



A simple route to reducing carbon emissions and increasing the energy efficiency of your infrastructure

How AI can help you optimise
your current estate



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In partnership with QiO





The pressure is on to be sustainable

Sustainability is now the watchword of governments and societies around the world. In its broadest sense, it captures a global desire to achieve a better and more sustainable future for all, as set out in the United Nations Sustainable Development Goals (SDGs). But, on a day-to-day basis, striving for sustainability focuses on addressing the global challenges of climate breakdown and environmental degradation.

For a while now, governments have been setting aggressive targets for carbon reduction and renewable energy adoption to support sustainability goals. COP26, 2021's UN climate change conference, intensified this, setting new, firm commitments. **In 2019 only 30% of the world was covered by net zero targets. In 2022 this figure stands at around 90%.** At an organisational level, this translates into ambitious sustainability targets that are being welcomed by stakeholders, employees and customers.

As the sustainability commitment spreads, investors are divesting from organisations that are heavy users of fossil fuels – a sign of things to come; investors will increasingly move away from organisations perceived to be part of the climate change problem, rather than part of the solution.

The consumer voice in support of sustainability is getting louder, too, and green credentials are an important part of supplier selection. The desire to make sustainable choices is driving buying decisions, increasing pressure on businesses to adopt sustainable practices. **In 2021, 30% of all UK consumers actively sought out a sustainable organisation and 28% stopped buying from a business altogether because of sustainability concerns.** ☞

The pressure is on organisations to deliver on their ambitious sustainability targets – but is the need to deliver quickly creating extra problems?

Are ambitious sustainability targets sending organisations down the wrong solution route?



In this pressurised environment, if you're committed to a significant reduction in carbon emissions, it makes sense that you'll want to demonstrate quick results. Your first thought may be to reach for the fastest way to meet your metrics – carbon offsetting.

Carbon offsetting offers rapid sustainability credentials

Not all emissions can be avoided or substituted, and reducing your emissions can involve wide-ranging organisational change, which takes time and investment. In some cases, the technology may exist to reduce your emissions, but its current price puts it out of your league. In other cases, the technology may only be in its infancy and won't be readily available for a few decades yet.

Should carbon offsetting be your primary route to carbon neutrality?

Currently, offsetting is a standard part of leading organisations' net zero journey. It's a simple, almost instantaneous action – instead of cutting your own carbon emissions, you pay someone else to cut theirs or somehow capture yours. As long as the carbon offsetting scheme chosen can show that it's genuinely generating extra carbon capture capacity, and that capacity will exist for long enough to do an efficient

job, it's a valid step. For many manufacturer's right now, offsetting is an effective way to manage the increased usage of 'dirty' fuels like diesel in a response to the rapid rise in cleaner energy prices.

However, the price of carbon offsetting means you'll be wise to have other, longer-term options in your sustainability strategy.

As demand for offsetting grows, the price of credits is rising and, if you only focus on offsetting, you may end up locked into a strategy with no ceiling cost. Experts predict that the voluntary carbon market will have to expand substantially – **15-fold by 2030 and 100-fold for us to achieve net zero by 2050 (even once all other emissions are avoided, reduced and substituted). Currently valued at \$300 million, the market could reach \$50 billion in the near future.** 

Look closer to home for your sustainability quick wins

Buying carbon credits should be an initial, short-term approach. Strategies to avoid, reduce and substitute harmful greenhouse gases must be developed alongside offsetting, with the aim of replacing offsetting altogether. Many organisations do go down this route but seize upon new initiatives as the solution to increasing sustainability. They look to new, discrete projects with easy-to-calculate returns like replacement technologies, such as Electric Vehicles (EVs) or replacing lighting with LEDs, or renewable energy.

What they often miss is finding quick sustainability wins within the infrastructure they've already got by reducing energy wastage throughout their operation.

Reducing energy wastage takes a shift in perspective

In the face of soaring energy prices, there's never been more of an imperative to reduce energy usage. In many cases, European factories have been asked to reduce their output or even stop production completely because the price of fuel is making manufacturing unprofitable. This looks like it'll be an ongoing issue, particularly for manufacturing organisations that have only been able to hedge their fuel costs a year ahead.

