



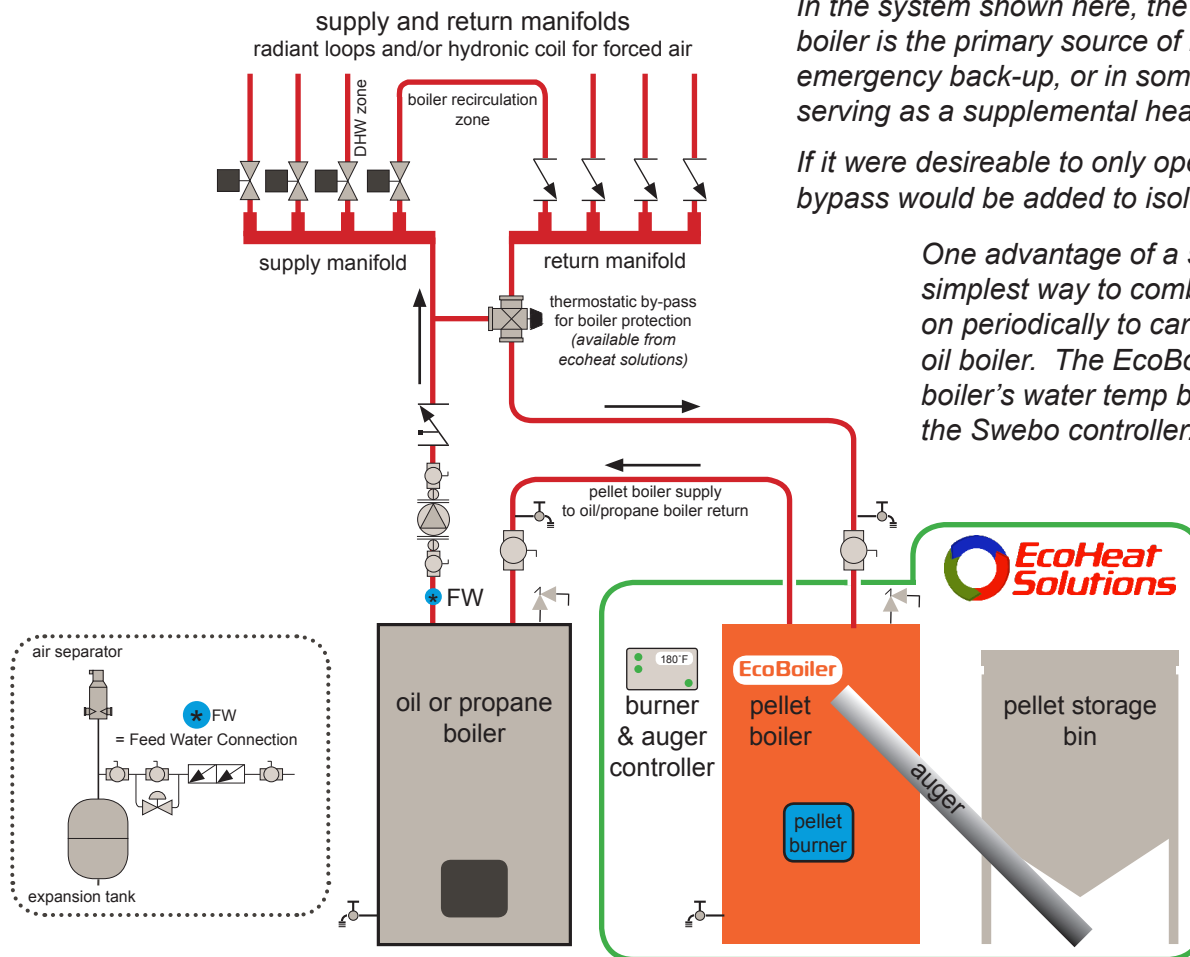
EcoBoiler Connected in Series with Oil/Propane Boiler

Biomass heating systems such as those featuring a wood pellet boiler serving as the primary heat source usually have a secondary heat source to serve as a back-up. A secondary heat source provides the system with some flexibility, by giving the homeowner the option to heat with the back-up fuel at any time, such as the end of a heating season, should the pellet supply run low. A back-up heat source can also provide heat in an emergency, should anything happen with the primary unit that keeps it from operating (typically low fuel supply).

