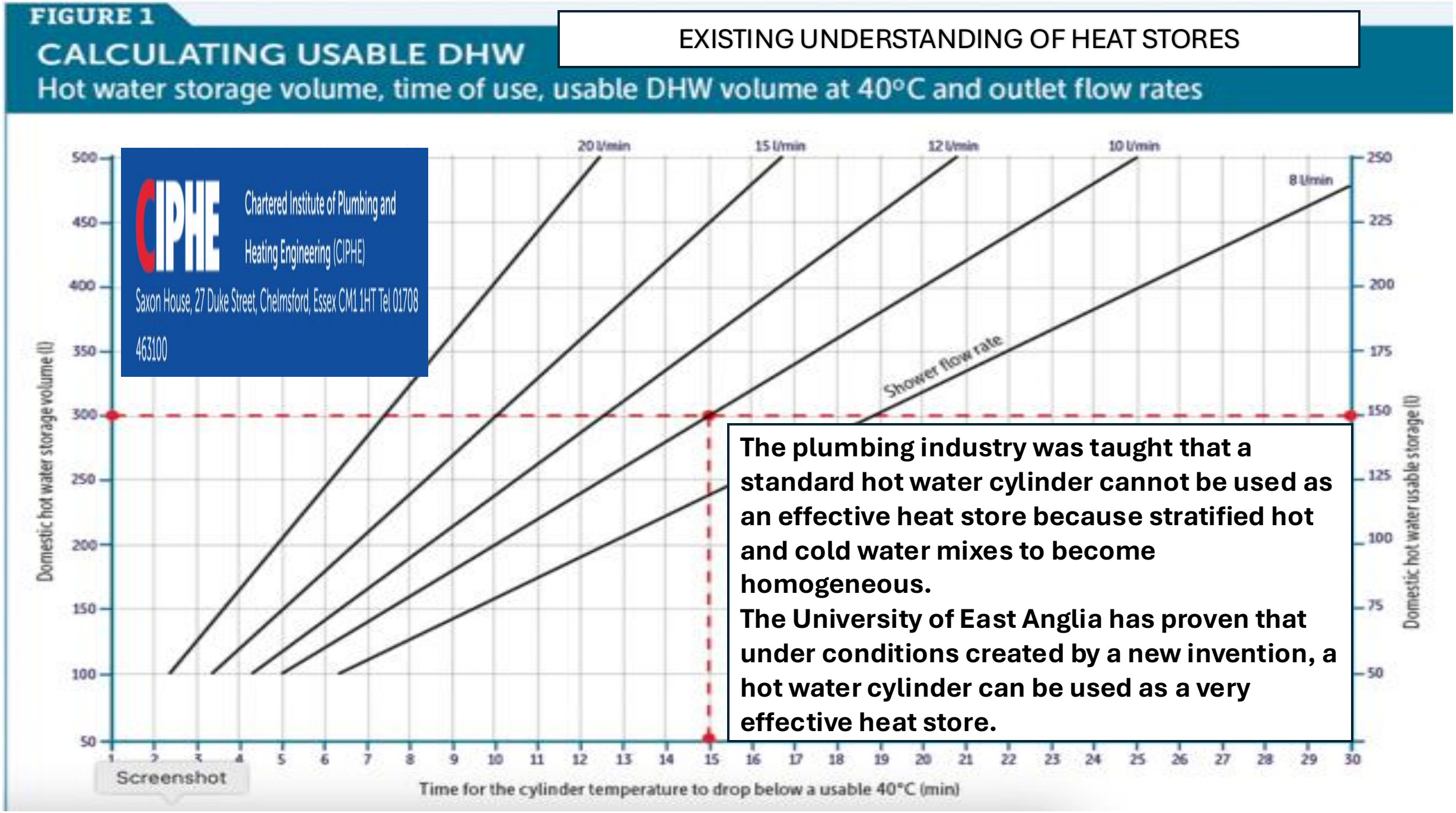
PRESENTATION TO NORWICH CITY COUNCIL - 9TH JUNE 2025
(Abridged)

The University of East Anglia, using advanced hydraulic modelling, has validated the efficacy of a new and surprisingly simple water-based heat store. The store is a simple hot water tank, devoid of complexity, which operates with amazing efficiency under flow conditions which are consistently replicated when running an SP22S ShowerPowerBooster for showers.

This allows low-cost heat storage which, combined with water storage, gives very significant and positive effects on water supply, energy supply, and can reduce the capital cost of heat pumps .

EXISTING UNDERSTANDING OF HEAT STORES



The plumbing industry was taught that a standard hot water cylinder cannot be used as an effective heat store because stratified hot and cold water mixes to become homogeneous.