Clearly, there'll be support in your organisation to save energy, but making this a reality can be challenging. Identifying where and how to reduce wastage is often complex, and quantifying the savings gets difficult. Many organisations find that reporting on the initiatives is hard, or that if they do produce reports, they can't explain the audit trail.

There's a gap between the intention to reduce wastage and the ability to make it happen.

The first rule of improving sustainability is to work out how you can make better use of what you already have. Avoid jumping into an apparent solution that involves ripping out existing infrastructure and replacing it with more 'environmentally friendly' equipment.

In reality, most current equipment isn't running at optimal levels, so there are significant energy savings to be made. Added to this, by keeping your existing equipment you're avoiding the environmental impact of creating new replacements and disposing of the old. In many cases, the more environmentally friendly option is to run your current equipment efficiently to the end of its life.

A change in perspective is all it takes to unlock fresh possibilities to save energy and reduce emissions. For example, rather than reducing delivery routes, optimise them to avoid congestion, and maximise EV range if you've already upgraded your fleet.



Make the most of ICT's ability to reduce carbon emissions

Carbon emissions from the ICT sector are expected to drop by as much as 40% by 2030 - despite an expected eight-fold increase in data traffic by 2030. ☞

This will come from purchasing renewable electricity, setting and achieving science-based emission reduction targets and driving energy efficiencies through new technologies such as 5G, fibre networks and the cloud.

It's expected this will limit the growth in energy demand to just 1.3% CAGR over the next decade. ☞

Example: shift your perspective on data centres

When it comes to energy consumption, data centres have a reputation for being energy hungry, and it's true that they emit roughly as much CO₂ as the airline industry. Recent predictions state that the energy consumption of data centres is set to account for 3.2% of the total worldwide carbon emissions by 2025 and they could consume no less than a fifth of global electricity. 🔄

These high energy use projections stem from our current approach of saving everything. Now data storage is so cheap, we don't always question what's worth saving. In fact, many cloud environments hold multiple copies of an item, and that mounting storage increases our energy use.

If you shift your perspective to ask how you can use your data centre more energy efficiently, significant potential savings of between 10-40% open up. For example:

- analyse what applications really need to stay on all the time and what CPUs and cores can be sent to sleep when not used
- optimise your workloads so that priority workloads sit on turbocharged cores, and less important ones sit on lower energy cores.

Example: shift your perspective on manufacturing

Analysts predict that ICT could reduce CO₂ emissions in the global manufacturing sector by up to 1.3 gigatonnes by 2030 — around 13% of the industry's current total. 🔄

It's easy to think that a manufacturing operation's energy efficiency is fixed, and that any chances of improvement will only come when the plant is updated or renewed.

However, if you shift your perspective towards optimising the equipment you've got, surprising possibilities for energy saving emerge. New AI and machine learning tools can collect data, model the trade-offs between production volume, quality and energy usage, and make recommendations to enable you to consistently achieve your sweet spot.



Five factors holding organisations back from making this a reality

Why wouldn't you optimise your current set up before pursuing other sustainable ways of operating? Here are the main factors that can become barriers to optimisation.

1. Visibility

Issue: Optimisation needs a foundation of solid baselined data, but often organisations can't measure the operations they currently have - and if you can't measure it, you can't improve it. Generally, a lot of environments aren't equipped with sufficient measurement sensors or they're not making good use of the data they already have.

Solution: Adding in sensors to your environment can be a straightforward and easy process. There's a perception that it takes hundreds of data feeds to gather the necessary insight but, in reality, as few as five can be enough to make noticeable improvements. Plus, not all the data for optimisation needs to come from sensors within the organisation. Useful, impactful data can also come from reusing existing telemetry data, understanding how equipment is used via ERP and MES systems, and external sources like temperature and humidity.

