish Indian Nation

SAMISH INDIAN NATION
LONG-TERM STRATEGIC ENERGY PLAN

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Prepared for the

Samish Indian Nation

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EXECUTIVE SUMMARY

The Samish Indian Nation contracted with RIDOLFI Inc. and Shuksan Energy Consulting to assist the Tribe in the developing a Long-Term Strategic Energy Plan. The Tribe's strategic energy planning effort is divided into three phases:

- *Completing an Energy Resource Assessment;*
- *Developing a Long-Term Strategic Energy Plan; and*
- *Preparing a Strategic Energy Implementation Plan for the Samish Homelands*.

This report summarizes the second phase of the Tribe's energy planning effort: the *Long-Term Strategic Energy Plan*.

The *Long-Term Strategic Energy Plan* is divided into three parts:

- *Tribal Energy Vision;*
- *Current Energy Status; and*
- *Action Plan*.

The Tribal Energy Vision provides a description of the Tribe's energy goals (where it wants to go); the Current Energy Status evaluates existing Tribal energy use (where it is now); and the Action Plan identifies options for moving toward achieving the Tribe's energy goals (how it will get there).

Tribal Energy Vision

The first step in developing an effective strategic energy plan is envisioning your destination. Developing a tribal energy vision should go hand-in-hand with other tribal objectives, like economic development, job creation, and cultural values.

In support of its long-term strategic energy planning effort, as well as its overall mission, the Tribe has adopted the following energy vision:

> *The Samish Indian Nation will develop a comprehensive Strategic Energy plan to set policy for future development on tribal land that will consist of a long-term, integrated, systems approach to providing a framework under which the Samish Community can use resources efficiently, create energy-efficient infrastructures, and protect and enhance quality of life. Development of the Strategic Energy plan will help the Samish Nation create a healthy community that will sustain current and future generations by addressing economic, environmental, and social issues while respecting the Samish Indian Nation culture and traditions.*

As an initial step on its path to realizing this Tribal energy vision, the Samish Nation became the first Native American Tribe to join the U.S. Environmental Protection Agency's (EPA's) Green Power Partnership in October 2004.

In support of its commitment, the Tribe made the following statement:

> *Recognizing both the economic and environmental risks of dependence on fossil fuels and other conventional energy sources, the Tribe is implementing a long- term sustainable energy strategy starting with a commitment to obtain at least 10% of their electricity from new renewable energy sources within the next year.*

Current Energy Status

After identifying the Tribe's energy goals, the next step is to understand where they are now. This requires a good understanding of the Tribe's current energy status – its *energy baseline*.

The Tribe currently relies on an energy mix of electricity, natural gas, and propane for its facilities and operations. For the year 2004, the Tribe's annual energy cost was just over $66,000.

Electricity, supplied to the Tribe by Puget Sound Energy, accounted for 80 percent of the Tribe's overall energy use in 2004, and 86 percent of the total energy costs.

The Tribal facility consuming the most energy was the Fidalgo Bay RV Park at Weaverling Spit, accounting for 86 percent of the annual electrical use, 82 percent of the total energy use, and 84 percent of the total energy cost. Collectively, the individual RV sites at the Fidalgo Bay RV Park

accounted for 49 percent of the Tribe's total annual energy use, and 52 percent of the Tribe's annual energy cost.

The Tribe's electric power provider, Puget Sound Energy, relies more heavily on fossil fuels for its electricity production than any other utility in the Pacific Northwest. The Tribe's annual energy use in the year 2004 produced an equivalent of 435 tons of carbon dioxide emissions, or the equivalent of an additional 76 cars on the road for one year. The Tribe's electrical use accounts for about 91 percent of the overall environmental impacts. More than half of the environmental impacts from the Tribe's energy use (55 percent) can be attributed to the individual RV sites.

The Tribe's current energy demands are expected to continue at a similar level into the near future, and future development on Tribal lands is expected to be primarily residential over the next few years, in addition to some further commercial development and expansion of some existing commercial and administrative facilities.

Action Plan

Once the Tribe has developed its energy goals and evaluated its existing energy use, the final step is to identify actions the Tribe can implement to move toward achieving its goals. The three primary types of options for moving forward include:

- *Energy generation options;*
- *Energy efficiency options; and*
- *Institutional and administrative options.*

As the Tribe has undertaken this strategic energy planning effort, some actions discussed below have already begun, and in some cases have already been completed. However, there are a number of additional actions that can keep the Tribe moving in the right direction, and that can set certain standards for how strategic energy planning can be incorporated into future development.

Recommended energy generation options include:

- *Installing solar PV at the Fidalgo RV Park for small-scale production of electric power, either on existing buildings or as separate structural elements, such as parking shelters.*
- *Installing solar PV and solar hot water at the Samish Homelands site for small-scale production of electric power, heating and cooling, and hot water.*

Recommended energy efficiency options include:

- *Completing a thorough energy audit of all energy use at the RV Park and developing a prioritized list of energy efficiency measures.*
- *Replacing existing lighting with energy efficient lighting in all Tribal facilities (completed).*
- *Incorporating energy efficiency considerations in the procurement of office equipment.*
- *Incorporating energy efficient heating and cooling as part of the expansion of the Clubhouse/conference center at the RV Park (completed).*
- *Incorporating energy efficiency requirements into Tribal building codes.*
- *Installing geothermal heat pumps where feasible to reduce heating and cooling needs.*
- *Maximizing use of passive solar energy through site design.*

Recommended institutional and administrative options include:

