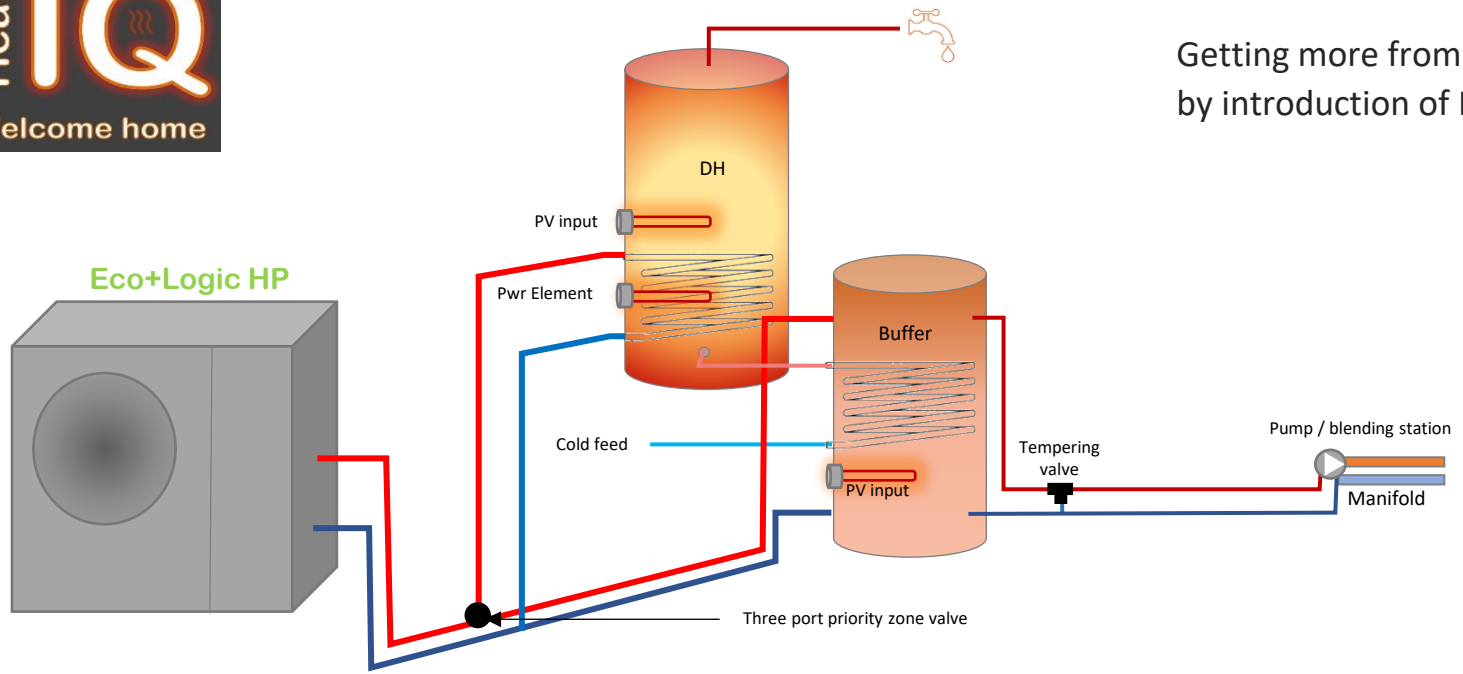
Getting more from your heat pump system by introduction of PV solar via a buffer tank



This detail shows valving relevent to the subject it may not show all valving requirement in a system

Heat pump Normally heats buffer tank to say 44°. Though with priority it switches to heat the hot water cylinder during pre set time schedule periods.

When heating Hot water it raises temperature in cylinder to 50° from this point it reverts back to heating output and controls the PWR element on to until your pre set DHW temperature is achieved

Once per week the HP ensures legionella protection by triggering the PWR element until the required 60°

PV power is directed to the DHW cylinder first (allowing it to rise to 75°)
At this point the PV is diverted to the buffer here it is contributing to the floor while also raising the buffer temp as high as 75° This higher temperature bank is fed to the floor via a tempering valve set at 45° blending the high temperature supply with the low temperature return from the floor. The manifold blending station will further reduce the delivery temp if required.

Control described here is based on our Inverter HP Control may be quite different with other brands

Buffer tank 100/150L. The coil is used as a pre heater for the domestic hot water though it doesn't produce all your DHW, this is very efficient input from a COP of say 3.8 to 1 achieved at (@44°) where conversely the direct input from the HP to the cylinder coil (@55°) may only give a COP of just over 2 to 1.

Why not use a bigger Buffer using say a 500L buffer may seem like a good idea.
However there is the capital cost which would be significantly more and logistically you need a space to install it.
In any case it is questionable there would be any significant benefit from it as it's inclusion would increase the total volume of water in the system from around 260L with a 150L buffer to 620L. At times when there is little or no PV available you still have to maintain the temperature of this volume, which will massively counter any of its benefits!.

Continues

Storing in a large buffer during the day and inputting to the floor at night might also seem like a good idea, but remember, if the floor temperature is not maintained it can cool so much that the stored energy is then largely used re heating the slab rather than providing stable heat from it!
In a well controlled system with typical night setback control there is relatively low demand from the floor through the colder night time hours.

Energy saving is not just from the big things.
Make sure there is adequate pipe in the floors, for a heat pump, the more pipe in the floor the lower the HP delivery temperature can be, and the lower the delivery temperature the higher the COP.

Fully Insulate all pipework feeding the system especially external pipework around the HP (*every un insulated fitting is the heat loss equivalent to 0.5m of uninsulated pipe!)*

Stagger all your control zone on time settings by 30 minutes so demand from the HP is not everything all at once.