IT (Information Technology) is a key enabler on your path to net zero and this short guide will give you some thoughts and pointers on how you can take advantage of technology on this crucial journey.

This guidance is written chiefly for Livery Companies that own or manage their own property, whether their own halls or other properties. Those Companies that lease or rent space for their offices or activities should usually look to the leaseholder or landlord to implement many of these proposals and ideas. New information technologies, smart metering of heat, lighting and ventilation, and the use of dashboards to collect, collate and present data in more useful ways can all help Livery Companies, whether they occupy new buildings or heritage ones, come closer to their net-zero target.

The two target dates to bear in mind are:

- Net zero by 2027 in the City of London Corporation's operations
- Net zero by 2040 across all the City of London Corporation's related activities

IT INFRASTRUCTURE

The IT configuration that works best for your Company will depend on a number of considerations, including whether you own or manage one property or several. If more than one, then finding good ways of sharing information will be of even greater importance to you than to a Livery Company with just its own hall to look after.

The first rule is always to think ahead. Work patterns are changing and technologies are evolving fast. You may need to plan for continued remote-working even after the worst of the COVID disruption has subsided. Other things to think ahead about include: digital management of energy consumption and greenhouse gas (GHG) emissions; installation of a building management system (BMS); and the secure sharing of data with third parties.

These future requirements need to be reviewed against your current setup to determine the scale and nature of the improvements required. This is where professional advice is needed. It may be worthwhile to carry out an IT audit/review to determine current and future technology requirements.

Bear in mind that climate change will fundamentally alter future demand for IT services: to manage the increased demand for energy; to cope with spikes in demand due to temperature fluctuations; and to manage changing working conditions.

Now is therefore the time to reassess any planned expenditure on IT or other technologies and make sure any investments dovetail with your Company's own climate-action strategy. In particular, Livery Companies that are still using Excel spreadsheets to manage membership and events on a single personal computer need urgently to change strategy and adopt smarter digital ways of conducting their business.

Data Storage

If data and systems are stored on an in-house server, this is the time to consider moving to the Cloud. Microsoft 365 is a cloud-based subscription service for home and business users that includes Office applications (Word, Excel, Powerpoint, Outlook, Access and Publisher), Cloud storage, and a variety of optional extras. For other applications, such as customer relationship management (CRM), membership management, fund raising etc., discussions need to be held with the supplier/IT consultant on migrating to the Cloud. Where a Livery Company is planning to upgrade existing applications or install new ones, priority should therefore be given to software suppliers that can provide Cloud-based solutions.

Backup and Recovery systems

Here too, if you do not already have them, investigate options for remote Cloud-based backup facilities. Moving to the Cloud will reduce and ultimately eliminate IT infrastructure costs associated with managing in-house servers. It will also provide better security for your data and systems. The benefits are:

- Affordability. Cloud-based solutions are now affordable even for small IT setups and organisations.
- Anytime, Anywhere Access. Having data in the cloud allows you access to your data anytime and from anywhere. As long as you have internet access, through a computer or a smartphone app, all files are readily available. There is no longer any need always to carry a laptop with you when you travel, or to go back into the office to read an important file.
- Off-site storage. It is important to keep a copy of all files offsite. Even if they are backed up on a file server, files on computers and file servers are vulnerable to destruction or damage from hurricane, flood, fire or theft. Keeping backed-up files in the Cloud ensures your data is safe, no matter what is happening to your hall or office.
- Simplicity. Cloud backup makes ongoing management and restoration of files easy. Just a few clicks of the mouse is all it takes.
- Automation. Time is one of the most commonly given reasons why companies are failing to back up their data. Cloud backup requires no additional time commitment. Computer files are backed up to the Cloud automatically and continuously, whenever you are connected to the internet.

Moving to the Cloud

Web-service providers such as Google, Apple, Microsoft and Amazon Web Services are better placed than small or medium-sized companies to go to net-zero. Migration to the publicly accessible Cloud can mean significant reductions in carbon emissions: an estimated 5.9% decrease in total IT emissions, equivalent to nearly 60 million metric tons of carbon dioxide globally per year.

Migration to the Cloud can be done safely by following some simple steps:

- Make an inventory of your applications and workloads
- Make an inventory of your hardware and infrastructure (servers, databases, and storage)
- Talk to users of applications to get a sense of what they use them for
- Draw up a dependency map of your applications and integrations (e.g. if you have 2 applications which are integrated, you cannot move them separately)
- Record the technologies used in your application portfolio
- Review the business processes associated with the applications and their dependencies
- Look at each application and its relevant components to work out the best sequence for your migration plan

Broadband and Internet Access

Online communication increases year by year, so make sure you build in a sufficient broadband speed to cope. Average broadband speeds sufficient for a Livery Company are currently:

- Download speed: 35Mbps -- 50Mbps
- Upload speed: 8Mbps -- 19Mbps

These can be checked for free here. If your broadband speeds fall short, then contact your telecoms provider to arrange an upgrade. Full fibre to the premises (FTTP) is currently available only in some geographic areas. Elsewhere, even in areas that boast fast broadband, you may need to rely on a copper cable to the property from the street cabinet.

