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EuroSite POWER

Hydrogen ready green CHP

An effective solution on the journey to Net Zero

Content

Context

How can organisations transition to Net Zero cost effectively?

Numerous well-known businesses have committed to reducing their net emissions of greenhouse gases to zero. Even more people have established some sort of goal for reducing emissions. The climate emergency is the larger background, and it seems like every year is a **“make or break year.”**

The public’s growing concern over global warming, the need for greater transparency, the possibility of new regulations, the rising cost of energy itself, as well as rising non-commodity prices, which now make up an increasing portion of electricity bills, are some of the other factors pushing organisations to reduce their emissions.

However, announcing a net zero target is just the first step on what can be a long and difficult journey, as many organisations are discovering. You can start with the easy wins, like replacing business flights with video calls, encouraging staff to cycle to work or even acting on the ‘low hanging fruit’ of energy efficiency such as LED lighting upgrades. But certain areas are much harder to decarbonise, such as energy-intensive industrial processes and the heating and powering of your sites. The long-term hope is that new technologies and processes will help with the trickier emissions sources, but most of these just aren’t a realistic option yet.

If your organisation has embarked on a net zero journey, you can’t wait for impractical solutions to become more practical, or for unproven technologies to come on stream; you need to start making changes and cutting carbon now.

CHP: its role today, and understanding its role in a hydrogen future

Energy efficiency for traditional CHP

of a hotel's energy goes on heating and hot water

Combined heat and power (CHP) is a well-established low carbon technology. It involves generating electricity and then capturing the heat from that process for use. With conventional electricity generation, nearly two-thirds of the energy used in the process is wasted in the form of thermal energy (heat) that simply dissipates into the atmosphere. Even more is lost in the process of getting it to the end user. But with CHP, the electricity is generated on-site, and the resulting heat is used to heat the building. **It is estimated that CHP can achieve energy efficiency of over 80%**, compared to around 50% for the conventional set-up of grid electricity and a boiler.

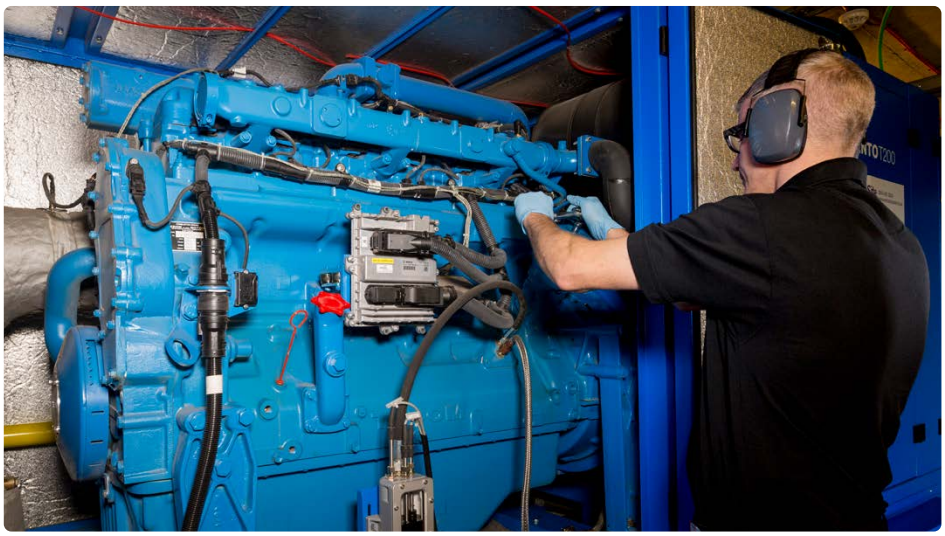
Traditionally CHP engines have been fuelled with mains natural gas, biogas and biomethane. While CHP engines can still use these fuels today, they can also be ready to run on hydrogen with most able to run without modification on a hydrogen blend of up to 20% which means that if the government's plan of blending hydrogen into the national gas grid at a mix of 20% hydrogen by 2035 becomes reality, then CHP engines installed today can continue to be used with no upgrades required. Should the amount of hydrogen within the grid further increase then these engines can be upgraded to accommodate the increased mix of hydrogen. Given this it is important to ensure that provision is made by CHP service providers within their contracts to insulate their customers from the cost of upgrades when required.