The University of East Anglia has proven that under conditions created by a new invention, a hot water cylinder can be used as a very effective heat store.

Current TrustScore

4.8

Based on 1,908 reviews

ShowerPowerBooster customers often remove existing Power Showers to achieve perfect showers by replacing them with SP22S ShowerPowerBoosters

A SP22S creates the conditions for the heat store to work efficiently.

Verified

May 12, 2025

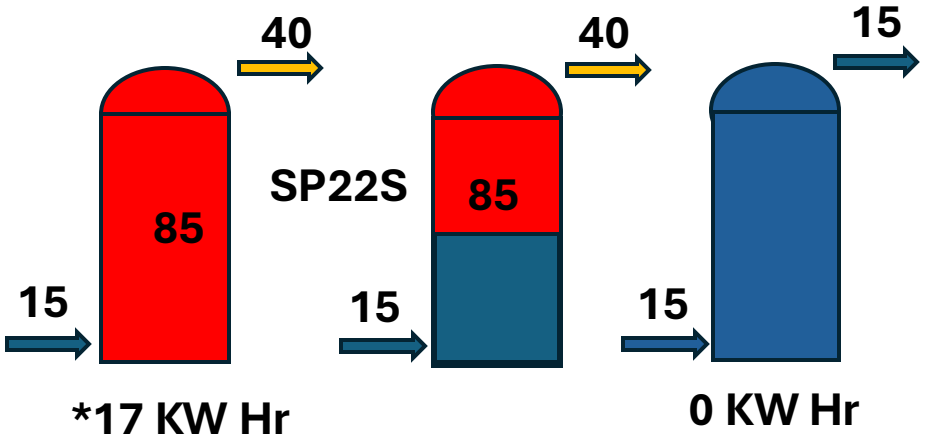
The existing Grundfos booster pump...

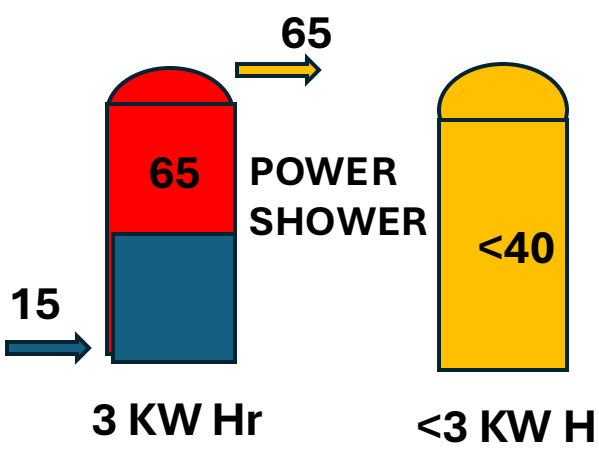
The existing Grundfos booster pump flowswitch flap stopped seating and so was not switching off despite cleaning.
I changed it over to the Shower Power Booster pump and this worked as well and better than that huge heavy Grundfos.
This new pump is an engineering marvel with its hitech flow switch, low consumtion, low cost and so easy to fit.

Date of experience: March 11, 2025

Energy Storage in a Simple Water Tank

Hot water is less dense than cold water. The perfect heat store is one that has hot water floating on the top of cold water with a narrow thermocline between the hot water and cold water. This allows you to draw most of the hot water off the top of the cylinder without disturbing the cold water below.





The Chartered Institute of Heating and Plumbing Engineers predicts that it takes under 10 minutes for a partly heated hot water tank to fully mix if you use a power shower.

The new patented heat store device can operate at 85 degrees centigrade. A blending valve regulates the temperature leaving the tank and it can operate at 85 degrees centigrade.

Traditional power showers operate at up to 65 degrees centigrade and cannot be integrated with a blending valve. The moment they switch on they start to mix the hot and cold water in a hot water cylinder. In under 10 minutes the hot and cold fully mixes.

The University of East Anglia computer model tells us why a simple standard hot water cylinder can store more usable energy than conventional wisdom predicted. A scientific ‘sweet point’ exists, where the flow rates during recharge, and discharge, are such that water wants to naturally maintain a thermocline.

4.4
Excellent
137 reviews

Complex and Expensive vs Simple & Cheap

Current TrustScore
4.8
Based on 1,908 reviews

Mixergy 210 Litre Indirect Unvented Smart Cylinder (MX-210-IND-582)
£1,910.65 incl. vat

60 Deg C	Maximum Temperature	85 Deg C
40 Deg C	Minimum Usable Temperature	40 Deg C
11 KW Hr	Usable Energy Stored	17 KW Hr
£1,910	Purchase Price	£366
£173	Capital Cost to store 1 KW Hr	£22

Annual servicing to maintain warranty typically costs between £100 and £120 (See Below)

I bought one of these booster pumps...

