



# Energy Efficiency Improvements Audit Report

*Prepared for:*

City of Sandpoint  
1123 Lake St.  
Sandpoint, ID 83864

*Prepared by:*

Energy Solutions Engineering Team

*Presented by:*

Sharmon Schmitt  
Account Executive  
(208)769-1370  
[Sharmon.Schmitt@AvistaCorp.com](mailto:Sharmon.Schmitt@AvistaCorp.com)

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# City of Sandpoint

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Avista was contacted by Sean Scoggin to schedule an audit for the following municipal buildings in Sandpoint ID: City Hall, Community Hall, City Beach – Beach House and shop, Jeff Jones Square restroom, Memorial Field, Waste Water, and Water Treatment. Specifically, this audit was conducted to find out what potential measures could be implemented in addition to identifying no cost/low cost energy efficiency measures that could be carried out in order to conserve energy.

A walk-thru of the facilities was conducted by Tom Lienhard, Andy Paul, Levi Westra, Carlos Limón, Bryce Eschenbacher, Caitlin Greeney, and Audra Reese of Avista with the help of Sean Scoogin, Ken Shawn and Rod. After completing a walk-thru it was noticed that a couple of energy efficiency measures could be applied in order to achieve energy savings very quickly. However, we discussed that there may be possible measures that can be implemented in order to attain savings with longer paybacks that might be worth looking into.

Going forward keep in mind that Avista offers two different options for potential incentives. One offers rebates through our Prescriptive programs and the other provides incentives under our Site Specific program for measures that don't fit the prescriptive program's requirements with a simple payback of 15 years or less. Contact your account executive before you start any project and they will be able to guide you through the process to determine which path the project will qualify under.

The following is a list of suggestions for you to consider that are intended to: 1) provide some ideas regarding potential energy efficiency saving measures and 2) serve as a relationship building tool for open and ongoing dialogue between the City of Sandpoint staff and Avista regarding future energy saving opportunities/projects of mutual benefit.

- **Lighting**

By implementing more efficient lighting, not only will you decrease your energy consumption, but you will also increase occupant comfort as you will be reducing the internal heat gains during the summer. Avista offers two different paths for lighting incentives. One is through our prescriptive program, and a site specific option for projects that don't fit our prescriptive Commercial Lighting Incentive program. Contact your account executive before you start any project and they will be able to guide you through the process. All forms can be found at <https://www.avistautilities.com/savings/rebates/Pages/default.aspx>.

**With lighting just keep in mind that it is a requirement for our incentive programs to use Design Lights Consortium (DLC) and/or EnergyStar tested and approved LED fixtures. For more information and/or listing of qualified fixtures go to [www.designlights.org](http://www.designlights.org) or for qualified screw-in lamps/bulbs go to <http://www.energystar.gov/productfinder/product/certified-light-bulbs/results>.**

**Screw in lamps:** Incandescent lamps are inefficient because they waste most of their energy in the form of heat. An equivalent LED lamp can produce the same amount of light with less energy while emitting less heat into the room. LED lamps have life spans that can exceed 40,000 hrs. Note that these lamps are available with dimming capabilities, but each has their limitations on how much they can dim. Thus, it is recommended that you test each type of lamp to determine if it will fit your specific lighting requirements. Implementing more efficient lighting can be a very cost effective option to decrease your energy consumption.

- The foyer outside the City Council chambers had several can fixtures with compact fluorescent screw-in lamps. These should be switched to screw-in LED down lights. You

might also consider installing 2x2 LED panels in place of the existing can lights. The LED panels mount in the existing ceiling grid and would provide superior light to what is existing.

- Memorial Field: recessed lighting fixtures in the concession facilities implemented a mixture of compact fluorescent screw-in lamps and incandescent/halogen lamps. These should be switched to screw-in LED down lights.
- Jeff Jones Square restroom: exterior jelly-jar fixtures at this facility were already implementing screw-in LED lamps. The storage room fixtures utilized incandescent lamps and can be switched out to LED lamps if these get a lot of use.
- Beach Park Gazebo: the screw-in parabolic incandescent/halogen lamps utilized should be replaced with LED lamps and/or new LED fixtures.
- City Beach - Park Restrooms: exterior jelly-jar fixtures utilized compact fluorescent lamps. These should be switched to LED lamps.

**Linear Fluorescent/LED Lighting:** T8 lighting technology offers more light output while using less energy than T12 fixtures. Since T8's are more efficient, they produce less heat and provide a better color rendering index (CRI). This means that the higher the CRI, the better it will make the objects appear. They can also offer a longer lamp life of more than 20,000 hours and provide excellent lumen maintenance. High performance fluorescent T8 lamps are now available which consume 25 or 28 watts rather than the typical 32 watts. In the past few years linear LED technology has come a long way in regards to lighting quality, fixture life, and fixture cost. In many cases they may be a viable replacement option, with costs close to that of new T8 fixtures. As with the screw in lamps, it is recommended that you test each type of fixture to determine if it will fit your specific lighting requirements.