CHP is commonly used in sectors where heating is important and heavily used, such as manufacturing, leisure, hospitality, and healthcare. By way of an example, the hospitality sector has been described by the Energy & Environment Alliance as "behind the rest of the UK economy" in terms of cutting emissions, because it is one of only three sectors to have increased its energy intensity since 1990. In other words, while almost all other sectors have found ways to use less energy per unit of economic output, the hotel sector has been using more. **Roughly 60% of a hotel's energy goes on heating and hot water**, so it is no surprise that the sector has turned to CHP as a way of saving on bills and cutting emissions.

CHP: generates considerable carbon and cost benefits to any business that utilises significant electrical and thermal energy

Benefits of CHP aren't limited to any specific type of organisation. Any business or public body whose sites use both electrical energy and thermal energy are likely to find that CHP delivers significant carbon and cost savings. It uses approximately a third of the fuel of a conventional energy system to deliver the same results. Resilience is another key benefit, and therefore CHP is particularly recommended for hospitals: with operation independent of the grid, critical machines can continue running even during grid outages.

However, CHP still involves burning fossil fuels, albeit much more efficiently than normal, which can pose a barrier to organisations who want to get to net zero as quickly as possible, particularly as grid electricity is decarbonised with the addition of renewables. If you are looking into upgrading the systems for powering and heating your sites, it is tempting to wait in the hope that a new and less-proven technology will eventually provide a magic zero-carbon solution. But looking too far into the future means that you are missing out on the opportunity to do something about your organisation's carbon emissions and energy costs today.



Hydrogen ready green CHP: a new way forward

There is now a way you can drastically cut your emissions while using a tried-and-tested technology. Developed by EuroSite Power, we call it Green CHP and it is hydrogen ready. It works exactly like a conventional CHP system, but we ensure that any natural gas used to fuel the CHP is certified as green and the entire solution is designed to run on hydrogen from a small percentage blended with natural gas or 100% hydrogen when it is available. Our fully funded Green CHP offer has been designed for organisations needing an immediate transitional solution as part of their zero carbon goals.

EuroSite Power's Green CHP solution uses similar reciprocating gas engine technology to a conventional CHP but takes advantage of certified biomethane injection to provide a zero-carbon solution today.

Let us help you to understand how our hydrogen ready green CHP solution can benefit your organisation's carbon goals

Renewable green gas

How can hydrogen ready Green CHP help us achieve our net zero goals?

Nearly half of the UK's greenhouse gas emissions are generated by the energy use of buildings, so heating/cooling and powering your sites is likely a significant source of emissions for your organisation. Decarbonising these processes will be a huge step forward in your net zero journey, and hydrogen ready Green CHP makes this possible. This is because all the gas burned by a Green CHP system is certified as renewable, using the widely accepted standards called Renewable Gas Guarantees of Origin (RGGOs) or Biomethane Certificates (BMCs).

We can also extend this to include gas used elsewhere in any of your buildings and which will allow you to state that you are using 100% green gas and have decarbonised your operational emissions from the use of buildings.

Do I need to report the use of RGGOs?

Thanks to schemes such as the Streamlined Energy and Carbon Reporting (SECR) regulation, many businesses now have mandatory carbon reporting obligations, and in the future, more businesses will likely fall under these new standards.

Presently, a hydrogen ready Green CHP system allows you to report no emissions in the market-based Scope 1 assessment (because you are only burning certified renewable gas, so your direct emissions are zero) and no emissions in Scope 2 (because you are generating and using your own electricity from a green source). Upstream emissions of green gas production and transportation do need to be reported as part of Scope 3, category 3, but only at the rate provided by the certification scheme and shown on the certificate.

What is green/renewable gas?

Biomethane gas is produced by sources such as decaying waste in landfill and the anaerobic digestion of food waste or an energy crop. It is 100% renewable and often called "green gas" because it's part of the natural cycle of growing and decaying; the emissions given off as the organic matter decays are balanced out by those it absorbed from the atmosphere earlier in its life cycle, making it carbon neutral.

Will I need a special gas supply for green CHP?

No. You will continue using gas from the grid, which is currently over 99% natural gas. But for every kWh of gas your organisation consumes, the equivalent kWh of green gas will be produced. This is backed up by an RGGO or BMC certificate. That's what makes it green.

Aren't RGGOs just a greenwashing offset scheme?

