



*Case Study for the Low Carbon
Innovation Bulletin*

Tadpole Energy Ltd

With increased pressure to make immediate reductions on carbon emissions, a 63-year old Yorkshire inventor could be on the brink of something big with an innovative energy efficient unit that can be fitted to existing central heating systems. The Tadpole, as the device is known, patented by Stan Whetstone of Tadpole Energy Ltd in North Yorkshire, is a small unit which tags onto any kind of boiler system to significantly increase efficiency and subsequently reduce energy consumption, CO₂ emissions and energy bills by up to 25%.

From concept through to research, development, manufacture of prototypes and some initial trials, the Tadpole has been six years in the making. Like all the best inventions, however, Tadpole Energy's device works on the simplest of principles, improving the efficiency of heating systems by minimising the dissolved air which just so happens to make the water in the heating system slower to heat.

The Tadpole is able to reduce air dissolved in water to circa one part in 2 ½ million, down from a normal 1 part in 40. The idea is to bring primary heating water to an inert level. With the air removed, the heating system reaches higher temperatures much faster, therefore reducing energy consumption.

As an added benefit, the Tadpole works silently, and even reduces the need to bleed systems, as the oxygen which contributes to the build up of magnetites and eventually leads to corrosion is no longer present. The Tadpole can be fitted to all central heating systems, whether gas, electric or oil as well as working on heat pumps and is very easy to fit.

Notable effects of the Tadpole include:

- Reduced energy consumption: heating or primary water operating with a Tadpole will become 10 to 12 degrees hotter, whilst using the same amount of energy...
- Associated reduction in CO₂ levels

- Improvement in the way heat is transferred across indirect coils and heat exchangers
- Increase in comfort levels
- Significantly reduced annual maintenance costs
- Almost silent running: much of the noise made by a heating system is associated with the air in water
- Known system problems cured, not simply having them dealt with, for example, uneven heating of radiators and noise associated with air
- Easy to fit, with only two connections
- Will work with condensing, non-condensing, oil and gas boilers, including combination boilers, as well as all types of heat pumps.
- Significant help in alleviating fuel poverty

Stan Whetstone left his 23-year career in the heating industry to put his innovative idea into development and the Tadpole technology was first patented in December 2006. Under Tadpole Energy Ltd, Stan has joined forces with Mark Huelin of Quattroseal and Aero-seal, and Tom McGahon Architect, both of whom have a wide experience in the energy field. Over the last 12 months, Tadpole Energy Ltd has been piloting their Tadpole with considerable success. They already have a number of very satisfied customers from the trials on Tadpole, (particular examples from homeowners who have installed the Tadpole are detailed at the end of this document).

With the heating season just a few months away, there is a need to get the product approved to CERT. Tadpole Energy Ltd has approached Energy Suppliers to assist in further testing of Tadpole to this end. There are 21 million gas heating systems and 1.7 million oil boilers in Britain, all of which can be improved with the addition of this surprisingly low-tech and low cost measure (under two hundred pounds).

The projected savings are impressive, standing at up to 25% off annual energy bills, and Tadpole Energy guarantees that if the Tadpole does not reduce energy by at least 10%, then customers can have a refund.

"The average household that installs the Tadpole will save around £150 a year on heating bills, giving a return on investment that is surprisingly short – under a year and a half," Stan said. "As each Tadpole has a maximum life span of 40 years, over the product's lifetime it could save up to £6,000 on fuel bills along with 70 tonnes of CO2 emissions."

Stan hopes the product will make a significant impact on the problem of fuel poverty. In Britain, five million people live in fuel poverty, (where 10% or more of their income goes on fuel bills), whilst 385,000 families are in a 'heat or eat' situation. Residents don't need to change their existing heating systems in order to see an energy saving. Replacing a boiler will not solve the problems associated with air in heating systems, as the system and boiler are two separate entities. If a boiler has become old and cannot be repaired because parts aren't available, then it

makes sense to replace it, but if not, then a more economical solution is to install a Tadpole to increase the efficiency at minimal cost. At a time when the government has reduced funding for the fuel poverty agenda, Tadpole Energy Ltd is hoping the Tadpole will have an important role to play in these areas.

The future is bright for Tadpole Energy: the company is working on a commercial scale model, currently being computer modelled, which will be available over the next couple of years and will be suitable for schools, offices, hotels, etc.

Tadpole Energy are not making claims throughout the Tadpole, but are merely reporting any events that have happened in the system since the installation of Tadpole.

What follows are three case studies conducted with residents around the country who have trialled the Tadpole device:

Nottingham:

A heating engineer in Nottingham, whose new condensing combination boiler had failed to rectify noise from pump and problems with air present in the heating system, had a Tadpole fitted. It was the first Tadpole that Stan and his colleagues had fitted to a sealed system (as opposed to a gravity fed system), so all parties were keen to learn the results.

The resident reported that the problems the old system was manifesting (primarily the noise disturbance) had disappeared within the first 10 minutes of re-commissioning the system, which was now:

- Running almost totally silently
- The difference in the boiler performance was such that the main thermostat is now turned back a full 1/3 turn
- Heat up and recovery time was just as fast, if not slightly faster
- Once radiators have been bled, they have not been touched since

Furthermore, the resident's annual bill was around £525, but since the installation of Tadpole, is now £150 down on previous bills. This represents a cost reduction of 28%.

Edinburgh:

Tadpoles were installed on the heating systems of two Edinburgh flats, both with 13ft ceilings that are not particularly easy to heat. However, twenty minutes after installation, the boilers in both flats had to be turned down, such were the efficiency effects of the Tadpole on the heating system – giving a particularly tangible perspective on the potential energy savings of the device.

Both tenants have reported a noticeably increased difference in heat output from the boiler, whilst one commented that one or two radiators at distance parts of their flat were now heating up whereas previously they were not getting very warm, due to being at the end of a pipe run loop. One tenant has affectionately called the Tadpole her "angel dust".

The director of the housing association through which the two flats are rented commented "we are keen to fit a Tadpole to all instances where we have to install a new boiler/system or where we need to replace an existing boiler. As a result we are acquiring a small supply of Tadpoles to have on hand for use."

Sussex:

The building in question here was originally a small 17th century cottage with an open vented oil fired system, which, like many houses of this type, had rooms added to it over the years. As the property was extended, new radiators were also added to the heating system. The last addition was a conservatory which extended the heating system to a point that the boiler was unable to supply the system efficiently. The result was that none of the radiators were getting as warm as they should and the conservatory radiator would not heat at all. The room thermostat was set at 24°C in an attempt to get the place warm.

A Tadpole was fitted with advice to the plumber to make sure it was installed correctly. After a couple of days, the owner noticed that the system, which was previously failing, was now running perfectly. All noise from the system was now noticeably absent and the room thermostat was now set back at 20°C.

The owner reported that every radiator in the house was noticeably hotter, even the conservatory, which had previously never heated up. The whole house was now much warmer and the domestic hot water was hotter and also heated and recovered much quicker.

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