



NOW
OR
NEVER

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OVERTAKING
FOSSIL FUELS

Renewable energy is poised to become the world's leading power source next year.

Issue 03

The bi-monthly mini mag
for GreenTech Innovators

09/2024

GREEN MACHINE

BEATING FOUNDER BURNOUT

What is burnout, actually – and how do you, as a business founder know when you're teetering on the edge of it?



NATURE-BASED SOLUTIONS

With an accelerating climate crisis on our hands, many governments around the world are turning to nature-based solutions (NBS) to mitigate the impacts of global warming.

Dear Innovators,

As we stand at the forefront of technological advancement, the greentech sector holds unparalleled potential to catalyse positive environmental change. The journey toward sustainability is both an opportunity and an obligation to ensure that our innovations pave the way for a healthier planet.

The COVID-19 pandemic was a stark reminder of how swiftly we can come together to tackle grand challenges. In the UK, manufacturers, innovators, and various public and private sector organisations demonstrated extraordinary collaboration and agility in addressing time-critical problems. Companies swiftly pivoted operations to produce essential medical supplies, while innovators developed solutions ranging from tracking apps to treatment technologies, all in record time.

This same spirit of urgency and collaboration is now required in our fight against environmental degradation. The lessons learned from the pandemic—swift action, open collaboration, and shared expertise—should now be directed towards our planet's most pressing issues: climate change, pollution, and biodiversity loss.

We have the tools and the knowledge; what we need now is collective will. By fostering partnerships across sectors and disciplines, we can develop innovative solutions that not only mitigate our environmental impact but also enhance our quality of life. Whether it's advancing renewable energy technologies, creating smarter waste management systems, or innovating in sustainable agriculture, every step we take is crucial.

This is an invitation to each of you: Apply the lessons from our recent past to our present environmental challenges. Let's work together with the same speed and intensity to ensure a greener, more sustainable future for all.

Together, we can transform challenges into opportunities—for our businesses, our communities, and our planet.

Warm regards,

Richard Spears
Editor

GREEN
MACHINE



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Meet Canda the Red Panda at
<https://pp-plus.org/canda-the-red-panda/>



Tony Hague

Tony champions a collaborative approach to maximising the once-in-a-generation green technology opportunity.

Now or Never: The Green Revolution is a UK manufacturing opportunity for the ages

According to Tony Hague, CEO of PP Control & Automation (PP C&A), if the UK continues to outsource its green technology production overseas, it risks squandering a once-in-a-generation opportunity.

Welcome to the race towards a low-carbon future, where a host of clean and green technology sectors are evolving and vying for the unprecedented opportunities that are emerging.

The opportunities I speak of are especially relevant for the United Kingdom, which stands at the threshold of a transformative era. However, we need to embrace it and act now to avoid squandering the chance to achieve a richer economic playing field that we all benefit from.

It is a chance, ultimately, to reclaim global relevance, spurred on by the convergence of ambitious net-zero targets, rising public and governmental support, and a burgeoning green technology ecosystem.

There is a caveat. To truly capitalise on this potential, the UK must prioritise manufacturing green innovations onshore. If we fail to retain the production of our green technology domestically, we risk losing not just economic benefits but the leadership role we seek in the global green transition.

Clean energy: a UK manufacturing renaissance?

The clean energy sector - encompassing wind, solar, hydrogen, electric vehicles (EVs), and battery storage - is undergoing explosive growth. Ambitious commitments to achieving net-zero emissions by 2050 triggered a surge in renewables, energy efficiency, and climate technologies, including offshore wind - a jewel in the crown of our energy production.

Britain is now one of the world's leading offshore wind producers. The government's Energy White Paper (2020) outlined how these sectors could play a central role in decarbonising the UK economy.

There are a couple of side notes at this point...

1 How healthy is the investment landscape around clean, green, and climate-tech?

2 Who is actually making this stuff?

Starting with point 1, the emergence of AI has resulted in shifts across the investment landscape – venture funding for AI has zoomed ahead of climate-tech ([BloombergNEF](#)).

In the first half of 2024, climate tech funding dropped by 16% compared to the same period in 2023, whilst AI startups saw a 60% rise in funding. The escalating costs of AI development, which can exceed \$1 billion by 2027 for training large models, may be diverting investments from climate tech, especially for early-stage companies struggling to bridge the ‘valley of death’ and secure Series B rounds.

This slowdown comes after a funding boom in 2021-2022, with many investors now waiting for returns before reinvesting. Globally, climate tech funding fell from \$44 billion in 2023 to \$22 billion in 2024, with the US leading in investments, particularly in clean power and energy storage startups.