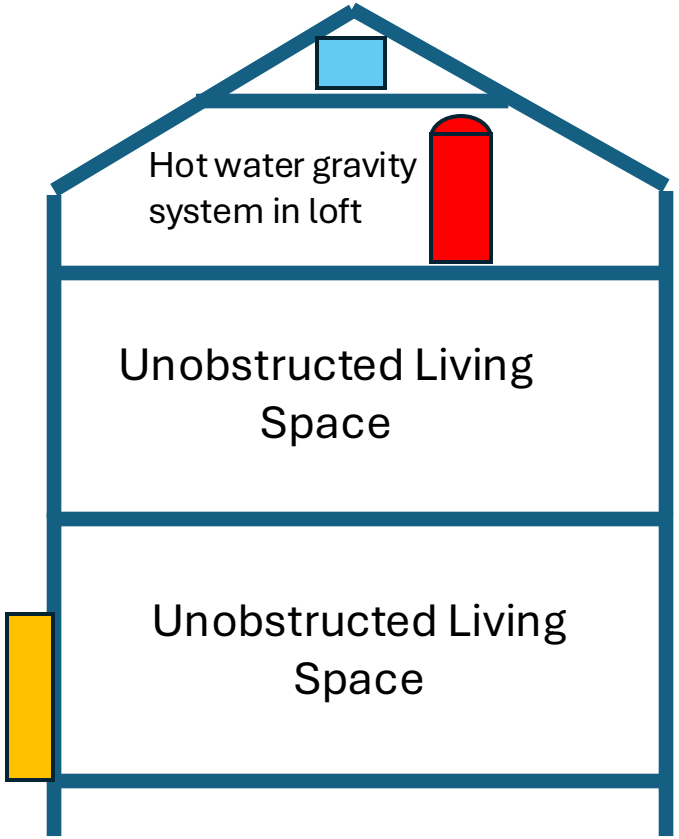
I bought one of these booster pumps 9year ago a still working the same as the day I installed it. Easy to install. Great product!

Date of experience: 06 June 2025

£1,080	Annual servicing costs excluding parts over 9 years	£0

Joule Stainless Steel Vented Cylinder – Direct – 1500×450
£365.53. Inc VAT

This Presentation summarises a proposal for Water & Energy Storage in New Housing
It uses 100% Renewable Energy.



There are two 454 litre coffin cold water storage tanks (One for potable water, one for rain-water harvesting)
Each H 580 x L 1680 x W 695 mm

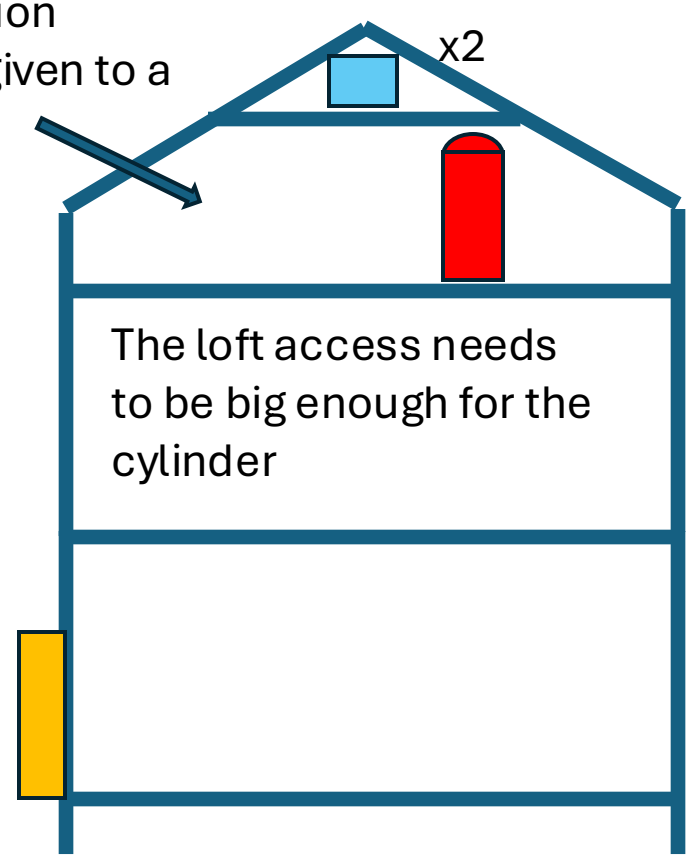
A 210 litre hot water cylinder/heat store
H 1500 x W 550 mm

One SP22S provides high pressure showers and taps (except kitchen taps which must have a mains supply). A second SP22S runs the rainwater harvesting

A hybrid air source heat pump for central heating only

Practical Considerations

Consideration should be given to a ‘warm roof’



Coffin tanks are designed to get through existing loft hatches and supported in the eaves they spread the load. One tank should be dedicated to supply toilets and the garden. The other for potable water.

