

NANAIMO REGIONAL HOSPITAL DISTRICT

**SELECT COMMITTEE MEETING
TUESDAY, FEBRUARY 23, 2016
4:00 PM**

(RDN Committee Room)

A G E N D A

PAGES

CALL TO ORDER

DELEGATIONS

2-31 **Island Health Representatives**, re Energy Plant Upgrade (Report Attached).

MINUTES

32-34 Minutes of the Nanaimo Regional Hospital District Select Committee meeting held Tuesday, October 27, 2015.

BUSINESS ARISING FROM THE MINUTES

COMMUNICATIONS/CORRESPONDENCE

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UNFINISHED BUSINESS

ADDENDUM

BUSINESS ARISING FROM DELEGATIONS OR COMMUNICATIONS

NEW BUSINESS

ADJOURNMENT



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NRGH Potential Biomass Project Summary

Island Health

January 6th, 2016 (Revision 2)

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1. Background and Overview of Options, Benefits, and Drawbacks

This report is a summary of the proposed biomass boiler project at Nanaimo Regional General Hospital (NRGH) from a requirements, benefits and drawbacks perspective. A brief summary of the project details is provided, however the purpose of this report is to present the pros and cons of the project in order to inform the decision process on whether to proceed or reject the project.

Before considering any new alternative energy source, the first step is to exhaust all practical methods of energy conservation. At NRGH, significant efforts have been made to reduce the natural gas consumption and associated greenhouse gas (GHG) emissions through heat recovery, load reduction and other energy efficiency projects. However, even with this focused conservation effort, it is not practical to completely eliminate the need for high temperature thermal energy at the facility, which today is supplied with natural gas.

1.1 Regulatory and Policy Requirements

The provincial government has passed legislation focused on reducing GHG emissions. Part of that requirement is for Island Health facilities to be carbon neutral. Today that requirement is met by purchasing carbon offsets for the facilities' emissions, which are primarily due to the natural gas consumed for the heating plants. Using carbon offsets is a short-term localized solution, and ultimately each facility must eliminate its on-site emissions in order for the overall GHG objective to be truly realized. The provincial government has stated that the intent is for on-site emissions to also be reduced, not just offset.

Consequently, Island Health has also adopted the provincial target of reducing emissions by 33% below 2007 levels by 2020. As of the 2014 reporting year, Island Health has reduced absolute (on site) emissions by 2% below 2007 levels even with adding close to 10% additional floor space. It should be noted that the Regional District of Nanaimo is a signatory of the BC Climate Action Charter and has also adopted the provincial government's reduction targets.

To meet the provincial GHG reduction target requirement, and supply the high temperature energy that remains after energy conservation methods are exhausted, Island Health is required to switch to a renewable, low emissions fuel source such as renewable natural gas, biomass, or electricity:

- Renewable natural gas can be purchased from FortisBC and it has environmental benefits beyond the reduced greenhouse gas emissions but the commodity cost is considerably higher than natural gas or biomass (currently 58% more expensive).
- Switching to electricity for steam and heating has practical limitations on the existing electrical service and would require significant capital for addition of a new electric service and electric boiler. Also the cost per unit energy of electricity is currently almost the same as renewable natural gas making the switch to electric heating unattractive.
- Other renewable energy such as solar and wind power have been previously examined and the amount of infrastructure needed is deemed not practical for servicing the high temperature heating load at NRGH.

1.2 Natural gas and the future of the Carbon Tax

The provincial government has recently undertaken a review of its current climate change policies by appointing a Climate Leadership Team (CLT). The Team recently released a report with 32 recommendations that will ensure BC meets its 2050 legislated GHG emissions reduction targets. A number of recommendations have been put forth that are relevant to Island Health and the decision about the heating plant:

CLT Recommendation 5

Increase the carbon tax by \$10/yr commencing in July 2018.

CLT Recommendation 17

Update current forest policy and regulation to increase utilization of forest residue for energy purposes and increase carbon sequestration.

CLT Recommendation 20

Establish by 2016 a buildings strategy that by 2030 reduces greenhouse gas emissions from the sector by 50 per cent, and includes the following core elements:

a) Commencing in 2016, require that all new public sector buildings increase the use of materials that sequester carbon, and have the capacity of meeting most of their annual energy needs by on-site renewable energy.

The provincial government will decide in April 2016 if they adopt the recommendations. Given the recent agreements made in Paris at the United Nations Climate Conference we can expect these or similar types of measures to be taken. The impact of recommendation 5 to NRGH would be as follows, if natural gas continues to be utilized:

Carbon Tax Today	\$110,000 / year
Carbon Tax 2020	\$185,000 / year
Carbon Tax 2030	\$554,000 / year
Carbon Offsets (\$30/tonne)	\$100,000/year (in addition to above costs)

Drawbacks of continuing to use Natural Gas as a Primary Fuel and Buying Offsets:

- Although currently the lowest cost path, carbon tax and offsets will become significantly more expensive as described above.
- It is difficult to project what the cost of natural gas will do as the world moves away from fossil fuels.
- It does not solve the emission problem locally, and does not meet the provincial objective of reducing on site emissions.
- The environmental impacts associated with the extraction and transport of natural gas are not addressed.
- The use of offsets are intended to be a short term means of being carbon neutral and public sector organizations are expected to develop plans to minimize the need for offsets. The time to do this is when large infrastructure is replaced.

1.3 Renewable Natural Gas

A simple way to change to a renewable fuel is to obtain “Renewable Natural Gas” (RNG), instead of “fossil” natural gas. This methane (natural gas) comes from various methane recovery or anaerobic digestion projects, and is available through the existing network from FortisBC. The advantage of purchasing RNG over applying a carbon offset is that the methane making up RNG is actually recovered or produced, physically measured and pumped into the natural gas distribution system. Essentially RNG is a real commodity rather than a theoretical reduction.

Benefits of Procuring Renewable Natural Gas

- Requires no additional capital or special boiler equipment to achieve carbon neutrality.
- Is as clean burning as “fossil” natural gas.
- Supports agricultural and municipal projects locally and throughout BC.
- RNG production is real and measured
- Reduces or eliminates reliance on natural gas, and lowers demand for natural gas extraction and the associated environmental impact.¹

Drawbacks of Procuring Renewable Natural Gas

- Relatively expensive solution to reduce emissions – this path increases gas cost by \$550,000/year to purchase 100% of NRGH needs today.
- Limited supply, and future availability is uncertain as carbon tax increases on hydrocarbon based fuel may increase demand for RNG.

1.4 Biomass Boiler Option

To achieve the provincial objectives, a biomass boiler can be incorporated into the hospital heating system to supply the majority of the high temperature heating energy to the facility. A 2.5 MW output boiler would be capable of supplying over 80% of the heating needs using a low cost carbon-neutral fuel. Natural gas / fuel oil boilers would remain for back-up purposes, and to provide a small amount of energy during peak periods. RNG can be used for the “peaking” purposes to reduce emissions further and avoid projected carbon pricing escalation. The biomass boiler system would include exhaust cleaning technology to keep emissions very low, and the boiler would be able to handle a range of fuels and moisture content for fuel sourcing security. This system would be designed to meet the strictest emissions requirements in BC, which is in Metro Vancouver’s boilers emissions bylaw.

¹ LIBRARY OF PARLIAMENT RESEARCH PUBLICATIONS, “Shale Gas in Canada: Environmental Risks and Regulation”, Penny Becklumb, Jed Chong, Tim Williams, Economics, Resources and International Affairs Division 26 February 2015.

Benefits and Support of Biomass Boiler Option

- Operational cost savings due to low price of fuel. Annual cost savings of \$500,000 per year.
- Biomass project will pay for itself (the incremental cost on a new heating plant) in less than 7 years at the expected utility rates
- Project supports the local economy through local fuel purchase contracts, and local biomass supply
- Reduces reliance on natural gas, and lowers demand for natural gas extraction and the associated environmental impact.¹
- Project can improve the air quality for the overall airshed through clean efficient burning of material that normally would be openly burned in slash piles. This is in line with the BC Ministry of Environment's initiatives for limiting open burning of forest residuals near BC communities, as a means of improving air quality, reducing greenhouse gas emissions, and diverting forest residuals to higher-value uses.²
- Project is in line with the Provincial Governments' province-wide GHG reduction targets.
- Project is in line with the Regional District of Nanaimo Community Energy and Climate Action Plan³.
- Project is in line with the City of Nanaimo's Community Energy and Climate Action Plan⁴
- Project is supported by the BC Climate Action Secretariat

Drawbacks of Biomass Boiler Option

- Additional capital cost of \$5,000,000 (incremental on new boiler plant)
- Additional maintenance cost, and operator effort. Additional \$30,000/year for maintenance, ash disposal and inspections, and one FTE Plant Engineer' time (2000 hours/year) to look after the boiler and fuel system.⁵
- A small amount of particulate will be emitted locally, even after the emissions control equipment. The biomass system will be 99% cleaner than open burning. The remaining emissions will be in the order of magnitude of the amount of total particulate that is currently emitted by the existing natural gas boilers.⁶
- To achieve net air quality improvements, the project requires over 2% of forestry slash that would have been burned to be part of the biomass boiler fuel.
- Fuel sourcing risk
 - reliance on suppliers and contracts to provide fuel within specifications

² "Open Burning Smoke Control Regulation - Policy Intentions Paper for Consultation INTENTIONS PAPER", June 2010, British Columbia Ministry of Environment and Ministry of Healthy Living and Sport

³ Action 5.3 Convert non-diverted, residual waste to energy

⁴ Goal 4: Promote a Thriving Economy: Taking advantage of new business opportunities for a "green" economy that includes green energy generation based on renewable energy to substitute fossil fuels and promoting energy conservation for efficient energy use. The eventual goal is to create jobs, ensure real economic growth and prevent environmental pollution, degradation, and GHG emissions. Also the solid waste diversion plan – working towards zero waste, and the Energy & Emissions Management Policies (Plan Nanaimo, 2008) "Encourage the development of alternative energy supply options"