- *Assigning staff that will be responsible for coordinating and implementing of strategic energy planning efforts.*
- *Establishing a policy-level Energy Committee responsible for energy program oversight and implementation, or assigning those duties to an existing policy-level committee.*
- *Incorporating green power purchasing into the Tribe's current electric power purchases.*

1.0 INTRODUCTION

The Samish Indian Nation (the Tribe) contracted with RIDOLFI Inc. (Ridolfi) and Shuksan Energy Consulting (Shuksan) to assist the Tribe in the development of a Long-Term Strategic Energy Plan. The Tribe's strategic energy planning effort is divided into three phases: (1) completing an Energy Resource Assessment; (2) developing a Long-Term Strategic Energy Plan; and (3) preparing a Strategic Energy Implementation Plan for the Samish Homelands development site. The first phase, the *Energy Resource Assessment* was completed and submitted to the Tribe in April 2005. This report summarizes the second phase of the Tribe's energy planning effort: the *Long-Term Strategic Energy Plan*.

This Strategic Energy Plan is divided into three parts: the *Tribal Energy Vision*, the *Current Energy Status*, and the *Action Plan*. The Tribal Energy Vision provides a description of the Tribe's energy goals (where it wants to go); the Current Energy Status evaluates existing Tribal energy use (where it is now); and the Action Plan identifies options for moving toward achieving the Tribe's energy goals (how it will get there).

2.0 TRIBAL ENERGY VISION

The first step in developing an effective strategic energy plan is envisioning your destination. Developing a tribal energy vision should go hand-in-hand with other tribal objectives, like economic development, job creation, and cultural values.

The Samish Indian Nation has developed the following "Mission Statement" that defines the Tribe's overall goals:

> *The Mission of the Samish Indian Nation is to use the talents, knowledge, and skills of tribal members to preserve and strengthen our culture, and to ensure quality of life, prosperity, health, and education for all members through progressive, diversified tribal and individual enterprises that sustain our Nation into the future.*

In support of its long-term strategic energy planning effort, as well as its overall mission, the Tribe has adopted the following energy vision:

> *The Samish Indian Nation will develop a comprehensive Strategic Energy plan to set policy for future development on tribal land that will consist of a long-term, integrated, systems approach to providing a framework under which the Samish Community can use resources efficiently, create energy-efficient infrastructures, and protect and enhance quality of life. Development of the Strategic Energy plan will help the Samish Nation create a healthy community that will sustain current and future generations by addressing economic, environmental, and social issues while respecting the Samish Indian Nation culture and traditions.*

As an initial step on its path to realizing this Tribal energy vision, the Samish Nation became the first Native American Tribe to join the U.S. Environmental Protection Agency's (EPA's) Green Power Partnership in October 2004.

The Green Power Partnership is a voluntary partnership between the EPA and organizations that are interested in buying green power. (Green power is a marketing term for electricity that is partially or entirely generated from environmentally preferable renewable energy sources, such as solar, wind, geothermal, biomass, biogas, and low-impact hydro.) Through this

program, the EPA supports organizations that are buying or planning to buy green power. As a Green Power Partner, an organization pledges to replace a portion of its electricity consumption with green power within a year of joining the Partnership.

In support of its commitment, the Tribe made the following statement:

> *Recognizing both the economic and environmental risks of dependence on fossil fuels and other conventional energy sources, the Tribe is implementing a long- term sustainable energy strategy starting with a commitment to obtain at least 10% of their electricity from new renewable energy sources within the next year.*

Further, Tribal Chairman Kenneth Hansen stated:

> *These cultural obligations come from our ancestors and must be followed in the traditional ways to ensure environmental stewardship. In our view, a long-term commitment to economically viable renewable energy will not only reduce our environmental impact, it will insulate our businesses and Tribal members from escalating energy costs.*

(Samish Indian Nation, 2004a)

3.0 CURRENT ENERGY STATUS

Now that the Tribe has envisioned its energy goals, in order to identify the best way to get there it is necessary to understand where they are now. This requires that we have a good understanding of the Tribe's current energy status – its energy baseline. In the following sections we will discuss the Tribe's current energy use, energy costs, environmental impacts, and anticipated needs.

3.1 Energy Providers

The Tribe currently relies on three different sources of energy to run its facilities and operations: electricity, natural gas, and propane. The Tribe's electricity is provided by **Puget Sound Energy**; its natural gas is provided by **Cascade Natural Gas**; and its propane is provided by **Suburban Propane** (Samish Indian Nation, 2004b).

3.2 Tribal Facilities

The Tribe currently owns and operates a variety of facilities in and around Anacortes, Washington. The Tribe's largest commercial facility is the Fidalgo Bay RV Park on Weaverling Spit. Other Tribal facilities include scattered properties that support the Tribe's governmental, administrative, and cultural functions. An inventory of Tribal facilities is included in Table 1 below.

Table 1. Inventory of Existing Tribal Facilities

Facility Description	Facility Size	Type of Energy Used
Tribal Administration Building	5,800 square feet	Electric
Tribal Longhouse/Daycare	4,300 square feet	Electric, Natural Gas
Tribal Contract Health	1,800 square feet	Electric, Natural Gas
Four-plex Housing (2)	2,600 square feet (each)	Electric, Natural Gas
Fidalgo Bay RV Park:		
Store	3,000 square feet	Electric, Propane
Clubhouse	4,300 square feet	Electric, Propane
Shower/Laundry	1,000 square feet	Electric, Propane

Source: Samish Indian Nation, 2004b

3.3 Energy Use

To determine the Tribe's current level of energy use, we obtained monthly energy data from the Tribe's Environmental Director. The data provided by the Tribe, based on monthly utility bills for the calendar year 2004, serves as the basis for the evaluation of energy use in this section, as well as the evaluation of energy costs, discussed in the next section (Samish Indian Nation, 2005c).