2. The potential impact on productivity

Issue: Some organisations worry that optimising energy usage will interfere with their day-to-day operations - including their core production processes. In some cases, organisations fear that monitoring processes will slow or even stop operations all together, with significant financial consequences. For example, an hour's outage on one production line for a premium car manufacturer equates to approximately £1m.

Solution: By co-developing the energy optimisation model for your business with your provider, you can specify the settings needed to create safe boundaries for the algorithm to work in, removing any detrimental impact on operations. A co-development or 'teaming' approach also builds the necessary trust so that when you're ready the algorithms can run closed loop, automatically generating savings without any manual intervention.

3. The rush to renewables

Issue: There's a strong trend for shifting purchasing to renewable energy sources at the moment, without thought of the consequences. However, the intermittent nature of many renewable energy sources may not match a company or production site's demand profile.

Solution: Renewables have their place, but their use should be in the wider context of energy saving across your organisation. It's best to start by using AI to identify areas where you can save energy, and the settings you need to achieve this. From here, use the AI to help optimise your renewable mix, for example, switching to the wind turbine when cloud cover and wind speeds are predicted to be optimal for its use.

4. Security

Issue: Monitoring and analysis of energy involves taking data feeds from multiple systems in both IT, industrial control systems and those external to the business, and this has the potential to increase security risks. Calculating energy saving settings requires connecting up a lot of different data feeds, and this could provide a backdoor for hackers.

Solution: Overcoming this takes a shift in perspective to look beyond just deploying software to incorporating security into the underlying infrastructure you use. For example, running software on a close loop basis at the network edge, rather than running it in the cloud will minimise external risks. While building in extra security controls to monitor unexpected behaviours and segmenting your network will limit the blast radius of any attack.

5. Reacting to industrial norms like ISO 50001 for energy management systems

Issue: With public and stakeholder pressure high to prove your green credentials, there's an understandable rush to gain certification. However, this often leads to a focus on concrete, easily quantifiable projects such as projections for an EV fleet and can divert efforts from more 'general' energy reduction measures.

Solution: With careful data capture and analysis before any energy optimisation measures are activated, it's simple to generate concrete proof of benefits in formats accepted by assessment bodies.