In the system shown here, the two boilers are connected in series. The pellet boiler is the primary source of heat, and the fossil fuel boiler only comes on as emergency back-up, or in some cases where demand spikes occur, then serving as a supplemental heat source.

If it were desirable to only operate one boiler without a back-up, a manual bypass would be added to isolate one of the boilers.

One advantage of a series connection is the ease of set-up. It is the simplest way to combine two boilers. The circulator should come on periodically to carry heated water from the pellet boiler to the oil boiler. The EcoBoiler's low limit can run off of the oil/propane boiler's water temp by connecting a second temperature probe to the Swebo controller.



Note: This schematic does not show

- low-water cut-off
- high limit safety switch
- indirect hot water tank
- controls
- chimney/venting
- air release valve on EcoBoiler (not included)

If individual zone circulators are to be used instead of zone valves, a hydraulic separator should be placed between the bypass and the manifolds

© EcoHeat Solutions LLC

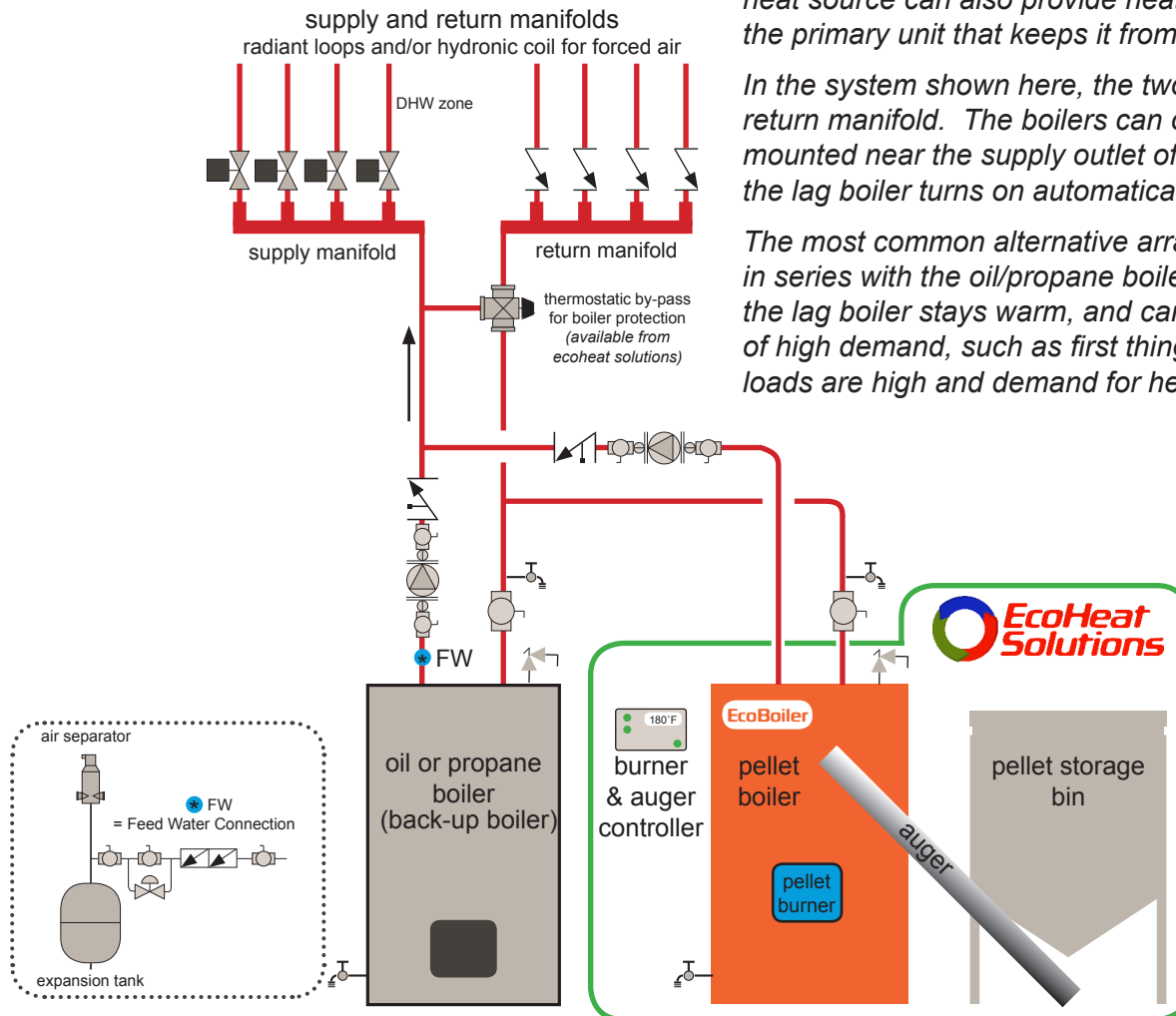


Lead and Back-up/Lag Boilers Connected in Parallel to Supply and Return Manifolds