As AI soaks up money and investor attention, there’s an underlying feeling that this is but a ‘bump in the road’ for climate-tech investment and not the end, as an enormous amount of capital is needed for climate finance right now, not to mention a healthy collaborative ecosystem to help in scaling up. Make no mistake, AI may be the poster boy right now, but climate-tech and green technologies will bounce back.

At PP C&A, we’re making a concerted effort to lend a hand in this area through collaborative networks such as PP Plus, CESP (Clean Energy Systems Partner Alliance), and PPXJ Agritech. More on those later.

On to point 2. While ideas and innovations in green technology have been flourishing on British soil, much of the production has been outsourced abroad, particularly to countries like China and Germany. This is a trend that needs to be reversed if the UK is to maximise the economic potential of its green innovations. It is not enough to simply design groundbreaking technologies domestically; we must manufacture them here and ensure that any economic wealth created stays here.



Inside the facility

Several impactful clean energy infrastructure and grid modernisation projects have benefited from PP C&A's engineering & production capabilities.

The argument for onshoring clean energy manufacturing and green tech is compelling. First, by producing these technologies in the UK, the country can boost its domestic economy, creating thousands of high-skilled jobs in the process.

Research by Make UK, a high-profile body representing manufacturers, suggests that every industrial job supports up to four additional jobs in the wider economy, contributing significantly to local communities. A 2021 study by Oxford Economics further found that UK manufacturing contributes £192 billion to the economy annually and supports 2.7 million jobs, demonstrating its significance to national prosperity.

In the clean energy sector specifically, the potential for job creation is substantial. For example, the UK's offshore wind sector alone could generate up to 60,000 direct jobs by 2030, according to the Offshore Wind Industry Council. Add to that the manufacturing roles in battery production, electric vehicles, solar panel assembly, and hydrogen technologies, and it becomes clear that onshore production of clean technologies could act as a catalyst for an employment boom and economic rejuvenation across the country.

Furthermore, manufacturing in the UK ensures the nation retains full control over its supply chains. Recent global disruptions, caused by the COVID-19 pandemic and geopolitical tensions, have underscored the importance of having resilient, local supply. By keeping production at home, domestic companies can mitigate the risks of external disruptions and secure a stable supply of green technologies, which will be vital in achieving net-zero targets on time.



Intellectual Property and the UK's innovation leadership

The UK is home to world-class research institutions, a thriving start-up ecosystem, and is increasingly becoming a hub for green innovation. British universities and private companies have pioneered advancements in renewable energy technologies, energy storage, and clean transportation solutions. However, without domestic manufacturing, we risk losing the strategic advantage of being an innovation leader.

Outsourcing production overseas often leads to the export of intellectual property (IP), reducing the long-term benefits of innovation. When UK-born ideas are manufactured overseas, foreign competitors can replicate or reverse-engineer those innovations. This diminishes our competitive edge and undermines our potential to capitalise fully on homegrown ideas.

By manufacturing domestically, the UK can safeguard its intellectual property and ensure that the returns from innovation flow back into our economy.

Onshore manufacturing of green technologies is an economic imperative, but it also aligns with broader environmental goals. To meet its 2050 net-zero targets, the UK will need to drastically reduce emissions across all sectors. Importing green technologies from overseas often arrive with a significant carbon footprint due to shipping and transportation.

Production onshore also supports a circular economy, where resources are used efficiently, waste is minimised, and products are designed for longevity and recyclability. The UK government's Green Industrial Revolution agenda aims to foster this kind of sustainability-driven economic model. By keeping production local, the UK can embed 'greener ways of doing things' into every step of the manufacturing process, from design to end-of-life disposal, furthering its environmental leadership on the global stage.



Data sources

Make UK
UK Manufacturing:
The Facts

<https://www.makeuk.org/insights/publications/uk-manufacturing-the-facts-2024>

Oxford Economics
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Manufacturing

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Offshore Wind
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Skills Intelligence
Report

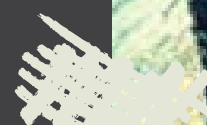
<https://www.owic.org.uk/our-work/people-skills>