If this is a project that you are considering you should keep in mind that to qualify for incentives the existing ballasts will need to be either replaced, for T8 retrofits, or removed, for LED retrofits, to qualify for incentives through Avista's programs. Avista currently offers incentives for the replacement of T12 or standard 32W T8 fixtures with high performance T8 fixtures (i.e. 25/28W lamps) through our Prescriptive Commercial Lighting Incentive program. If however, the proposed lighting option you are considering is not listed and/or does not meet the wattage criteria on the commercial lighting form, you will need to get in contact with your account executive to provide the project specifications before the project is started in order to qualify for a potential incentive through the Site Specific program.

- The fire station garage is entirely lit with F54T5 HO fluorescent fixtures. Avista currently offers \$15 per tube to convert those to T5 LED lamps. We recommend doing that before the end of the year when the incentive will change.
- There is a mix of TLED and T8 fluorescent tubes throughout the fire station offices, police station and city hall. We recommend replacing all of the T8 fluorescent tubes with TLED.
- The Water treatment facility was entirely lit with F54T5 HO fluorescent fixtures. As with the fire station, we recommend replacing those with T5 LED lamps sooner than later.
- Jeff Jones Square restroom: 4-lamp T8 fixtures are recommended to be retrofitted with TLEDs or replaced with new LED fixtures
- City Beach – Beach House: combination of 2-lamp and 4-lamp T8 fixtures are recommended to be retrofitted with TLEDs or replaced with new LED fixtures.
- City Beach – Shop: a significant amount of 2-lamp and 4-lamp T8 fixtures are recommended to be retrofitted with TLEDs or replaced with new LED fixtures.
- City Shop: the T8 lamps utilized in the office areas and the high output T5 fixtures utilized in all of the shop areas are recommended to be retrofitted with corresponding TLEDs.
- Memorial Field: lawn equipment shop and both of the concession stands utilized T8 fixtures, here it is recommended that these be retrofitted and/or replaced with new LED fixtures.

- Lake Water Treatment Plant: a combination of standard T8 fixtures and high output T5 fixtures are recommended to be retrofitted with TLED.
- Waste Water Treatment Plant: the majority of the fixtures here were found to be T8s and are recommended to be retrofitted with TLEDs and/or replaced with new LED fixtures.

**HID and Exterior Lighting:** high intensity discharge (HID) lighting fixtures are mainly found in high bay (gymnasiums, warehouse facilities) and exterior applications (parking lots, canopies and wall packs). Metal Halides, High Pressure Sodium, and Mercury Vapor are the most common fixtures found. These fixtures are generally high wattage fixtures with slow strike times and can sometimes have poor CRI (color rendering index). This translates to high energy bills, long waits for lighting to come to full power, and (with the exception of metal halides) yellow dim lighting.

Viable options exist to replace interior HID fixtures with more efficient lighting that will also improve the color and strike time. LED high bay fixtures can produce as much or more light than a standard HID fixture at a fraction of the power. These fixtures also have lifespans in excess of 10 years, meaning that they will provide maintenance savings along with energy savings for your facility. It should be mentioned that there are a variety of LED product currently available, it is therefore recommended that several vendors be contacted to consider specific options at each location before making a final decision. However, depending on both the application and the customer's preferences, LED products may not be the best option for every application.

Going forward we discussed that you can take advantage of our Commercial Exterior Lighting Prescriptive Program. Avista offers different incentives depending on the existing wattage of the HID fixture, through our prescriptive lighting incentive programs. These rebates range from 60 dollars to 610 dollars per HID fixture that is replaced with a fixture that meets the Prescriptive lamp/fixture type and wattage criteria. If however, the proposed lighting option you are considering is not listed and/or does not meet the wattage criteria on the commercial lighting form, you will need to get in contact with your account executive to provide the project scope details before the project is started in order to analyze the project for a potential incentive through our Site Specific program.

- City Hall: the parking lot fixtures are all 250W or 400W metal halide fixtures. We recommend replacing these with new LED parking lot fixtures.
- City Beach Parking Lot: significant opportunity exists here to replace or retrofit the 250W MH cobra head parking lot fixtures with LED lighting.
- City Beach Tennis Courts: while we were unable to verify the wattage, these appeared to be at a minimum 400W HID fixtures that should be replaced with more efficient LED fixtures.
- City Shop: all exterior fixtures have already been switched to LED fixtures, no additional recommendations at this time.
- Memorial Field: new decorative exterior fixtures at the entrance were already implementing LEDs. As the costs of field LED fixtures start to come down there may be opportunity in the future to replace the field's HID fixtures with LEDs.
- Community Hall: exterior fixtures have already been switched to LEDs, no additional recommendations at this time.
- Lake Water Treatment Plant: a lot of exterior wall packs and pole 70-400W HID fixtures are recommended to be retrofitted and/or replaced with LED lighting.
- Waste Water Treatment Plant: while we were unable to determine wattages, several exterior HID fixtures can be retrofitted and/or replaced with LED lighting.
- Travers Park: here it is recommended that the eight exterior metal halide fixtures be retrofitted with LEDs and/or replaced with new LED fixtures.