Biomass heating systems such as those featuring a wood pellet boiler as the primary heat source usually have a secondary heat source to serve as a back-up. A secondary heat source provides the system with some flexibility, by giving the homeowner the option to heat with the back-up fuel at any time, such as the end of a heating season, should the pellet supply run low. A back-up heat source can also provide heat in an emergency, should anything happen with the primary unit that keeps it from operating (typically low fuel supply).

In the system shown here, the two boilers are tied in parallel to the supply and return manifold. The boilers can operate independently. A temperature sensor mounted near the supply outlet of the EcoBoiler™ can be used to determine when the lag boiler turns on automatically. In this arrangement, the lag boiler starts cold.

The most common alternative arrangement to this is to have the EcoBoiler™ piped in series with the oil/propane boiler. The advantage of connecting in series is that the lag boiler stays warm, and can easily supplement the EcoBoiler™ during times of high demand, such as first thing in the morning on very cold days when heat loads are high and demand for heat peaks.



Note: This schematic does not show

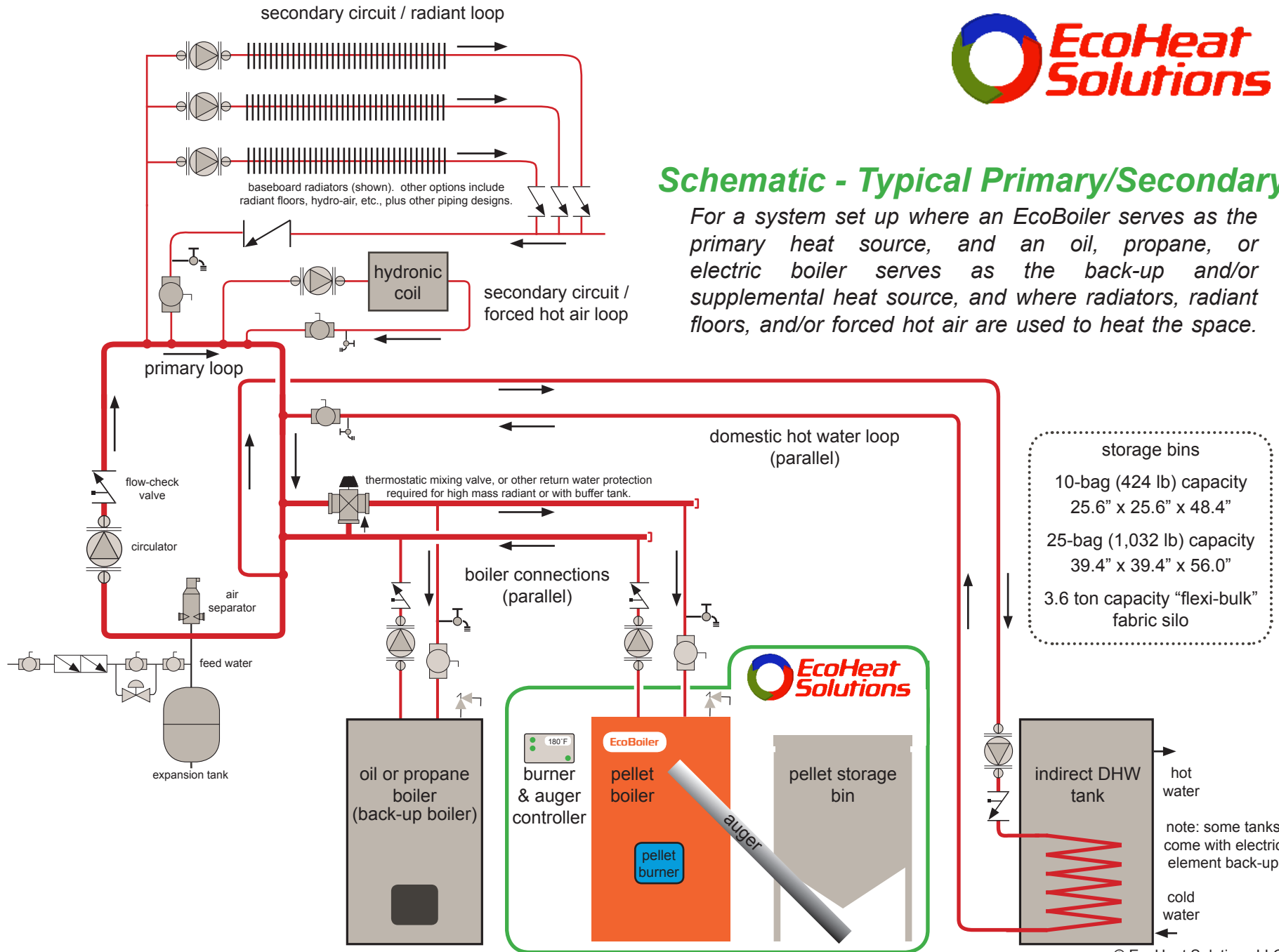
- low-water cut-off
- high limit safety switch
- indirect hot water tank
- chimney/venting
- controls
- air release valve on EcoBoiler (not included)