UK Government
Energy White Paper:
Powering Our Net Zero
Future

<https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future>

YouGov
Poll: Public wants
government to support
British businesses

https://yougov.co.uk/topics/politics/explore/topic/British_Politics



A missed opportunity we cannot afford

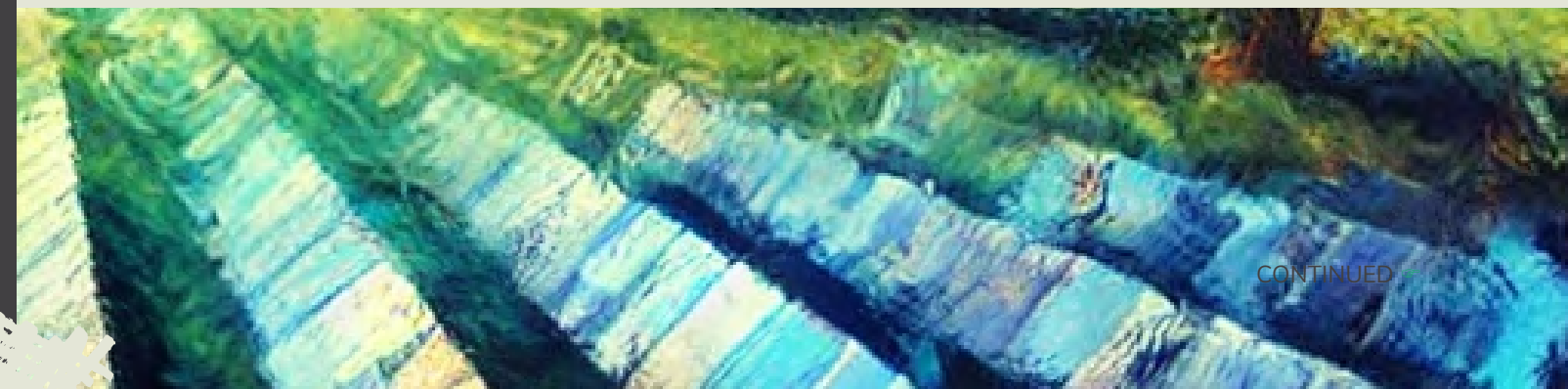
The window to establish a leading role in the global clean and green-tech economy is finite, and countries like Germany, China, and the United States are aggressively positioning themselves to capitalise on it. Failure to act now would not only see the UK fall behind in the race to lead the revolution but would also result in significant economic and environmental costs.

Failure to act now would not only see the UK fall behind in the race to lead the revolution but would also result in significant economic and environmental costs.



There is a growing public and political consensus around the importance of supporting domestic industries. The British public increasingly favours goods made in the UK, with a 2020 YouGov poll showing that 67% of people believe the government should prioritise supporting domestic businesses. This suggests there is both the political will and public support for policies that promote onshore manufacturing in green technology sectors.

It is one thing to talk the talk on green technologies, and hopefully my passion on this subject is evident, but how am I, and my business acting on it? Well actually, in quite a few ways! The secret here is collaboration.



Better together

We're no strangers to collaboration at PP C&A, having been a founding member of the Manufacturing Assembly Network (MAN) in 2006, when UK manufacturing was suffering from the collapse of major manufacturers, including MG Rover, Peugeot's Ryton Plant and Agco.

It was impeded by a lack of Government support and faced with increasing commercial pressures from low-cost rivals in Eastern Europe, the Far East and sub-continent. In short, industry was lacking ambition and confidence.

Founding members of the group had a common interest in tackling these notions and believed the answers lay within a collaborative approach. The group still carries this belief today, and 18 years on, it continues to fly the flag for UK manufacturing, and in recent years, turning its attention to encouraging the next generation of engineers through its rapidly expanding Design & Make Challenge.

During the pandemic, we set up the #UKMfgUnite platform, attracting over 300 UK manufacturers to help overcome supply chain disruptions and champion the reshoring effort. Today, we have a similar approach through several collaborations that aim to capture this window of opportunity in clean and green technologies.

The first of those collaborations is PP Plus, a carefully curated collective with over 20 organisations across UK manufacturing, academia, and professional services. It is acting as a single source for green tech start-ups to bridge the commercial valley of death and scale faster.

Born from close collaboration with other members of the PP Plus ecosystem is a new partnership that has become the bridge between cutting-edge agricultural innovation and bringing the technology to market. PPXJ Agritech is helping innovators with everything from access to academic researchers and leaders, to the design and engineering capabilities needed to realise agricultural innovations.

Our most recent endeavour is CESPA (Clean Energy Systems Partner Alliance), a pioneering collaboration between six industry leading companies. The partnership is harnessing innovation in clean energy systems through an alliance of complimentary design & engineering capabilities, and hardware & software solutions, to drive efficiency and environmental stewardship.