**Occupancy Sensors:** The best way to save energy is to turn off the lights when they are not being used. Occupancy studies have shown that individual offices have a vacancy rate of 30% to 60% during a normal business day, but the lights may be left on 100% of the time. During our last site visit we discussed that a significant opportunity exists to reduce your energy consumption as little to no areas throughout the facility utilized occupancy sensors. Occupancy sensors are great for areas where lights are left on when no one is occupying the space (e.g. common areas, restrooms, individual offices, break rooms, etc.). There are three basic types of sensors, passive infrared, ultrasonic, and dual technology sensors which are recommended in bathrooms with stalls. Also keep in mind that in addition to selecting the correct occupancy sensor technology and adjusting the sensitivity for each individual space, the location where the sensor will be placed is vital to how well the sensor will operate.

Going forward it is recommended that you identify any potential areas where you could implement occupancy sensors. Avista currently offers a \$40 incentive through our Prescriptive Interior Commercial Lighting Incentive program for occupancy sensors, but it should be noted that it will only be provided for an occupancy sensor controlling at least 170 watts (excludes switch sensors). There may also be a potential incentive for lighting projects where the prescriptive requirements are not met for an occupancy sensor controlling multiple fixtures. However this will have to be analyzed Site Specifically so you will need to contact your account executive with the project specifications before the project is started, to determine if the project is eligible for a potential incentive.

- Jeff Jones Square restroom: Lights operate 24/7, opportunity for occupancy sensors. While occupancy sensors were stated to of have been utilized in the pasts ...dual technology sensors are recommended in RRs with stalls to prevent them from turning off while occupied.
- City Beach – Shop: during our walk thru we found that the majority of the T8 fixtures in the shop were turned on while no one was occupying the space. Here it is recommended that you explore the feasibility of implementing occupancy sensor controls on lighting circuits and/or individual fixtures.
- Lake Water Treatment Plant: the breakroom, conference room and office areas are good candidates for occupancy sensors as the fixtures were on during our walk thru with no one occupying the space.

**Daylight Harvesting:** The concept is simple, digital photocell sensors detect daylight levels and automatically adjust the output level of lights to create a balance. This allows the use of natural light whenever possible instead of turning on all of the lamps/fixtures which will help save on lighting costs. When used with dimming ballast you can reduce energy use proportional to the amount of daylight that enters the room. The photocell will read the light level in rooms automatically, turning portions of the lights on/off accordingly or dimming them to different light levels. Some photocells even include delay mechanisms to prevent turning the lights on from temporary cloud cover.

There may be an opportunity to explore the feasibility of implementing daylight harvesting in areas where there is a considerable amount of natural light by means of windows (i.e. perimeter offices of Admin building). While this may not be feasible with every single fixture, you should consider implementing photocells along with step/dimming ballasts on the perimeter fixtures to reduce their “on” time when there is sufficient natural light. This way each fixture will vary the light output depending on the amount of natural light coming into the space, and doing so will reduce your energy usage.

- Lake Water Treatment Plant: since the membrane room has a skylight this area will be a good candidate to implement daylight harvesting controls. This can be achieved at the circuit level or at each fixture.

If you are interested in pursuing this as a project please contact your account executive with the project specifications before the project is started to determine if the project is eligible for a potential incentive.

**LED Exit Signs:** Light-emitting diode (LED) exit signs are available and will allow you to replace existing incandescent exit signs with ones that use less energy (typically around 3-5W). LED fixtures can be purchased with or without a battery backup and will last over 15 years while significantly reducing maintenance costs. Current incandescent exit signs cost approximately 20 dollars a year in energy usage when maintained properly. In contrast, the LED exit signs use two to four dollars in energy annually, so you can see a very quick payback along with the cost savings of maintaining them.

- Here we recommend that all exit signs in all of the city's facilities that are not already LED signs should be replaced with LED signs.

If you are interested in pursuing this as a project please contact your account executive with the project specifications before the project is started to determine if the project is eligible for a potential incentive.

## • **Hot Water**

After space heating and cooling, water heating is typically the next largest energy user. Installing a high efficiency water heater can reduce your energy consumption, but it can be costly. Unless the water heater is old, leaking or otherwise not operating properly, we'd recommend you take other measures before replacing a working hot water tank.

One of the simplest ways to reduce wasted energy is to set the temperature between 115°F and 120° F. This range is ideal, assuming that the water heater is not attached to a process that requires hotter water, and will provide the most energy savings. It is important to note that the water heater temperature should never go below 115°F; this is to prevent Legionella bacteria growth which thrives in temperatures between 68°F and 113°F.

- City Hall: the police stations gas water heater is in a room that doubles as a storage room. During the audit we moved some card board boxes out of the combustion zone near the water heater. It is important to keep the area directly around the water heater clear of flammable objects, this is to minimize the possibility of a fire if a backdraft causes the flame to come out of the firebox. It is also to insure that if there is a problem with the water heater and the pressure relief valve starts blowing off water it is noticed.
- City Beach – All facilities: In all of the facilities we visited we found electric storage water heaters. Here it is recommended that you work with your account executive to determine if natural gas can be provided to these facilities. If so, you should explore the feasibility to switch all electric units to high efficient natural gas units.
- Lake Water Treatment Plant: several electric storage water heaters were found throughout the facility. Here it is recommended that you explore the feasibility to switch all electric units to high efficient natural gas units.
- City Shop: a natural draft natural gas storage water heater is utilized for domestic hot water that also supplies the washer. Here it is recommended that you replace the current unit with a high efficiency condensing unit.
- Memorial Field: since the new grandstands utilized two 100 gallon high efficient (94% thermal efficiency) water heaters, there are no additional recommendations at this time.