No. The UK's Green Gas Certification Scheme, which issues RGGOs, is run by a subsidiary of the trade body which represents British renewable energy producers.

RGGOs were specifically created to end bad practices such as greenwash and double counting in the green gas market. This provides an objective way of tracking a unit of green gas right through the supply chain to the end user. It doesn't physically follow the flow of gas in the system, but it follows the transactions. This means that every unit of green gas purchased and backed with an RGGO really does displace the need for the equivalent unit of natural gas, so RGGOs really are helping to reduce fossil fuel consumption.

We already have a CHP system. Can we convert it to a green CHP?

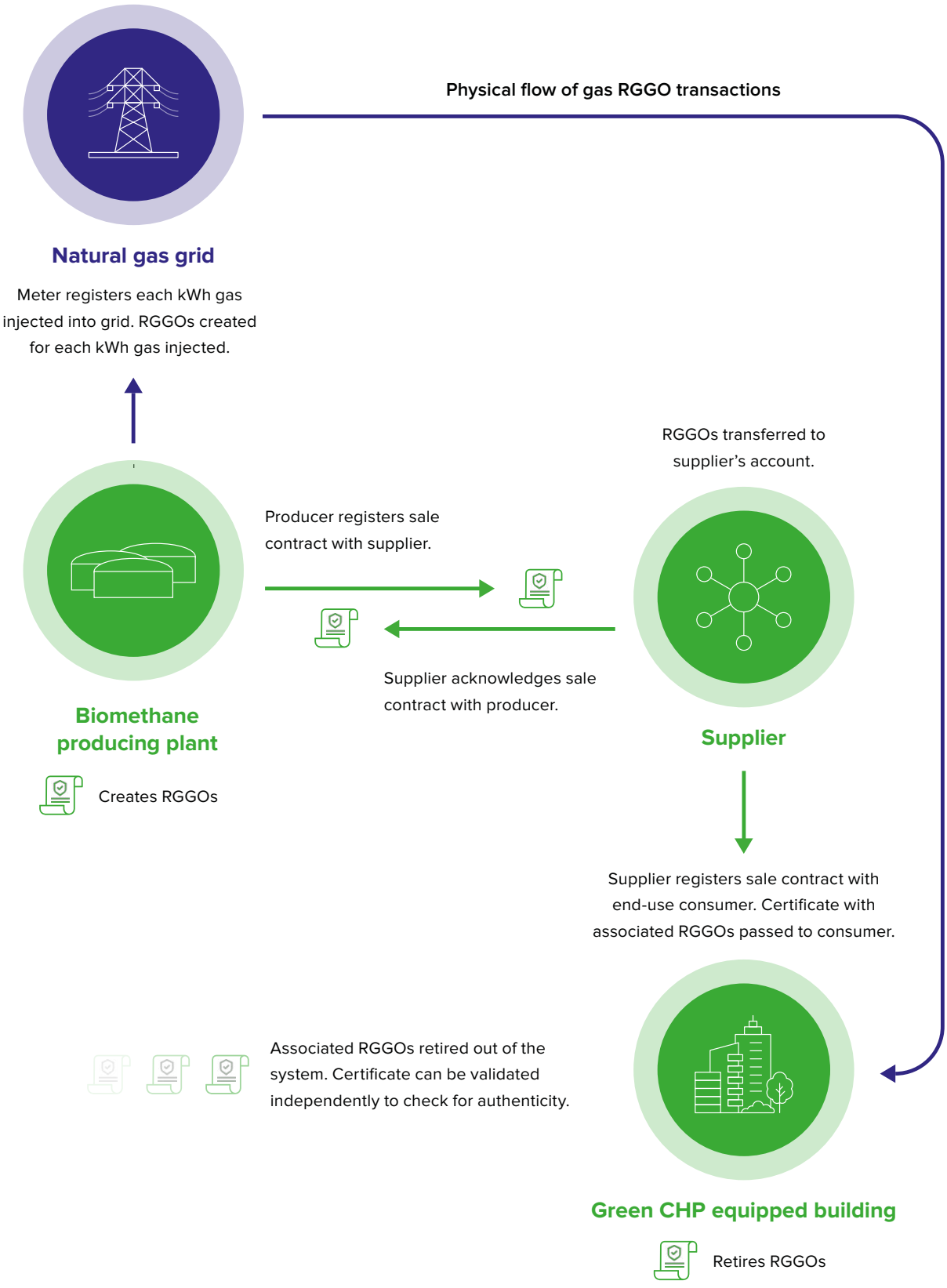
Very easily. To use green gas there's no need to change anything physical, just change the way you purchase your gas. Alternatively, if your system is due for an upgrade, we can help by installing the best hydrogen ready CHP system for your organisation's needs.