⁵ Note the plant engineer is assumed to already be present, and is not an incremental labour cost

⁶ Absolute particulate measurements from the existing boilers is not available at this time. However US EPA emission factors for natural gas boilers, and the GVRD Boiler Bylaw provides data on average particulate emissions from natural gas boilers

- competition for fuel can affect supply and price – long term contracts necessary
- labour disputes and weather can affect supply
- Significant plant area “footprint” on campus (410m²) for fuel storage and biomass boiler building

1.5 Financial Comparison (Using Current Prices) and Emission Levels

	Annual Fuel, Offsets & Incremental Maintenance Cost	Incremental Capital Cost	Local Particulate Emissions (Filterable PM) g/hour	Local Particulate Emissions (Filterable and Condensable) g/hour	Net Particulate Emissions (Total Life Cycle) g/hour
Natural Gas Boilers and Purchase Carbon Credits	\$ 980,000	\$ -	8.2	33	39
Natural Gas Boilers and Purchase Renewable Natural Gas	\$ 1,530,000	\$ -	8.2	33	33-39
Install 2.5 MW Biomass Boiler, Natural Gas Peaking Boilers	\$ 450,000	\$ 5,000,000	102	256	0

The emissions from the above table is based on the plant outputting 2.5 MW of heat. Emissions for the natural gas boilers are estimated based on standard US EPA emissions factors

Filterable particulate emissions of 102 g/hour (absolute quantity) is based on the concentration limit of 10 g/m³ of exhaust gas which is 44% less than the GVRD bylaw limit of 18 g/m³ for the size of boiler proposed.

Biomass net particulate emissions rely on including at least 2% forestry slash in fuel that would have otherwise been burned in the open. Including trucking and fuel processing, local particulate emissions for biomass is estimated at 257 g/hour assuming 4 hours of diesel engine operation per day to process and transport the fuel.

Financial analysis includes energy price escalation at 3.5%, and carbon tax increases of \$10/tonne starting 2018

1.6 Summary of Energy Prices:

The following table is a summary of the prices of fuel on a per unit energy basis at the time of the report, including the carbon taxes and carbon offsets, with demand charges factored in to the calculation as it relates to this project. Note that the electricity price is adjusted to account for the difference between electric heating and boiler efficiency:

	\$/GJ
Natural gas	\$13.16
Electricity	\$18.02
Renewable Natural Gas	\$20.55
Biomass (20% moisture)	\$3.81

Note that fuel prices given are current to the time of the report and are subject to change.

2. Biomass Boiler Project Background

NRGH's existing heating plant is at the end of its useful life. A new heating plant is planned, and there is an opportunity to include a biomass boiler as part of this overall project. The primary reason for switching to biomass fuel is to meet the provincial and Island Health GHG reduction targets. However, supplementing NRGH's heating plant with a biomass boiler (sized to operate as a base load all year) will also bring a financial benefit since biomass fuel is less expensive than natural gas.

A biomass boiler sized for 50% of peak load (2.5 MW output) will displace over 80% of the natural gas consumption at NRGH with biomass energy, and consequently reduce the fuel cost by about 55%, as well as reduce GHG emissions by about 79% for NRGH compared to today.

The main drawback of using biomass as a fuel compared to natural gas, is that a small amount of stack emissions exist, which is higher than the emissions of a modern natural gas plant. However, for the NRGH project, there would be an electrostatic precipitator on the biomass boiler. This pollution control equipment reduces emissions over 98% compared to if the biomass was burned in a slash pile. If the biomass can be obtained such that it is prevented from being burned in an open fire, a net emissions reduction will result, actually improving the overall air quality for Vancouver Island.

There are a number of special considerations to be made when deciding on a biomass boiler:

- Permitting and emission levels
- Fuel sourcing (securing clean reliable fuel)
- Fuel handling (unloading, clean-up, maintenance)
- Emissions control equipment (electrostatic precipitator)
- Maintenance (ash removal, cleaning, inspection, greasing moving parts, bearings)
- Public perception and buy-in (stake-holder consultation)

Many of these factors have been examined in the feasibility study for the project which can be found in Appendix C. A summary of the findings are provided in the following sections.

2.1 Fuel Sourcing Details

Securing long term fuel supply contracts is essential for the success of the biomass project. The contracts will outline the fuel composition, sizing, moisture content and acceptable fuel sources. The contract will also need to include how fuel is stored onsite, delivered, and the mechanisms for inspection and rejection of load if contamination or out-of-spec conditions exist.

A fuel management plan as outlined by the GVRD Boiler Bylaw will be developed that includes the following items:

- Fuel Specification – Size, moisture content, fuel type or source, contamination restrictions.
- Quality Assurance Plan – for testing, inspection and rejecting off quality fuel
- Fuel Storage Plan – for storage at the supplier's facility.
- Record Keeping Requirements

For NRGH, clean construction and demolition waste diverted from landfills is the desired primary fuel with at least 2% of forestry residuals from logging operations mixed in to generate a net air shed benefit.

Three suppliers were contacted, and all were willing to provide long term supply contracts. See Appendix A for the biomass supplier details, and Appendix B for a test of the fuel composition from one of the suppliers.

2.2 Biomass Fuel Moisture Content

The moisture content of the biomass fuel impacts the heat output of the boiler, and the amount of fuel consumed. Each biomass boiler is designed to handle a range of moisture contents, therefore care must be taken when selecting the boiler so that fuel moisture variations are not problematic. Fuel above 45% moisture content is not desirable, and the fuel contract will prevent wet deliveries. The operations staff can inspect the load prior to delivery, and reject it if too wet or contaminated. Rain during transport has a minor effect; however the supply contract will specify covered storage on the supplier’s site, and covered transport to prevent contamination, and reduce fugitive wood dust on the delivery path.

Table 1 Biomass heating values as a function of moisture content, and impact on boiler output

	Biomass Heating Value GJ/tonne	Compte Fournier ATC 250 Steam Boiler kW (thermal output)
Fuel Moisture at 10%	16.9	3060
Fuel Moisture at 20%	14.7	3060
Fuel Moisture at 35%	11.5	3000
Fuel Moisture at 50%	8.3	2800

2.3 Ash Disposal

A small amount of ash will remain as a waste product. This dry ash will come out of the boiler and the pollution control equipment. Typically about 1.2% of the mass of the fuel will be ash, meaning about 52 tonnes of ash will need to be disposed of annually (one per week).

This material can be sent to a cement plant for recycling, or can be certified as fertilizer (through a testing and certification process) and used in agriculture. Landfilling the ash would be the least desirable method of disposal.

2.4 Truck Traffic

For the proposed biomass system, fuel delivery will be preferably done within typical daytime hours. When operating at full capacity, the 2.5MW (8.5 MMBTUH) system will require on average one truck delivery per day. Provided the trucks follow the City of Nanaimo’s designated truck routes, the city has no objection for transporting the biomass to NRGH, or the ash out of the site for recycling, use as fertilizer or disposal.

Currently NRGH receives 25 to 55 truck deliveries per day. Adding one truck to this schedule should have little impact, particularly due to the existing variability in deliveries that occur already. NRGH is not aware of

any complaints from the existing truck traffic, and the additional biomass deliveries are not expected to be problematic with the public.

2.5 Exhaust Stack Consideration

In the feasibility study for this project, the issues around stack height (to meet the minimum requirements of the GVRD Bylaw) and interference with helicopter flight paths have been resolved. Dispersion modelling will be needed as part of the permitting process in order to finalize heights, and obtain the appropriate permits.

2.6 Stake Holder Engagement

At this point in the project, public stakeholders have not been contacted, and no public consultation process has been initiated. If the project passes the internal tests, then the next step will be to do a formal stakeholder engagement process.

However, the City of Nanaimo has been contacted about the project, and based on the preliminary information provided to them, the City is currently open to the concept.

3. Emission Descriptions, Requirements and Comparisons

3.1 Regulations

While the City of Nanaimo does not regulate air emissions at this time, cues can be taken from Metro Vancouver where stack gas concentrations from biomass boilers are regulated. Maximum values allowable by Metro Vancouver are presented below, along with comments:

Table 2 Regulated emission levels from the GVRD

	Filterable Particulate Matter	Carbon Monoxide	Volatile Organic Compounds	Opacity	Nitrous Oxides (NO _x)	Sulphur Dioxide (SO ₂)
< 3 MW Biomass Boiler	18 mg/m ³	250 ppmv	20 mg/m ³	5%	Not regulated	
Comments	System will be designed to emit less than 10 mg/m ³ using filter and ESP UBC achieved 2.4 mg/m ³	Boilers will be in compliance UBC achieved 3.4 mg/m ³	Boilers will be specified to be in compliance UBC achieved 70% below limit	Boiler flue gas opacity not available, but requirement will be met due to the ESP	NO _x Will be about 3x higher than existing natural gas boilers, without adding secondary options to reduce NO _x	

The biomass boiler system selected will meet the GVRD regulations, and it is intended that the installed system would operate at less than 10mg/m³ with respect to particulate, even though the regulated level is 18 mg/m³ for the 2.5 MW boiler needed.

The emissions levels listed above are stack gas concentrations. See Section 1.5 for total quantity of emissions accounting for firing rate and stack gas volumes.

In addition, the project would fulfill the other requirements of the GVRD regulations including

- continuous monitoring equipment,
- fuel source plan,
- dispersion modelling
- prescribed tune up and testing intervals
- fuel inspection and testing
- record keeping

The above practices will ensure the system is operating as intended, emissions are kept below desired levels, and the net benefits of using biomass as a fuel are preserved.