WiFi and GSM/3G/4G/5G

Your building's internal WiFi and GSM/3G/4G/5G (GSM is the Global System for Mobile Communication) signals are also essential for good communication. WiFi coverage in each room can be checked using a laptop or iPad, by opening up an application that normally connects using WiFi. Consider installing WiFi

boosters in rooms where the connection is poor and slow. Smart mobile phones use WiFi internally or a GSM/3G/4G/5G signal outside WiFi coverage.

Web Portals

Your web portal, or website, is an integral part of the digital life of a Livery Company. It can be used to highlight the many and varied activities of your Company. But it can also be used to promote the contribution of the Livery movement as a whole to achieving net zero. If your communications plan encourages this, it can present selected data showing your progress in reducing your GHG emissions etc.

Security

Security has become an essential component of any IT infrastructure, and especially so where files are being shared internally by staff or remotely by members. Whether your Company still uses an in-house server or has migrated its files to the Cloud, keeping your data secure is vital to comply with legally-binding general data-protection (GDPR) rules. A Cloud-based system will include the appropriate access security for staff and members. Security considerations include:

- Permissions. A system that protects against internal unauthorised access
- Passwords. Used to access data, a password is one of the easiest and most commonly-used security systems. Passwords should never be shared or left in plain sight
- Cyber security. Technology to protect your data from external unauthorised access
- Setting up a VPN (Virtual Private Network) is also an option to enable secure access to the Cloud over the internet, particularly for remote access when working away from the Hall. A VPN is often a feature provided by the IT security software. However, seek professional advice as a VPN can interfere with your internet access.

Remote working

Although remote working is not a legal requirement, it needs to be a consideration for any Livery Company. Its benefits and its costs need to be thought through for the hall staff. Any plan to allow or encourage remote working would need to ensure that both the in-house and homeworking technology setup is secure and adequate, and that the two can operate well together. In the winter months, for a Company aiming to move to net zero, heating a hall may be more efficient and less costly than heating the homes of a large number of staff.

Zoom, Teams and Online Events

During the COVID pandemic, many Livery Companies moved as many events as they could online, whether through Zoom, webinars, Teams etc. As the pandemic abates, the demand for online events will not disappear entirely. An online event requires a different IT infrastructure and different management to be successful: coordination of the event, managing the speakers, publicising the event and its output, recording the event -- all need

to be reviewed. Well-run online events can help retain membership and promote the Livery. Poorly managed ones will undermine all the creative good work done thus far.

Resilience through Disruption

Climate change is already responsible for more severe weather events around the world, including in the UK. Livery Companies need to be able to keep their work going and maintain resilient operations whatever disruption they may face, whether as a result of a cyber attack or changing weather patterns. It is therefore essential to think through potential response and recovery strategies and plans. Cloud services offer greater resilience and recovery, whatever the potential threat of disruption.

SMART TECHNOLOGIES

Smart technology can play an increasingly important role in helping to control energy usage throughout a building, so that the only parts of a building being lit and heated at any one time are those that are actually in use.

Quick Smart Technology Wins

- Evaluate occupancy patterns: tracking occupancy patterns means that a building's owner can make best use of natural lighting and more focused use of appliances and electricity, rather than running all the systems all of the time. More efficient use of energy in this way will not only improve the building's carbon footprint, it will also extend the life of appliances and increase general comfort levels throughout. This can be done using wireless density/movement sensors.
- Match energy use to occupancy: sensors generating detailed, real-time data about both the occupancy of the building and the conditions within it can make best use of ventilation and lighting.
- Smart lighting: significant energy savings can be made with the use of automated controls, plug upgrades, occupancy sensors and digital readouts of energy performance.
- Smart metering: relatively easy to install for electricity, water, gas etc, this allows utility companies to introduce price differentiation, microgrids for local sources of energy and apps that encourage lower usage. Smart meters also provide more frequent data, enabling the building's automation system to run more efficiently.
- Smart elevators: while making travel faster and more pleasant for occupants, automated elevators use less energy than legacy models and give technicians more real-time data and control to help prevent breakdowns.
- IoT (Internet of Things): lighting control systems, thermostats, sensors, and alarms -- all connected to the internet -- can automatically adjust building settings to actual usage, thereby saving energy, improving air quality and increasing overall efficiency.
- Demand-control ventilation (DCV): while reducing electricity consumption significantly, DCV installation can improve comfort for those using the building.

