Creating a demand for proven technology with strong policies and fair financial support will bring a just transition and a cleaner future in heating, writes Dave Pearson, Group Sustainable Development Director, Star Refrigeration


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Why we need to make tough choices to get to zero carbon

AT a time when the world is becoming ever more committed to the fight against climate change, it is beyond disappointing to see technologies that could play a £20 million role in the fight massively under-utilised and marginalised. The example of the ambitious £20m Queens Quay development on the site of the old John Brown Shipyard makes this point. The water-source driven district heating network, which serves Queens' Quay, draws on the ambient heat contained in the waters of the Clyde, and generates vastly less carbon emissions than would be the case if these buildings were heated through gas-generated heat: 80% less.

In its first phase the district heating network will provide heat for West Dunbartonshire Council's offices at Aurora House, plus the Titan Enterprise Centre and other buildings. (See the Queens Quay case study below).

However, it has to be recognised that brilliantly successful though the Queens Quay system is, it is extremely difficult for developers to make a purely economic case for deploying this technology to work in other cities. The reason is quite simple and lies in the fact that electricity today is five times the cost of gas.

For large-scale district heating systems to work a sufficient number of owners of existing buildings as well as owners of new-build developments have to sign on to the project. At present, however, with gas being so ridiculously cheap, there is no incentive for existing building owners to transition from gas-fired heating systems to a district heating system, even if the pipes for the heating system go right past the front of their buildings.

As a result, we may well be looking at a future where this world-class example of a river-source heat pump driven district heating system may well turn out to be simply a stranded beacon never repeated in another city.

What tipped the scales in the Queens Quay development was the total commitment of the development team, led by West Dunbartonshire Council, Clyde Development Limited and its various stakeholders. All were committed to a low-carbon solution. As such, they laid a key foundation stone in Scotland's quest to move from burning fossil fuel just to heat buildings. They drew on financial support from the Scottish Government and the now removed Renewable Heat Incentive from the UK Government. All parties deserve great credit for this project. What we need is for Queens Quay to become a blueprint for future developments. However, it is absolutely clear for this to happen governments in both Scotland and the UK need to take some key policy decisions.

Doug Parr, Chief Scientist and Policy Director, Greenpeace, put the dilemma succinctly: "If we are to have any chance of delivering progress, the Government must get behind available, proven solution and smash the barriers to these.

"Done with the right supporting policies, one clear proposition is to shift non-domestic taxation from electricity to gas then use these revenues to support techniques such as heat pumps of all sizes," he pointed out.

Unless the Treasury steps forward and addresses this policy vacuum there will be no way out of this problem. There is as yet a total lack of obligation for existing non-domestic buildings to reduce their emissions of gas and NOx all the way to zero in less than a generation.

The UK Government may have announced the necessity for this but the methodology is missing. Similarly, the Scottish Government, who see Air Quality as a delegated authority, cannot mandate that air quality issues merit a phase down of combustion in cities as energy as gas use/energy is a reserved matter. We can't look to isolated decisions by local authorities, such as that by West Dunbartonshire with respect to Queens Quay, as a substitute for national policy, since this was only possible through the by now unavailable fiscal balancing tools


Star Refrigeration's pump system being installed at Queens Quay

We are seeing 'zero-carbon' target dates being set and referenced to again and again in society but, frankly, it is not even clear what is meant by 'net zero carbon'.

It could mean huge levels of offsets which at best is a murky subject. The extreme high levels of NOx should be a warning it's not okay to release harmful and toxic emissions just because you plant a tree somewhere. So we need an unambiguous statement that gas will be phased out and policies put in place that allow investment to begin that progress zone by zone for entire cities.

Only the UK Treasury has the power to make gas less attractive. If it does this, perhaps by signposting far more onerous taxing of non domestic gas-generated heating over the next 20 years, it will shift the behaviour of existing building owners and drive them towards much more carbon efficient district heating systems driven by technologies available at scale in most cities; river water-source heat pumps.

Such action by the Treasury is far from unimaginable. There already exists a relatively unknown tax on gas and electricity called the Climate Change Levy. It currently adds a very modest 0.465 pence per kilowatt hour to the cost of gas. However, it adds almost twice that levy to the cost of electricity, which exacerbates the problem. You couldn't make this stuff up, particularly given all the 'net zero' talk we are hearing from top politicians.

It has to be said there are three major problems with the Climate Change Levy, considered from the standpoint of whether or not it is capable of changing behaviours. One: it is unknown in most circles. Two: it is not clear if it is going to be given more teeth over an extended period, so no-one factors it into decision making. Three: the proceeds vanish into central funds and are not themselves used to drive changes in behaviour.