We're actively building a blueprint for better collaboration across the spectrum of green technologies, which, at its heart, is driven by the imperative of keeping production onshore.



Easy access support network for GreenTech innovators

PP Plus offers three pillars of support that give access to hundreds of capabilities, services and methods to help you rise through seed investment, to the flourishing market debut of your groundbreaking green technology.

Written by Tony Hague



Hydrogen vessel

CESPA partner, Glacier Energy specialises in hydrogen, carbon capture, utilisation and storage (CCUS), energy storage, and wind energy solutions.

We must retain our economic value

The emerging green technology sectors offer a historic opportunity for UK manufacturers to lead the global clean energy transition, to solve rapid environmental changes and escalating food demands, and to benefit from sustainability and a circular economy.

In short, by manufacturing green technologies domestically, the UK can create jobs, strengthen its economy, secure resilient supply chains, and meet its climate goals.

Importantly, keeping production onshore ensures that the UK retains the economic value of its innovations and remains at the forefront of global efforts to combat critical issues such as climate change. This is a window of opportunity that the UK cannot afford to miss. By investing in onshore manufacturing now, the UK can build a greener, more prosperous future for generations to come ■



Drax EMERSON Glacier Energy PHOSPHORUS POWER SYSTEMS VOLTserve

CESPA (Clean Energy Systems Partner Alliance)

Harnessing innovation in clean energy systems through an alliance of complimentary design & engineering capabilities, and hardware & software solutions, to drive efficiency and environmental stewardship.



PP C&A Jaltak

PPXJ Agritech

Acting as a bridge between cutting-edge agricultural innovation and bringing the technology to market, the PPXJ Agritech collaboration brings a comprehensive suite of engineering and production capabilities.

Beating founder burnout



EFM Associate Ronny Munster shares his thoughts in the latest in a series of informative articles from MPA and EFM.

The life of a business founder is often a challenging one, as the demands of the business pull them in many directions at once and place them under considerable stress and strain.

As outsourced Finance Directors (FDs) and other Finance professionals working predominantly with owner-managed businesses, we see this a lot – and much of the value in what we do is that we can relieve those stresses and strains and help prevent them from developing into the damaging syndrome of full-blown burnout.

But what is burnout, actually – and how do you, as a business founder or owner, know when you're teetering on the edge of it, and what action to take?

What burnout is - and when and why it happens

Burnout is defined by Mental Health UK as 'a state of physical and emotional exhaustion' that can 'occur when you experience long-term stress, for example, working in a stressful job.'

But in a business context, there are two very interesting things about burnout. Firstly, it tends to occur in two distinct stages of business growth – initially, when you're starting a business, and then when you're running an established business.

Secondly, burnout doesn't necessarily mean you stop functioning. In fact, sufferers of burnout are likely to 'carry on regardless' – but what stops functioning properly is the business that depends on their decisions as well as your own personal life.

MPA acquires EFM

In June of last year, PP Plus network partner MPA announced the acquisition of EFM Financial Management Limited as well as Outsource-FD Limited, both trading as EFM.

"I am delighted to add the EFM companies to our group here at MPA. EFM and MPA complement each other perfectly, giving a more comprehensive package of services for SMEs from start-up through scale-up and on to eventual exit."

Mike Price, Director MPA



MPA comprises a diverse team of technical experts, tax specialists, and industry-leading accountants, dedicated to fostering innovation in the UK economy since its establishment in 2004.



EFM is an experienced team of Finance Professionals who provide 'pay as you go' financial management services to businesses that want the benefits of experienced finance professionals, but without paying a full-time salary or needing a full-time resource.

Burnout is often characterised by a 24/7/365 absorption in the business, an inability to switch off and engage with family and friends, emotional volatility and general 'rattiness', and often the neglect of nutrition, exercise, and health.

Let's take a look at the two distinct burnout phases and explore how we at EFM, can help business owners beat them.

Burnout in the early stages of a business

When you start a business, you often find yourself doing pretty much everything – sales, marketing, product, finance and finance management – and this is clearly a recipe for pressure and stress.

What fuels the flames here is that you don't have the internal resources to delegate to, or the funding to put them in place. In short, it's something of a vicious circle.

Burnout in established businesses

In more established founder businesses, burnout is less of an all-at-once problem, and more of an issue that builds continuously before it reaches a head.

What makes it so damaging is that those who suffer it don't notice it accumulating over time, and their leadership sleepwalks into ineffectiveness as a result.

But despite these two distinct phases, burnout has many characteristics that are common to the two – and can be resolved in similar ways.