Introducing QiO Foresight Optima™

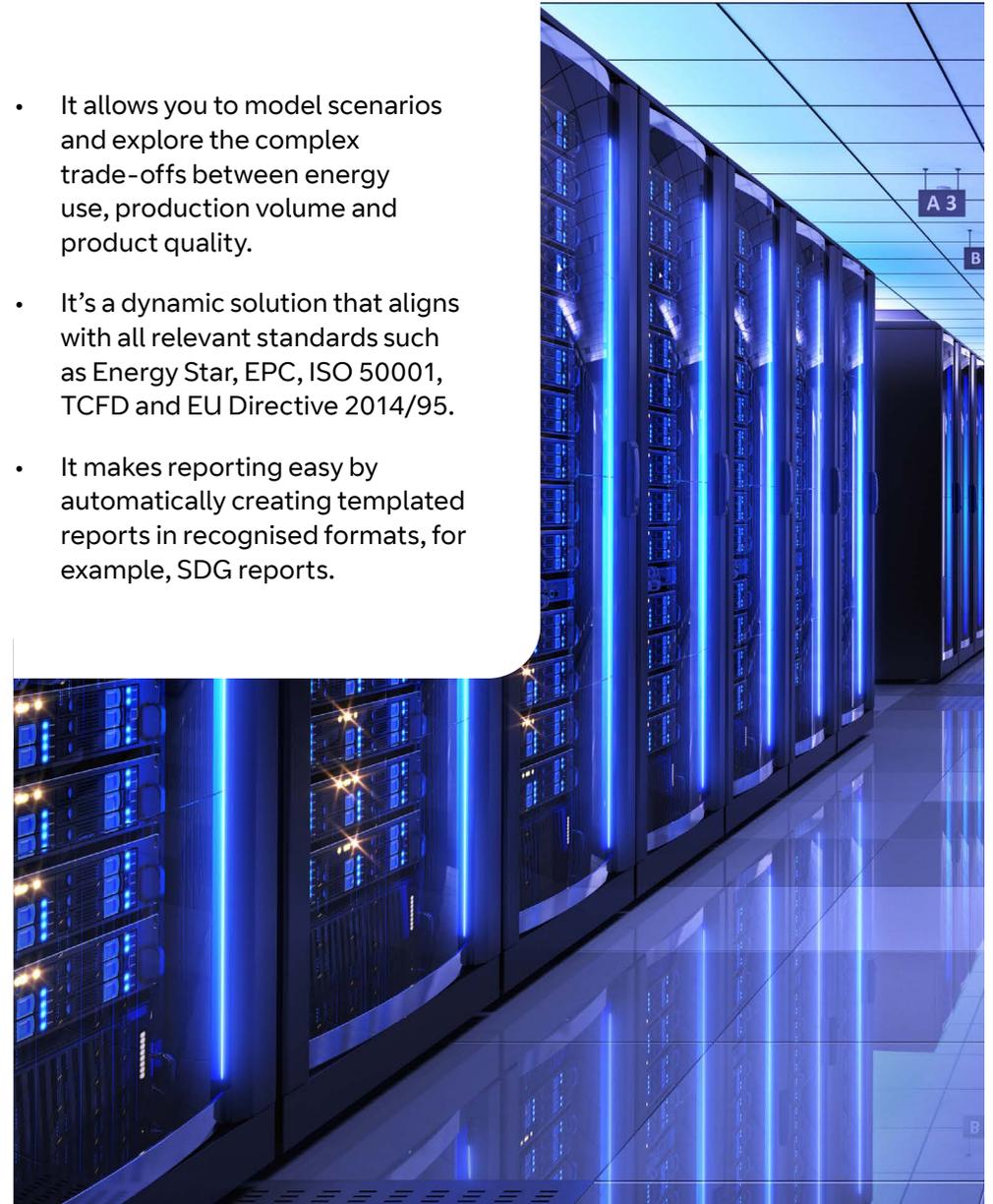


With our partner, **QiO Technologies**, we now offer a new approach to managing your operational assets over their lifetime. QiO Foresight Optima™ is a straightforward, effective way to make a step change in how you manage your energy usage and carbon emissions.

QiO Foresight Optima™ simultaneously optimises your energy use, carbon emissions, alongside production throughput and quality. It then helps you monitor and service your assets with predictive and prescriptive insights to maintain optimal Overall Equipment Effectiveness (OEE) and to extend the life of your assets. It's the key to reducing your energy costs by between 5-15%.

How does QiO Foresight Optima™ work?

- It brings together real-time data from sensors and edge devices, machinery control settings, databases, external data and energy bills to identify the variables that impact your energy consumption (for example, the quality of raw materials, worker behaviours, machinery settings).
- It plots an Energy Efficiency Index (EEI) to look at past processes and compares them to see which of these were the most energy efficient and why. It can also compare sites, and equipment to look for best practice.
- It automatically trains and deploys AI models to identify strategies for reducing energy consumption and carbon emissions. For each production run or process it shows the specific EEI score. Then, for each one you can drill down and see how you could have improved it and what the individual saving would have been in money and carbon.
- It allows you to model scenarios and explore the complex trade-offs between energy use, production volume and product quality.
- It's a dynamic solution that aligns with all relevant standards such as Energy Star, EPC, ISO 50001, TCFD and EU Directive 2014/95.
- It makes reporting easy by automatically creating templated reports in recognised formats, for example, SDG reports.



QiO Foresight Optima™ in action



QiO Foresight Optima™ uses a repeatable algorithm that can be used to identify efficiency savings in any sector through data analysis. Here's a taste of what it can do in the energy saving arena:

Steel production

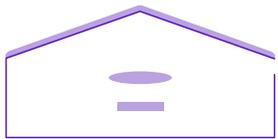
Energy savings of

6%

per annum and a carbon reduction of

41,600

tonnes at the trial plant.

