



# COUNTING ON A CLEANTECH FUTURE

The IEA estimates that at least \$100 trillion must be invested in clean energy technologies over the next three decades to meet global climate objectives. Senior Editor **Jacob Ambrose Willson** talks to Criticaleye Members to examine the drivers of the cleantech revolution

**C**lean technology – or cleantech – is a high growth sector that has developed for several decades and been conceptualised in myriad ways throughout this time. A broad definition refers to cleantech as ‘various companies and technologies that aim to improve environmental sustainability’.

This lends credence to the idea that cleantech functions as an umbrella term incorporating a range of industries and financial asset classes. These include climate initiatives and investments ranging from renewable and low carbon energy to biofuels, waste recycling and water purification.

Typically, a cleantech invention will improve operational performance, productivity or efficiency while reducing costs, energy consumption, waste or pollution, with ongoing technological innovations and ever-greater data integration and automation driving the industry forward. ➤



Recent years have seen vast sums of capital flow into the cleantech space from multiple avenues - public markets, private equity and government budgets alike - with the rise of the ESG agenda in finance over the last decade supporting exponential growth. Much of this momentum can be traced back to the 2015 Paris Climate Accords and other landmark political policies, with more recent examples being the 2021 Glasgow Climate Pact and the US Inflation Reduction Act (IRA).

**Dominic Emery**, former Chief of Staff to the CEO at bp, likens these macro forces to a 'strong sucking sound for investment' into the sector: "The current optimism around cleantech is there because the opportunities to invest are enormous. And the returns in certain sectors could be really impressive."

In particular, he highlights the 2022 IRA - which directs nearly \$400 billion in US federal funding to clean energy - as giving fresh incentives for growth in areas like green hydrogen, carbon capture and storage and electric vehicle (EV) manufacturing.

"I'd certainly watch the US [for cleantech developments], as it's such a hotbed of innovation. I think we might see the US take over as the big driver in the coming years, given the new incentives from the IRA."

The UK has a long-stated commitment to Net Zero by 2050 and has made huge strides around renewable power deployment - particularly offshore wind - but now the challenge lies in decarbonising hard to abate sectors like heat and transportation.

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**Dominic Emery**

In the latter area, the UK Government published a Transport Decarbonisation Plan in 2021 which set out a pathway to Net Zero for all forms of transport in the UK. The plan anticipates a zero emissions fleet of vehicles and decarbonised maritime and aviation industries, delivered by sustained investment in a range of clean technologies, from alternative fuels to electrification.

Similar Net Zero commitments have been made in neighbouring Republic of Ireland. The nation's 2021 Climate Action Plan aims to cut transport-related Co2 emissions by 42-50 percent by 2030, a target which doesn't leave any time for inertia at Córas Iompair Éireann (CIÉ) - Ireland's national public transport provider.

"Our bus and train fleet represent the largest emissions in our Group. In the last few years, we've been trying to adopt various technologies to begin

the transition away from diesel," says CIÉ Group CEO **Lorcan O'Connor**, who implemented a Group-wide Sustainability Strategy in 2020.

"We initially focused on a transition to hybrid buses - part diesel, part plug-in. Now we are only buying all-electric buses, gradually moving towards zero tailpipe emissions for the entire fleet. We're also working to ensure that the electricity we're using is renewable through purchase power agreements (PPAs)."

These changes have not been incorporated without teething problems, hence CIÉ's gradual approach. Issues such as battery range and recharge time mean that other technologies are being considered. An alternative pathway could be provided by green hydrogen - a nascent technology that CIÉ is supporting in a profound way.

In partnership with other key stakeholders, CIÉ delivered a trial for Ireland's first hydrogen fuel cell buses back in 2021. Following the successful trial, three hydrogen fuel cell buses entered service in the Greater Dublin area, as part of a continuing pilot programme for the emerging cleantech.

CIÉ is also a founding partner of the Galway Green Hydrogen Valley project (GH2), which is designed to bring together key stakeholders, including generators and consumers of green hydrogen in order to help establish the sector.

"We see ourselves acting as a catalyst to help the green hydrogen industry get off the ground, because it's very capital intensive and you need an 'off-taker' to come to the party to make it all work," >



**Lorcan** says. “Therefore, we see our role as being that bit more valuable to the wider economy and the Net Zero effort.”