Burnout behaviours - and how to address them

Founders suffering from burnout exhibit many similar traits.

They often find themselves focusing on the detail, rather than on strategic decision-making. Instead of focusing on their products and services, who their customers are and what they want, and how to acquire more of them, they're more likely to be worrying about toner cartridges!

They also find trust difficult – not only towards others' ability to fulfil their responsibilities, but in their own ability to let go and delegate effectively.

Poor decision-making, or an inability to make decisions, and a tendency to ignore urgent deadlines, or procrastinate, also characterise burnout behaviour.

And very often, those suffering burnout find it difficult to prioritise, or to set goals and objectives, and develop plans to achieve them.

Burnout sufferers typically can't see wood for trees, don't make rational and effective decisions, take shortcuts and cut corners without thinking through their impacts, and ultimately impair the business' growth – the last thing in the world they want to do.

How can Finance help prevent burnout?

Changing the way the business manages Finance can do a great deal to resolve burnout issues.

By handing responsibility for Finance over to an outsourced Finance Director and their expert colleagues, you solve multiple issues at once.

At the level of day-to-day operational Finance, you dispense with the stress

associated with book keeping, and responding to crucial financial deadlines like HMRC submissions and payroll.

No more drowning in the detail – you're freed up to focus on your core business activities!

But on a more strategic level, outsourced Finance expertise also makes good decision-making easier, supported by proper analysis of the business's financial performance, cash flow forecasting, business plans, goals and objectives, and so on.

No more indecision, no more struggling to understand what to prioritise – and no more procrastination.

The worry of cost, too, is minimised; with an outsourced Finance expert, you're not paying a full-time FD's salary (currently up to £150,000 in the UK, or €170,00 in Ireland) – instead, you pay only for the hours you need.

And for businesses in those very early stages, there's an added bonus, as outsourced Finance professionals can also help you secure funding and other sources of external finance that will enable you to bring on board new resources, squaring the vicious circle and relieving some of the operational pressure on you.

Improved health & wellbeing

In addition, there can be an immense sense of liberation in entrusting some responsibilities to others, and this can deliver significant benefits to your personal health and wellbeing, but also to the performance of your business, steering you clear of the issues that can cause burnout.

Does outsourced, pay-as-you-go financial management, or business mentoring and coaching, solve all your burnout issues?

No. You also need to eat well, exercise, rest, socialise, and generally ensure you're fit enough to meet the challenges of running your business. But it's worth noting that two of the most high-profile men in history – Ronald Reagan and Steve Jobs – both took the view that surrounding themselves with people who could do what they couldn't was a far healthier way to achieve success than attempting it all themselves ■



Mental
Health
UK

<https://mentalhealth-uk.org/burnout/>

The modern ways of life have drastically affected our work-life balance and stressors in life, causing many to experience burnout. Mental Health UK conducted polling of 2,060 working adults in the UK, capturing the public's perceptions of burnout and the contributing factors in its Burnout Report 2024.

Need help taking the pressure off?

EFM has over 50 highly experienced Finance Professionals, with track records of delivering growth, control and profits for clients. With a broad range of skills across both Financial Management and business growth disciplines, backed by advanced management systems, the team has the ability to provide expert support to growing businesses, and to help you to drive the performance and value of your business, whatever your goals.

<https://efm.uk.com/>

Is renewable energy really overtaking fossil fuels?

According to a lot of the commentary around the race to combat climate change, renewable energy is poised to become the world's leading power source next year.

This means potentially surpassing coal and marking a historic shift. The progress, whilst promising, begs the question: Is it happening fast enough to address the climate crisis?

And more importantly, will it be enough to fully replace fossil fuels, or is the transition fraught with hurdles that could slow global progress.

The promise

Renewable energy, particularly wind and solar power, has experienced unprecedented growth in recent years. In fact, the International Energy Agency (IEA) projects that 90% of new electricity generation between 2022 and 2027 will come from renewable sources (World Economic Forum). The world's largest offshore wind farm, Hornsea 2, became operational in 2023, providing clean power to 1.4 million homes annually (World Economic Forum). This project is symbolic of the broader shift as more countries accelerate their commitments to a green energy future.

This momentum is further reinforced by international pledges, such as the global coalition of over 120 countries that aims to triple renewable energy capacity by 2030 (Home of Energy News). Such initiatives reflect a collective realisation that renewables are no longer just a supplemental energy source; they are central to the future of global power.