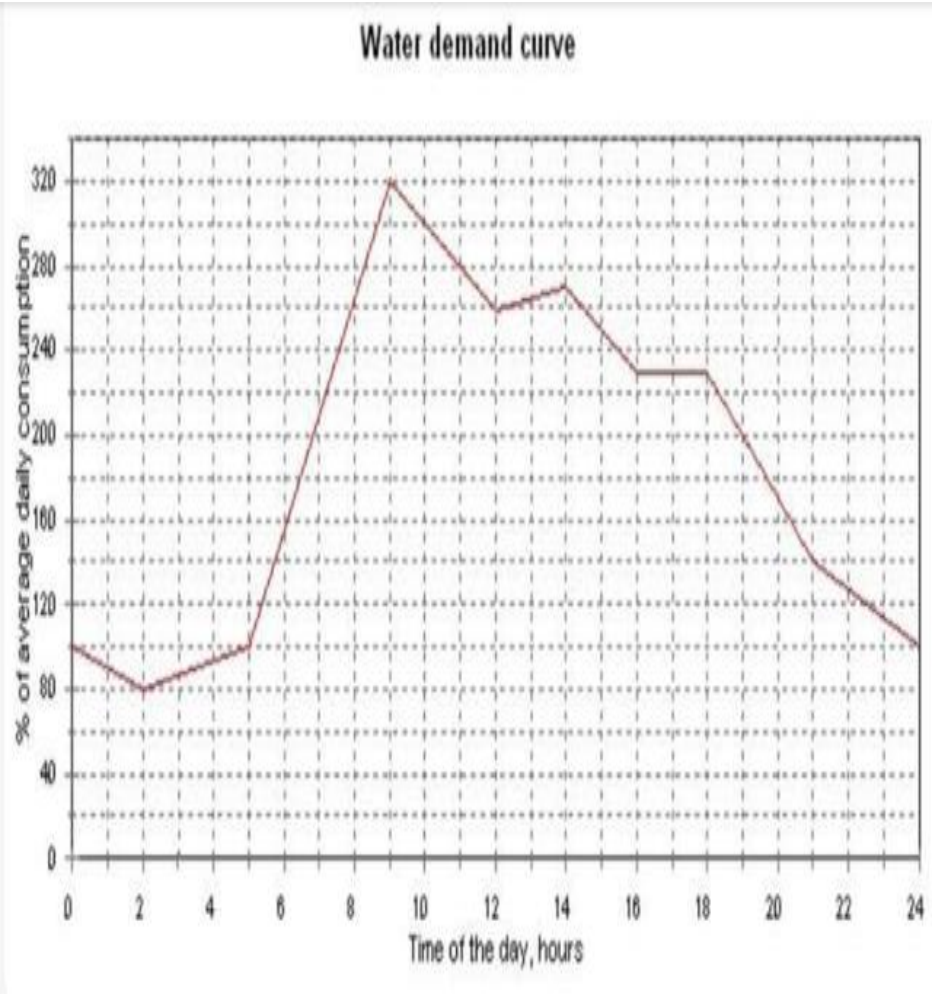
The cylinder can sit near one end of the loft to minimize loading issues. This is not a problem and many SPB customers already have cylinders in their loft.

The addition of a micro pump allows ‘instant hot water at taps’

An additional SP22S and garden boosters can harvest rainwater at minimal cost

A hybrid air source heat pump for central heating only is not interfaced with the potable hot water system which provides hot water for 48 hours in the event of a power cut.

Water & Energy Storage in New Housing
Effect on Water Consumption



One coffin tank has the capacity to store more than one day's supply of potable water and it is supplied via an actuated valve. It fills at off-peak times
The second coffin holds rainwater. If it needs extra mains fed water it fills at off-peak times.

The hot water cylinder/heat store provides multiple showers using stored water with no further energy input

Two SP22S fully automatic ShowerPowerBoosters are responsive to demand from taps, showers, and toilets.

The hybrid air source heat pump can be turned off in the summer.