Some intelligent DCV systems can be used with both new and legacy heating, ventilation and control (HVAC) systems, providing significant benefits and savings without replacing existing equipment.

- Dynamic power consumption: smart buildings should be capable of adjusting their energy consumption to the real-time scarcity of electricity. When loads are high, the energy grid can send a request to smart sensors to reduce energy consumption temporarily.

- Digital twins: a building management system can be considered the equivalent of creating a digital twin of the building thereby providing real time information that allows property owners and operators to maximise efficiencies and reduce costs. Such systems mainly used to look at the automation of HVAC equipment. They now cover lighting control, fire and smoke detection and alarms, motion detectors, closed-circuit television, security and access control, lifts, shading, smart meters etc. They may also be used to monitor and control power distribution, energy consumption and uninterrupted power supplies and may be referred to as building energy management systems (BEMS).
- CO_2 sensors

Smart Technologies for Heritage Buildings.

Smart technologies can be built in to new buildings but can also be fitted in heritage buildings. However, Livery Companies hoping to exploit such technologies need to consider:

- Does the proposed system suit the building and its use?
- What are the likely carbon-reduction benefits?
- Will the potential savings exceed the whole-life costs?
- Can the system be fitted safely with no significant adverse impact on the historic fabric of the building?
- What will be the visual impact on the building?
- Are there any planning controls that would affect the choice and positioning of the system to be installed?

DASHBOARDS AND MEASUREMENT

We cannot know if performance has improved unless we know its starting point. For that we need to establish a baseline. The baselines of heritage buildings will vary a lot. In some cases, technology can make a big difference and help Companies reach their net-zero target.

It would be helpful if property-owning Livery Companies were to work to a standard set of metrics. This is not to advocate the use of any particular IT system. But consistency in the format used and the metrics gathered would make understanding, monitoring and comparison easier.

The dashboard could hold data on energy performance certificates, current GHG emissions, links to a building management system and smart meters. It could encompass short- and longer-term actions to improve performance. It could include a framework to record and manage the carbon footprint of suppliers. The dashboard needs to be able to match the projected trend in all these areas to the targets of 2027 and 2040 and show whether the measures being taken are sufficient.

By working in partnership with organisations such as the [Carbon Trust](#), [Historic England](#), [UK100](#), [Active Building Centre](#), etc., Livery Companies can establish their actual baseline and then set targets for energy reduction.

Active Digital Measurement System (DMS)

 An active DMS will bring together data from sensors for heat loss, CO_2 emissions, and smart meters for gas, electricity and water, while recording real-time data from a building management system which then can be processed into a pre-defined dashboard. In order to do this, your BMS will need to include the analytics platform.

Building Management System (BMS)

Optimises energy use, reduces costs and frees up facilities managers to focus on other tasks.

Data: the heart of the matter

What you really need is connected data. All buildings have systems, technology and sensors that generate data. The data may come from a building management system, utility meters, security access systems, air-quality sensors and a whole range of other meters and monitors. In a traditionally-managed building, these systems do not talk to each other. They produce their data in isolation on a specific aspect of the building's performance or its operation. Only by connecting them up into a single platform can all this information be analysed in ways that make it more meaningful and useful.

The simplest and best way for any Livery Company embarking on a smart-building journey to turn your property into a smart building is to partner with an IoT technology company that specializes in commercial buildings. Make sure your partner is focused squarely on what you want to achieve.

To avoid being sold more than you need, consider the following:

- Does their offering include an advanced analytics platform? Some companies provide you with sensors and a dashboard but not the means to analyse your data. Conducting such analysis takes time and expertise. So choose a partner that offers an analytics service that can turn your data into actionable insight.
- Do they have expertise in the particular smart-building technology you need? An experienced partner will not only be able to provide a variety of subject-matter

experts (e.g. for excessive water or energy consumption etc), they will also have a wider range of operational models built into their analytics platform.

- How are they on connectivity? Ask any potential partner about the network options they can offer to connect sensors to your systems.

Smart Grid

A Smart Grid refers to digital technology which allows for two-way communication between an energy supplier and its customers. Sensing along the transmission lines is what makes the grid smart. The technology allows the electrical grid to respond digitally to changing demand for power.

Given their scale, large grids inevitably involve governments alongside public companies, while mini-grids can be built by private firms, local entrepreneurs, or cooperatives of users such as the City of London Corporation.

See also Government guidance on measuring GHG emissions.

Fact checked by: