by The Energy Managers Association

INDUSTRY INTERVIEW

Energy Management at the Scottish Fire and Rescue Service

In this feature, we focus on how organisations across different industries approach energy management. In this issue, we asked Brian Troddyn, Carbon & Energy Officer at the Scottish Fire and Rescue Service (SFRS) about energy management at one of the largest fire and rescue services in the world.

Brian Troddyn – Carbon & Energy Officer at SFRS

Background

The Scottish Fire and Rescue Service is the fourth largest fire and rescue service in the world with more than 7,900 employees. SFRS is a national organisation delivering frontline services from three strategically positioned hubs based in the East, North and West of the country. The Service responds to many different emergency incidents including fires, road traffic collisions, rope rescue, water rescue, hazardous materials and flooding as well as assisting partner agencies to keep Scotland's communities safe.

Across Scotland, there are 356 fire stations, comprised of: 74 Wholetime fire stations which operate 24hrs day, 240 Retained fire stations and 42 Volunteer stations. Retained and volunteer stations are usually unoccupied most of time except during call outs and training exercises. The organisation's fleet is made up of over 800 fire appliances and almost 800 light fleet (cars/vans).

What does energy management mean at SFRS?

Energy is used in a number of ways within our operations. Fire stations are very energy intensive buildings, particularly our Wholetime sites, which require heating, lighting and hot water 24hrs a day, seven days a week. This poses a challenge when trying to run the building as efficiently as possible. There is not a lot of dynamic loads within the building and so the energy baseline of these buildings can be quite high.

Our smaller Retained stations, where firefighters respond to emergencies via a pager-system when required, are very different in their use patterns. They are not always operational and when they are not being used for emergency call outs, they are used for training nights. Heating and hot water systems still need to operate but we are retrofitting smart heating controls to ensure that the heating is not running at full comfort temperatures for long periods when unoccupied. Drying rooms for firefighter PPE are vital for stations. Items not completely dry would pose a health and safety risk. This means that this is also the most energy intense process within the building. The rooms need to run at over 28°C for long periods to dry wet PPE. Managing the energy of hundreds

of sites across the whole country poses its own challenges. Many of our smaller sites are in very rural, hard to reach areas and communities. However, one major advantage to our operations in terms of energy management is that all fire stations generally have the same operational needs, systems and use patterns. Any solution we develop can then be easily repeated and deployed across all other stations and this is an approach we are having a lot of success with.

Have the organisation's strategies been adapted to include focus on Net Zero policy?

SFRS is very much focused on becoming a Net Zero organisation. In 2019, we published our Climate Emergency Response Plan which is a statement of how we will respond to climate change, support communities across Scotland and reduce our own organisation's impacts on climate change. As an emergency service, we are very much at the frontline of many impacts from climate change and so our focus is not just on how we can serve and support our communities but also on reducing our own organisational impact.

We then published our first 10-year Energy and Carbon Management Strategy 2020-2030 which maps out the challenges, drivers and opportunities for better energy management within the organisation long term. We have set ourselves an ambitious target of 6% carbon emissions reduction from our 2015/16 baseline each year to 2030. We have also developed our first of 5-year rolling Carbon Management Plans and are in the second year of our Carbon Management Plan 2020-2025. Through this plan, we are currently running a number of different energy and carbon reduction programmes across our building estate and fleet. We have a dedicated Environmental and Carbon Management Board with representatives from across all heads of functions.

How does SFRS deal with energy management?

Energy security and resilience is very important to us and so onsite generation of power is a major part of our strategy and we are deploying roof mounted solar panels across all our Wholetime and corporate buildings. We have so far deployed over 3286 solar panels on our roofs which generates just over 1MWH of electricity each year which represents about 4.8% of our total electricity use. We plan to continue this trend to generate as much onsite power as possible across our estate.

Smart asset management is a key strategy for us going forward. We are currently upgrading all our existing BMS systems to smarter BEMS systems and integrating them onto a central BEMS platform for remote management. Part of this was to develop a bespoke fire station controls strategy. We are also retrofitting smart heating controls to all 240 Retained stations by 2025 with about 50 completed so far.