If individual zone circulators are to be used instead of zone valves, a hydraulic separator should be placed between the bypass and the manifolds



Schematic - Typical Primary/Secondary

For a system set up where an EcoBoiler serves as the primary heat source, and an oil, propane, or electric boiler serves as the back-up and/or supplemental heat source, and where radiators, radiant floors, and/or forced hot air are used to heat the space.



- storage bins
- 10-bag (424 lb) capacity
25.6" x 25.6" x 48.4"
- 25-bag (1,032 lb) capacity
39.4" x 39.4" x 56.0"
- 3.6 ton capacity "flexi-bulk"
fabric silo

© EcoHeat Solutions LLC



EcoBoiler Connected with Electric Boiler

Heating with a pellet boiler usually includes some form of back-up heat source, particularly when there is a chance of the fuel supply running out. Often the back-up is the pre-existing fossil fuel boiler or furnace. There are cases where it is not practical to use a pre-existing heat source, such as when that other heat source is broken down, or takes up too much room.

An electric boiler can be the best choice for back-up, particularly when used only as an emergency heat source, or for off-season hot water preparation. This schematic shows a simple arrangement that is suitable for systems where the EcoBoiler has the capacity for providing 100% of the heat load. The electric boiler comes into play only in the following instances:

1. emergency back-up, in cases where the pellet boiler runs out of fuel
2. for heating water during seasons where the pellet boiler is turned off (e.g. summer, requires indirect hot water tank or other suitable heat exchanger)

