MAY 2020

OPERATIONS & MAINTENANCE MANUAL

Townhouse Residents

Not subject to Condominium Corporation

Blatchford Renewable Energy

Edmonton

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Blatchford Renewable Energy

Blatchford Renewable Energy is a new City of Edmonton owned utility that delivers reliable heating, cooling (air conditioning) and hot water to all the homes and businesses in Blatchford. Our renewable energy system plays an essential role in helping to achieve the vision for a sustainable community that is carbon neutral and uses 100% renewable energy.

To help achieve this vision, the community has implemented three key strategies around energy production and usage:

- Energy Conservation – Homes and buildings are designed to conserve energy with a well-insulated building envelope and smart design technologies like heat recovery ventilators.
- Energy Efficiency – The energy that is required for heating, cooling and hot water needs is delivered through a highly-efficient District Energy Sharing System (DESS). The system allows the same unit of energy to be shared over and over again by capturing excess energy and transferring it to other buildings in the neighbourhood.
- Renewable Energy – The District Energy Sharing System provides clean, renewable energy for your home from on-site energy sources like geoexchange and sewer heat recovery.

We are committed to minimizing the neighbourhood's environmental impact and will deliver renewable energy on a neighbourhood scale never before seen in Canada.

How the District Energy Sharing System (DESS) Works

District Energy Sharing Systems are centralized systems where thermal (heat) energy is distributed from a central location to multiple buildings in a neighbourhood.

Blatchford's District Energy Sharing System is a highly efficient system that uses renewable energy sources. The first stage of the District Energy Sharing System uses a geoexchange field which harnesses the shallow geothermal energy below the earth's surface to provide reliable heating and cooling for the homes and buildings in the community.

Pipes under Blatchford's streets circulate water that is used to distribute energy from the community Energy Centre to homes and buildings. These pipes are connected to your home and circulate clean, room-temperature water through your heat pump system(s). This cycle is illustrated in Figure 1 and Figure 2.

Unlike a traditional home, your house does not have a furnace or an air conditioner. Instead, it is equipped with a heat pump that transfers energy between your home and the Blatchford District Energy Sharing System. Your heat pump transfers energy back and forth between your home and the water in the DESS.

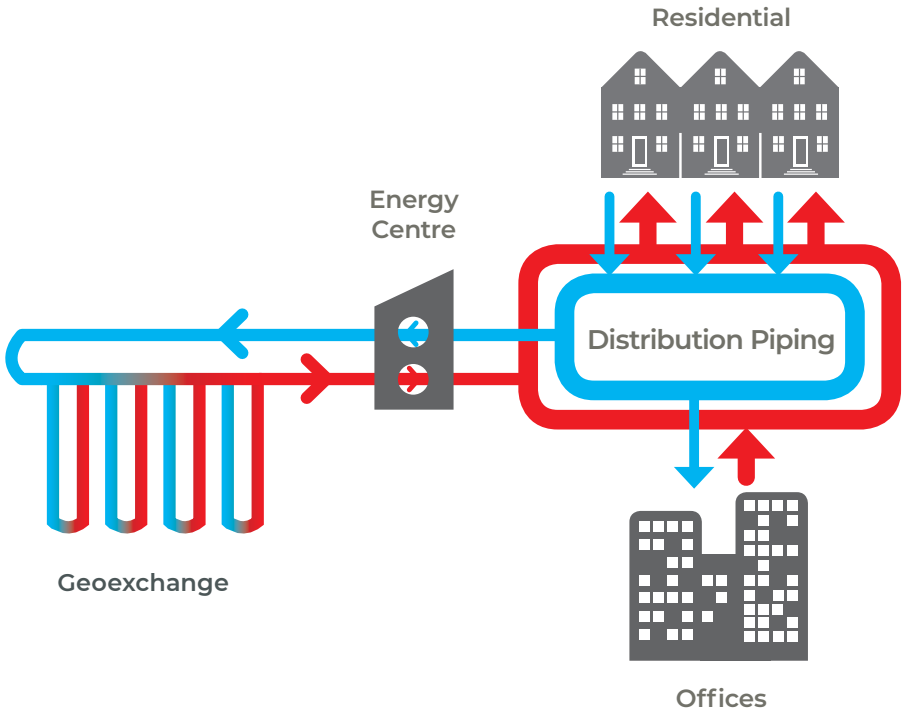


Figure 1: *District Energy Sharing System uses a network of distribution piping to connect homes and buildings to the community energy centre.*