3.2 Particulate Emissions

Particulate emissions are the greatest concern in regards to a biomass boiler. In general particulates can be divided into three categories:

- **PM_{2.5}** - Filterable particulate of 2.5 micrometers or smaller in diameter
- **PM₁₀** – Filterable particulate of 10 microns or smaller in diameter (contains PM_{2.5} as a subset)
- **Condensable Particulate** – are emissions that are gaseous at the exhaust temperature, but condense out at room temperature into solid material. These are not considered filterable because of the gaseous nature at stack temperatures. They by nature are considered smaller than 2.5 micrometers.
- **Definition** - Filterable particulate means any size of solid particulate that can be filtered out of the airstream. It includes PM_{2.5} and PM₁₀ as a subset, plus any larger solid particulate that is present.

PM 2.5 and condensable particulates are considered the most detrimental for health because of the small diameter and tendency to get lodged in cardio-pulmonary tissues.

3.3 Comparative Emissions (Concentrations)

The emissions limits for the GVRD are presented below, along with maximum expected from the proposed boiler, the estimated emissions from the current natural gas plant, and also for reference emissions measured from UBC’s biomass boiler: It is expected that the system installed at NRGH would have similar emissions levels to the UBC system, although it would be a different boiler technology.

Table 3 Emission comparison between proposed biomass plant, GVRD limits, UBC system, and Existing Boilers

	Filterable Particulate Matter mg/Sm ³	Condensable Particulate Matter mg/Sm ³	Carbon Monoxide mg/Sm ³	Nitrous Oxides (NO _x) mg/Sm ³	Volatile Organic Compounds mg/Sm ³
Metro Vancouver Limits	18	Not regulated	250	n/a	20
Proposed Boilers (level depends on options)	< 10	< 15	12-250	203-500	< 20
UBC Biomass Measured Emissions (Dec 2013 stack tests)	2.4	n/a	70% below limit	231	4.1
Existing Natural Gas Boilers	2.8	8.42	124	360	2.1

The emissions levels listed above are stack gas concentrations. See Section 1.5 for total quantity of emissions accounting for firing rate and stack gas volumes.

3.4 Comparison with slash burning

In order to have a net positive effect to the regional airshed, it is proposed to obtain some of the boilers fuel from forestry residuals that would normally be burned in slash piles. Emissions from the proposed biomass system will be approximately 98% cleaner than open burning due to the combustion and emissions clean up equipment (electrostatic precipitator) present. The US EPA's deemed emissions factors were used to demonstrate the benefit of controlled combustion in a modern boiler system, compared to open pile burning in the forest.⁷

Table 4 Emissions reduction for boiler combustion compared to open burning

	Filterable Particulate Matter	Carbon Monoxide
Reduction over burning slash pile	98% reduction	93% reduction

Overall there is close to 95% less emissions if the slash is consumed in a modern biomass boiler, rather than being burned in an open pile.

⁷ US EPA, < http://www3.epa.gov/ttnchie1/eiip/techreport/volume03/iii16_apr2001.pdf>.

4. Lifecycle Greenhouse Gas Emissions

4.1 Natural Gas

Thermal energy derived from natural gas emits GHGs from the combustion process, and also from upstream activities required to extract, process and deliver the gas to the point of end-use. Together these make up the lifecycle or “cradle to grave” emissions.

Depending on methodology and assumptions, total lifecycle emissions for natural gas-derived thermal energy is between about 57⁸ and 84⁹ kg CO₂-e per GJ, of which most (50 kg) is from the combustion process.

4.2 Biomass

For biomass wood chips, the combustion process does not contribute to net GHG emissions because this carbon was sequestered from the atmosphere during tree growth, but there are still emissions associated with processing and delivering the fuel to the point of end use.

Literature indicates these emissions to be just over 4^{1,2} kg CO₂-e per GJ. Of this, a small portion (about 0.8 kg)^{10,11,12} are from transporting the biomass by truck.

4.3 Electricity

For electricity delivered by BC Hydro the lifecycle GHG emissions are quite low (0.01 kg CO₂-e per kWh¹³, or 2.8 kg CO₂-e per GJ) due to the large percentage of hydroelectric power generation in British Columbia.

⁸ DEFRA / Department of Energy and Climate Change, <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69554/pb13773-ghg-conversion-factors-2012.pdf>.

⁹ World Energy Council, <https://www.worldenergy.org/wpcontent/uploads/2012/10/PUB_Comparison_of_Energy_Systems_using_lifecycle_2004_WEC.pdf>.

¹⁰ NRCAN, <<http://www.nrcan.gc.ca/energy/efficiency/transportation/commercial-vehicles/reports/7607>>.

¹¹ Environment Canada, <<https://ec.gc.ca/ges-ghg/default.asp?lang=En&n=AC2B7641-1>>.

¹² Assuming 20 tonnes biomass per truckload, 250 km round trip, 15% biomass moisture content.

¹³ BC Ministry of Environment, <http://www2.gov.bc.ca/assets/gov/environment/climate-change/policy-legislation-and-responses/carbon-neutral-government/measure-page/2014_bc_best_practices_methodology_for_quantifying_greenhouse_gas_emissions.pdf>.

4.4 Total Combined Emissions

Accounting for lifecycle emissions from all relevant energy sources (gas, biomass and electricity) the site wide GHG emissions are presented for NRGH currently, and also if the biomass project is implemented in the following table:

Table 5 Annual emissions from NRGH's existing natural gas boiler plants

	Standard GHG Emissions Factor for BC (kg CO2-e/GJ)	Lifecycle GHG Emissions Factor (kg CO2-e/GJ)	Current NRGH Consumption (GJ)	Standard GHG Emissions for BC (tonnes CO2-e)	Lifecycle GHG Emissions (Tonnes CO2-e)
Electricity	2.8	2.8	46,700	131	131
Gas	49.8	70.3	74,300	3,696	5,225
Totals Per Year (Current Case):				3,827	5,356

Table 6 Annual emissions projected for NRGH with biomass boiler included in new boiler plant

	Standard GHG Emissions Factor for BC (kg CO2-e/GJ)	Lifecycle GHG Emissions Factor (kg CO2-e/GJ)	NRGH Consumption With Biomass System (GJ)	Standard GHG Emissions for BC (tonnes CO2-e)	Lifecycle GHG Emissions (Tonnes CO2-e)
Electricity	2.8	2.8	48,600	136	136
Gas	49.8	70.3	9,800	488	689
Biomass	0	4.4	63,900	-	280
Totals Per Year (Biomass Case):				624	1,106
Annual GHG Savings (Tonnes):				3,204	4,250
Savings (%):				84%	79%

5. Biomass Project Financial Summary and Sensitivity Analysis

5.1 Commodity Prices, Carbon Tax and Offset Prices:

5.1.1 Natural Gas Prices

Recently the natural gas delivery charges from FortisBC have been reduced in line with rates across other service areas of BC. At present, Island Health is paying approximately \$12.279 per GJ for all costs associated with natural gas energy including commodity charges, delivery charges, carbon tax, and other taxes.

This rate is lower than what was used when this project was originally proposed but is now used as a base case for the sensitivity analysis. Net present value of the biomass project is modeled against annual gas price escalation ranging from -5% to +15% compared to the base price.

Of all relevant energy sources (gas, electricity and biomass), the project's business case is most sensitive to gas prices.

5.1.2 Carbon Tax

As previously described, it is proposed to the Provincial Government by the BC Climate Leadership Team that the carbon tax increase by \$10/tonne every year starting at 2018, until it reaches \$300 / tonne in 2050. This escalation is included in the baseline financial analysis.

5.1.3 Electricity Prices

In September 2015, BC Hydro filed a rate design application with the BC Utilities Commission to change the Large General Service rate structure, effective April 2017¹⁴. This comes as a result of detailed review and stakeholder consultation which determined the current rate structure is difficult to implement and not well understood by customers.

From the rate design application, "the key issue with the existing LGS two-part energy rate is that it does not provide a clear price signal for conservation and is poorly understood by customers. The result is that minimal conservation savings have been delivered to date, and that BC Hydro cannot count on and does not forecast any conservation savings going forward." (BC Hydro, 2015).

Assuming the application is approved, current LGS Part 1 and 2 charges with the rolling monthly baseline will disappear and be replaced with a new flat rate for electrical energy of approximately 5.56 cents/kWh. This is slightly higher than the existing part 1 rate of 5.13 cents, and significantly less than the existing part 2 rate of 9.9 cents. There will also be a new flat rate for peak demand of approximately \$11.20/kW, which is slightly higher than the existing highest marginal rate of \$10.55/kW.

The biomass boiler project would cause a slight increase in electricity consumption and peak demand, so the lower proposed electrical energy rate will slightly benefit the project's business case. Sensitivity to electricity prices is low so modeling is not necessary.

¹⁴ BC Hydro, <<https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-matters/2015-rda.pdf>>.

5.1.4 Renewable Natural Gas Price

Renewable natural gas is currently available from FortisBC at a cost of \$20.55 / GJ including taxes.

5.1.5 Biomass Prices

Biomass price varies based on fuel type and quality. Wood pellets are the most expensive form of biomass due to the low moisture content, and high uniformity. Hog fuel (bark) is the least expensive. The following table lists the prices expected for the region, for clean C&D waste mixed with some forestry residuals which is the preferred fuel mix for the NRGH project.

Cost of Biomass for NRGH	
\$56.0	/ tonne delivered (tax incl.)
\$3.32	/GJ @ 10% moisture content
\$3.81	/GJ @ 20% moisture content
\$4.46	/GJ @ 30% moisture content
\$5.37	/GJ @ 40% moisture content

Biomass energy prices have been modeled assuming a 20% moisture content and biomass energy price escalation ranging from 0% to +10% annually. Also a sensitivity on the project simple payback was performed if the initial biomass price is 50% higher than the rate given today.

5.2 Summary of Energy Prices:

The following table is a summary of the prices of fuel on a per unit energy basis, including the carbon taxes and carbon offsets, with demand charges factored in to the calculation as it relates to this project. Note that the electricity price is adjusted to account for the difference between electric heating and boiler efficiency:

Fuel Cost Comparison	\$/GJ
Natural gas	\$13.16
Electricity	\$18.02
Renewable Natural Gas	\$20.55
Biomass (20% moisture)	\$3.81

Note that fuel prices given are current to the time of the report and are subject to change.