Potential incentive may be available for the installation of more efficient units. If you are interested in pursuing such a project please contact your account executive with the project specifications before the project is started to determine if the project is eligible for a potential incentive.

- **Insulate Hot Water Pipes**

Insulating your hot water pipes can help lower your energy usage by reducing the standby losses that occur while there is no hot water consumption. The Department of Energy states that by insulating your hot water pipes you can raise water temperature 2°F to 4°F hotter than what uninsulated pipes can deliver. It is especially important to insulate pipes passing through an unconditioned space. When the pipes are exposed to the unconditioned temperatures, they will experience a significant amount of heat loss. Therefore, it is recommended that you identify and insulate any exposed hot water pipes in order to reduce the amount of heat loss.

At this time Avista doesn't have a prescriptive program for pipe insulation, but you may still qualify for an incentive through the Site Specific program for the addition of pipe insulation. However, in order to qualify for a potential incentive you will need to contact your account executive with the project specifications before the project is started.

- The sidewalk outside of city hall is equipped with a snow melt system. This system is served by a hot water boiler and piping loops under the sidewalk. The supply piping that comes down from the boiler is uninsulated and located in a storage closet adjacent to the elevator machine room. A staff member explained that the cold air coming from the elevator shaft in the winter cancelled the heat coming off the piping so the closet didn't get too hot. We recommend that the piping is insulated all the way back to the boiler to reduce the heat loss that is happening with the cold air coming in from the elevator. In addition the elevator shaft door should have new weather stripping and a door sweep to limit the amount of cold air infiltration.
- City Beach – All facilities: In all of the facilities we visited we found that the pipes were uninsulated. While it was stated that the water heater units get winterized during the off season, it is still recommended that you explore the feasibility of insulating the hot water piping to reduce heat loss.
- Jeff Jones Square restroom: even though there is only a short distance between the water heater and the point of use, it is still recommended that you insulate the hot water piping to reduce heat loss on the system.
- City Shop: during our walk thru we found that the water heater contained uninsulated hot water pipes. Here it is recommended that you explore the feasibility of insulating the hot water piping to reduce heat loss.
- Lake Water Treatment Plant: Here it is recommended that you explore the feasibility of insulating the hot water piping to reduce heat loss on the several water heaters throughout the facility.

- **Insulation Levels**

Insulation levels are referred to by R-values which are an indication of how well the insulation resists the transfer of heat. This means that the higher the R-value, the better it is at preventing heat loss in the winter and heat gain in the summer. Insufficient building insulation is one of the leading causes attributing to heat loss/gain and in doing so, increases the total energy consumption of the HVAC system.

As a guideline, the following 2015 Washington State (more stringent than International) Energy Code minimum insulation levels of new buildings are provided to give you an indication of pursuing potential insulation measures. Mass walls require R-9.5 continuous insulation, metal building walls require R-19 continuous insulation, steel framed walls require R-13 plus R-10 continuous and wood/other framed walls require R-21. Minimum roof insulation above roof is R-38 continuous, metal buildings require R-25 plus R-11 below purlins and uninterrupted by framing members, and attics/other roofs require R-49 insulation.

Just keep in mind that the addition of insulation reaches a point of diminishing returns as the R-value gets increased. For example, adding R-11 to an inadequately insulated ceiling will pay for itself very quickly, whereas you can expect fewer savings and a longer payback with the next R-11 added. Going forward, if you identify any inadequately insulated areas, you can provide us with bids for higher insulation options prior to any work being done to find out if the addition of insulation is cost effective for you and to determine if potential incentives are available.

Depending on the existing insulation values of your building's shell, you may be able to take advantage of Avista's Prescriptive Insulation program which can incentivize the addition of insulation ranging from \$0.20 to \$0.25 per square foot for roof/attic insulation and from \$0.40 to \$0.45 for wall insulation. If however the proposed insulation does not meet the prescriptive program criteria (e.g. replacing glazing with insulated wall), you may still be able to qualify for a potential incentive through our Site Specific program. Just make sure you contact your account executive with the project specifications before the project is started in order to qualify for potential incentives.

- Due to the style of construction, insulation levels were not verified during our audit of city hall, the fire station and the police station. When the building is in need of a new roof we recommend that the level of rigid foam insulation present on the roof deck be evaluated and more added if necessary.
- City Beach – Beach House: during our visit it was stated that the attic contained zero insulation. Here it is recommended that you add insulation to adequate levels. It is also recommended that you explore the feasibility of furring out the uninsulated concrete walls in order to add some insulation.
- City Shop: batt insulation under the steel decking/siding appeared to be in good condition so no additional recommendations at this time.
- Community Hall: although it may take away from the aesthetics of the building, it is recommended that you explore the feasibility to furr-out some interior walls in order to add wall insulation. On a side note, since the fireplace is not operational it is recommended that the flue be capped off.