As discussed above, Tribal facilities are supplied with energy in the form of electricity, natural gas, and propane. Each is briefly discussed below.

Electricity

Puget Sound Energy (PSE) provides electrical power to all Tribal buildings, as well as to 185 individual electrical hook-ups at the Fidalgo Bay RV Park. The Tribal Administration Building is the only Tribal facility that also relies on electricity for heating.

In 2004, the Tribe used just under 765,000 kilowatt-hours (kWh) of electricity at all of its facilities. (A kilowatt-hour is the equivalent on one kilowatt [1,000 watts] delivered for one hour.) More than 86 percent of this total (about 659,000 kWh) was used at the Fidalgo Bay RV Park. Table 2 below displays the annual electricity use of individual tribal facilities for the year 2004.

Table 2. 2004 Annual Electrical Use for Tribal Facilities

Tribal Facility	Annual Electrical Use (kWh)	Percent of Total Electrical Use
Tribal Administration Building	55,149	7%
Tribal Longhouse/Daycare	23,320	3%
Tribal Contract Health	7,276	1%
Four-plex Housing (2)	16,507	2%
Fidalgo Bay RV Park	659,248	86%
Other	3,054	<1%
TOTAL	**764,554**	**100%**

Source: Samish Indian Nation, 2005

Figure 1 displays the relative proportion of energy use by individual Tribal facilities for the year 2004.

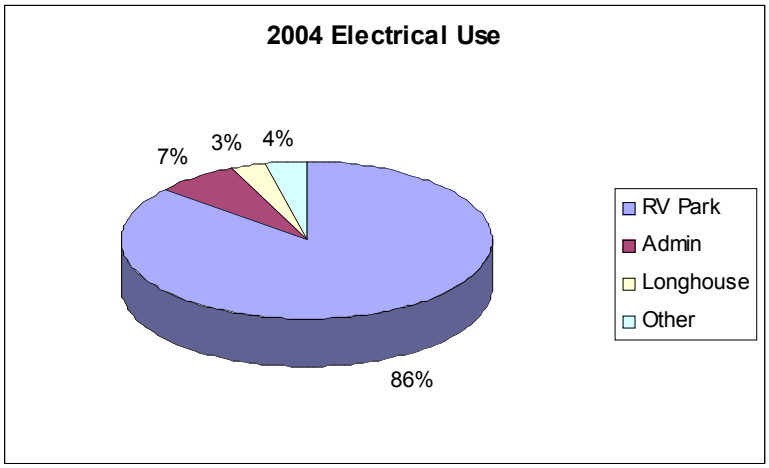

Figure 1. 2004 Annual Electrical Use

Electrical use for the Fidalgo Bay RV Park, the largest user of electrical power, can be further evaluated by looking at the electrical use at each of the separate locations within the RV Park. Table 3 displays annual electrical use for individual locations within the Fidalgo Bay RV Park for the year 2004.

Table 3. 2004 Annual Electrical Use for the Fidalgo Bay RV Park

RV Park Location	Annual RV Park Electrical Use (kWh)	Percent of Total RV Park Electrical Use
RV Sites	463,477	70%
Clubhouse	19,272	3%
Kitchen	6,182	1%
Shower/Laundry	63,960	10%
Office	89,637	14%
Pumps	16,720	2%
TOTAL	**659,248**	**100%**

Source: Samish Indian Nation, 2005

Figure 2 displays the relative proportion of energy use by individual locations within the Fidalgo Bay RV Park for the year 2004.