5.3 Simple Business Case (compared to business as usual)

Based on current fuel costs, the biomass boiler project would reduce operating (including fuel) costs by about \$530,000 per year. For an incremental cost of \$5,000,000 this means the simple payback is about 9 years accounting for fuel price escalation of 3.5%.

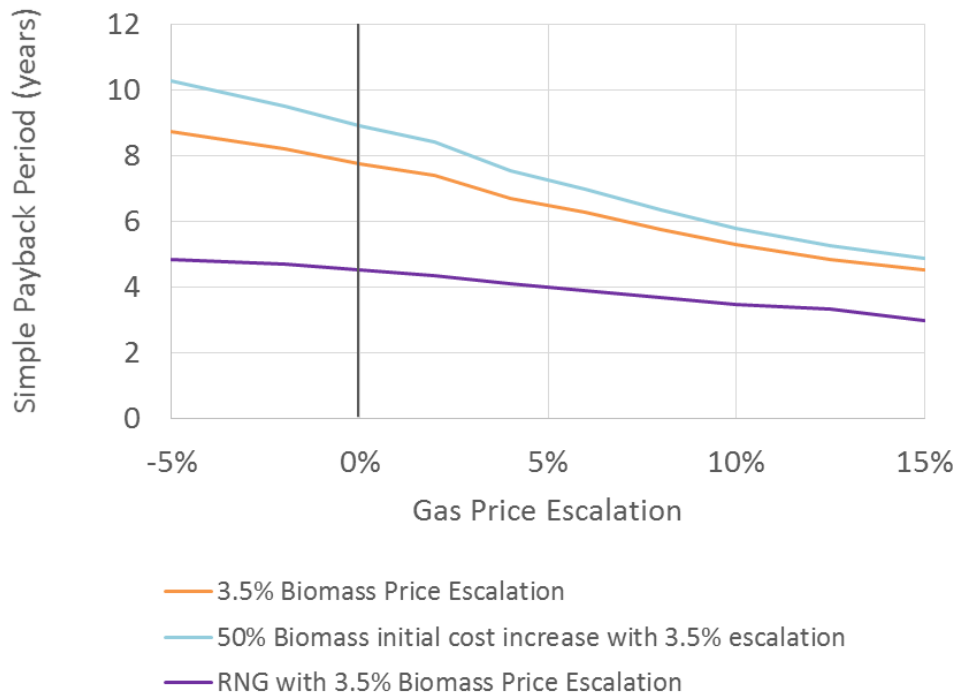
Table 7 Simple business case for biomass project compared to business as usual, and 100% renewable natural gas purchase

	Natural Gas cost (Including taxes and offsets)	Electrical energy and demand cost	Biomass energy + incremental labour cost	Total
Baseline	\$978,136	\$2,700		\$981,000
Biomass Project	\$129,584	\$43,800	\$273,000	\$447,000
Renewable Natural Gas	\$ 1,527,000	\$2,700		\$1,529,000

First-year OpEx costs (assuming no annual fuel price escalation)

A simple payback sensitivity was also performed for the biomass project for a variety of annual gas price escalations (with annual electricity and biomass price escalation fixed at 3.5%). A scenario was also run for the case where biomass fuel price was 50% higher at the onset of the project:

Figure 1 Simple payback for biomass project with sensitivity analysis to natural gas and biomass price



5.4 NPV and IRR Analysis

Net present value (NPV) and internal rate of return (IRR) of the biomass project option have been modeled assuming 20-year project life, with annual cash flows discounted at a rate of 3%. These models are shown below:

Figure 2 NPV analysis for biomass project with sensitivity analysis to natural gas and biomass price

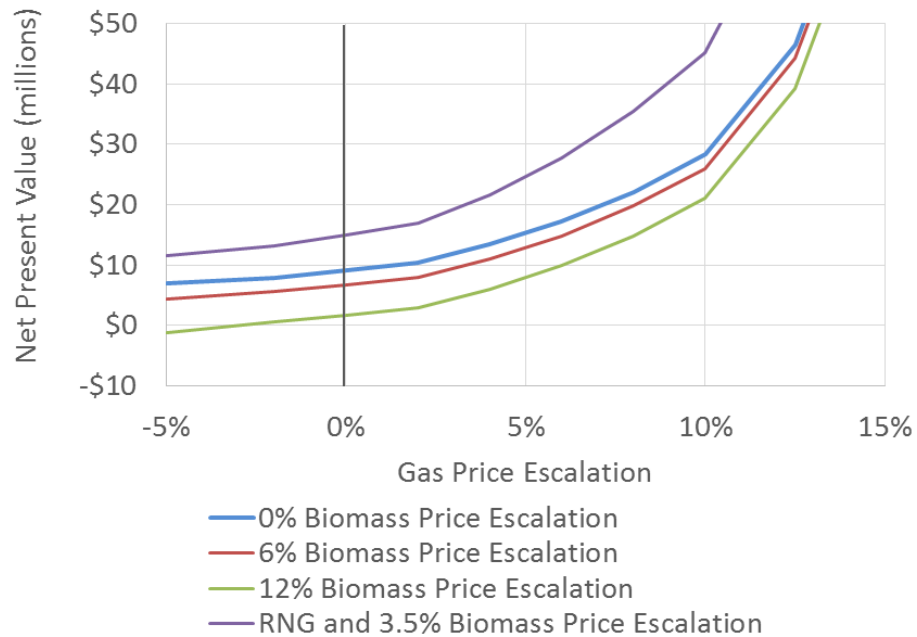
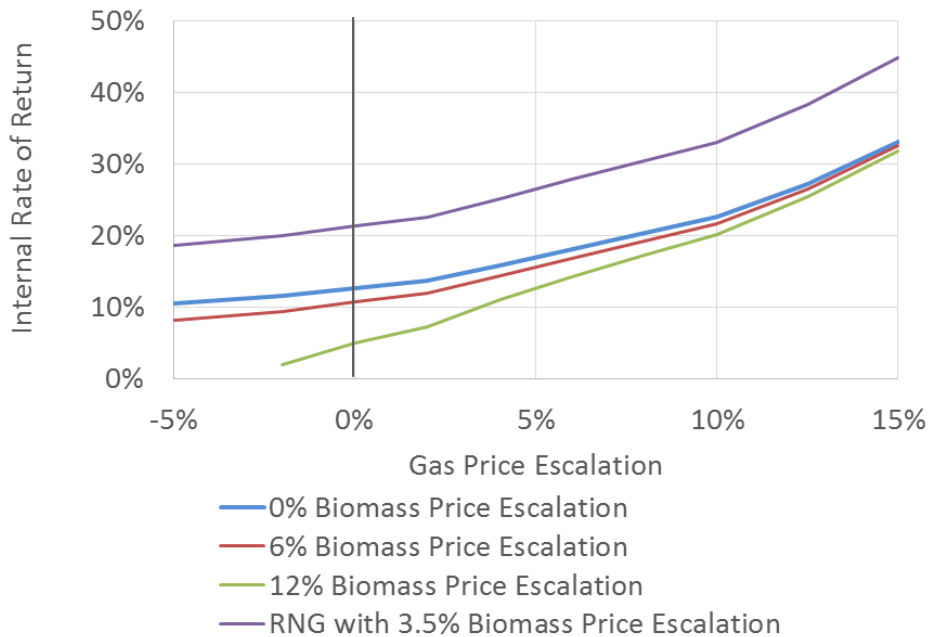


Figure 3 IRR analysis for biomass project with sensitivity analysis to natural gas and biomass price



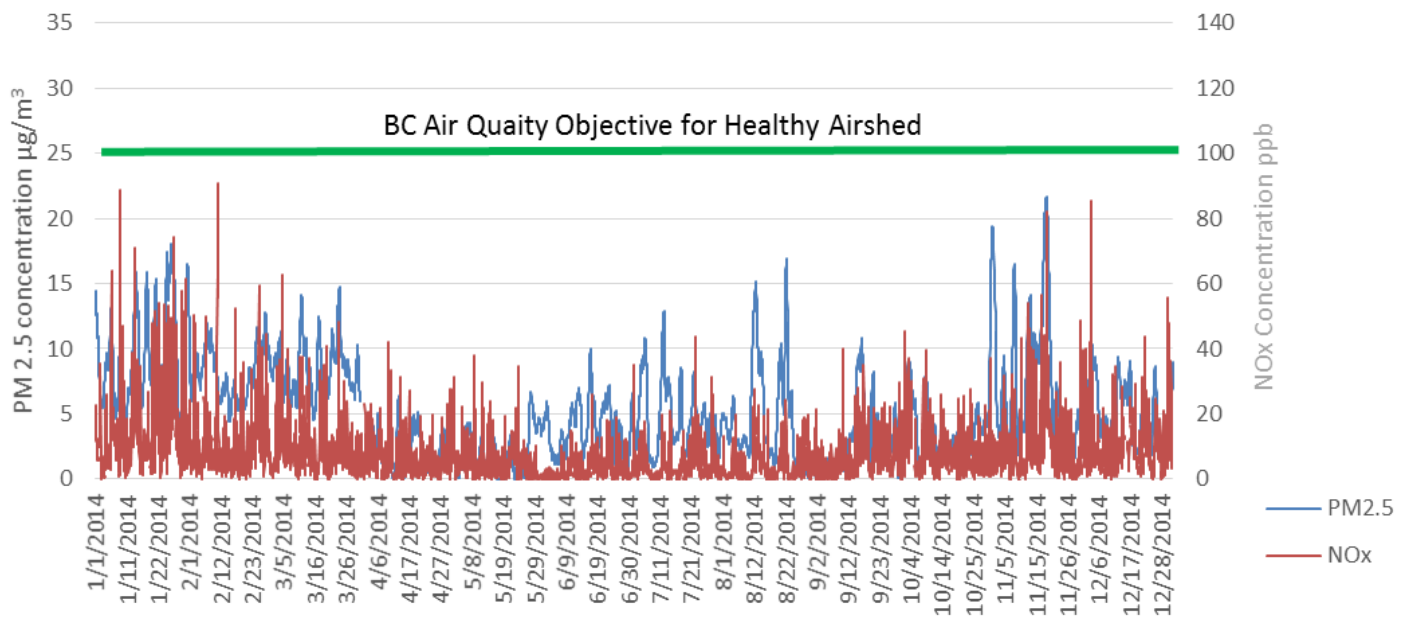
6. Nanaimo Air Quality Summary

The City of Nanaimo in general has very good air quality, and typically recorded pollutants are well within the levels considered healthy. Intermittently, forest fires and other major events will push pollution levels higher, but these are isolated events.

