PRIMING THE PUMP

There is a huge amount of support for heat pump technology – harvesting valuable heat from the free resource of our rivers, writes Dave Pearson

ONE would have to be living in a dark and isolated cave not to have heard about Climate Change. Many would also probably be aware of air quality issues and let's be fair, pollution from plastics have fairly ratcheted up the awareness ladder in recent months. But how committed is our society to addressing these things, what mechanisms have been put in place to encourage more sustainable behaviour and is this going to be enough?

On one hand the Paris Agreement is world-wide. Even the USA, whilst seeming reticent (or pointedly opposed some might say) to acknowledging the challenge of Climate Change has strong pockets advocating for a more sustainable future. In a protectionist "fewer imports" mindset, harvesting local energy makes the world of good sense so maybe they will join the party at some stage.

Similarly, in Westminster we have enshrined in UK law the Climate Change Act 2008 with an 80 per cent lower carbon budget than 1990 by 2050. The Renewable Heat Incentive provides appropriate support for lower carbon techniques to be utilised if one wants to. Heat pump uptake has though been very low.

Uptake is the fundamental problem. One rarely wants to do something more expensive upfront, using technology that's a bit alien (at best) and probably all a bit confusing with too many competing solutions. Equally, with little public encouragement describing why this is in everyone's interest it is hardly a vote winner to suggest we need to burn less gas. Despite continued commitment from NGOs like The World Wildlife Fund (WWF) renewables all still seems a bit "wouldn't it be nice if ..."

Acting Director WWF Scotland Dr. Sam Gardner said: "Star Renewables are demonstrating that the shift to a zero carbon future can drive innovation and support investment in new technologies. WWF Scotland is looking to all political parties to commit to ending our contribution to climate change in a generation. Such a clear signal would mark Scotland as the place to invest in low carbon tech.

'Knowing the right path is only half the battle. Getting consumers to adopt it is another'

"Given so much gas use is related to heating our homes and offices it is imperative we deploy new techniques such as river source heat pumps and make it easier to connect to new district heating networks."

So why is it nice to burn less gas? Well for a start gas burning contributes around 35 per cent of the NOx emissions in our cities so whilst we are trying to implement clean air zones based on traffic policy, 35 per cent comes from the gas boilers and gas combined heat and power engines that have become so popular in large cities. This is a good example of mistaken progress. Five years ago when the electricity grid was still around 550g/kWh of CO_2 emissions per 1kWh of electricity, burning gas locally to make electricity seemed great. Gas was cheap and dual output made a lot of financial and carbon sense.

Roll forward a few years and the electrical grid has decarbonised so that heat from gas CHP is perhaps seven times the carbon footprint from just five years ago and rapidly approaching a level higher than a simple gas boiler. In the public estate we in effect have a rising carbon footprint not falling despite strong government leadership.

So we need the vision to adopt the right techniques not just now but ready for 2050 and have made huge progress every decade.

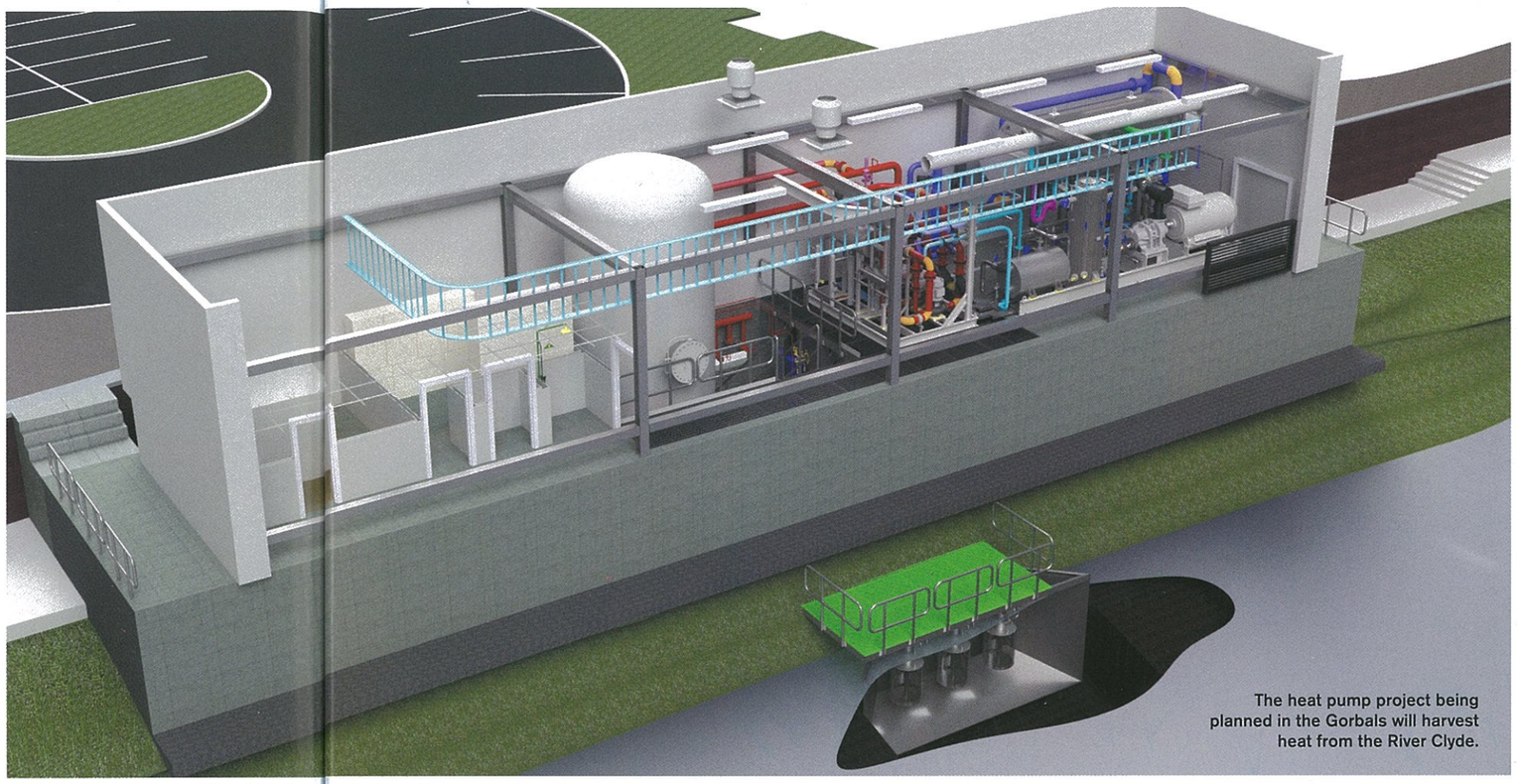
The Low Carbon Infrastructure Transition Programme is supporting key Scottish projects with funding to get the difficult ground breaking projects moving therefore showing they are technically achievable. Beyond this though we have to acknowledge individually and collectively the need to offer something attractive to public, corporate and private consumers.