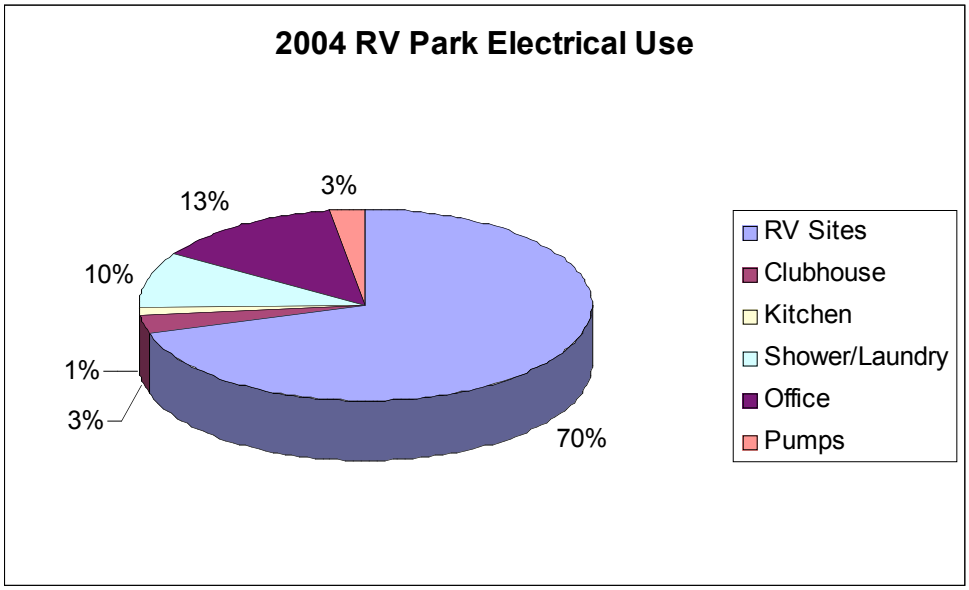

Figure 2. 2004 Electrical Use at the Fidalgo Bay RV Park

Natural Gas

Cascade Natural Gas provides natural gas for heating all Tribal buildings except the Tribal Administration Building and the Fidalgo Bay RV Park at Weaverling Spit. In 2004, the Tribe used about 2,100 therms of natural gas at three facilities (a therm is a measure of energy produced by natural gas, and is equivalent to about 100,000 British Thermal Units [BTU] or about 30 kWh). Table 4 below displays annual natural gas use by individual Tribal facility. The values used in Table 4 are only estimates. Natural gas cost information was available for the entire year of 2004, but the number of therms used was only available for 7 months (June through December). The estimated annual natural gas use is based on actual annual costs per facility, multiplied by the average cost per therm for the period of June through December 2004. The cost per therm varies based on the amount of natural gas used (the more used, the lower the cost per therm) and by the time of year (the same number of therms may cost more in one month than in another) (Samish Indian Nation, 2005).

Table 4. 2004 Annual Natural Gas Use for Tribal Facilities

Tribal Facility	Annual Natural Gas Use (Therms)	Percent of Total Natural Gas Use
Four-plex Housing (2)	967.63	46%
Tribal Contract Health	364.31	17%
Tribal Longhouse/Daycare	772.19	37%
TOTAL	**2,104.12**	**100%**

Source: Samish Indian Nation, 2005

Propane

Suburban Propane supplies propane for heating (including hot water) and cooking at the Fidalgo Bay RV Park. In 2004, the Tribe used about 4,700 gallons of propane at three locations within the RV Park. Table 5 below displays annual propane use by location.

Table 5. 2004 Annual Propane Use for Tribal Facilities

Location	Annual Propane Use (Gallons)	Percent of Total Propane Use
Clubhouse	3,060.6	65%
Shower/Laundry	1,366.5	29%
Office	292.4	6%
TOTAL	**4,719.5**	**100%**

Source: Samish Indian Nation, 2005

Total Energy Use

To compare the relative contribution of each of the energy sources to the Tribe's overall energy use, it is possible to convert each source into an equivalent energy measurement using the following conversion factors:

- 1 kWh of electricity = 3,413 British Thermal Units (BTU)
- 1 Therm of natural gas = 103,000 BTU
- 1 gallon of propane = 91,600 BTU

(Cogeneration Technologies, 2005)

Table 6 displays the Tribe's total energy use by source for the year 2004.

Table 6. 2004 Total Energy Use by Source

Source	Amount	Equivalent BTU	Percent of Total
Electricity	764,554 kWh	2,600,000,000 BTU	80%
Natural Gas	2,104 Therms	217,000,000 BTU	7%
Propane	4,719 Gallons	432,000,000 BTU	13%
TOTAL		**3,300,000,000 BTU**	**100%**

Based on the amount of energy produced by each source of energy, 80 percent of the Tribe's energy is supplied by electricity, 7 percent is supplied by natural gas, and 13 percent is supplied by propane.

3.4 Energy Costs

Based on information compiled by the Tribal Environmental Director, the Tribe spent just over $66,000 on energy for the year 2004. A breakdown of energy cost by source is provided in Table 7 below.

Table 7. 2004 Annual Energy Costs

Source	2004 Annual Cost
Electricity	$57,201
Natural Gas	$6,123
Propane	$2,935
TOTAL	**$66,258**

Source: Samish Indian Nation, 2005

The annual cost for electricity accounted for 86 percent of the Tribe's total energy cost for the year 2004. Total energy costs (electric, natural gas, and propane) for individual tribal facilities are displayed in Table 8.

Table 8. 2004 Annual Energy Cost for Tribal Facilities

Tribal Facility	2004 Annual Energy Cost	Percent of Total Energy Cost
Tribal Administration Building	$4,174	6.3%
Tribal Longhouse/Daycare	$2,915	4.4%
Tribal Contract Health	$1,026	1.5%
Four-plex Housing (2)	$2,501	3.8%
Fidalgo Bay RV Park	$55,324	83.5%
Other	$316	0.5%
TOTAL	**$66,258**	**100%**

Source: Samish Indian Nation, 2005

The Fidalgo Bay RV Park accounted for nearly 84 percent of all the Tribe's energy costs in the year 2004. Table 9 shows a breakdown of energy costs for the individual locations at the RV Park.

Table 9. 2004 Annual Energy Cost for the Fidalgo Bay RV Park

Location	2004 Annual Energy Cost	Percent of Total Energy Cost
RV Sites	$34,572	52%
Clubhouse	$5,436	8%
Kitchen	$520	<1%
Shower/Laundry	$6,492	10%
Office	$7,012	11%
Pumps	$1,292	2%
RV Park Total	$55,324	83.5%
OVERALL TOTAL	**$66,258**	**100%**

Source: Samish Indian Nation, 2005

3.5 Environmental Impact

In addition to the financial costs of the Tribe's energy use, there are also environmental costs. In moving toward achieving the Tribe's vision of long-term sustainability, improving the quality of life, and improving environmental, social, and economic conditions, it is critical to understand the impact the Tribe's current energy use is having on the environment.

The Tribe's electrical energy (which accounts for about 80 percent of the Tribe's total energy) is provided by Puget Sound Energy (PSE). The primary environmental impact of electrical energy occurs during the production, as opposed to the end use, of electricity, and is highly dependent on the fuels used to produce the electricity. Figure 3 below displays the 2004 fuel mix for PSE (CTED, 2005).