The BC Ministry of Environments is working on initiatives for limiting open burning of forest residuals near BC communities, as a means of improving air quality, reducing greenhouse gas emissions, and diverting forest residuals to higher-value uses.¹⁵ The proposed biomass project can facilitate this initiative, and help improve the air quality for the overall airshed through providing a clean, efficient alternative for burning forestry residuals that normally would be openly burned in nearby slash piles.

For reference, last years' air quality in Nanaimo for NO_x and PM_{2.5} was as follows:

Figure 4 Nanaimo air quality – NO_x and PM_{2.5} levels for 2014



PM_{2.5} is shown as a 24 hour average, with the limit for 24 hours being 25 µg/m³ for ambient air. NO_x is shown as an hourly value with the limit being 100 ppb for a one hour period.

Annual averages for Nanaimo are

5.4 µg/m³ for PM_{2.5}, which is also below the limit of 8.

7.4 ppb for NO_x, which is also below the limit of 32 ppb.

¹⁵ "Open Burning Smoke Control Regulation - Policy Intentions Paper for Consultation INTENTIONS PAPER", June 2010, British Columbia Ministry of Environment and Ministry of Healthy Living and Sport



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To: Deanna Fourt
From: Jamie Oliver
Date: February 1, 2013
Re: Biomass costs for North Island hospitals

Hi Deanna,

We have looked into biomass fuel costs for VIHA’s northern Vancouver Island hospitals. Here is a summary of our findings:

Due to private wood recycling operations in the Comox and Campbell River areas, the North Island hospitals would benefit from a local supply of biomass chips. These chips could be sourced primarily from construction waste (2x4s, pallets, etc.) free of nails and paint, with a moisture content of less than 50%. Glue can also be excluded from this waste source if necessary. Chipped slash would also be a potential fuel source, although the moisture content in slash would likely be higher than in construction waste.

Long term supply contracts would be available for VIHA. It would be useful to know the expected heating loads of the hospital(s) in order to determine how much biomass is required, but for the time being it appears that 5,000 tons/year should be available (for comparison, this would be the biomass fuel demand at NRGH). Chips would be processed and stored under cover to keep moisture content down.

These biomass chips are available in the Comox, Campbell River and Nanaimo areas for approximately \$35/tonne, \$40/tonne and \$50/tonne, respectively (costs above \$35/tonne are due to more complex delivery requirements). Biomass heating value is greatly dependant on moisture content. The lower the moisture content, the more heat per tonne of fuel, and hence the less VIHA would pay per GJ of fuel.

The following table shows the cost per GJ of biomass energy for a range of moisture contents:

Table 1. Biomass Fuel Cost for Northern Vancouver Island

Location:	Comox	Campbell River	Nanaimo
Approximate fuel cost:	\$35 / tonne	\$40 / tonne	\$50 / tonne
Fuel cost @ 50% moisture:	\$4.27 / GJ	\$4.88 / GJ	\$6.10 / GJ
Fuel cost @ 40% moisture:	\$3.37 / GJ	\$3.85 / GJ	\$4.81 / GJ
Fuel cost @ 30% moisture:	\$2.78 / GJ	\$3.17 / GJ	\$3.97 / GJ

These fuel costs are based on the following assumptions:

Table 2. Heating Value Assumptions

Moisture Content	Heating Value (GJ/tonne)
50%	8.2
40%	10.4
30%	12.6

We would suggest that VIHA could specify less than 40-45% moisture content to be supplied in their purchase contract (or at least the contract pays for fuel on a 45% moisture basis; for example, the supplier would have to test and indicate the moisture content of weekly shipments). Note that lower moisture content is also beneficial for boiler operation.

We hope this information is clear and useful for VIHA. Please do not hesitate to contact us if you require any further details.

Best Regards,

Jamie Oliver, MEng, EMIT
Energy Consultant
Willis Energy Services Ltd.
604-685-2206 ext. 30
joliver@willisenergy.com

SGS

CONSTRUCTION DEBRIS
GROUND BY A TUB GRINDER

REPORT OF ANALYSIS

Principal:
Pacific Wood Waste Inc.,
3, Box 187
2401 Cliffe Avenue
Courtenay, BC

Issued: July 12, 2013

SAMPLE I.D.	:	Wood Waste Sample
DATE RECEIVED	:	July 8, 2013

Report No. : 203-16498

The sample(s) to which the findings recorded here (the "Findings") relate were drawn and/or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representation of any goods and strictly relate to the sample(s) are said to be extracted. The Company accepts no liability with regard to the origin or source from which the sample(s) are said to be extracted.

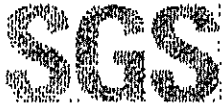
THIS IS TO REPORT that in accordance with instructions received from our Principal, Pacific Wood Waste Inc., to perform analysis of the above mentioned sample, we hereby report the following:

<u>ANALYSIS</u>	<u>AS RECEIVED BASIS</u>	<u>AIR DRY BASIS</u>	<u>DRY BASIS</u>	<u>METHOD</u>
% Moisture	14.19	7.27	----	EN 14774-2
% Ash	1.12	1.21	1.31	EN 14775
% Volatile Matter	69.20	74.78	80.64	DD CEN/TS 15148
% Fixed Carbon	<u>15.49</u>	<u>16.74</u>	<u>18.05</u>	By Difference
	100.00	100.00	100.00	
% Sulphur	0.03	0.04	0.04	ISO 19579
% Chlorine	0.039	0.043	0.046	ASTM D 4208
<u>Calorific Value (Gross)</u>				
Btu/Lb	7469	8071	8704	EN 14918
Kcal/Kg	4149	4484	4836	EN 14918



V. Sharma, Laboratory Supervisor

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CONSTRUCTION DEBRIS AND
LAND CLEARING MIX
Horizontal Granular

November 29, 2013

PACIFIC WOOD WASTE INC.
Box 187
#3 - 2401 Cliffe Avenue
Courtenay
BC V9N 2L5
Canada

Page 2 of 2

REPORT OF ANALYSIS

SGS Minerals Sample ID: 203-1300514.002

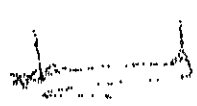
ULTIMATE ANALYSIS

	Method	As Received	Dry
Moisture, Total %	ASTM E871	27.54	
Moisture, 60 Mesh %	ASTM D3173	5.84	
Ash %	ASTM D1102	3.06	4.23
Sulfur %	ASTM D4239A	0.04	0.05
Carbon %	ASTM D5373	36.49	50.36
Hydrogen %	ASTM D5373	4.23	5.84
Nitrogen %	ASTM D5373	0.18	0.25
Oxygen (by difference) %	(by diff)	28.46	39.27

MISCELLANEOUS ANALYSIS

	Method	As Received	Dry
Chlorine, Cl %	ASTM D4208	0.043	0.059

Tests	Method	Result	Unit
Moisture, 8 Mesh	ASTM E871	27.54	%


Vishwa Sharma
Lab Supervisor

Minerals Services
7500 76th Street Delta t (604)-946-2249 f (604)-846-2257 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

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November 29, 2013

PACIFIC WOOD WASTE INC.

Box 187
3 - 2401 Cliffe Avenue
Courtenay
BC V9N 2L5
Canada

Page 1 of 2

REPORT OF ANALYSIS**SGS Minerals Sample ID: 203-1300514.002**

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THIS IS TO REPORT that in accordance with instructions received from our Principal to perform analysis of the above mentioned sample(s), we hereby report the following:

PROXIMATE ANALYSIS

	<u>Method</u>	<u>As Received</u>	<u>Dry</u>
Moisture, Total %	ASTM E871	27.54	
Moisture, 60 Mesh %	ASTM D3173	5.84	
Ash %	ASTM D1102	3.06	4.23
Sulfur %	ASTM D4239A	0.04	0.05

CALORIFIC VALUES

	<u>Method</u>	<u>As Received</u>	<u>Dry</u>
Calorific Value Btu/lb	ASTM D5865	6138	8471
Calorific Value kcal/kg	ASTM D5865	3410	4706
Calorific Value KJ/Kg	ASTM D5865	14278	19705
Calorific Value GJ/MT	ASTM D5865	14.28	19.70
Net CV @ C. Pressure Btu/lb	ASTM D5865	5454	7926
Net CV @ C. Pressure kcal/kg	ASTM D5865	3030	4403
Net CV @ C. Pressure KJ/Kg	ASTM D5865	12685	18435
Net CV @ C. Pressure GJ/MT	ASTM D5865	12.69	18.44

Vishwa Sharma
Lab Supervisor

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7500 76th Street Delta t (604)-946-2249 f (604)-946-2257 www.sgs.com/minerals

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REGIONAL DISTRICT OF NANAIMO

**MINUTES OF THE NANAIMO REGIONAL HOSPITAL DISTRICT SELECT COMMITTEE MEETING
HELD ON TUESDAY, OCTOBER 27, 2015 AT 5:00 PM IN THE
RDN COMMITTEE ROOM**

In Attendance:

Director W. Pratt	Chairperson
Director A. McPherson	Electoral Area A
Director J. Stanhope	Electoral Area G
Director I. Thorpe	City of Nanaimo
Director M. Lefebvre	City of Parksville
Director T. Westbroek	Town of Qualicum Beach

Also in Attendance:

Director B. Veenhof	Electoral Area H
P. Thorkelsson	Chief Administrative Officer
J. Harrison	Director of Corporate Services
W. Idema	Director of Finance
C. Golding	Recording Secretary

CALL TO ORDER

The Chairperson called the meeting to order.