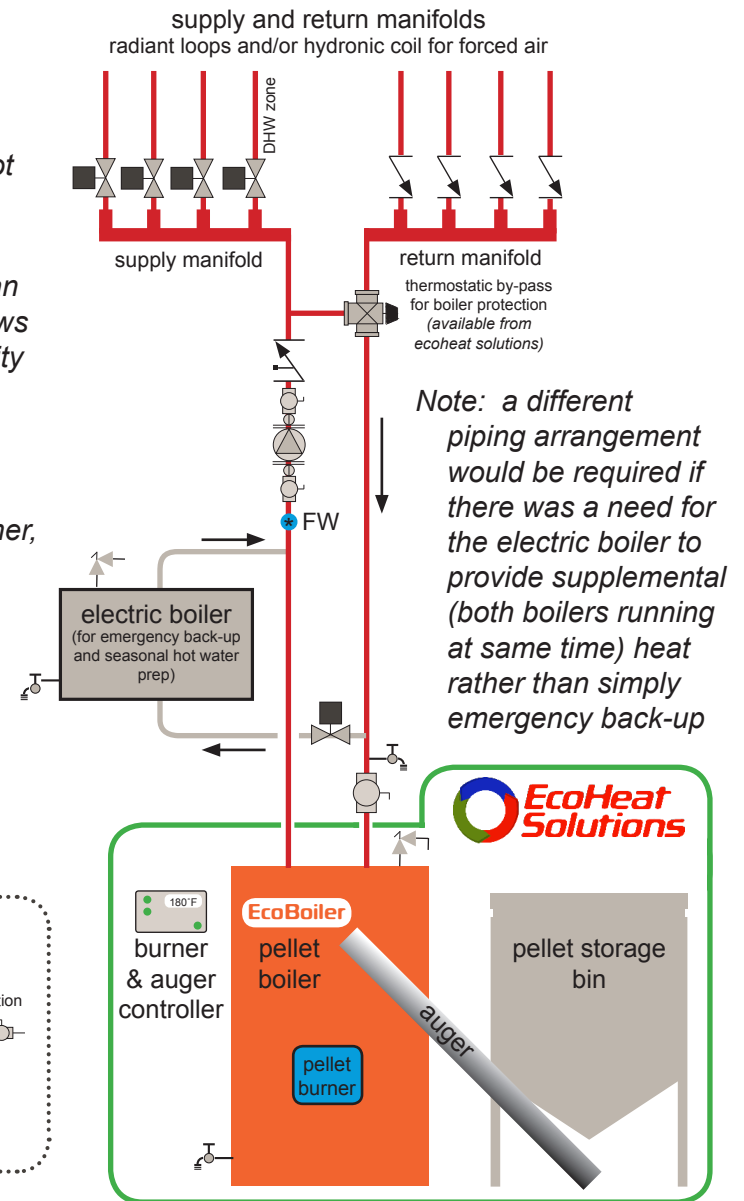
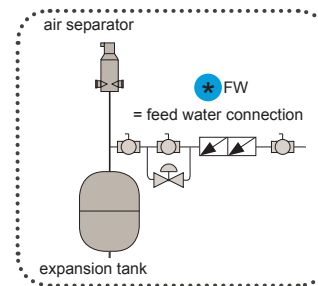
The electric boiler does not have water running through it during periods where the pellet boiler is running. If a sensor detects water temperature is low in the EcoBoiler, the valve leading to the electric boiler opens up to allow water to pass through the electric boiler. The electric boiler will run during these times based on a flow-switch.

In order to keep power costs to a minimum, the temperature provided by the electric boiler can be just enough to keep the house from freezing.

Note: This schematic does not show

- low-water cut-off
- high limit safety switch
- indirect hot water tank
- controls
- chimney/venting
- air release valve on EcoBoiler (not included)

If individual zone circulators are to be used instead of zone valves, a hydraulic separator should be placed between the bypass and the manifolds



© EcoHeat Solutions LLC



Schematic - System with Buffer Tank

For a system set up where an EcoBoiler serves as the primary heat source, and an oil, propane, or electric boiler serves as the back-up and/or supplemental heat source, and where radiators, radiant floors, and/or forced hot air are used to heat the space.

The buffer tank provides longer run times for the EcoBoiler, and provides a reserve of heat for when large zones or high mass radiant are part of the system.

With this set-up, the buffer tank can be taken off line in the summer, with hot water provided by solar or the back-up boiler. Alternatively, the EcoBoiler can be turned on to get buffer and indirect hot water up to temp, then shut down, possibly for days with heat drawn from the tank as needed.

System Control

The EcoBoiler controller monitors and maintains temperature in the buffer tank that can be drawn off when DHW or zones call for heat.

If the EcoBoiler is not operating, the lag boiler senses lower temps and starts.

Alternative Set-up

An alternative piping scheme for the buffer tank would be to have it as a secondary circuit off of a primary loop. This makes it easy to shut off the buffer in the summer.

If the buffer tank is piped in this way, there should be some means to reverse the flow in and out of the tank so that hot water is added to the top of the tank, and that hot water is taken from the top of the tank for heating purposes.