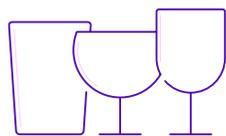


Glass tableware manufacturing

Improved line production throughput and reduced energy consumption by

8%

per plant.



NHS acute hospital

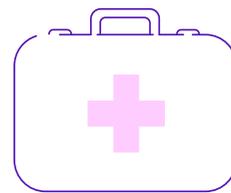
Energy savings of

5%

across boilers, CHPs, HVAC and a wind turbine with a carbon reduction of over

100

tonnes.



Process manufacturing

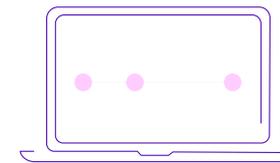
Achieved an eight-fold return on investment within six weeks by identifying savings of

\$420,000

per annum per kiln or

\$840,000

per site.

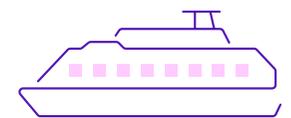


Ferry transportation

Fuel efficiency improvements of

10%

while fully meeting timetable commitments.



The BT and QiO sustainability partnership

Whole project support

The purpose of our partnership is to unlock sustainability success for your organisation, smoothly and effectively, and this involves partnering with you from inception to realisation. Many organisations we talk to have employed experts who have made recommendations that haven't been specific or practical enough to be implemented. They've become locked into a cycle of commissioning reports that promise big sustainability gains but that don't deliver.

A solution tailored to your operation

We understand that achieving optimisation isn't a case of one size fits all. That's why we bring a strong ethos of co-development to our QiO Foresight Optima™ offering. We provide experts in your sector who will work with you to create a version of the QiO algorithm customised to your organisation in about six weeks. The result is an algorithm that's able to make the most of any source of data you have available, so you can deploy it with confidence, knowing it reflects every critical aspect of your operation.