DELEGATION

Cecil Rhodes, Corporate Director, Facilities Operations, Suzanne Fox, Executive Director, Geography 2 & IHealth, Dr. Drew Digney, Executive Medical Director, Geography 2, Chris Sullivan, Director, Capital Planning.

Island Health staff provided the following updates:

Due to bundling of imaging equipment purchases and cost-sharing with the District Hospital Foundation, two CT scanners instead of one can be purchased. A request for reallocation of 2013/14 funds for minor capital projects totaling \$170,000 and Capital Equipment purchases totaling \$213,928 was presented.

An update on the Unit dose Medication Distribution/Pharmacy Upgrade project was provided. Cost is estimated at \$4.6 million, decreased from the original \$5.4 million. The NRHD 40% share = \$1.86 million.

Confirmation of 40% cost-sharing of the funding for the 12.5 million for the Electrical Energy Plant was requested.

The NRHD Board previously indicated support for a conventional gas/fuel boiler in May 2015. Island Health staff and the Province are planning to move forward with a Hybrid Biomass Energy Plant in future and are requesting 40% funding from the NRHD up to the \$12.5 million estimated cost of a conventional system to be used towards the cost of a Hybrid Biomass plant. Island Health and the Province would cover 100% of the difference in costs associated with this project.

MINUTES

Minutes of the Nanaimo Regional Hospital District Select Committee meeting held Tuesday, April 28, 2015.

MOVED Director Lefebvre, SECONDED Director McPherson, that the minutes of the Nanaimo Regional Hospital District Select Committee meeting held Tuesday, April 28, 2015, be adopted.

CARRIED

REPORTS

Island Health Funding Requests and Project Updates.

MOVED Director Westbroek, SECONDED Director Stanhope, that the report on Island Health project updates and funding requests be received for information.

CARRIED

MOVED Director Stanhope, SECONDED Director Lefebvre, that the reallocation of \$383,928 in 2013/14 annual capital grant funding to revised priority projects and equipment purchases and that the updated plan for the purchase of two CT Scanners using 2014/15 NRHD funding be approved.

CARRIED

MOVED Director Stanhope, SECONDED Director Lefebvre, that the updated project cost information for the Unit Dose Medication Distribution/Pharmacy upgrade project be received for information and approved at the lower funding level amount of \$1.86 million.

CARRIED

MOVED Director Westbroek, SECONDED Director Thorpe, that Nanaimo Regional Hospital District capital funding for the Electrical Energy Plant Redevelopment at the Nanaimo Regional General Hospital up to the requested \$5 million be approved.

CARRIED

MOVED Director Westbroek, SECONDED Director Thorpe, that this matter be referred to staff to obtain further information from Island Health regarding the Energy Plant Upgrade Project including information about air quality impacts, natural gas rates used for the operational cost savings estimates, greenhouse gas reduction calculations and impacts to the hospital community as a result of trucks hauling hog fuel into the area and ash out:

That future capital funding up to the requested \$5 million for the Boiler Plant Replacement at Nanaimo Regional General Hospital be approved at an amount equivalent to the 40% share of the cost of a conventional gas/fuel boiler be approved.

CARRIED

Nanaimo Regional Hospital District 2016 Preliminary Budget.

MOVED Director Westbroek, SECONDED Director Thorpe, that a 2016 Regional Hospital District Provisional Budget be approved with the following components:

Property tax requisition	\$	6,984,190
Capital grant allowance	\$	3,444,055

CARRIED

MOVED Director Lefebvre, SECONDED Director Thorpe, that the 2016 to 2020 five year projections be received for information.

CARRIED

MOVED Director Westbroek, SECONDED Director Lefebvre, that "Nanaimo Regional Hospital District (Nanaimo Regional General Hospital Electrical Energy Plant Redevelopment) Borrowing Bylaw No. 161, 2015", be introduced and read three times.

CARRIED

MOVED Director Westbroek, SECONDED Director Lefebvre, that "Nanaimo Regional Hospital District (Nanaimo Regional General Hospital Electrical Energy Plant Redevelopment) Borrowing Bylaw No. 161, 2015", be adopted.

CARRIED

NEW BUSINESS

Hospital Area Development Planning.

In response to a request from the City of Nanaimo for a NRHD participant in the hospital area community planning process, Geoff Garbutt, General Manager, Strategic & Community Development, was appointed by the Committee to attend the meetings and update the Nanaimo Regional Hospital District Select Committee members as needed.

Reserve Funds.

MOVED Director Westbroek, SECONDED Director McPherson, that staff prepare a report outlining cost implications of increasing reserve funds over the next 10 years to ensure funding is available to provide 10% of the NRHD's share for a significant project such as a patient tower in future.

CARRIED

ADJOURNMENT

MOVED Director Westbroek, SECONDED Director Stanhope, that this meeting be adjourned.

CARRIED

TIME: 5:55 PM

CHAIRPERSON

CORPORATE OFFICER

TO: Dennis Trudeau
Interim Chief Administrative Officer

DATE: February 16, 2016

FROM: Wendy Idema
Director of Finance

SUBJECT: Request for Approval of 2016/2017 Capital Equipment and Minor Capital Project Lists

RECOMMENDATIONS:

1. That the 2016/2017 list of minor capital improvement projects with Nanaimo Regional Hospital District cost sharing in the amount of \$1,215,802 be approved.
2. That the 2016/2017 list of capital equipment purchases with Nanaimo Regional Hospital District cost sharing in the amount of \$851,438 be approved.
3. That \$1,376,815 in unallocated annual minor capital funding from 2016/17 request be split with \$776,815 redirected to Regional Hospital District cost shared large capital projects and \$600,000 held in contingency for minor capital projects and equipment purchases.
4. That the \$868,435 in unallocated prior year minor capital funding be reallocated to the NRGH Electrical Energy Plant Upgrade project.

PURPOSE:

To present Island Health's 2016/2017 capital equipment and minor improvement project lists for approval.

BACKGROUND:

Island Health has provided the attached letter (Appendix A) to detail their requests for minor capital equipment and project funding for the 2016/17 year. The request for annual minor capital grant funding is \$3,444,057 which is unchanged from 2015 and is based on the Nanaimo Regional Hospital District (NRHD) provisional budget amounts. These funds are typically used by Island Health for the purchase of minor capital equipment items and to undertake smaller capital projects under \$1.5 million. In the past few years however, these funds have also been partially allocated to larger capital projects such as towards the Emergency Room and replacement CT Scanners.

Appendix B lists minor capital improvement projects. Island Health expects to spend \$1,984,037 in 2016/17 and is requesting 40% cost sharing in the amount of \$1,215,802. Two of the projects are continuations of previously approved 2015/16 projects for building/control system upgrades.

Appendix C lists minor capital equipment. Island Health expects to spend \$2,128,596 in 2016/17 and is requesting cost sharing from the NRHD at 40% or \$851,438. Staff do not comment on the selections made by Island Health except to verify that the equipment or projects are for facilities funded by the Nanaimo Regional Hospital District (NRHD). The list has been reviewed and staff believe all items are appropriate for funding.

The total equipment/capital projects funding requested for 2016/17 is \$2,067,240 which does not fully utilize the 2016 funding envelope of \$3,444,055. Island Health's letter includes \$1,376,815 as unallocated funding, a portion of which Island Health may request at a later date as they complete their 2016/17 minor capital prioritization process. The relatively large unallocated funding occurs because Island Health is using its provincial funding for larger capital projects.

A similar situation occurred in 2014/15 and 2015/16 where there was unallocated funding. Discussion with Island Health indicates they will like utilize up to \$600,000 of the \$1,376,815 in unallocated funding for other minor capital that comes up. As such staff are recommending that the remaining \$776,815 in unallocated funding be applied to the capital reserve being developed for future major capital.

As well, as a result of changes to prior year equipment and project allocations there is an additional \$868,435 available from unallocated funding related to prior year capital grant allocations at this time. As Island Health has indicated they see a need for only up to \$600,000 in unallocated funding as noted above, staff recommend this funding be transferred over to the major capital project for the Electrical Energy Plant Upgrade project to reduce borrowing for that work.

ALTERNATIVES:

1. Approve the requests as presented.
2. Provide alternative direction.

FINANCIAL IMPLICATIONS:

Alternative 1

The following table lays out the possible allocation of the 2016/17 capital grant funding as well as the use of prior year annual capital grant funds that have become unallocated as a result of changing project/equipment costs and priorities.

Year	Use of funds	Amount
2016/17	Minor Capital Projects	\$1,215,802
2016/17	Minor Capital Equipment	\$851,438
2016/17	Unallocated funding held for future minor capital requirements	\$600,000
2016/17	Unallocated funding transferred to reserve for future major capital	\$776,815
Prior years 2012/13 to 2015/16	Annual capital grant funding that has become unallocated transferred to Electrical Energy Plant Upgrade project	\$868,435


All of the spending requests from Island Health appear appropriate and the transfer of funds from unallocated funding to reduce borrowing requirements for major capital projects is consistent with prior years. Redirecting the unallocated funds this way has been discussed with Island Health representatives and they support the use of funds this way as an effective method of reducing NRHD borrowing costs particularly as they do not currently have matching minor capital project funding available.

Additional information regarding tax requisition implications will be included in the annual budget report.

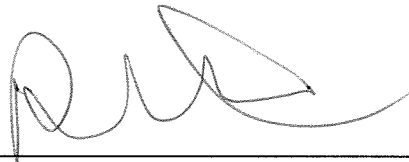
SUMMARY/CONCLUSIONS:

The NRHD preliminary budget for 2016 budget included a capital funding envelope of \$3,444,055 for annual minor capital equipment and projects. Island Health has submitted information indicating how it wishes to use \$2,067,240 of those funds and have requested through discussion that \$600,000 of the unallocated funding be held for other minor capital requests that arise through the year.