The roadblocks

Despite this progress, the transition from fossil fuels remains complicated. Currently, the world's energy systems are still deeply rooted in fossil fuels, with coal, oil, and natural gas making up 81% of global energy consumption, the same proportion as 30 years ago. This stubborn reliance poses a significant challenge to meeting the 1.5°C global warming target set by the Paris Agreement. Fossil fuel industries, supported by decades of infrastructure and investment, are not easy to dismantle overnight.

Furthermore, while renewable energy technology is advancing, it has yet to fully address the issue of intermittency. Solar and wind, the most abundant forms of renewable energy, are dependent on weather conditions, which can lead to gaps in energy supply. Energy storage solutions, like large-scale batteries, are making strides but have not yet reached the scale required to stabilise grids entirely reliant on renewables.



The speed

Another key issue is whether the pace of renewable adoption is fast enough. According to the IEA, renewable energy's growth must not only outpace fossil fuel expansion but also offset the ongoing emissions from existing fossil fuel infrastructure. Whilst wind and solar power are now cheaper than coal in many regions, fossil fuels continue to benefit from subsidies and entrenched political interests, especially in major economies like China and India, which remain significant coal consumers.

A crucial consideration is that even as renewables rise, global energy demand continues to grow, particularly in developing nations. This growing demand risks outpacing the installation of new renewable infrastructure, especially if fossil fuel subsidies remain in place, perpetuating reliance on carbon-intensive energy sources.

The future

The path forward demands more than just scaling up renewables. It requires systemic changes in how we produce, distribute, and consume energy. Decentralised energy systems, carbon pricing, and substantial investments in grid infrastructure will be essential to ensure that renewables not only overtake coal but do so in a way that is sustainable and resilient to climate shocks.

Renewable energy is indeed on track to surpass fossil fuels in the near future, but this victory will be incomplete unless paired with aggressive policy changes and technological advancements. The energy transition is not just about replacing coal with wind turbines—it's about rethinking the entire system to ensure a sustainable, equitable future for all.

It looks a tall task, but who doesn't enjoy a challenge? And nonetheless, we must succeed – it is a global imperative ■

Nature-Based Solutions

With an accelerating climate crisis on our hands, many governments around the world are turning to nature-based solutions (NBS) to mitigate the impacts of global warming.

These solutions include reforestation, wetland restoration, and sustainable land management.

They aim to harness the power of ecosystems to capture carbon and enhance biodiversity, offering a natural way to combat climate change. However, while the adoption of these policies is increasing, it raises the question: are these efforts fast and ambitious enough to meet the urgency of the climate crisis?

Growing policy momentum

Over the past year, governments have more than doubled the number of nature-based policy announcements, signalling a growing recognition of the role that ecosystems play in climate mitigation. Policies promoting forest preservation, afforestation, and other nature-based interventions have become more common in global climate action plans. Yet, despite this progress, over 90% of these policies align with a 2°C warming target, not the more ambitious 1.5°C goal outlined in the Paris Agreement.

This gap between policy ambition and climate reality raises concerns about whether current efforts will be sufficient to mitigate the worst impacts of climate change. A positive example of these policies in action is the Trillion Trees Initiative, which aims to conserve, restore, and grow over 1 trillion trees by 2030.

This initiative, backed by governments and private companies, shows a promising collaborative approach, but it still faces practical and funding challenges. Moreover, some experts argue that while tree planting is vital, maintaining and restoring diverse ecosystems is equally critical. Monoculture forests, for example, may not provide the same level of carbon capture or biodiversity benefits as naturally diverse forests.



“We are delighted to celebrate the milestone of 12 billion trees pledged by over 100 companies, and we look forward to welcoming further pledgers in the coming years. The private sector has a catalytic role to play in climate action and ecosystem restoration by investing in the trillion trees movement.”

Nicole Schwab
Co-Head of the Nature Positive Pillar
at the World Economic Forum



Addressing the gaps

One of the major criticisms of current nature-based solutions is their scalability. While these initiatives can make a significant impact locally, they need to be scaled up globally to address the climate crisis effectively. Reforestation, for instance, offers immense potential for carbon sequestration, but it requires long-term planning and maintenance to ensure that forests are healthy and resilient in the face of climate change.

Furthermore, policies must also tackle the issue of deforestation, which is often driven by agricultural expansion and illegal logging. According to the United Nations, deforestation continues to release substantial amounts of carbon into the atmosphere, undermining efforts to reduce greenhouse gas emissions. Brazil's Amazon rainforest, for example, has faced increased deforestation in recent years, challenging global climate goals. Tackling deforestation, especially in biodiversity-rich regions, is critical if nature-based solutions are to succeed.