• **Thermal Windows**

In a well-insulated structure, 20 to 50 percent of the total energy loss may occur through and around the windows. Currently the new construction standard is double-pane glass and triple-pane glass is even more energy efficient. The lower the U-value the better the window is in the winter at keeping heat in or out in summer. By installing thermally improved windows not only will your energy costs be reduced, but you will notice an increase in your comfort level. During our last visit it was stated that all of the windows in the facility had already been upgraded to double-pane windows. However, if there are any remaining windows that need to be replaced, you should replace them with either high efficient double-pane or triple-pane low-e windows. As a guideline you should note the following 2015 Washington State (more stringent than International) Energy Code minimum values for windows of new buildings:

U-factor		SHGC		
Nonmetal framing	0.30	Orientation	S, E, & W	N
Fixed metal framing	0.38	Projection Factor (PF) < 0.2	0.40	0.53
Operable metal framing	0.40	0.2 ≤ PF ≤ 0.5	0.48	0.58
Metal framing doors	0.06	PF ≥ 0.5	0.64	0.64
PF = A/B A = distance measured horizontally from furthest extremity of any overhang, eave or permanently attached shading device to the vertical glazing. B = distance measured vertically from bottom of glazing to underside of overhang, eave or permanently attached shading device.				

At times a total window replacement can be quite expensive and the installation may not be justified by the savings. It is therefore highly recommended that you properly insulate your building's shell to the appropriate insulation levels before you replace any windows, as there will be more energy savings from the addition of roof insulation and/or a furred-out insulated wall measure. Now when the time comes to replace your windows, you may also consider reducing the total amount of glazing to better reduce your building's heat loss. This can be achieved by replacing a portion of windows with framed batt insulated walls instead of windows. It is also recommended that you periodically seal and caulk/weather-strip around the windows. It may also be a good idea to inspect and do the same around any doors that have visible gaps. By eliminating or reducing these paths of heat flow, you can greatly improve the energy efficiency of the windows and ultimately of your building.

Potential incentives may be available for the installation of efficient windows or the replacement of windows with insulated wall through Avista's Site Specific program. Just make sure you let your account executive know about the project before the installation in order to see if the measure qualifies for an incentive.

- The windows present at City Hall, the fire Station, and the Police Station, are all double pane and appear to be in good condition.
- City Beach – Beach House: the majority of the windows are single-pane units so when the time comes to replace these units, you should do so with Low-E double-pane windows. Where possible you should replace the glazing with insulated wall.
- Community Hall: single-pane windows with an additional storm window pane are in place. While the storm window pane is beneficial, it is recommended that you explore the feasibility of installing low-e double plane windows that meet historic registry standards.

- **Entrance Doors**

Sometimes these are overlooked, but the reality is that doors can significantly contribute to air leakage in a building as well as some heat transfer losses. The result of energy losses can be attributed to the age of the door, an improperly installed door, or an improperly air sealed door. It is also recommended that each entry door's weather-stripping be inspected and replaced if missing or worn out in order to reduce exterior air from entering and conditioned air from escaping. You should note that a ¼ inch gap at the bottom of a three foot wide door is equivalent to having a three inch by three inch hole open to exterior conditions all of the time.

The purposed of a vestibule is to create an unconditioned space to effectively separate the conditioned space and the exterior conditions to prevent direct exchange of air reducing the rate of infiltration. Implementing a vestibule will result in energy savings due to a reduction of infiltration losses/gains from wind and stack effects. Potential incentives may be available for the installation of efficient doors or the implementation of vestibule entry doors through Avista's Site Specific program. Just make sure you let your account executive know about the project before the installation in order to see if the measure qualifies for an incentive.

- The Fire Station garage was ventilated by a large exhaust fan that discharged out the side wall. A large intake louver is located on the opposite wall from the exhaust fan. The purpose of this was to ventilate the space when the trucks were running. The exhaust fan and intake louver have not been used in many years and are blocked off with foam insulation. We recommend permanently blocking the openings for the intake and exhaust. Permanently sealing these openings will reduce infiltration and heat loss at those locations, which will help the HVAC system maintain space temperatures.
- City Beach – Beach House: a total of three separate entrance doors are in place. Here it is recommended that one of the two NE doors be replaced with insulated wall. It is also

recommended that you explore the feasibility of adding vestibules while taking into account the limited amount of use for the facility (Memorial day to Labor day).

- Community Hall: here there is opportunity to implement vestibules at the main entrances. If this is not feasible, you should at the very least install new weather stripping on the exterior doors as visible daylight can be seen.