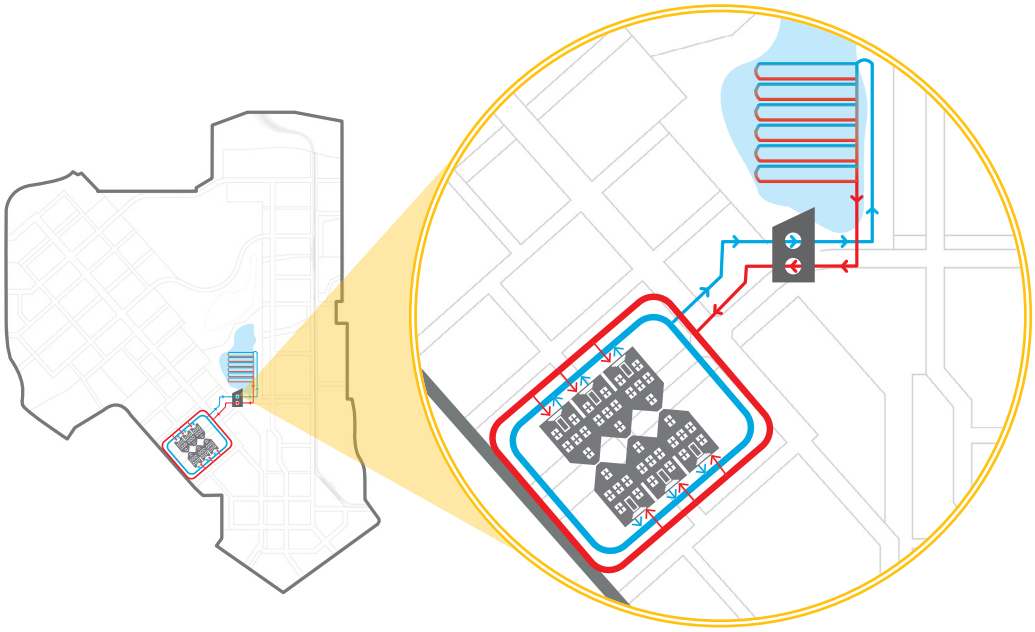


Figure 2: *The first stage of the District Energy Sharing System relies on a geoexchange field as the source of renewable energy.*

In winter, the District Energy Sharing System uses heat pumps to transfer the thermal energy that is available from the water in the system. Once the heat pump(s) in your home takes this 'usable heat', the cooled water is then returned from your heat pump(s) to the neighbourhood's system. This water is sent back to the Energy Centre where, if needed, it's reheated by thermal energy from the geoexchange field before being recirculated within the community.

In summer, your heat pump reverses and provides cooling (air conditioning) to your home by removing excess heat from your home, which is then sent back into the system. The warmer water is returned to the Energy Centre where it can be sent to the geoexchange for seasonal storage or shared with your neighbours in Blatchford that require heat.

A District Energy Sharing System will significantly reduce the neighbourhood's greenhouse gas emissions. It plays a major role in helping the Blatchford community on its exciting journey to become a carbon neutral community that uses 100% renewable energy.

Who is this Operations & Maintenance Manual for?

This operations & maintenance manual is meant for residents living in townhouses that are not part of a condominium corporation.

The manual provides residents and qualified service technicians an overview of how the Blatchford District Energy Sharing System works. It provides general information only and is not to be relied on for specific requirements for maintaining or operating the equipment inside your home.

The equipment-specific manuals provided by the manufacturer must be used to maintain the equipment in the home; guidelines and standards outlined in the manual must be followed by the qualified service technician. Residents are solely responsible for the operation and maintenance of the equipment inside their home, except for the energy meter, DESS metering network conduit (for energy meter communication) and the associated piping between the DESS to the energy meter, which are the property of Blatchford Renewable Energy. Residents and service technicians should not alter, adjust or tamper with this equipment.

Please keep this manual with the heat pump manufacturer's manual provided by the home builder. If you are unable to find the heat pump manual, you can visit the manufacturer's website to find the operations manual for the specific brand and model of your heat pump.

Equipment in Your Home

The following is a description and an example photo of the DESS related equipment inside your home. Please note that the exact equipment might look slightly different based on different manufacturers used by home builders.

Energy Meter:

Measures the DESS energy used by your heat pump(s) for heating and cooling your home. This energy meter is owned by Blatchford Renewable Energy and should not be adjusted, modified or tampered with.

Heat Pump(s):

A heat pump transfers energy between your home and the DESS. A heat pump extracts energy from the DESS and upgrades it to generate useful heat for your home. In the summer, the heat pump will provide cooling for your home.

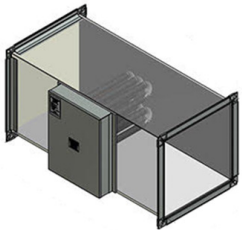
Your home has a second heat pump for heating domestic water for showering and washing. This specialized heat pump is designed to deliver water at the high temperatures required for hot water use.

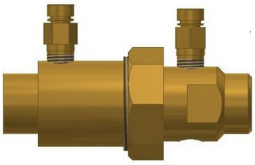
Hot Water Tank:

Like other homes, your home has a hot water tank which stores hot water for showering and washing. The water in this tank is heated by a heat pump also using DESS energy.

Backup Heater:

Your heat pump system(s) have an electric backup heater. The electric backup heater is there in case there is an issue with your heat pump or the DESS. Under normal circumstances, the backup heater should not be needed.



DESS Control Valves:	Each heat pump has a control valve which regulates the flow of DESS water through the heat pump.	
Strainer:	Each home has a strainer to keep any debris from entering the heat pump(s).	
Auto Flow Valve:	Each heat pump has an auto flow valve to regulate the flow of DESS water through the heat pump when the heat pump is running.	
Shutoff Valve:	Your home is equipped with DESS shutoff valves to stop the supply and/or return of the DESS water. The flow can be stopped using the valve's handle. When the handle is perpendicular to the pipe, the valve is closed; when the handle is parallel to the pipe, the valve is open.	
Other Components:	Some homes may have hydronic heating systems (such as in-floor radiant heat or radiators) that require additional equipment such as pumps, piping and additional hot water storage tanks. These components are provided by your builder as part of your home heating system. Refer to the new home manuals provided by the home builder for recommended maintenance of these systems.	

District Energy Sharing System Operating Principles

The DESS is designed to deliver water at a temperature, pressure and flow rate that is suitable for the home heat pump system(s) to operate efficiently and provide heating or cooling at any time of the year.

The following section defines the normal operating conditions of the DESS and specific requirements of your home heat pump(s).

DESS Operating Temperatures

Normal operating temperatures of the DESS may vary throughout the year and are dependent on the number of residents heating or cooling their homes. The DESS supply (incoming) temperatures for winter and summer are provided in Table 1 below. The DESS normally provides cool or room-temperature water to each building (this is different from a district heating system which provides hot water or steam). This room-temperature water is used by the heat pump(s) as an energy source to provide heating or cooling at any time of the year.

Table 1: DESS Typical Operating Temperature Range

	DESS Supply (Incoming) Temperature
Minimum (winter)	10°C
Maximum (summer)	25°C

The return (outgoing) water temperature is expected to be around 5°C lower than the entering water temperature when the heat pump is in heating mode, and 5°C warmer than the entering water temperature when the heat pump is in cooling mode.

This information may be useful to technicians who are maintaining or repairing your heat pump–ask them to read it. Store this manual with your heat pump.

Note that the DESS does not contain antifreeze. Care must be taken to prevent freezing of the DESS source water. The heat pump low pressure switch must be set to prevent freezing of the DESS water.

DESS Operating Pressures and Flow Rates

Pumps in the community's central Energy Centre provide flow through the DESS and therefore a source water circulator is not required for home heat pump systems.

The pumps in the Energy Centre operate to provide a minimum of 10 PSI differential pressure to all buildings. Heat pumps, piping and all DESS components inside the building should be designed for a pressure drop of no more than 10 PSI at design flow. This includes the 1-1/4" High-Density Polyethylene piping from the property line to the building.

Each heat pump is required to have an automatic control valve to limit the DESS flow through the heat pump to meet the design flow rate at all times. Flow control valves should be factory pre-set for approximately 2.8 gallons per minute per ton of heat pump nominal capacity.

Each heat pump is required to have a control valve to stop DESS flow through the heat pump when it is off.

The DESS water pressure may be as high as 100 PSI and with a differential pressure (supply-return) of up to 50 PSI differential at some times of the year. All DESS piping and components must be designed for a minimum working pressure of 100 PSI. Control valves must be capable of operating under a differential pressure of up to 50 PSI differential.

Backup Electric Heat Operating Principles

Each heat pump is designed with a backup electric heater. Water-to-air heat pump systems will have an electric duct heater. Water-to-water systems will have an electric element in the storage tank.

This electric backup heater is designed to maintain a minimum level of comfort in the home in case there is an issue with the heat pump or the DESS. Under normal circumstances, the backup heater should not be required. The heat pump is designed to provide the full heating requirement of the building without the need for an auxiliary heater.

Each system may be slightly different, but generally, all backup heating elements will be controlled by a relay connected to the heat pump alarm signal AND a thermostat. If the heat pump locks out or goes into alarm, then the relay provides power to the backup electric heater. Once powered, the thermostat controls the element to maintain the room air temperature or hot water tank temperature.

> **Backup electric heat should not be necessary under normal operation of the system. The heat pump should be sized for the full load of the building.**

> Energy costs will be lower by using the heat pump for space heating and limiting the use of backup electric heat.

District Energy Sharing System Components

Piping, valves and components have been provided by the home builder to supply DESS water from the main DESS lines in the street to the heat pump(s) in the home as shown in figure 3. Components must not be removed or disabled. Any failed components must be replaced with identical or similar products.

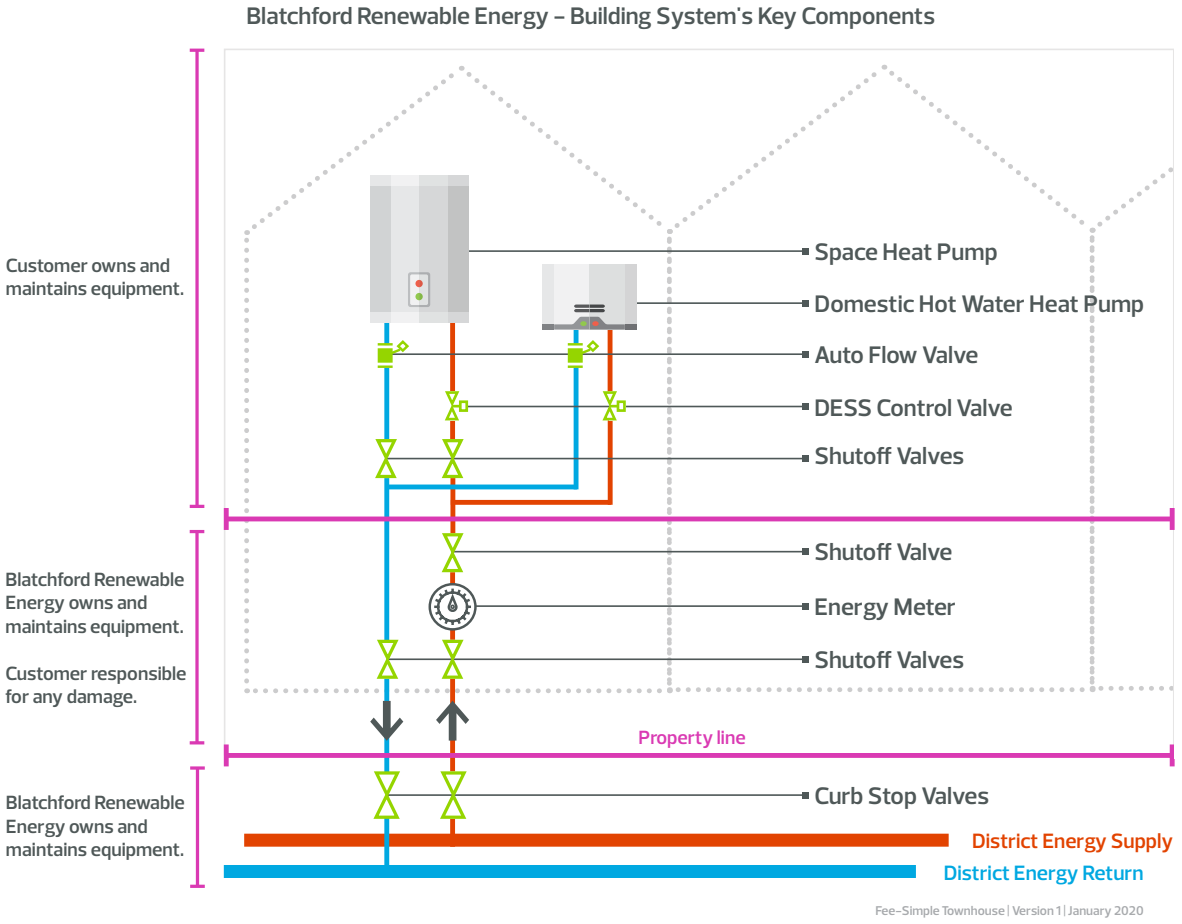


Figure 3: *DESS (Source) Piping Requirements Schem*

Heat Pump Maintenance Manual

This maintenance manual is intended to be used by qualified service technicians to understand and maintain the DESS heat pump system(s) in your home. This manual is an overview document which provides general information only and is not to be relied on for specific requirements on maintaining or operating the equipment inside your home. The equipment specific manuals provided by the manufacturer must be used to maintain the equipment by a qualified service technician.

The resident is responsible for the operation and maintenance of the equipment and associated piping inside their home, with the exception of the energy meter, the DESS metering network conduit (for energy meter communication) and the associated piping between the DESS to the energy meter.

Blatchford Renewable Energy is not responsible for the operation or maintenance of the equipment inside the homes except for the energy meter, DESS metering network conduit (for energy meter communication) and the associated piping between the DESS to the energy meter. The energy meter, DESS metering network conduit and the service connection piping from the energy meter to the street are owned by Blatchford Renewable Energy and should not be altered, adjusted or tampered with by the resident or their service technician. Fines may be applicable to the resident if a meter is damaged or the meter's seal is broken.

A regular maintenance program will prolong the life of your heat pump, help proactively identify issues or repairs, and improve efficiency and reliability of the system. Similar to traditional furnaces, residents are encouraged to have a qualified service technician complete a service check on the heat pump(s) and DESS connection on an annual basis or on an interval as recommended by the heat pump manufacturer.

Any maintenance activities should only be undertaken by qualified and licensed personnel.

Heat Pump

For specific maintenance of your heat pump, refer to the maintenance requirements in the operations & maintenance manual provided with your equipment by the home builder. If you are unable to find the heat pump manual, please contact the manufacturer directly (the manufacturer's name should be on the heat pump and/or on a sticker attached to the unit).

Key Things for your Qualified Service Technician to check:

- Because the DESS contains no antifreeze, the heat pump should be set to prevent freezing of the source water. Refer to the heat pump manual for details on these settings.
- Check the heat pump temperature setpoint(s) and dead band. The dead band should be large enough to ensure the heat pump runs for several minutes before cycling. Refer to the heat pump manual for specific recommendations.
- Review the heat pump manual for service recommendations specific to your heat pump.

