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SPECIAL ISSUE

Science-based targets for sustainable IT

Can cloud computing drive sustainability?

Saving the world one device at a time

Displace is the new replace in the fight against e-waste

Reducing commuting with IT-enabled remote working

SUSTAINABLE IT

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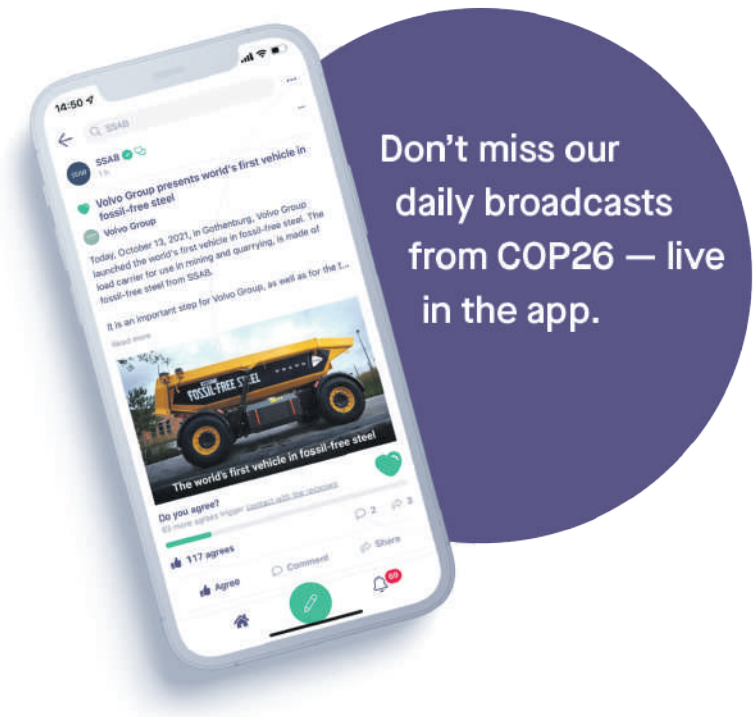

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Welcome to this Sustainable IT special issue of My Green Pod Magazine!

In this edition we profile an ecosystem of information technology organisations that we feel is working to reduce the impact of computing on our planet.

One year on from the Time I.T. Changed special issue, we review annual progress and outline plans for the future to promote low-carbon computer manufacturing and use and abatement strategies such as device longevity, remote working and offset programmes.

Read on to find out more!

Justin Sutton-Parker, GUEST EDITOR
Doctorate researcher at the University of Warwick (Computer and Urban Science) and MBA, Sustainability & Leadership

This year COP26 will be held in the UK. While many topics will be discussed, manufacturing, energy consumption and transportation will be high on the agenda.

In context, computing generates 2.3% of global greenhouse gas (GHG) emissions due to raw material mining, manufacturing, distribution, use (electricity consumption) and recycling.

If somebody said, 'we only have 50 things to address to save the world', computing would need to be given a place on that list.

Add to this the impact of what I call 'commuting to access IT' (CAIT) and the problem is exacerbated; IT is then responsible for 5% of all emissions, meaning that the IT-related footprint is actually one-twentieth of our problem. Certainly food for thought.

From a brand perspective, many companies are working not just to offset the issue but to actually prevent it. As you will read in this special edition, strategies include data centres powered by renewable energy, recycled plastic laptops, second-use cardboard packaging, low-energy devices and remote working. All of this is hugely positive, but we – as users – must take advantage of these sustainable approaches.

Aspects of my research determine 1% of annual global GHG emissions can be attributed to 4.2bn users powering personal computing devices and creating an annual demand for the manufacturing of 460 million more units.

Yet the same research tests and validates that device options exist that consume 57% less energy and offer the same experience. So why don't we add sustainability to our buying criteria?

According to my research, it's down to a lack of meaningful information at the point of purchase.

This is why I'm spending a great deal of time researching and developing applications to rectify the issue. Similarly, concerned by the statistic that in normal circumstance 68% of all UK commuters travel to work by car, I recently monitored and compiled the CAIT habits of 815 employees for one year.

I presented the findings at the 11th International Conference for Sustainable Energy IT (SEIT), and concluded that in the UK, without exercising remote working the average scope 3 commuting footprint per user is 1.5t CO_2e per year.

Considering the UK's largest employment sector has 10.95m car commuters, by simply moving forward into the 'new normal' and maintaining two days per week remote working, we could collectively avoid 6.4m tCO_2e GHG emissions every year. In less technical terms, we would need 7.7m acres of forest to sequester that level of pollution. Considering that's equivalent to the entire UK woodland cover, perhaps the suggestion is reasonable.