Are they enough?



Deforestation

Deforestation is the large-scale removal of trees and forests, often for agriculture, urbanisation, or logging. It disrupts ecosystems, contributes to climate change, and leads to loss of biodiversity.

While nature-based solutions are an essential part of the climate puzzle, they cannot stand alone. They need to be integrated with broader strategies that include renewable energy, carbon pricing, and technological innovations. Moreover, nature-based policies must be implemented with careful planning to avoid unintended consequences, such as land-use conflicts or the displacement of indigenous communities.

It's also important to recognise the limitations of these solutions. Nature-based interventions like reforestation or wetland restoration take time to deliver results. In the meantime, global emissions continue to rise. As a result, many climate advocates argue that NBS should be viewed as a complementary strategy rather than the primary solution to the climate crisis.

Nature-based solutions offer a powerful tool in the fight against climate change, but they must be implemented more ambitiously and at a much larger scale to be truly effective. Governments have made significant strides in adopting these policies but aligning them with the 1.5°C warming target and addressing deforestation challenges will be crucial. As the urgency of the climate crisis increases, it's clear that while nature can be part of the solution, it cannot be the solution alone.

The path forward will require a balance of natural restoration efforts alongside technological and policy-driven approaches ■



Partner profile



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Protolabs has an unmatched speed to market as it seamlessly navigates the complexities of demand volatility throughout a product's lifecycle. With automated quoting and manufacturing systems, your product development cycle is cut by weeks or even months, bridging the gap to production with parts in record time—sometimes within a single day.

A consultative design service can be tapped into for engineering expertise, ensuring the creation of highly manufacturable solutions. Not a design consultancy per se, but Protolabs engineers collaborate closely with you to overcome challenges and optimise your designs for efficient production.

With an extensive range of engineering-grade materials, including ABS, polycarbonate, nylon, aluminium, stainless steel, and more, Protolabs can tailored to diverse applications and industries. With its digital processes, scientific moulding techniques, and stringent inspection protocols, Protolabs ensure the consistent delivery of exemplary parts, accelerating your product development journey and driving innovation forward.

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Alternative energy case study

Metal 3D printing is revolutionising geothermal energy applications by providing design flexibility and durability. Direct Metal Laser Sintering (DMLS) has accelerated the development of tools for emerging geothermal technologies, helping Houston-based startup Downhole Emerging Technologies (DET) win a national energy award.

Traditional geothermal energy relies on shallow steam vents, but new geothermal systems (EGS) target deeper, superheated rock to produce steam. However, equipment capable of withstanding the extreme heat—up to 700°F—had not yet been developed. To address this, the U.S. Department of Energy (DOE) launched the \$4.65 million American-Made Geothermal Manufacturing Prize, focusing on 3D printing innovations.

DET, led by engineers Ken Havlinek and Tingji “TJ” Tang, took on the challenge by developing a high-temperature packer system. In oil, gas, and geothermal industries, packers regulate fluid flow in wells, but existing systems made from rubber or plastic could not survive in geothermal conditions. DET’s solution required metal components, prompting them to use DMLS for its speed and precision.

Protolabs’ DMLS service proved crucial, enabling DET to rapidly prototype multiple designs. The system allowed Havlinek to upload CAD models, receive feedback, and obtain quotes quickly. This fast turnaround was essential given the competition’s tight deadlines.

DET’s final product, the Diamond ETIP (Extreme Temperature Isolation Packer), was a retrievable all-metal system designed to withstand geothermal heat. The innovative packer design required less energy to operate, thanks to internal features optimised by additive manufacturing. Made from durable metals like Inconel 718 and stainless steel, the system was prototyped in five iterations.

DET’s tool won one of two grand prizes in the DOE competition, including \$500,000 in cash.

KEN HAVLINEK

Ken Havlinek, co-founder of DET, brings 29 years of product development experience in the Oilfield Service industry. He was VP of Research & Technology at C&J Energy and CTO at Probe. Previously, he spent two decades at Schlumberger, starting as a junior design engineer and rising to Technology Center Manager. Havlinek holds S.B. and M.S. degrees in Mechanical Engineering from MIT.