We are trialling new direct electric boilers to replace all our smaller gas heating systems on our rural sites. Biomass is playing a smaller part with our national headquarters recently switching over to a biomass boiler and we plan to replace our existing oil boilers with biomass at other key sites.

Building fabric is important too and we have begun to roll our cavity and loft insulation at many of our rural Retained stations. For our bigger Wholetime and corporate sites we are looking to develop a suitable external cladding system to retrofit to these sites to improve their U-Values.

The greening of our light fleet is well underway and we are

developing a national Blue Light EV charging network in conjunction with emergency service partners. Currently, we have transitioned about 20% of our light fleet to low/zero emission vehicles with a target to fully transition over next 5-6 years.

Staff engagement is key. Enabling staff to make a positive impact on their working environments is a major challenge and one we are looking to tackle head on. We plan to launch a nationwide energy campaign over this coming winter. We are developing a suite of tools and information to allow station level users to assess and implement their own energy action plans within their local station. The plan is to launch this as part of an energy competition this winter. This will be the launch pad for more sustained and wider environmental and carbon related behaviour changes programmes going forward.

What areas of everyday business are most challenging in terms of energy management?

Resilience is paramount when it comes to our day to day operations. As a front-line emergency service, the ability to maintain the same level of response and service delivery takes precedence over all other considerations when we are looking at how our buildings and fleet operate. Downtime of key energy systems such as heating and hot water need to be minimal with a Plan B in place for any possible incidents of failure. This is especially true for hot water for showers as firefighters need to clean themselves after coming back from incident grounds and hot water for our BA (Breathing Apparatus) systems is critical to firefighter safety.

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Can you describe an energy management project that reflects the organisation’s principles when it comes to energy management and environment?

We recently decommissioned many of our large underground fuel bunker stores. Energy security is key for us particularly around our fleet. The ability to continue to mobilise our fleet during a fuel shortage is critical in ensuring we can continue to respond to incidents as required. We had a number of legacy fuel stores around the country, some in poor condition and overall, we were over capacity. Upon review, we decommissioned a number of these and only kept strategically placed fuel stores which drastically reduced the amount

MACALPINE Road Fire Station Solar PV

of fossil fuel we keep on our sites. Ultimately, we are aiming to transition our heavy fleet over to an alternative low carbon fuel solution, but this will take time.

How has Covid-19 affected the energy management at SFRS?

Fire stations' energy needs remained largely the same during the pandemic. However, like many other organisations a lot of our staff have been home working. Currently, about 80% of our support staff still work from home and this is set to continue as we are now moving to a more flexible working policy. This will no doubt lead us to assessing the use patterns of our buildings and how best to manage them in terms of energy.

home working. As employees are now home working we will have to report on home working emissions in the near future. The Scottish Public Sector is currently working on a tool for this.

The biggest risk and challenge is now the reliability of our supply chains as many components are both becoming more expensive and in short supply. Forward planning is key to mitigating this risk where we can.

What is in the pipeline for the future?

Emissions from our heavy fleet represents about one third of our carbon footprint and also presents the biggest challenge for decarbonising. Fire appliances do not only need to travel to their destination but also the engine needs to work hard to power the water pump at an incident potentially for long periods and so transitioning to a low/zero carbon alternative fuel source that can deliver the same level of operational need is a major challenge but one SFRS is keen to explore.

We will continue to develop projects to decarbonise our built estate. Currently, we are developing a suitable low/zero carbon heating solution to replace our gas heating systems within our large Wholetime fire station and corporate buildings. This is another major challenge that we are focused on.

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We have seen a sustained drop of about 20% in energy use at our office buildings where most staff have been

Author's profile:

Brian Troddyn is SFRS's Carbon & Energy Officer and works within their Environmental & Carbon Management team. He has responsibility for all energy management activities across SFRS, including developing and delivering energy projects, monitoring and reporting, developing behaviour change programmes and advising on energy and carbon aspects of capital programmes. He holds a MSc in Energy Management and a BSc in Environmental Science.