The effect on water supply and distribution

I worked for Anglian Water and other Water Companies for over 30 years. I was the most senior design Engineer in Norfolk with specific responsibility for water network design and construction, so I know that
once you add 48 hours of water storage in enough homes, the effect on the water network and water supply would be game-changing. The effects on regional water supply and distribution would be:

Reduced peak pressures in the networks which will result in a significant reduction in bursts and less leakage in general.

Bursts are affected by cyclic variations in pressure with the magnitude of the fluctuation being critical and with greater failures the higher the peak pressure.

Reduced energy would be needed to pump water around the grid (but at significant increased cost to Anglian Water because they are paid to use surplus electricity at night).

Reduction in the unit price of water, as supply sources can run at a more even output, (assuming that the daytime energy tariffs are relaxed).

An overall increase in water output from individual source works.
Many source works have a minimum contact time for treatments and the maximum output based on those minimums. Without storage capacity, water is left idle in a process tank during parts of the day.

The effect on the cost of heat pumps

Heating hot water for showers etc represents a small part of the total hot water and heating bill
Heat pumps are great at heating homes.
Heat pumps are inefficient at heating water for hot showers etc.

Air to Air Direct Heat Pumps
When the temperatures outside are around 5 degrees C, a direct air to air heat pump is super efficient. To achieve an air temperature of 20 degrees centigrade inside, t**hey only need to raise the temperature by 15 degrees centigrade .**

Air to Water Heat Pumps (CH Only)
To achieve an air temperature of 20 degrees centigrade they need to heat radiators to 40 degrees. **They need to raise the temperature by 35 degrees centigrade.**

Air to Water Heat Pumps (Central Heating and Hot Water)
To achieve hot water temperature at 60 degrees centigrade you need an indirect hot water cylinder, and the coil needs to be heated to 75 degrees centigrade. **They need to raise the temperature by 70 degrees centigrade.**

Running the heat pump to the higher temperatures results in much bigger air source heat pumps, noisy pumps, lower efficiency, and vastly more complicated systems, high maintenance costs, and higher servicing costs, and needing to run them though the summer. Smaller systems just running central heating could be 50% of the cost.

The effects on the cost of new housing

New homes would be cheaper to build because hybrid heat pumps are substantially cheaper, vented tanks are cheaper than unvented tanks, and on-site mains can be down-sized.

Additional new homes can be built in areas where demand for water and electricity is already close to maximum capacity.

Isolated new homes when built will not increase peak demand on the water supply and water networks.

Existing homes can be retrofitted and reduce peak demand, so perhaps every retrofit allows you to build one new home paid for by the developer.

Flats can use Air to Air Heat Pumps instead of Air to Water Heat Pumps with similar energy and water storage arrangements to those in new homes.

Destructive Technologies

Peak demand for water and electricity is coincident so in the morning an electric shower can take power at 13 KW and water 6 litres a minute. Combi Boilers take water at times of peak water demand.

Power Showers destroy the thermocline in hot water cylinders yet they are accepted by many plumbers as the only way to boost water. They use up to three times the water and energy compared with traditional showers. Customers prefer the showers SP22S create.

There are many more technologies such as multiple jet shower cubicles and the list is extensive.

It would be politically difficult to ban these and the vested interests within those industries are considerable. The facts above are understood by anyone who understands the science and the problems we face in mitigating climate change.

For the last 12 years, Norwich City Council and indeed all Councils across the country have set an example by insisting that all property upgrades install Combi Boilers and Electric Showers.

SLIDE ADDED JULY 25

There will be “pilots” in Norwich North, another in Norwich South, and a third in Norwich City. Only the Norwich City Pilot is in doubt as that is dependant on a £100,000 grant to be announced on the 24th July. Norwich North and South are funded and will go ahead. Our target is 1,000 Affordable Heat Stores retrofitted in homes by May 2026 plus 2,000 in “New Build”.

As a participant of the scheme, as well as immediate energy and water savings, you will have the bonus of a negotiated low energy tariff, and for those in Norwich City, there is a chance to share part of the £60,000 allocated for direct customer support.

The new technology is a game changer and you are invited join me on the 25th July to find out all.

Get your ticket now for an evening of amazing discovery with experts in the field of sustainable energy and fluid dynamics and the inventor Alan Wright.

A low-cost affordable route towards ending global warming.

Opportunities for Q&A

Store free energy in your own home and reduce your personal water bills.
A limited number of Norwich consumers will receive ½ price electricity.
Find out how to be one of the lucky few and be first to apply!

25th July At The Thomas Paine Auditorium University of East Anglia at 7pm
BOOK YOUR FREE TICKET THROUGH EVENTBRITE NOW

GOOGLE “THE AFFORDABLE HEAT STORE PILOT “