DESS Piping and Components

The DESS piping contains water treated with corrosion inhibitors. The water is non-potable and should not be used for drinking, cleaning, watering or any other purposes. Any flush ports that could be confused with potable water should be labeled as "Non Potable – Do Not Drink".

During routine maintenance, it is recommended that the qualified service technician complete the following key checks.

Key Things for your Qualified Service Technician to check:

- Clean the strainer(s) on the incoming DESS pipe.
- Check the heat pump source water control valve(s) for proper operation.
- Check and record differential pressures across the heat pump(s) and auto-flow valve with the system running. A record of these pressures may be useful to identify issues such as clogged heat exchangers.
- Check for leaks in the piping and components.
- Exercise all shutoff valves.
- Check insulation is intact and check for signs of condensation which could lead to issues.
- Check that any flush valves on the DESS pipes are labeled as non-potable water.

Energy Meter

The energy meter, DESS metering network conduit and the service connection piping from the energy meter to the street are owned by Blatchford Renewable Energy and should not be altered, adjusted or tampered with by the resident or their service technician. Fines may be applicable to the resident if a meter is damaged or the meter's seal is broken.

If you suspect any reading issues with the energy meter and/or to request meter testing, please contact EPCOR at 310-4300.

Key Things for your Qualified Service Technician to check:

- Check for leaks around the energy meter.
- Check for any signs of damage.
- Check for any disconnected wires.

Troubleshooting

For troubleshooting, always refer to the manufacturer's operations & maintenance manuals for specific instructions for the specific model of the heat pump. Below is a list of potential issues and suggested actions. Always use a qualified service technician for any checks or repairs of your home heat pump or DESS piping system components. To contact a qualified service technician, review the sticker attached to the heat pump to find the manufacturer, make and model of the heat pump and then search online to find service technicians with experience working with the equipment.

There is a leak from the district energy sharing system

If there are signs of a leak from the DESS pipes and/or around the energy meter and/or the heat pump:

- Close the shutoff valve(s) to stop the water flow to and from the heat pump. Note that the heating, air conditioning and domestic hot water capacity may be impacted if the DESS valves are closed.
- If the leak has stopped after closing the shutoff valve(s), contact a qualified service technician to fix the leak. You can contact a technician by conducting an online search to find service technicians with experience with the brand of heat pump.
- If the leak has NOT stopped after closing the shutoff valve(s) or can not be isolated from inside the building, please contact 311 for support.

There are signs of water condensation around the equipment

Please note that water condensation is a common occurrence and is usually not significant enough to cause damage, therefore, no action is required. Condensation on the DESS pipes can happen particularly in the cooler seasons (fall/winter) when DESS temperatures are the coldest.

There is insufficient heating or cooling

- Check the circuit breaker in your electrical panel to ensure that the breaker has not been switched out of the ON position. If the breaker has been switched out, reset the circuit breaker by switching the breaker out of the OFF position and back to the ON position.
- Check the thermostat and heat pump control settings. Refer to the equipment manual for details.
- Check the heat pump for fault codes.
- Contact a qualified service technician (review the sticker attached to the heat pump to find the manufacturer, make and model of the heat pump and then search online to find service technicians with experience working with the equipment). Have a service technician check that the DESS control valve is working properly, DESS auto flow valve is not obstructed, and DESS flow rate is normal through the heat pump (2.8 gallons per minute per nominal ton).
- Refer to the heat pump manual for additional troubleshooting suggestions.

There is no hot water

- Check the heat pump that is responsible for heating the domestic water for an alarm. If there is an alarm, refer to the manufacturer's manual for resetting instructions and/or other troubleshooting suggestions.
- Contact a qualified service technician for troubleshooting and repair if needed (review the sticker attached to the heat pump to find the manufacturer, make and model of the heat pump and then search online to find service technicians with experience working with the equipment).