With regard to the remaining unallocated annual minor capital funding of \$776,815 for the 2016/17 request year and for the \$868,435 of prior year funding that has become available due to project/cost changes, Island Health supports the transfer of those funds to be used for major capital projects and reserves. Staff recommend approving the equipment and project lists as submitted.



Report Writer



Interim CAO Concurrence

Appendix A

Excellent care, for everyone,
everywhere, every time.



February 3, 2016

Nanaimo Regional Hospital District (NRHD)
Attn: Wendy Idema, Director of Finance
6300 Hammond Bay Road
Nanaimo, BC V9T 6N2

Dear Wendy Idema:

Re: 2016/17 Capital Projects and Equipment

I am writing to advise you of the Island Health 2016/17 capital plan for which NRHD cost-sharing is requested.

I understand the NRHD has approved a provisional 2016 budget of \$3,444,055 for minor capital projects and equipment. Island Health proposes the following allocation which we have itemized in the attached project and equipment lists:

2016 NRHD Allocation

Minor Capital Projects	\$1,215,802
Equipment	\$851,438
Unallocated Funding	\$1,376,815
	\$3,444,055

I would like to thank the NRHD for its significant contribution to Island Health's capital projects and equipment. We are grateful for your support, and we appreciate partnering with you to meet the Nanaimo Regional District's health infrastructure needs.

Please call me at (250) 370-8912 if you have any questions.

Yours truly,

Chris Sullivan
Director, Capital Planning

Attachments

cc: Carol Botrakoff, Manager, Capital Finance and Treasury
Shelley McKenzie, Nanaimo, Oceanside

Capital Planning

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Previously Approved Projects				Total Annual Cashflow						
File #	Portfolio	Project Name	Site	Total Project Cost	Previous Cashflow	Cashflow 2016/17	2016/17 VIIA	2016/17 RHD	2017/18	2018/19
4509	FMO	Building Fabric and Finish	NRGH - Dufferin Place	\$520,200	\$250,000	\$270,200	\$162,120	\$108,080		
4829	FMO	Control System Optimization Measures	NRGH	\$400,000	\$163,075	\$236,925	\$142,155	\$94,770		
TOTAL PREVIOUSLY APPROVED PROJECTS				\$920,200	\$413,075	\$507,125	\$304,275	\$202,850		

2016/17 Recommended Committee Approvals										
File #	Portfolio	Project Name	Site	Total Project Cost	Previous Cashflow	Cashflow 2016/17	2016/17 VIIA	2016/17 RHD	2017/18	2018/19
4510	FMO	Bulk Oxygen Storage Compound	NRGH	\$238,772		\$238,772	\$143,263	\$95,509		
5102	FMO	Replace Copper Water Pipes	NRGH - Dufferin Place	\$250,000		\$250,000	\$150,000	\$100,000		
5112	FMO	Install Medical Gas Shut Off Valves	NRGH	\$99,000		\$99,000	\$59,400	\$39,600		
4340	FMO	Replace Steam Plant Pipe and Device Safety Devices	NRGH	\$99,000		\$99,000	\$59,400	\$39,600		
5117	FMO	Repair Building Fabric and Finishes	Trillium Lodge	\$99,000		\$99,000	\$59,400	\$39,600		
5120	FMO	Repair Building Fabric and Finishes	Eagle Park Lodge	\$99,000		\$99,000	\$59,400	\$39,600		
5121	FMO	Upgrade 7 Neg. Pressure Rooms	NRGH	\$95,000		\$95,000	\$57,000	\$38,000		
4730	FMO	Upgrade Washrooms, Change Rooms and Lavatory Rms	NRGH	\$187,272		\$187,272	\$112,363	\$74,909		
	FMO	Cooling Tower NRGH Main Building**	NRGH	\$200,000		\$200,000	\$120,000	\$80,000		
4506	FMO	Replace Main Bldg Chiller***	NRGH	\$900,000		\$900,000	\$540,000	\$360,000		
5272	Geography 2	Inpatient Window Safety Upgrade	NRGH	\$50,000		\$50,000	\$30,000	\$20,000		
5283	Geography 2	Facility Wide Paging System	NRGH	\$25,000		\$25,000	\$15,000	\$10,000		
5282	Geography 2	Triage Area Renovation	Oceanside Health Centre	\$30,000		\$30,000	\$18,000	\$12,000		
5107	FMO	Dryer Heat Recovery and Controls Optimization	Cumberland Regional Laundry*	\$320,670		\$320,670	\$256,536	\$64,134		
TOTAL 2016/17 APPROVALS				\$2,692,714		\$2,692,714	\$1,679,762	\$1,012,952		
TOTAL CAPITAL PROJECTS				\$3,612,914	\$413,075	\$3,199,839	\$1,984,037	\$1,215,802		

2016/17 RECOMMENDED APPROVED CAPITAL EQUIPMENT - NANAIMO REGIONAL HOSPITAL DISTRICT

Control #	Department	Site	Equipment Description	Qty	Budget	New / Replace
Equipment > \$100,000						
6099	Lab Medicine - Hematology	Nanaimo Regional General Hospital	Automated Hematology Slide Review System	1	107,831.70	N
Total Equipment > \$100,000					107,831.70	
Equipment < \$100,000						
3089	Medical Device Reprocessing	Nanaimo Regional General Hospital	Instrument Tracking Additional Modules	1	33,236.67	N
3088	Operating Room	Nanaimo Regional General Hospital	Battery Powered Reamer Drivers	10	103,924.26	R
8007	Operating Room	Nanaimo Regional General Hospital	I-Health Integrated Bar Code Scanning	1	53,925.00	N
3084	Operating Room	Nanaimo Regional General Hospital	Battery Powered Sagittal Saws	10	94,915.41	R
3067	Electro Diagnostic Services	Nanaimo Regional General Hospital	EKG Recorder- Spider-Flash	10	81,680.20	N
3063	Electro Diagnostic Services	Nanaimo Regional General Hospital	Blood Pressure Machine	2	15,422.55	R
9382	Pediatrics	Nanaimo Regional General Hospital	Pediatric Bed with Side Rails	2	21,306.85	N
1290	Prenatal	Nanaimo Regional General Hospital	Bladder Scanner	2	40,553.69	N
1289	Prenatal	Nanaimo Regional General Hospital	Fetal Monitors	2	45,665.45	N
3142	Prenatal & Pediatrics	Nanaimo Regional General Hospital	Hover Matt Air Transfer System	1	5,090.13	N
2287	Audiology	Nanaimo Regional General Hospital	Diagnostic Typanometer	1	15,125.96	R
3136	Mental Health and Substance Use	Nanaimo Regional General Hospital	Water and Ice Machine	1	9,096.84	N
3201	General Support	Trillium Lodge	Washer & Dryer Pair	1	36,094.89	R
3051	Intensive Care Unit	Nanaimo Regional General Hospital	Patient Transport Monitor	4	147,961.57	N
2195	Endoscopy Clinic	Nanaimo Regional General Hospital	Endoscopy Guidance System	2	141,692.80	N
3052	Intensive Care Unit	Nanaimo Regional General Hospital	GE Handheld Ultrasound	2	47,216.73	N
1044	Minor Surgery	Nanaimo Regional General Hospital	Patent Stretchers	3	15,054.78	R
2196	Pain Program	Nanaimo Regional General Hospital	Surgical Plasma Knife	1	37,192.07	N
2193	Floor 3	Nanaimo Regional General Hospital	Stretchers	3	33,455.96	R
3053	Floor 1 / ICU	Nanaimo Regional General Hospital	Vein Finder	2	18,744.33	N
3055	Ambulatory Clinic	Nanaimo Regional General Hospital	EBUS Endobronchial Ultrasound	1	78,275.37	N
3199	General Support	Nanaimo Regional General Hospital	Washer & Dryer	1	36,094.89	R
3195	FMO	Nanaimo Regional General Hospital	High Pressure Steam Devices	4	38,703.13	R
9712	Equipment Depot	Nanaimo Regional General Hospital	Bariatric Bed	1	33,703.13	N
3380	Equipment Depot	Nanaimo Regional General Hospital	Ultrasound Machine with endocavity probe	1	32,791.90	N
2228	Urgent Care	Oceanside Health Centre	Low Air loss Mattress	1	44,725.40	N
2225	Integrated Community Care	Oceanside Health Centre	Lab Centrifuge	1	28,888.39	N
2231	Urgent Care	Oceanside Health Centre	Lab Centrifuge	1	5,770.94	N
3183	Minor Surgery Clinic (Colposcopy)	Nanaimo Regional General Hospital	Electro Surgical Cautery Unit	1	16,370.09	R
3182	Medicine	Nanaimo Regional General Hospital	Portable Intubation for Code Blue RTs equipment	1	12,041.45	R
3181	Medicine	Nanaimo Regional General Hospital	Ventilation Machines for Neonatal Care Unit	5	103,775.97	R
2062	Medical Imaging	Nanaimo Regional General Hospital	Barco Corvus-SMP-2HD Monitors with Video Card and Accessories	1	39,887.09	R
3250	Medical Imaging	Nanaimo Regional General Hospital	Ultrasound Machine Upgrade	1	47,454.00	R
3247	Medical Imaging	Oceanside Health Centre	Ultrasound Machine Upgrade	1	47,454.00	R
2057	Medical Imaging	Nanaimo Regional General Hospital	Computerized Radiology Processing Unit	1	67,129.00	R
1370	Lab Medicine- Transfusion Medicine	Nanaimo Regional General Hospital	SB1 Compliant Blood Product Labeling System	1	53,428.12	N
9091	Lab Medicine- Histology	Nanaimo Regional General Hospital	Digital Cameras & Stand For Gross/Frozen Section Room	3	134,299.36	N
1355a	Lab Medicine - Transfusion Medicine	Nanaimo Regional General Hospital	Plasma Thawer	1	12,189.75	R
1384a	Lab Medicine - Transfusion Medicine	Nanaimo Regional General Hospital	Blood Products Refrigerator	2	29,765.52	R
2372	Residential Services	Nanaimo Regional General Hospital	Century Tub & Carenado Chairs	1	33,934.44	R
3357	Residential Services	Eagle Park	Bath lift Chairs/Stretchers	1	10,785.00	R
3307	Lab Medicine - Hematology	Nanaimo Regional General Hospital	Coagulation Analyzer	1	65,986.00	R
1518	Various Departments	Nanaimo Regional General Hospital	Defibrillator	2	53,863.72	R
Total Equipment < \$100,000					2,020,763.90	
Total Equipment Approved for NRHD					2,128,595.60	
Total Possible Cost Sharing by NRHD					851,438.24	

TO: Dennis Trudeau
Interim Chief Administrative Officer

DATE: February 16, 2016

FROM: Wendy Idema
Director of Finance

FILE: 1700-03

SUBJECT: Nanaimo Regional Hospital District Bylaw No. 162 - 2016 Proposed Budget

RECOMMENDATIONS:

1. That the 2016 Regional Hospital District budget be approved with the following components:

Property tax requisition	\$	6,984,190
Capital grant allowance	\$	2,667,240
Transfer to major capital reserve	\$	1,776,815

2. That "Nanaimo Regional Hospital District 2016 Annual Budget Bylaw No. 162, 2016" be introduced and read three times.
3. That "Nanaimo Regional Hospital District 2016 Annual Budget Bylaw No. 162, 2016" be adopted.