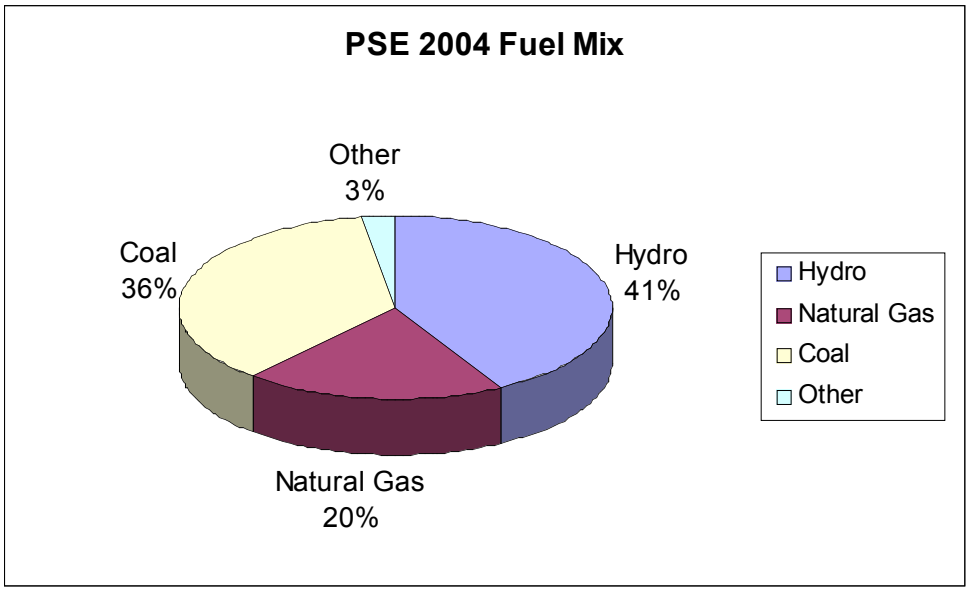

Figure 3. Puget Sound Energy 2004 Fuel Mix

As shown in Figure 3, more than half of PSE's energy is produced by burning fossil fuels. PSE depends more heavily on fossil fuels than any other electrical utility in the Pacific Northwest. The U.S. Environmental Protection Agency (EPA) has developed air emissions factors for determining the amount of greenhouse gases produced from burning of fossil fuels for electrical generation. The factors, based on average air emissions in the U.S., are listed below.

- The average emission rates in the United States from coal-fired generation are 2,249 lbs/megawatt hour (MWh) of carbon dioxide, 13 lbs/MWh of sulfur dioxide, and 6 lbs/MWh of nitrogen oxides (EPA, 2005a).

- The average emissions rates in the United States from natural gas-fired generation are: 1135 lbs/MWh of carbon dioxide, 0.1 lbs/MWh of sulfur dioxide, and 1.7 lbs/MWh of nitrogen oxides (EPA, 2005b).

Using PSE's 2004 annual fuel mix and the Tribe's energy use data, the estimated air emissions associated with the Tribe's 2004 electrical use are:

- 792,567 pounds of carbon dioxide (CO_2);
- 1,911 pounds of nitrogen oxides (NOX); and
- 3,593 pounds of Sulfur Dioxide (SO_2)

In addition to electricity, equivalent CO_2 emissions can also be estimated for direct use of natural gas and propane. It is estimated that the Tribe's natural gas and propane use for 2004 accounted for an additional 77,000 pounds of CO_2 emissions, for a total of about 870,000 pounds of CO_2 emissions (American Forests, 2005).

For most people it is hard to put these figures into a useful frame of reference. One way to make the figures more understandable is to compare the output to an equivalent numbers of cars on the road. The average American car produces approximately 11,450 pounds of CO_2 per year. The estimated CO_2 emissions from the Tribe's annual electrical use are equivalent to an additional 76 cars on the road for one year (EPA, 2005c).

Another reference point offered by the EPA is that planting 1.35 acres of trees is estimated to absorb 10,000 pounds of CO_2 per year. Using this measurement, it would take 87 acres of trees to absorb the Tribe's annual CO_2 production (EPA, 2005c).

3.6 Future Energy Use

The existing level and type of energy use by existing Tribal facilities is expected to continue into the near future. However, there are plans for additional development on Tribal lands that are likely to increase energy demand, including additional residential development (up to 26 homes) at the Samish Homelands site near Lake Campbell. Potential commercial development, although not planned at this time, may occur locally in or around the City of Anacortes. Other planned or ongoing development includes the recently completed expansion of the Clubhouse

and conference center at the Fidalgo Bay RV Park, and the potential expansion of Tribal administrative facilities in Anacortes.

3.7 Energy Status Summary

The Tribe currently relies on an energy mix of electricity, natural gas, and propane for its facilities and operations. For the year 2004, the Tribe's annual energy cost was just over $66,000.

Electricity, supplied to the Tribe by Puget Sound Energy, accounted for 80 percent of the Tribe's overall energy use, and 86 percent of the total energy costs.

The Tribal facility consuming the most energy was the Fidalgo Bay RV Park at Weaverling Spit, accounting for 86 percent of the annual electrical use, 82 percent of the total energy use, and 84 percent of the total energy cost. Collectively, the individual RV sites at the Fidalgo Bay RV Park accounted for 49 percent of the Tribe's total annual energy use, and 52 percent of the Tribe's annual energy cost.

The Tribe's electric power provider, Puget Sound Energy, relies more heavily on fossil fuels for its electricity production than any other utility in the Pacific Northwest (CTED, 2005). The Tribe's annual energy use in the year 2004 produced an equivalent of 435 tons of carbon dioxide emissions, or the equivalent of an additional 76 cars on the road for one year. The Tribe's electrical use accounts for about 91 percent of the overall environmental impacts. More than half of the environmental impacts from the Tribe's energy use (55 percent) can be attributed to the individual RV sites.