Knowing the right path is only half the battle. Getting consumers to adopt it another. So why do people adopt change? Excitement, fear, opportunity, jealously, FOMO? They all stack up in part but we must create a groundswell of opinion that the journey we are on is a viable and valuable journey for everyone in society.

A large part is awareness and this is why the LCITP programme is so vital.

One way to make heat from heat pumps cheaper is to make electricity cheaper. If we view electricity generation as the only problem and the only solution is to add taxation to all electricity to drive down demand, then we stifle electrified heat.

Actually, demand managed heat generation can switch off when the grid is a bit stretched but equally focus on consuming electricity when it is more in surplus and this will become more likely with more peak wind generation. We should note the coincidence of higher heat requirement with higher wind speed.



The heat pump project being planned in the Gorbals will harvest heat from the River Clyde.

Take the project being planned in the Gorbals shown in the graphic above. It harvests heat from the River Clyde. This is solar energy that fell upon the Clyde valley and leached into the river and rumbled downhill thanks to rainfall and gravity right into the heart of the challenge; the city.

When problem solving it is always a good tactic to break a problem into chunks, classify the chunks by size and solvability and go for the biggest and easiest wins

Heat is no different. More heat demand exists in cities than outside of them and if we subscribe to the idea of district heating because it is simpler and cheaper than fitting every building with individual devices and we seek clean heat for the network and the cities sit on rivers then it seems obvious to harvest heat from the river using big heat pumps.

There is a huge amount of leadership in this area both within government and the industry groups. Claire Mack, Chief Executive, Scottish Renewables said: "With heat accounting for such a large proportion of Scotland's energy use and carbon emissions, it's critical we develop a range of affordable, efficient and low-carbon heat solutions alongside those for power and transport. Projects like this are important pioneers for opening up significant resource of renewable heat that Scotland's many rivers present. It's good to see the Government support helping home-grown technologies, and we hope that this continues beyond 2021 when important Scottish and UK Government schemes are due to end.

"Our forthcoming Low-Carbon Heat Conference on April 24 in Glasgow will showcase the progress being made in Scotland to drive down emissions and the costs of low-carbon heating."

So our goal is lower carbon, the progress in electricity generation has been good but the battle ground shifts to heat, most of this is gas in origin and largely consumed in the cities where we also have air quality issues and most cities are on rivers. It seems a pretty good idea then to harvest heat from rivers. ■

CHECKLIST TO PAVE THE WAY TO A ZERO CARBON FUTURE

Dave Pearson was recently asked to join the board of Scottish Renewables

THE author, Dave Pearson is Director of Star Renewable Energy, a Glasgow-based high temperature, heat pump manufacturer. He is also Chair of CeeD-Scotland, a business and academic knowledge sharing group with nearly 200 members across Scotland.

Dave represents the heat pump industry in the Brussels-based Renewable Heating and Cooling Platform as Vice-President and was recently asked to join the board of Scottish Renewables.

His wish list going forward:

- A continuation of the Renewable Heat Incentive beyond 2021
- A simplification of the electrical tariff for heatpumps
- A removal of Climate Change Exemption for Gas CHP (given it is increasingly in CO_2 emissions).
- A simplification of the planning process for district heating
- A recognition that gas boilers create pollution and that not being subject to Non-Domestic rates whereas District Heating is needs rebalanced
- An emphasis on public sector buildings to adopt lower carbon solutions thereby also leading to anchor loads to facilitate district heating
- An obligation on buildings to join district heating if made available at a fair price.
- Council ownership of District Heating (also facilitating heat connection).