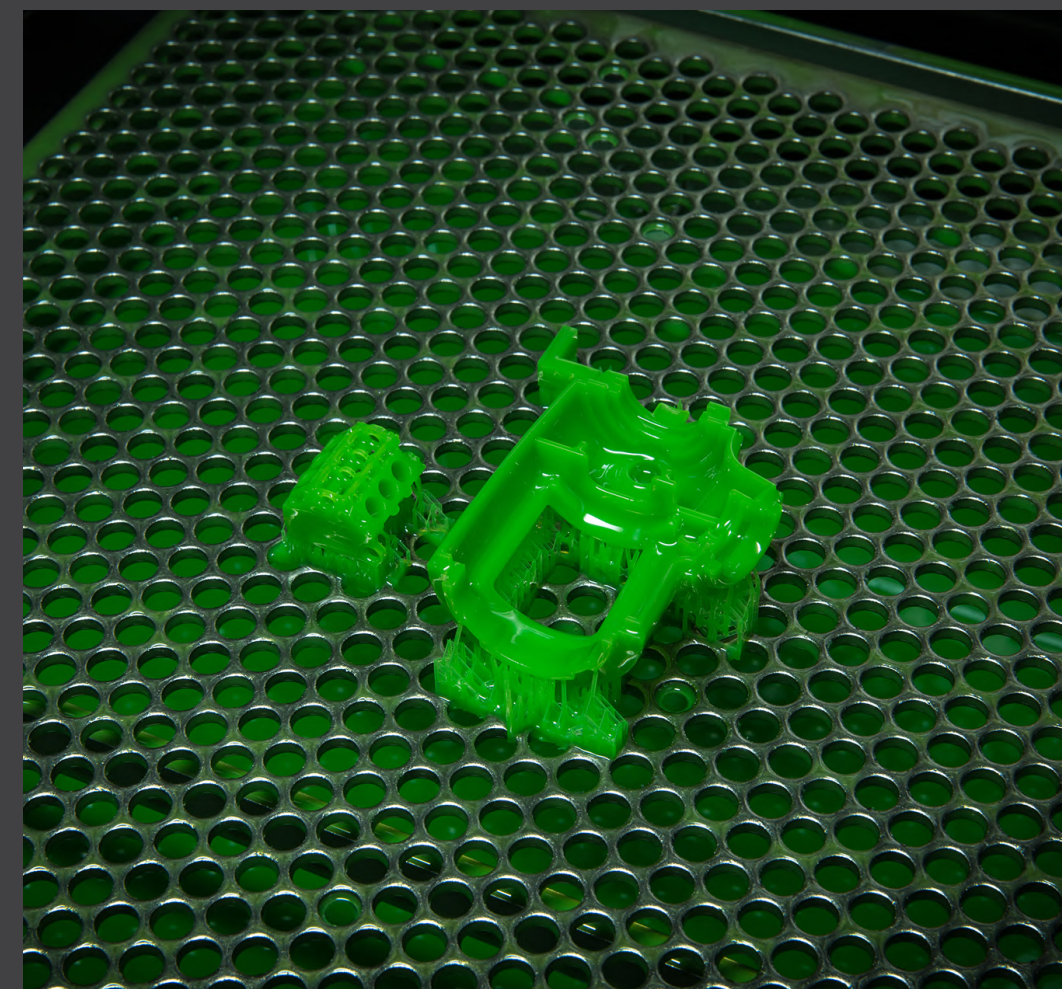


ABOVE

Direct Metal Laser Sintering (DMLS) is an additive manufacturing process that uses a high-powered laser to fuse fine metal powder layer by layer. The laser selectively melts the powder based on a 3D CAD model, forming solid metal parts. It is used to create complex, high-precision components, particularly in aerospace, medical, and automotive industries.

RIGHT

Selective Laser Sintering (SLS) is an additive manufacturing process where a laser fuses powdered materials, typically plastics, layer by layer to create durable, complex parts directly from digital models.



Network founder



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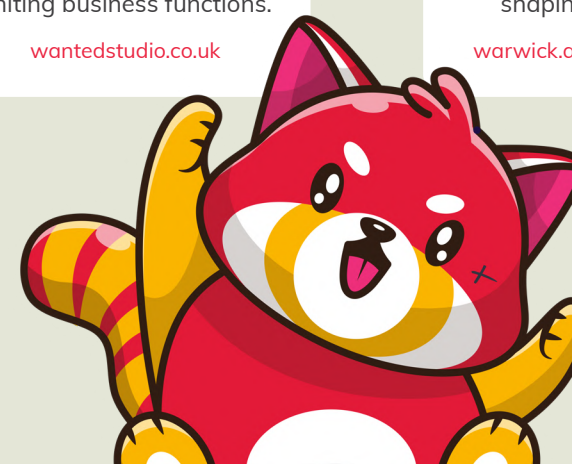
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Contact the editor

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