The Tribe's current energy demands are expected to continue at a similar level into the near future, and future development on Tribal lands is expected to be primarily residential over the next few years, in addition to some further commercial development and expansion of some existing commercial and administrative facilities.

4.0 ACTION PLAN

Now that we know what the Tribe's energy goals are (the Tribal energy vision), and have a picture of the Tribe's existing energy use (current energy status), the final step is identify options the Tribe can implement to move toward achieving its goals. The following sections discuss the three primary types of options for moving forward: energy generation options, energy efficiency options, and institutional and administrative options. The final section includes recommended actions to begin implementation of this strategic energy plan.

4.1 Energy Generation Options

During the first phase of the Tribe's strategic energy planning efforts, Ridolfi and Shuksan Energy completed a renewable energy resource assessment for the Tribe to identify available renewable energy resources on or near Samish Tribal lands. Based on that assessment, certain renewable energy generation options were recommended for further evaluation, including solar photovoltaic (PV), solar thermal, small-scale wind, geothermal heat exchange, and biomass. The most technically and financially feasible of those options at this time are expected to be solar PV, solar thermal, and geothermal heat exchange options for incorporation into existing and future residential, commercial, and institutional development.

4.2 Energy Efficiency Options

Perhaps the easiest, least expensive way to reduce both the cost and environmental impact of the Tribe's energy use is to simply use less. There are a number of simple energy efficiency options the Tribe can incorporate into existing and future developments to reduce current and future energy loads. Energy efficiency reduces the energy used by specific end-use devices and systems, typically without affecting the level or quality of service. Many energy efficiency measures can pay for themselves in only a few years, saving large amounts of money during the remaining useful life of the facility.

4.3 Institutional and Administrative Options

Often, changes in existing institutional and administrative structures may be necessary to develop and implement an effective tribal energy program.

After evaluating energy generation and energy efficiency options, it is critical to think about implementation and the organizational and institutional structures that will be necessary to raise financing, oversee project implementation, and carry out longer-term operations and maintenance functions. Effective implementation of any energy project—whether it involves conventional sources, renewables, or energy efficiency—requires a long-term commitment to a business-like philosophy. This may require establishing one or more business units within the Tribe to separate the energy project commitment from tribal politics. While it is probably possible to carry out much of the preliminary project definition within existing tribal economic development or environmental programs, the effective, stable implementation of energy projects requires dedicated staff focused on the long-term success of the project.

There are a number of organizational options, including establishing a tribal utility authority, supporting small tribal businesses, creating an energy services company, expanding the scope of existing water and sanitation departments, creating joint ventures with existing businesses, or forming cooperatives with other tribes in the region. It is important that some organizational unit be charged with the responsibility for carrying out the project from start to finish, with sufficiently skilled staff to assure the long-term viability of the project (EERE, 2005a).

4.4 Recommended Options

For the Tribe to begin moving toward its energy goals, we are recommending the actions identified in the following sections. As the Tribe has undertaken this strategic energy planning effort, some actions discussed below have already begun, and in some cases have already been completed. However, there are a number of additional actions that can keep the Tribe moving in the right direction, and that can set certain standards for how strategic energy planning can be incorporated into future development.

4.4.1 Energy Generation Options

As a result of the Renewable Energy Resource Assessment, certain energy generation options were recommended for further evaluation. Some options may require further evaluation of their technical and economic feasibility, while others are recommended for direct

implementation. As there do not appear to be large-scale opportunities for energy generation on existing Tribal lands, options feasible at this time are small-scale generation options.

Recommended options to begin small-scale implementation of on-site energy generation include:

- *Installing solar PV at the Fidalgo RV Park for small-scale production of electric power, either on existing buildings or as separate structural elements, such as parking shelters.*
- *Installing solar PV and solar hot water at the Samish Homelands site for small-scale production of electric power, heating and cooling, and hot water.*

As discussed further below, heating and cooling and hot water production are significant residential energy uses, and in combination with site design and energy efficiency options, both solar electric and solar hot water production may complement other recommended actions to minimize the use and environmental impact of energy at future Tribal residential developments.

4.4.2 Energy Efficiency Options

Implementing energy efficiency options is likely to be the quickest, easiest, and least expensive way of reducing both the cost and environmental impact of the Tribe's energy use. Because the overwhelming majority of the Tribe's energy use is associated with the Fidalgo Bay RV Park, our first recommendation is that the Tribe continue and complete a thorough energy audit of all energy use at the RV Park and develop a prioritized list of energy efficiency measures.

Other initial energy efficiency options are identified here based on typical energy use for the types of facilities the Tribe currently operates, as well as the most likely types of future development.

Office Energy Use

Several existing Tribal facilities are used primarily for standard business office purposes. Figure 4 displays typical energy uses for office buildings.