- **HVAC Systems**

City Hall, the fire station, and the police station are heated by packaged roof top units and cooled by the same units. The units all appear to be in good condition and well maintained. The garage of the fire station is heated by a pair of gas fired unit heaters. If you are considering the replacement of any of the HVAC equipment, you should have several HVAC contractors provide you with bids for installing the proposed high efficiency equipment. Also keep in mind that when replacing HVAC equipment, the higher the Annual Fuel Utilization Efficiency (AFUE) for heating equipment and the higher the Seasonal Energy Efficiency Ratio (SEER for units of 5-ton or less) or the Energy Efficiency Ratio (EER for units of 5-tons or more) for cooling equipment, the more efficient the HVAC system will be.

- City Hall: The existing unit heaters condition a space by heating the air in the space to the set point temperature. When the doors of the garage are opened a large amount of the heated air is immediately lost to the outside. When the doors are closed the heaters will need to come out to reheat the air. The garage of the fire station would be better served by gas fired infrared red heaters. These type of heaters heat the occupants of the space not the air in the space.

There was one old A/C compressor on the roof that looks like it may not be operating, but everything else looked well maintained. There were some complaints by workers on heating and cooling comfort levels. We heard this in the planning office. It did not seem like anything air balancing could not help. I could not see the controls on the sidewalk heating system boiler from the second floor. Wherever they are, they should be reviewed and maintained to avoid heating the concrete when it is not needed.

- Jeff Jones Square restroom: electric unit heaters with manual knob for control. Here it is recommended that you work with your account executive to determine if natural gas can be provided to this facility. If so, you should explore the feasibility to switch all electric units to high efficient natural gas unit heaters.
- City Beach – Beach House: 1 ½ ton Ductless heat pump was going to be replaced with a 2 ½ ton unit to increase capacity. As we discussed though, the existing unit was not able to meet the temperature setpoints due to the lack of insulation in the building. Once you add insulation to the building the proposed unit may end up being oversized for the space.
- City Beach – Shop: Electric unit heaters are utilized with stand alone thermostats. Here it is recommended that you work with your account executive to determine if natural gas can be provided to these facilities. If so, you should explore the feasibility to switch all electric units to high efficient natural gas units.
- War Memorial Arena: the new grandstand's current system utilizes electric heat air handling unit (AHU) with electric reheat VAV boxes. It is unclear as to why the main AHU utilizes electric heat even though gas is available on site. As a result the city is paying two to three times more than necessary for heating with electric heat source rather than natural gas. Here it is recommended that you explore the feasibility to replace the AHU electric heating system with gas or consider replacing it if there are any failure/s in the electric system.
- City Shop: a radiant hydronic heating system is in place to heat the office and shop areas. Here there is opportunity to replace the existing natural draft boiler (approx. 80% thermal efficiency) with a high efficiency condensing boiler. The condensing units was stated to be 15+ years old (10-13 SEER) and is recommended to be replaced with a high efficient unit.

- Community Hall: the HVAC system was replaced in the past 2-3 years in order to add air conditioning. Since the system utilizes two high efficient (93% thermal efficiency) gas furnaces and the A/C units are fairly new there are no recommendations at this time.
- Lake Water Treatment Plant: three separate ductless heat pumps with stand alone controls were utilized to condition the breakroom, conference and office areas. While some natural gas unit heaters were found in some areas, the majority of the plant's zones utilized electric unit heaters. Here it is recommended that you explore the feasibility of replacing the electric heaters with high efficient natural gas units.

Potential incentives may be available through our Site Specific program, but you need to make sure that you contact your Account Executive with the project specifications before you start any HVAC project in order to qualify. Alternately, depending on the proposed equipment's size and heating efficiency, you may be able to take advantage of Avista's Commercial Natural Gas HVAC program which provides rebates ranging from \$4.50 to \$8 per input kBtu.

In any case, you should have several HVAC contractors provide you with bid options for installing high efficiency equipment. We can then analyze the high efficiency equipment options to determine whether it will be cost effective for you to implement.

- **Thermostats & Settings**

Controlling your thermostat is one of the best ways to save energy within your building. By adjusting and maintaining your thermostat you can save energy on the heating, ventilation and air conditioning system. Typically occupied setpoints of thermostats should not be programmed lower than 78° F for cooling and no higher than 68° F for heating, as each degree will cost you about 3% on your heating or cooling bill. For the unoccupied setpoints, it is typically recommended that it be lowered as much as possible (55-60°F are typical heating set back setpoints) as long as the HVAC equipment has enough capacity to satisfy the occupied temperature setpoint by the time doors open for business.

There is a common misconception that the HVAC will cost you more to raise the temperature back up to the desired temperature if it is decreased to the unoccupied setpoint, when in reality the energy saved during the decrease in temperature is roughly equal to the energy used to get the temperature back up to the desired temperature setting. Therefore, your energy savings actually come from the duration of time that the HVAC maintains the lower temperature instead of the higher temperature during the heating season and vice versa during the cooling season. So the longer the building remains at the lower temperature, the more energy savings that you will see reflected in your energy bill.

- **Destratification**

Since warm air rises, stratification naturally occurs when you have a room with a high ceiling. Stratification means that the air settles into layers of different temperatures with the warmest air at the highest point. A typical rule of thumb is that you can expect the air temperature to increase by approximately ½ °F for every foot above a normal five foot thermostat. Thus, in areas with significantly high ceilings (i.e. guest rooms with lofts), the majority of your heat will stack up at the top further increasing your building's heat loss, especially if there is not sufficient roof insulation in place. However, this can be prevented by operating a (paddle or ducted) low speed, high volume ceiling fan(s) in winter mode to mix the air and evenly distribute heat to the space.