Of enormous help would be if the Chancellor Rishi Sunak advertised the existence of the Climate Change Levy and put its administration and the responsibility for its future direction into the hands of the Committee on Climate Change (CCC). That would give the CCC a similar role in setting the Climate Change Levy to the Bank of England's role in setting interest rates. It could become a very effective policy lever, ratcheted up if progress falls behind.

What we have seen to date with private estates, such as universities trying to 'green up' by deploying gas-based Combined Heat and Power (CHP) solutions, is the rapid rise in the carbon footprint of these techniques. People tend not to realise as Scotland's electricity generation transitions more and more to renewables, instead of being a low-carbon fuel, the carbon emissions for heat from gas engines get higher and higher.

The carbon footprint of Glasgow University's CHP system, for example, will now

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be 700 percent higher than when first installed simply because the offset grid electricity is now cleaner. Harsh but true.

The challenge isn't simply to build lots of new buildings that are low-carbon. We also have to fix all the old stuff. With the incentives as they currently stand, this is simply not going to happen and we are not going to get anywhere near zero carbon. Those are just the facts.

A just transition means creating a new paradigm based on high quality jobs as quickly as possible and fixing inherent parallel problems like poor air quality. This means setting policy that brings success not policy that brings failure. ■

A river runs through it: Clyde delivers Queens Quay district heating system

IN MID-DECEMBER 2020 the new, high-tech district heating system at Queens Quay, on the site of the former John Brown Shipyard, went live. Commissioned by West Dunbartonshire Council and built by Vital Energi, the system takes ambient heat from the waters of the River Clyde and runs it through two 2MW water-source heat pumps designed and built by Star Refrigeration systems.

Nick Gosling, Chief Strategy Officer at Vital Energi, said: "We'd heard about the possibility of using large heat pumps to harness sustainable energy from rivers and were delighted to be selected by West Dunbartonshire Council to support them with design and delivery of an ultra-low carbon heat scheme."

Unfortunately, Gosling, notes, the closure of the non-domestic Renewable Heat Incentive in March 2021 will make it difficult for future sustainable heat schemes like Queens Quay (which can reduce carbon emissions compared to fossil fuelled heating by over 80%), to get off the ground.

He added: "We hope we can work with government in developing new policies that fairly recognise the value of low-carbon heat, and allow future low carbon heat schemes to be delivered."

Queens Quay is the first, large-scale water source heat pump scheme of its kind in Scotland, and in the opinion of the Council, will make Dalmuir one of the greenest areas in the country.

The £20 million project involved the creation of an Energy Centre to house the water-source pumps and attendant gear and involved the laying of five kilometres of below-ground pipework. In its initial phase the project will supply heat to Council offices at Aurora House, the Titan Enterprise Centre, Clydebank Leisure Centre and the new care home at the site, Queens Quay House.

There is already pipework in place to supply the forthcoming Clydebank Health Centre, along with 140 flats and retail units already on the site. The district heating system will also be able to serve all future homes planned for the site, as well as the Clydebank Library and Clydebank Town Hall.

The design is deliberately on a modular basis, so it can be expanded beyond Queens Quay. There is scope for it to provide heating for the Golden Jubilee Hospital and the Clyde Shopping Centre, as well as being extended into the town centre.

The Council says the network will make a major contribution to its climate change targets.

It will mean cheaper bills to residents of the more than 1000 homes to be built on the site. Plus the heat interchange each home will be fitted with, which enables households to regulate the heat provided to their homes, will require far less upkeep than conventional combi-gas boilers. Councillor Iain McLaren, Convener of Infrastructure, Regeneration and Economic Development, said: "This system is the first of its kind in Scotland and I am proud West Dunbartonshire is leading the way in using this natural resource to provide energy.


Nick Gosling, Chief Strategy Officer at Vital Energi

"This system will have a hugely positive impact on Clydebank and West Dunbartonshire as a whole, allowing the Council to take steps to address fuel poverty among tenants and residents by offering reduced tariffs compared to traditional heating methods, as well as working to achieve carbon reduction targets, removing more than 4000 tonnes of carbon from the environment every year for the next 40 years.

Councillor Marie McNair, Vice Convener of Infrastructure, Regeneration and Economic Development, added: "I am pleased to see this pioneering project reach completion, as it will be extremely beneficial to the people of Clydebank for many generations to come.

"We have a long and proud history of industry at the River Clyde on this site, and I welcome the new system which will mean the River and its water can again be used to support its residents."