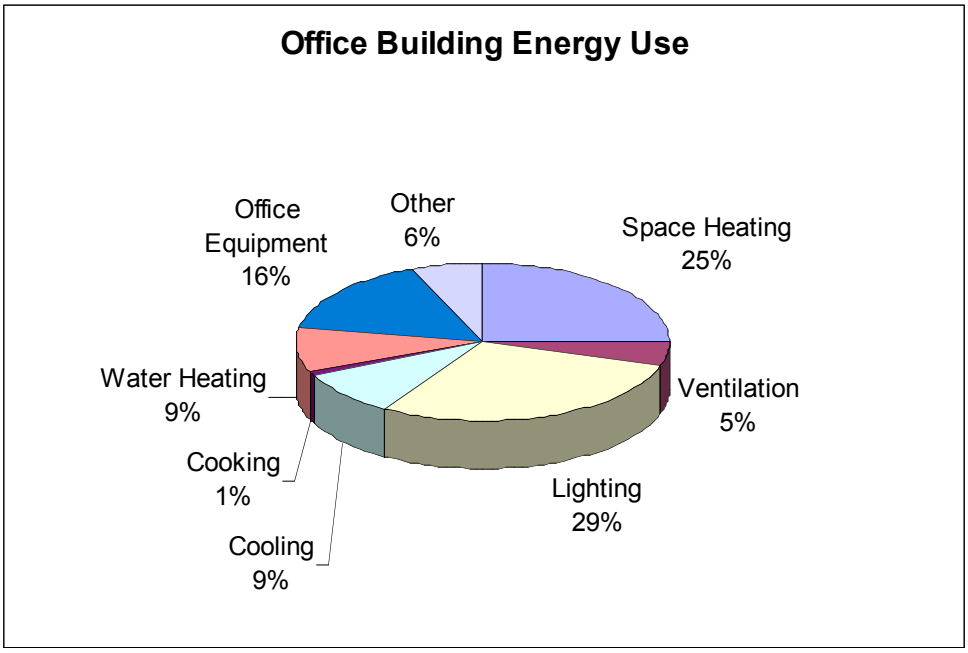

Figure 4. Typical Energy Use in Office Buildings

(Source: EIA, 2001a)

As shown in the figure, the primary uses of energy in a typical office are for heating and cooling, lighting, and office equipment. Within the last year, as part of its energy planning effort, the Tribe has replaced existing lighting with energy efficient lighting. Because lighting is a significant source of office energy use (almost 30 percent), the Tribe should begin to see reductions over the next few years as a result of these measures. In addition to improved lighting efficiency, we also recommend that the Tribe incorporate energy efficiency considerations in the procurement of office equipment, as office equipment typically accounts for more than 15 percent of office energy use.

Commercial and Service Building Energy Use

In addition to existing office buildings, Tribal facilities also include some buildings geared more toward commercial and service uses (including the RV Park facilities), and more of this type of development may occur in the future. Figure 5 displays typical energy uses for retail and service buildings.

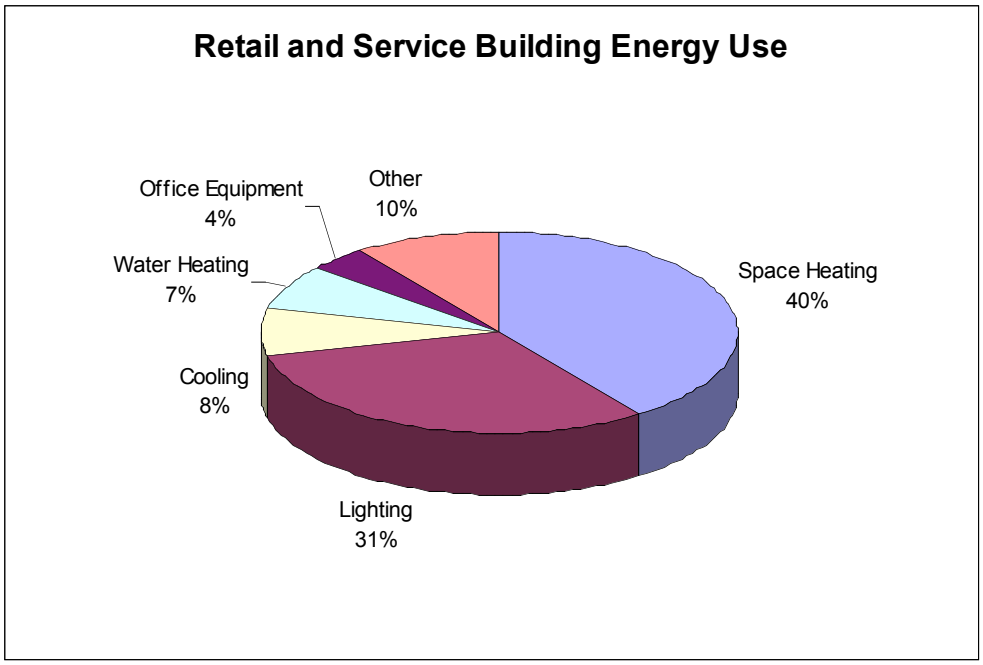

Figure 5. Typical Energy Use in Retail and Service Buildings

(Source: EIA, 2001b)

The primary uses of energy in retail and service building are for heating and cooling and for lighting. These uses account for about 80 percent of total energy use. Within the last year, as part of its energy planning effort, the Tribe has replaced existing lighting with energy efficient lighting (as discussed above), and has incorporated energy efficient heating and cooling as part of the recently completed expansion of the Clubhouse/conference center at the RV Park. Reductions in energy use as a result of these measures should be recognizable over the next few years.

Residential Energy Use

Although there is little existing residential development on Tribal lands, future residential development is planned for the Samish Homelands site near Lake Campbell. Figure 6 displays typical energy uses for the average home.