## The Capital Markets

A wave of momentum for sustainable investment has been building for several years within global exchanges, driven by huge changes in the disclosure landscape for listed entities. London Stock Exchange Group (LSEG) Head of Sustainable Finance, Capital Markets and Post Trade, **Claire Dorrian**, says: “The mobilisation of capital around sustainability has really increased in recent years. Eighty-six percent of asset owners globally are now implementing sustainable investment in their strategies.”

As one of the largest capital markets in the world, the London Stock Exchange assumes a hugely influential role in the ongoing development of the cleantech industry, through the mobilisation of capital at scale and the specific funnelling of capital via several pathways supporting sustainable development projects.

The Voluntary Carbon Market (VCM) resembles LSEG’s latest innovation in this space, after it was launched in October 2022 in response to strong demand for scale, liquidity and transparency in the carbon markets. The LSEG’s VCM enables London-listed funds and operating companies to raise capital for climate change mitigation projects that are expected to generate carbon credits.

These carbon credits may be distributed as a dividend in specie to investors, including corporates seeking to manage their residual carbon emissions in parallel to their decarbonisation strategies, to

attain Net Zero targets. For **Claire**, the VCM is just another way in which the Exchange supports climate financing and the energy transition: “We have focused on providing the right infrastructure to direct capital into climate change mitigation projects and we believe carbon markets have a role to play in the transition.”

Another sustainable financing pathway for London-listed companies and funds is the Green Economy Mark, which is provided to those that can demonstrate that they can generate 50% or more of their revenues from products and services that are contributing to environmental objectives such as climate change mitigation and adaptation, waste and pollution reduction and the circular economy.

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**Claire Dorrian**

To date, 107 entities across the Main Market and AIM have received the Green Economy Mark, giving them broad exposure to an expanding proportion of asset owners and managers looking to deploy capital into sustainable investments. Of those 107 entities, 25 are classified as cleantech companies.

## Managing the Transition

Developments in the clean energy space have shot up the agenda for investors of all backgrounds during the last 12 months, given the context of an energy supply crunch across Europe. Spiralling fossil fuel prices – exacerbated by the War in Ukraine – have led to widespread calls for solutions to this energy crisis, in addition to managing the colossal task of transitioning to a low carbon global economy.

While there are concerted efforts taking place right across political, commercial and civil society, the global energy transition must be viewed as just that – a transition that will take several decades to achieve. As such, traditional oil and gas companies – like bp – will have a huge role to play.

In early 2020, recently appointed CEO Bernard Looney announced a transformation programme that resembled the biggest shift in the firm’s 110-year history. After first investing in cleantech in the early 2000s, bp symbolically rebranded itself as an ‘integrated energy company’ and set a Net Zero by 2050 or sooner target.

“bp has now moved from spending around \$500 million in cleantech ventures prior to 2020 to serious and material project investments,” says >



**Dominic.** “The intention is to ensure that investments in conventional oil and gas and in low carbon renewables is roughly 50-50 by 2030, about \$8 billion in each.”

Notable investments in cleantech by bp range from low carbon fuels (biofuels, green hydrogen) to EV infrastructure (bp Pulse) and renewable power generation, including offshore wind and solar. In the latter space, bp invested \$200 million in a promising solar venture called Lightsource in 2017. The partnership subsequently deepened to the point of a 50:50 arrangement in 2019, under the name Lightsource bp.

Lightsource bp Chief Operating Officer **Ann Davies** says: “Prior to the bp investment, Lightsource was a booming solar business in the UK, expanding into Europe and elsewhere in the world. Lightsource recognised that – with the right partner – it could build an international solar development company with good quality, safely and profitably.

“The bp investment has allowed the business to grow from startup to significant scale up, and we have successfully married together bp’s experience and international gravitas with Lightsource’s flair and entrepreneurship.”

Lightsource bp has since expanded into 20 countries, opened offices in 14 cities and boasts an attractive 55GW pipeline of solar opportunities worldwide, making it the single [largest solar developer globally](#). The company’s success demonstrates the staying power of solar as a mature clean technology, along with its international scalability – a key ingredient for long-term growth and profitability.