I've heard that CHP systems give off fumes – is air pollution an issue?

Because CHP systems and conventional boilers involve combusting natural gas, they will inevitably generate some pollutants. The CHP equipment used by EuroSite Power can be specified to reduce pollutant emissions and some of the manufacturers we use can also provide treatment kits for CHP plants that can reduce the levels of nitrogen oxides (NOx) and nitrogen dioxide (NO_2) to almost zero, which means there are no air pollution concerns.

We are also working on ways to retrofit this technology to existing CHP plants and should have some good news soon. But it's important to keep a sense of perspective; most research into the emissions from CHP systems shows that their contribution to air pollution is tiny compared to other sources, such as traffic fumes.

How does it work?



All the evidence suggests that natural gas will be a part of our fuel mix for a long time to come and therefore basing a net zero strategy on suddenly being able to get gas with any percentage of hydrogen in it could actually delay your progress towards net zero. Hydrogen ready green CHP works with this reality to cut your emissions today, while preparing for the future.

> Hydrogen ready Green CHP is a perfect fit for most organisations' needs.

What about heat networks and heat pumps?

The Climate Change Committee (CCC) recommends heat networks and heat pumps to meet global climate goals. But the reality today is that they're not feasible for many organisations. Heat pumps often can't produce high enough temperatures, and heat networks are serious infrastructure that require significant investment, which hasn't happened yet. This is precisely why so many individual natural gas boilers continue to be installed. The beauty of hydrogen ready green CHP is that it allows us to get on with the job of reducing our carbon emissions today, using the technology that's already in place and is fit for future changes.

Will hydrogen ready Green CHP be superseded by better technology?

Quite possibly, but it's still the right option for today and the foreseeable future. We consider it to be a transitional technology: something to start organisations on the road to net zero while they wait for more innovative solutions to come along – or be proven unworkable. Waiting for a technological silver bullet to fix the world's climate problems is a risky strategy whether you're a government, a business, or an individual.

We need to act now, using the practical, tried-and-tested technology that already exists. CHP remains an efficient and versatile means of generating both heat and electricity from one primary energy input delivering savings in consumption, consequentially emissions and ultimately the cost of fuel.

How to make it happen: On-Site Utility

EuroSite Power is a highly experienced energy solutions business. We have created a proven, trusted model to fully fund your on-site energy generation solutions called On-Site Utility (OSU). We take care of the upfront costs of installing our hydrogen ready Green CHP solution, so you don't have to make any significant financial outlay. Our OSU model means that we install, maintain, and operate the whole system over the course of its lifetime.

First, we carry out a site audit so that we can identify exactly which system works for the needs of your business. Then we agree the project plan with you and get on with the installation. Then we continue to operate the system for its whole lifetime.

Included in this is the promise that we will adapt your CHP over time as the hydrogen content of the gas delivered by the national gas grid increases free of charge and worry.

> "With our OSU model, there is minimal financial risk to your business – but you still reap the benefits"

Under our OSU model, we agree to pay for the RGGO or BMC certificates which will make your gas green. This means that if the price of these certificates rises dramatically during the life of our contract with you, we shoulder the cost. Since we are also paying the upfront costs of purchasing, installing, and upgrading where necessary the hydrogen ready Green CHP system, there is minimal financial risk to your business – but you still reap the benefits.

Our OSU model is already widely deployed both in the public and private sectors. Many of our customers are also reaping other benefits of switching to Green CHP, including lower energy costs and greater resilience.

Ultimately, hydrogen ready Green CHP is transitional technology which is a perfect fit for most organisations' needs this year and beyond.

If you would like to know more about how EuroSite Power's hydrogen ready Green CHP system could cut your organisation's carbon footprint while saving you money, we'd be delighted to hear from you.

EuroSite POWER

+44 (0) 800 028 8001

info@eurositepower.co.uk

eurositepower.co.uk