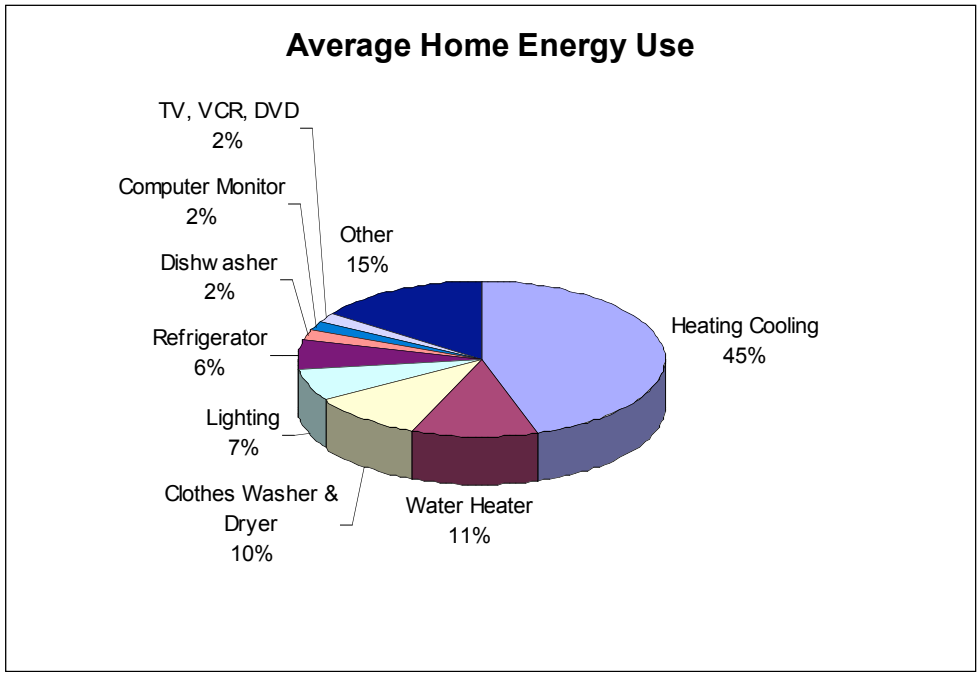

Figure 6. Typical Energy Use in Residential Buildings

(Source: Energy Star, 2005)

Similar to both office and commercial buildings, heating and cooling account for a large percentage (45 percent) of total residential energy use. Other residential uses that account for a significant portion of energy use include water heating (11 percent) and home appliances (more than 20 percent), including washer and dryer (10 percent), refrigerator (6 percent), dishwasher (2 percent), and home electronics (4 percent). Home lighting accounts for a relatively small portion of energy use (7 percent) compared to office and commercial buildings, where lighting accounts for about 30 percent of all energy use. Because of these differences, and because nearly all residential development will occur in the future, we recommend the following energy efficiency options:

- *Incorporating energy efficiency requirements into Tribal building codes.*
- *Installing geothermal heat pumps where feasible to reduce heating and cooling needs.*
- *Maximizing use of passive solar energy through site design.*

By incorporating energy efficiency requirements in Tribal building codes, we expect that heating and cooling demands, as well as energy demands from major appliances, will be minimized. By maximizing the use of passive solar energy through site design, heating and cooling demands can be further minimized. Finally, installing geothermal heat pumps can in some cases reduce heating and cooling needs by 30 to 60 percent (EERE, 2005b). While geothermal heat pumps are feasible for most locations in the U.S., we recommend that a site feasibility study be completed to determine the potential effectiveness and optimal design for installation at the Samish Homelands site.

4.4.3 Institutional and Administrative Options

To successfully implement actions that will begin moving the Tribe toward its energy goals, it is essential that the responsibility for program implementation and follow-through be assigned to individuals at both the staff level and at the policy level.

We recommend the following actions be taken to develop an internal structure for beginning implementation of this plan:

- *The Tribe should assign staff (either by name or by position) that will be responsible for coordination and implementation of strategic energy planning efforts.*
- *The Tribe should either establish a policy-level Energy Committee responsible for energy program oversight and implementation, or assign those duties to an existing policy-level committee.*

In addition to recommending actions for internal administrative organization, it is also important to pursue external institutional options. While the actions recommended above may reduce the Tribe's energy needs (energy efficiency options) or may provide small-scale sources of energy (energy generation options), neither is likely to achieve the Tribe's initial goal of obtaining at least 10 percent of its electricity from new renewable energy sources. The best option at this time for obtaining a greater portion of the Tribe's electricity from renewable

energy sources is to begin incorporating *green power purchasing* into current electric power purchases.

Green power refers to electricity that is partially or entirely generated from environmentally preferable renewable energy sources, such as solar, wind, geothermal, biomass, biogas, and low-impact hydro. All larger electric utilities in Washington State are required by law to offer their customers opportunities for purchasing green power. Some green power purchasing programs allow customers to directly purchase locally-generated renewable energy, and others allow customers to purchase what are known as "renewable energy credits" or "green tags".

When an electric utility sells electricity onto the electric grid, it receives the same price regardless of whether that energy was generated by fossil-fuels (coal, natural gas), hydroelectric turbines, or renewable sources (solar, wind). However, in addition to power, renewable sources also provide an *environmental benefit* because they can replace power that would have been generated by more damaging sources. That additional environmental benefit can be sold by the utility to provide an incentive for developing more renewable sources. In other words, a utility that produces renewable energy can sell its power, and it can also sell its environmental benefits. The environmental benefits are sold by energy brokers like a commodity, and are commonly referred to as green tags.

Incorporating green power purchasing into the Tribe's current electric power purchases can be accomplished by any of the following options:

- *Purchasing green power through the Tribe's existing supplier (Puget Sound Energy).*
- *Purchasing green power through other suppliers.*
- *Purchasing "renewable energy credits" or "green tags".*

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