After destratification, you can expect the air temperature in the room to vary slightly by a few degrees between the ceiling and the floor level. With destratification, not only will you improve the energy efficiency of your building while generating savings, but you will also improve the comfort of the space. Here we discussed that you should explore the feasibility of implementing ceiling fans in your guest rooms with lofts to reduce energy consumption.

- The Fire Station garage has several ceiling fans installed. We recommend turning these fans on in the winter to help circulate the heated air back down to the occupants.
- Lake Water Treatment Plant: the membrane room is a good candidate for destratification fans due to the height of the facility. Here we recommend that you explore the feasibility of implementing low speed high volume ceiling fans.
- City Shop: depending on how often the overhead doors get opened during the winter months you may benefit from adding destratification fans as the shop utilizes a floor radiant heating system.

You may qualify for an incentive through the Site Specific program for the addition of destratification fans. However, in order to qualify for a potential incentive you will need to contact your account executive with the project specifications before the project is started.

## • **Commercial Food Service Equipment**

During the visit it we discussed that there are rebates available for high efficient food service equipment that uses less energy. At the moment, Avista offers rebates to help you offset the cost of purchasing high efficiency equipment. These rebates are available for a variety of qualifying equipment. Thus, when the time comes to replace or install new food service equipment, you should consider buying more efficient food service equipment that can qualify for a rebate. Replacing inefficient equipment in a kitchen will lower your energy usage and in turn save money. For more details about what equipment qualifies please contact your account executive.

For more details about what equipment qualifies for an incentive, visit <https://myavista.com/energy-savings/tools-for-your-business/rebates-washington> to read the specifications required on our Commercial Food Service Equipment program or contact your account executive.

- City Beach – Beach House: there is various commercial food service equipment (e.g. electric oven, electric griddle, chest/upright freezers, ice machine, etc.) utilized at this location. When the time comes to replace or install new food service equipment, do so with high efficient EnergyStar equipment.

## • **Vending Misers for Cold Drink & Snack Machines**

Cold drink vending machines may seem like unlikely candidates for saving energy in your facility, but they use more electricity than you might think. According to the Department of Energy, a typical refrigerated vending machine can cost approximately \$300 per year to operate. The energy is used in a cold drink vending machine is primarily used for running the machine lights and the refrigeration unit. Automatic control devices installed on vending machines can help lower electricity costs by up to 50%, depending on the number of hours your machine is actively used. Here it is recommended that you implement control devices that utilize occupancy sensors to shut down the machine when no one is around without effecting the product or overall operation of the machine. At this time Avista doesn't have a prescriptive program for vending misers. However, a potential incentive may still be available through our Site

Specific program. Just make sure you contact your account executive with project specifications before the project is started in order to qualify for any potential incentives.

- The vending machines in the foyer outside the city council chambers would be good candidates for the vending misers.
- City Beach – Beach House: Two drink coolers appeared to already be implementing LED lighting. Here you will just want to make sure the coolers are turned off during the off season.

## **Lake Water Treatment plant & Waste Water Treatment Plant**

The Sandpoint Sewage Treatment plant underwent several major energy efficiency upgrades in or around 2005 and were completed/commissioned in 2010. These measures included

- 1) Upgrade from a coarse bubble to fine bubble aeration plate diffuser system that included variable speed-driven aeration blowers, and new dissolved oxygen monitoring and control.
- 2) Digester methane gas to be used in boiler or micro-turbine. You may want to take a look into why methane is still being flared off and not ran through the turbine.
- 3) Waste activated sludge pumps and return activated sludge pumps upgrade to VFD control.
- 4) Replace gravity belt thickener with a rotary screen thickener (one more gravity thickener remaining). It is our understanding that the entire facility will be upgraded to handle additional MGD capacity and to comply with additional EPA effluent discharge requirements (population > 10,000). As this upgrade project becomes more defined, it is important to get Avista involved in the process early on to identify any possible energy saving opportunities and gather the necessary information early on. Typically this will involve any equipment or systems that are beyond what a traditional system would entail and if there is a cost premium associated with that upgrade. Also, any building components, etc. that are above building codes that carry an additional cost may also be eligible for incentives.

Lighting should be addressed at this facility as we determined that most structures contained either t8 or t12 fluorescent lighting. We strongly recommend that you consider upgrading to LED fixtures for reasons previously mentioned.