PURPOSE:

To introduce and obtain approval of the 2016 budget bylaw for the Nanaimo Regional Hospital District (NRHD).

BACKGROUND:

At the November 10, 2015 Nanaimo Regional Hospital District Board Meeting the following motions for the 2016 Hospital District Budget were approved:

That a 2016 Regional Hospital District Provisional Budget be approved with the following components:

Property tax requisition	\$	6,984,190
Capital grant allowance	\$	3,444,055

CARRIED

That staff prepare a report outlining cost implications of increasing reserve funds over the next 10 years to ensure funding is available to provide 10% of the Nanaimo Regional Hospital District's share for a significant project such as a patient tower in future.

CARRIED

Since that time, the annual capital grant funding request has been received from Island Health and incorporated into the attached proposed 2016 budget and 2016 – 2020 projections document (Appendix A). Island Health's request for allocation of the annual capital grant funding included an unallocated portion of \$1,376,815 which has been broken into two parts for the budget, \$600,000 to be held for other minor capital items that come up during the year and \$776,815 to be transferred to the major capital projects reserve. Additionally, there is \$868,435 in annual capital grant funding from prior years (2012 through to 2015) that has become available as a result of project/cost changes. The 2016 budget shows this amount transferred from minor capital funding to be applied against the Electrical Energy Plant Upgrade project and reduce borrowing requirements.

The 2016 budget and 2016 – 2020 financial projections incorporate amounts for the following known major capital projects including debt servicing where required:

- Unit Dose Medication Distribution/Pharmacy Upgrade - \$1,860,000 NRHD share funded through prior year reallocation of annual minor capital grant funds.
- Electrical Energy Plant Upgrade – up to \$5 million NRHD share of funding (Borrowing Bylaw No. 161).
- Energy (Boiler) Plant Replacement Project – up to \$5 million NRHD share of funding pending further discussion on project.
- ICU Upgrade Project – no formal request as yet, but included in plan as is a priority project for Island Health – up to \$5 million estimated NRHD share.

As a result of the Board direction from November to develop a reserve for a significant project such as a patient tower, staff have also incorporated between \$800,000 and \$1,776,815 annually as transfers to reserves over the next few years to build that fund. If other surplus funds become available, they can also be allocated to this reserve.

Bylaw No. 162 is required in order to complete the NRHD 2016 budget approval process.

ALTERNATIVES:

1. Introduce and approve Bylaw No. 162 as presented for the 2016 Nanaimo Regional Hospital District Budget.
2. Make further changes to the annual budget and approve an amended bylaw.

FINANCIAL IMPLICATIONS:

Alternative 1

A 2016 budget with a 2% increase (2015 = 2%) and related five year forecast results in a \$6,984,190 tax requisition for 2016 (2015 = \$6,847,245). This will also result in an estimated \$21.79 per \$100,000 mil rate which is below the 2015 rate of \$22.42 as a result of increased assessment values throughout the region.

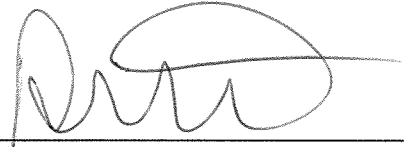
The requisition for future years based on currently available information about major capital projects includes proposed increases to the tax requisition for 2016 to 2020 estimated at 2.5% to 3% annually. Should there be approval from the Province for a major capital project that the NRHD agrees to cost share on, debt servicing costs would need to be revised for the future. This requisition level includes transferring over \$5 million to a major capital reserve fund over 5 years.

SUMMARY/CONCLUSIONS:

Regional Hospital Districts are required to approve an annual budget on or before March 31 each year. Staff recommend a budget which raises \$6,984,190 in property tax revenues for 2016 – an increase of 2.0% over 2015. The budget includes \$2.667 million for minor capital equipment/capital projects at VIHA facilities, \$1.776 million transferred to reserve, reallocation of approximately \$1 million from surplus and unallocated minor capital funds to major capital and \$3 million for debt servicing in 2015. The transfer of funding from minor capital to major capital has been discussed and agreed upon with Island Health representatives.



Report Writer



Interim CAO

**NANAIMO REGIONAL HOSPITAL DISTRICT
BUDGET PROJECTIONS
2016 to 2020**

	2015 Approved Budget 2.0%	2015 Actuals	2016 Proposed Feb 2016 2.0%	2017 Proposed Feb 2016 2.5%	2018 Proposed Feb 2016 3.0%	2019 Proposed Feb 2016 3.0%	2020 Proposed Feb 2016 3.0%
Current Projection							
Revenues							
Property taxes	6,847,245	6,847,245	6,984,190	7,158,794	7,373,558	7,594,765	7,822,608
Grants in lieu	30,000	33,394	30,000	30,000	30,000	30,000	30,000
Interest income	50,000	113,780	75,000	75,000	75,000	75,000	75,000
Other revenue		41					
Transfer from reserves			868,435				
Transfer from prior years unallocated grant funding	3,061,864	3,061,286	2,128,466	1,542,978	1,329,909	1,077,373	980,420
Prior year surplus applied	9,989,109	10,055,746	10,086,091	8,806,772	8,808,467	8,777,138	8,908,028
Expenditures							
Administration	31,400	31,400	36,400	37,856	39,370	40,945	42,583
Debt payments	2,871,180	2,868,549	2,976,577	2,757,452	3,153,787	3,095,207	3,510,958
Debt issue expense/temp financing	133,079	48,283	75,000	237,500	225,000	312,500	182,500
Special cash flow for Phase II							
Annual capital grants (see below)	2,144,055	2,144,055	2,667,240	3,444,055	3,512,936	3,548,065	3,619,027
Annual capital grant applied to major project	1,300,000	1,300,000	868,435				
Surplus applied to capital projects	267,426	400,993	142,646				
Reserve for Future Projects	1,134,000	1,134,000	1,776,815	1,000,000	800,000	800,000	800,000
	7,881,140	7,927,280	8,543,113	7,476,863	7,731,094	7,796,718	8,135,067
Surplus for future years' expenditures	2,107,969	2,128,466	1,542,978	1,329,909	1,077,373	980,420	772,961

Total assessments	Revised roll Mar 2015	Completed roll Jan 2016	1.02	1.02	1.02	1.02	1.02
Rate per thousand	30,541,852,619	30,541,852,619	32,687,516,197	32,687,516,197	33,341,266,521	34,008,091,852	34,668,253,689
Projected Tax Cost per \$100,000	\$ 22.42	\$ 22.42	\$ 21.90	\$ 22.12	\$ 22.33	\$ 22.55	\$ 22.55

Reserve Fund Status							
Opening Balance	1,245,000	1,245,000	2,379,000	4,155,815	5,155,815	5,955,815	6,755,815
Applied to budget							
New contribution	1,134,000	1,134,000	1,776,815	1,000,000	800,000	800,000	800,000
Balance available	2,379,000	2,379,000	4,155,815	5,155,815	5,955,815	6,755,815	7,555,815

NANAIMO REGIONAL HOSPITAL DISTRICT

BYLAW NO. 162

**A BYLAW TO ADOPT A
BUDGET FOR THE YEAR 2016**

The Board of the Nanaimo Regional Hospital District, in open meeting assembled, enacts as follows:

1. This bylaw may be cited as the "Nanaimo Regional Hospital District 2016 Annual Budget Bylaw No. 162, 2016".
2. Schedule 'A' attached hereto and forming part of this bylaw is the Annual Budget for the Nanaimo Regional Hospital District for the year ending December 31, 2016.

Introduced and read three times this _____ day of _____, 2016.

Adopted this _____ day of _____, 2016.

CHAIRPERSON

CORPORATE OFFICER

Schedule 'A' to accompany "Nanaimo Regional Hospital District 2016 Annual Budget Bylaw No. 162, 2016".

Chairperson

Corporate Officer

SCHEDULE 'A'
NANAIMO REGIONAL HOSPITAL DISTRICT
2016 ANNUAL BUDGET

Property taxes	\$ 6,984,190
Grants in lieu	30,000
Interest income	75,000
Transfer from prior years unallocated grants	868,435
Prior year surplus	<u>2,128,466</u>
Total Revenues	<u>\$10,086,091</u>
Administration	\$ 36,400
Debt servicing	2,976,577
Debt issuing expense	75,000
Capital grants	2,667,240
Capital grant applied to major projects	868,435
Surplus applied to capital projects	142,646
Transfer to reserve	<u>1,776,815</u>
Total expenditures	<u>\$8,543,113</u>
Net surplus for future year	<u>\$1,542,978</u>