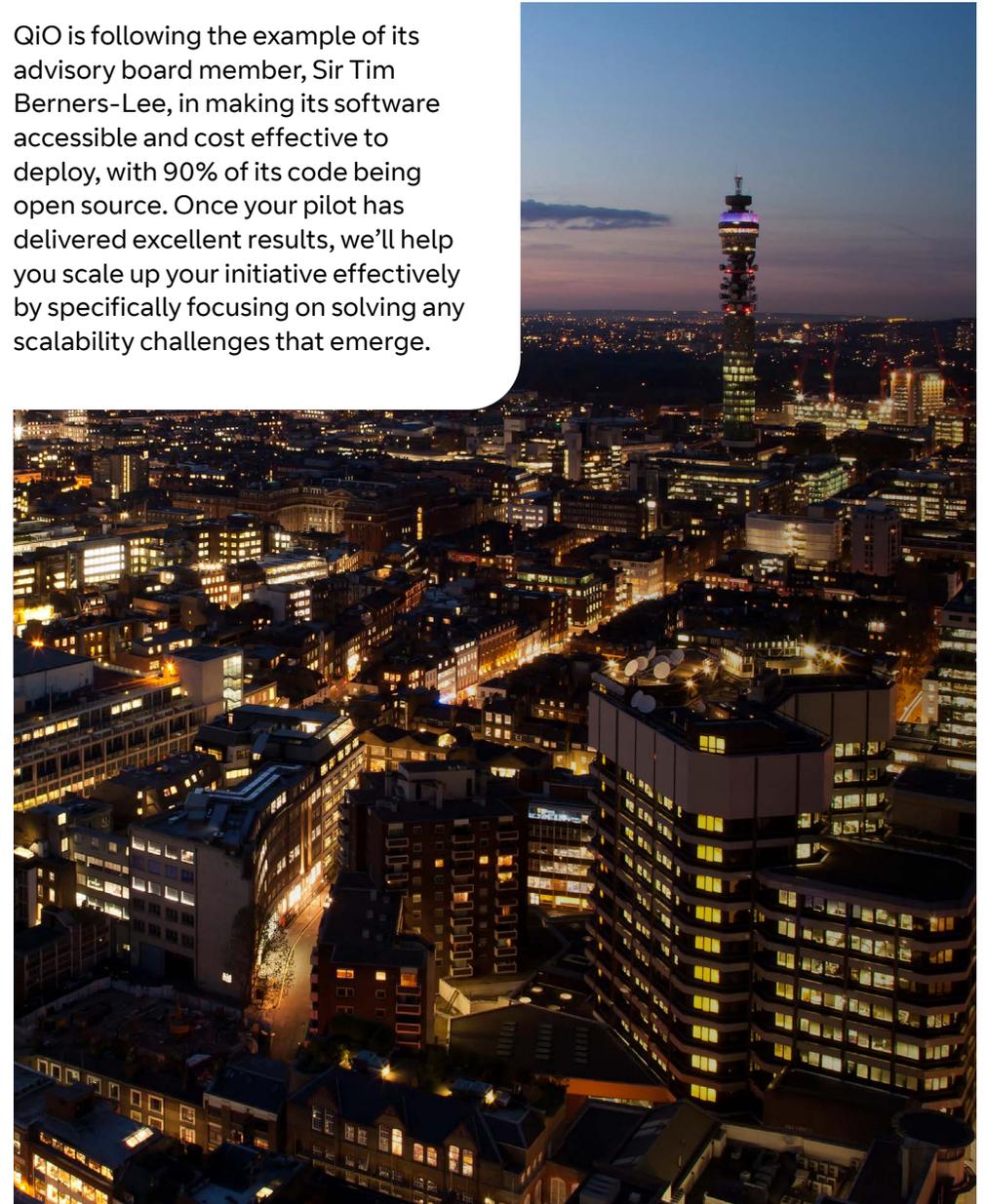
A comprehensive offering

Our partnership delivers everything you need to embed QiO Foresight Optima™ into your operation safely and to scale it up to achieve maximum returns. We put a robust security wrap around the QiO software; QiO has shared its IP with us under NDA, so we've been able to run it through all our security protocols. We think beyond the software – we can help you refresh your network to add sensors and can deploy edge compute for local processing. Once the software is ready, we can collaborate with you on analysing the results via an industrial version of Microsoft Teams. Finally we can provide a service wrap that meets the exacting SLAs you demand.

Support to implement successfully and cost-effectively

We start by helping you develop your business case for energy optimisation, quantifying your current mode of operation and looking at the possibilities of a smart transformation as well as at the different financials around different future modes of operation. At all times we operate a commercially transparent, open relationship and our pricing relates directly to the complexity of what you want to measure.

QiO is following the example of its advisory board member, Sir Tim Berners-Lee, in making its software accessible and cost effective to deploy, with 90% of its code being open source. Once your pilot has delivered excellent results, we'll help you scale up your initiative effectively by specifically focusing on solving any scalability challenges that emerge.



Our headline sustainability credentials

Our sustainability achievements are globally recognised:

CDP environmental rating is 'A' for climate for the fifth year running, putting us in the top

3%

of

9,500

global reporters



We're ranked

3rd

in the FTSE100, and 7th globally, based on our sustainability reporting



Since 2016/17, we've reduced the carbon emissions intensity of our operations by

57%

and have reduced carbon emissions by

19%

in our supply chain over the same timeframe

We've brought forward our operational target on emissions and now aim to be net zero by

2030

We're working with our suppliers to help them reduce their carbon emissions by

42%

by the end of March

2031

We're currently ranked

7th

in the FTSE100, based on our environmental credentials

Ranked

platinum

by EcoVadis

Increase your sustainability through optimisation

Every day, as the pressure to increase sustainability grows, you could be missing out on obvious energy savings and sustainability gains.

It's important to resist the urge to leap ahead to new sustainability initiatives before you're satisfied that you're operating with as much energy efficiency as possible. Your mantra needs to be 'optimise before making new investment'.

AI-based solutions exist that can power rapid sustainability gains within six weeks, and that can easily scale up to open up optimisation across your operation.

BT and QiO are ready to help you make this a reality. Talk to your account manager to find out more.





Offices worldwide

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