On a follow-up visit on June 22nd, Carlos Limon and Andy Paul were accompanied by Jeff Cowley to tour the City of Sandpoint Lake Water Treatment Facility. This is one of two surface water treatment plants, the other, Little Sand Creek, is served by Northern Lights along with the majority of the distribution system. The Lake plant underwent significant upgrades in 2012. Much of the plant operation was already utilizing current state-of-art energy efficient equipment demand control strategies. Both the raw intake supply vertical turbine pumps and the membrane filtration in-line vertical pumps were all drive and controlled by variable frequency drives (the intakes running at averages of 40 – 50Hz). One suggestion here would be to automate/optimize the system (both supply and finished water distribution, if not already). Immersed membrane systems lend themselves very well to automation as compared to traditional coarse media filtration systems. The most immediate and cost effective upgrade to the water treatment facilities involve upgrading the T5 and T8 fluorescent lighting systems with LED and advanced occupancy, dimming and possibly daylighting controls. As previously mentioned, LEDs are now becoming more readily affordable and have life-spans several times longer than incandescent or fluorescent lighting, significantly reducing maintenance cost in most cases.

### **• Compressed Air**

Compressed air usually requires more energy than any other type of equipment. In many industrial facilities, compressed air systems use more energy than other types of equipment. A properly managed and maintained compressed air system can save significant amounts of energy. Air leaks in a compressed air system are a significant source of wasted energy as they can sometimes waste approximately 20-30% of the compressor's output capacity. As an example, a hole as small as 1/32 in. diameter can waste approximately 1.6 CFM (leak rates identified in cubic feet per minute) at 100 psi system operating pressure. Nearly all compressed air systems will have leaks, but only 5-10% of total

compressed air usage is considered acceptable. Thus, it is highly recommended that you identify and repair any and all leaks during non-operating hours. Leaks can be detected with the assistance of ultrasonic leak detectors or through the use of soapy water and paint brushes in suspected areas. It was mentioned that your air requirements were somewhere between 90 psig at the point of use. Upon further inspection, it was found that the compressor supply pressure was relatively a constant 110-120 psig. The difference in operating pressure of a compressed air system significantly affects the cost of compressed air as each 2 psig pressure drop will result in approximately 1% energy savings. Conversely, operating a compressor at 115 psig instead of 100 psig will require about 8% more energy as well as increase the leakage rate. Typically there should be no more than a 10 psig pressure drop between the discharge and the equipment requiring the highest pressure. Here it is highly recommended that you evaluate each of your air consumers to determine what your maximum air requirements are in order to adjust your system pressure accordingly. Another potential energy saving opportunity is to eliminate any inappropriate compressed air usage. Inappropriate uses include open blowing, machine clean-up, drying, cooling and dislodging debris with compressed air. Most of these can be eliminated through education and behavior modification. Part of our deliberations included the possibility of purchasing a new compressor. Once you have selected a vendor, we will work then them to investigate any energy savings opportunities on a site-specific basis and predict potential incentives. Compressed air variable frequency drives (not new and retrofit) in conjunction with cfm demand monitoring could yield excellent energy savings if properly controlled and might qualify for an incentive on a site-specific basis.

- **Variable Frequency Drives**

A variable frequency drive is an electronic controller that adjusts the speed of an electric motor by modulating the power being delivered. The VFD can convert a single speed motor to variable speed with no modification to the motor itself. VFD's are readily available for motors from 1 HP to 300 HP and are easily installed directly into the power line leading to the motor, replacing the existing motor starter. By accurately controlling the speed of the motor through frequency modulation, VFDs provide an excellent method of matching exactly the output needs of your system during part-load situations. Therefore, VFDs offer the possibility of a better way to control motors in your facility and will save you energy in the process. In addition to savings from reduced energy usage, VFDs provide "soft starts" that gradually ramp up a motor to its operating speed contributing to reduced maintenance and repair costs yielding longer equipment life. We recommend that you develop and maintain a comprehensive motor inventory log to determine where there is potential to implement VFDs (again, many of the existing systems are already equipped with VFDs). However If additional future opportunities for VFDs can be applied (fans/blowers, pumps, etc.) we recommend that you get at least three bids from different vendors and that you contact your account executive before you start a project in order to be eligible for an incentive as VFDs for non-HVAC (or motors higher than 300HP) applications (most of your motors fall into this category) will need to be analyzed as Site Specific projects.

## **General Information Regarding Energy Efficiency Measures**

With respect to other potential energy saving opportunities, Avista will be happy to consider most measures that represent a measurable kWh and/or therm reduction. This includes energy efficient equipment and/or processes that would be considered above and beyond industry standards or minimum code requirements for which you must pay a cost premium. Incentives may be available depending on the nature of the project, the kWh/therm reduction, and the simple payback in years.

- **Next Step**

We understand that some of the measures with longer paybacks may be more difficult to implement. In any case, we do emphasize the need to perform some of these Energy Efficiency Measures in order to further reduce your energy usage and to increase the efficiency of your facility. Keep in mind that for any of the measures we recommend that you get at least three bids and provide us with the one you choose along with any completed project information worksheets in order to complete an analysis.

However, before you start any of these measures or if you have any questions regarding possible incentives, you should call your account executive, **Sharmon Schmitt at (208) 769-1370**. Sharmon can answer any of your questions and set up contracts for you regarding any measures other than the prescriptive measures so if there are rebates, you will get them. We look forward to hearing back from you and to work with you in helping you reduce the energy consumption of your facility.

*Respectively submitted, Energy Solutions Engineering Team – July 12, 2018.*