The heat pump is locked out or showing an alarm

- Check for any service interruption notices on Blatchford Renewable Energy's website at blatchfordutility.ca
- Try resetting the heat pump. Refer to the manufacturer's heat pump manual for instructions specific to the heat pump model.
- If the heat pump locks out again, contact a qualified service technician (review the sticker attached to the heat pump to find the manufacturer, make and model of the heat pump and then search online to find service technicians with experience working with the equipment).

The heat pump is repeatedly locked out or showing an alarm

If the heat pump locks out more than once, have a qualified service technician troubleshoot the issue. The technician may do the following:

- Check the water flow by manually operating the control valve and checking pressure drop across the auto flow valve or heat pump. DESS water flow may also be confirmed by checking the flow rate displayed on the energy meter.
- Check if the source side heat exchanger is fouled or plugged.
- Check the strainer on the DESS supply for blockage.
- Check for air in the DESS piping.
- Check that the control valve is working and there is a sufficient delay before the compressor starts to allow the valve to open fully. Heat pumps may need to be set with a start delay if the valve is slow-acting. Refer to the heat pump manual for details.
- Check that incoming water temperature is within normal range (between 10 – 25°C).
- Refer to the heat pump manufacturer's manual for additional troubleshooting suggestions.

The thermostat is flashing red or showing an alarm/error

- Refer to the thermostat manufacturer's manual for troubleshooting suggestions.
- Contact a qualified service technician for troubleshooting and repair if needed.

My electricity usage appears to be high

- Check that the heat pump is NOT showing an alarm or is locked out.
- Review your thermostat settings - a temperature setback of 2-3°C at night or while occupants are away can help reduce energy usage.
- Review the domestic hot water tank settings (refer to the equipment manual for details and/or ideal settings).
- Review other electricity usage within your home (for example lights, appliances, etc).
- Contact a qualified service technician to check that the electric heat is set to operate only in the event of a heat pump fault and is not being used as a second stage heat source. The service technician may check the heat pump performance and compressor amperage is within the normal range (refer to the heat pump manual for details).
- Refer to the heat pump manufacturer's manual for additional troubleshooting suggestions.

The DESS energy usage appears to be high

- Review your thermostat settings - a temperature setback of 2-3°C at night or while occupants are away can help reduce energy usage.
- Contact a qualified service technician to review your heat pump operation and confirm that the heat pump is operating normally. As well as confirm that the heat pump control valve closes fully when the heat pump stops running to avoid unnecessary energy use.
- If you suspect that there is an issue with your energy meter, please contact EPCOR at 310-4300 to request meter testing; if no issues are found, a meter testing fee will apply.

Change filter on heat pump

As part of regular maintenance, the requirements for changing the filter in your heat pump may differ based on the make and model of your heat pump. Please review the heat pump manufacturer's manual for instructions and contact a qualified service technician for assistance if needed.

Heat pump serviced

To learn more about the heat pump maintenance schedule and servicing requirements, please review the manufacturer's manual for the specific model of the heat pump.

Customer Support

Customer Care

In Edmonton: 311
Calls from outside Edmonton: (780) 442-5311
TTY Services: (780) 944-5555

7 days a week from 7am to 7pm (closed statutory holidays)

Billing

To manage your account online, please visit **epcor.com/myaccount**

For billing and/or consumption inquiries, please contact EPCOR at **310-4300** or by email at **custserv@epcor.com**

EPCOR Hours of Operation:
Monday to Friday 8am to 7pm
Saturday from 8am to 4:30pm
Sunday & statutory holidays closed

Emergencies

For emergencies during business hours (7 am to 7 pm) please contact:

In Edmonton: 311
Calls from outside Edmonton: (780) 442-5311
TTY Services: (780) 944-5555
For emergencies after hours (7pm to 7am) please contact:
In Edmonton: (780) 508-9200

For more information, please visit **blatchfordutility.ca**
or email **blatchfordutility@edmonton.ca**

Blatchford Renewable Energy

Edmonton

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