#### KEY FIGURES:

- 86% of asset owners globally are now implementing sustainable investment into strategies
- 68% of FTSE All-Share companies have published some form of Net Zero target
- 45% of FTSE All-Share companies have set interim Net Zero targets for 2025-35
- 16% of FTSE All-Share companies have published a Transition Plan
- 107 companies and funds have been provided with London Stock Exchange’s Green Economy Mark, with a combined market cap of £159 billion
- 25 of those 107 Green Economy Mark issuers are involved in the cleantech space

The Lightsource bp partnership also provides an interesting framework for other growth companies in the space looking to leverage deep-rooted, sector expertise and – more importantly – financial backing. **Dominic** references similar investment opportunities arising for startups developing existing and emerging technologies for emissions reduction across the oil and gas industry.

“Industry specific collaborations like the Oil and Gas Climate Initiative (OGCI) Climate Investment Fund have focused on reducing the Co2 and methane impact of their operations [Scope 1 and 2 emissions]. Investing in startups or not yet commercialised technologies

for methane management has been a very important part of that Group’s strategy. The companies themselves then deploy some of this new technology across their own assets,” he adds.

#### Private Equity

Capital has continued to flow into cleantech assets from private equity during the last two years despite the volatile macroeconomic environment, which is currently defined by lingering high inflation and soaring interest rates. This buoyancy is demonstrated by a [PwC report](#) that found more than a quarter of all venture capital funding (over \$50 billion) found its way into ‘climate technology’ in 2022, with increased focus on technologies that can do most to cut emissions.

One PE-backed business focused on cutting emissions via an energy-from-waste (EfW) solution is Encyclis. Formally known as Covanta Europe, the company diverts non-recyclable waste from landfill sites – where it can accumulate and generate harmful methane emissions – and turns it into electricity using world-leading technology.

**Priya Chowdary**, Chief Financial Officer at Encyclis, explains: “Diversion of waste from landfill is a vital part of the Government’s waste strategy. The process of EfW is highly regulated to protect the environment. So, in terms of cleantech, we do follow that agenda and as we progress in this drive to Net Zero, we are participating in government programmes on carbon capture, developing district heating networks and looking at how we can work with industries where the carbon can be utilised.” >





She also discusses potential forward and backward synergies between the EfW industry and other cleantech areas like recycling, carbon capture, battery storage and EV charging. This implies a need for cross-sector collaboration in order to improve efficiencies and maintain a concerted societal drive to Net Zero.

**Dominic** poses questions for cross-sector collaboration: “How do you collaborate across the shipping value chain, for example, to include the likes of the big maritime enterprises, through to the producers of green fuels and the supply chain? How do you do the same for sustainable aviation, involving airlines, airports and fuel producers?”

“Another critical form of collaboration is across the financing space, particularly those companies that signed up to the enormous commitments made at Glasgow COP (GFANZ). Around \$150 trillion is under management amongst those companies, so bringing those committed investors with such financial muscle together with these nascent low carbon value chains is a critical step.”

Bringing together multiple agencies and instilling a unified approach will continue to be one of the biggest challenges facing the Net Zero movement going forward. The current economic climate is also creating headwinds for players in the cleantech space, with high interest and inflation rates likely to make debt financing more challenging and cash returns on cleantech projects less profitable, in the short term at least.

The collapse of Silicon Valley Bank (SVB) provides a visceral example of the pitfalls confronting borrowers in the current

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Lorcan O'Connor

climate, with many cleantech project developers set to be impacted. However, the present remains a moment of real opportunity for investment in cleantech ventures, given the huge institutional policy drivers at play and the long-term, global demand trend for clean technologies.

“We can’t deploy cleantech fast enough to manage energy security issues and also climate issues, **Dominic** declares. “The investment that’s going to be required to replumb and rewire the world’s energy systems between now and 2050 is probably going to be the order of at least \$100 trillion - so we’re talking about \$3-4 trillion a year. At the moment, we’re spending about \$1 trillion a year on energy, so the spend rate is at least a third of what it needs to be.”

These eye-watering sums make abundantly clear the scale of opportunity available for businesses within the extensive cleantech sphere in the coming decades. Whether it be for emerging technologies, innovative Net Zero initiatives or established low carbon emitting industries, there remains a wall of capital available from both public and private sustainable finance networks that will only deepen through the march to a decarbonised future. ■

### CEO Sustainability Retreat 2023

Criticleye is holding its annual CEO Sustainability Retreat on 12-13 October at Pennyhill Park in Surrey.

Please click [here](#) for more information or to register interest in attending.

### Featuring Commentary From:



**Priya Chowdhary**  
CFO  
Encyclis



**Ann Davies**  
COO  
Lightsource bp



**Claire Dorrian**  
Head of Sustainable Finance,  
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