All I ask is that you take the time to read the following pages, absorb the sustainability efforts being made and think about four simple strategies that you may adopt. Do I really need to replace my IT? If so, how can I do this in the most sustainable way? Can I organise my working week to either be remote for 40% of my time, or at least defer to a more sustainable mode of transport? When I'm finished with my laptop or desktop, does it have an afterlife to support displacement and circular economy strategies?

For now, I hope you enjoy this second My Green Pod Sustainable IT special edition. Perhaps it may even influence your human behaviour and help us all to act in concert to safeguard the future.

'IT is then responsible for 5% of all emissions, meaning that the IT-related footprint is actually one-twentieth of our problem. Certainly food for thought.'

JUSTIN SUTTON-PARKER

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This plan will save our home and help avoid climate catastrophe and could serve as a model for ecological transition everywhere. But we cannot do it alone. **Join us in protecting the Earth's Beating Heart.**

CONTENTS

06 Five ways Citrix is helping to advance sustainability

08 Green IT hardware can save money and emissions in everyday scenarios

09 How supporting the IT Channel will enable sustainability leadership

10 Why ‘displace is the new replace’ when it comes to sustainable IT

12 How Google is working with customers, partners and larger communities to drive sustainability in the tech sector

14 Sustainability strategy drives investment and innovation in design, packaging and software

15 Liberation and isolation: the mental dichotomy of remote working

16 Green gold: a fresh perspective on digital currencies

18 How thinking ‘Px3’ – people, planet and productivity – can help slash IT emissions

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5 WAYS

Citrix is helping to advance sustainability

By Keith Littlejohns, senior sustainability and ESG manager at Citrix

Citrix is one of the most recognised brands when it comes to digital workspace technology.

With 100 million users in more than 100 countries, the leader in hybrid work platforms realised the pandemic was the greatest opportunity to redefine the future of work – a future that is not only hybrid, but also less carbon intensive. With sustainability at the core of our business strategy and philosophy, we are on a mission to make the world a better place to live and work. Here are the top five green initiatives Citrix has implemented to drive its sustainability objectives.

Citrix has a target to reduce total absolute GHG emissions by 30% by 2030 from a 2019 base level

1

SETTING A CARBON REDUCTION TARGET

In line with the 2015 Paris Agreement that advised global warming be limited to 2°C or below, Citrix announced a target of reducing total absolute greenhouse gas (GHG) emissions by 30% by 2030 from a 2019 base level. We are currently aligning this target with the Science Based Targets initiative (SBTi) to ensure our efforts are rigorous and are helping to limit global warming.

This means that the business will invest its resources to discover new ways of using less energy in terms of both direct and indirect sources of emissions. In 2020, Citrix reviewed outdated key infrastructure assets that consumed significant amounts of energy and replaced them with more efficient ones, such as energy-efficient chillers for cooling office spaces. Citrix started an optimisation project at our Miami data centre that used sustainable design to reduce the physical footprint of servers by 70% (from 86 to 23 racks).

Speaking of data centres, 100% of electricity consumption (indirect sources) at data centre locations in Santa Clara and Doral are sourced from renewables, while 74% of energy consumption at India operations is managed through renewables. This helped reduce our CO2e emissions by 5,889 metric tonnes in 2020.

Our leadership team is fully committed to achieving these goals; executive compensation is linked to ESG metrics to ensure the company retains its focus.

2

IMPROVING MEASUREMENT OF EMISSIONS DATA

For a business such as ours, sizeable sustainability goals cannot be attained by turning off the lights or improving data centre efficiency alone: we must dive into different emissions sources and find innovative opportunities to reduce them.

Indirect sources of emissions are some of the highest contributors to our overall carbon footprint. Indirect sources include procurement of goods and services, business travel, employee commuting and the energy usage of the products we sell.

To further advance the accuracy of our GHG inventory, Citrix is improving data collection methodologies with a special focus on indirect emissions sources. In 2020, we added five additional indirect categories to fine-tune our measurement and reduction strategy. For example, new analysis is underway that takes our top sources of emissions into consideration, and explores the avenues available to addressing them.

3

MAKING SUPPLY CHAIN AND PROCUREMENT MORE SUSTAINABLE

Nearly every purchase is an opportunity to reduce carbon impact – either through reduced demand for unnecessary, carbon-intensive materials or by working more closely with suppliers that have dramatically reduced their own emissions.

To effectively manage carbon exposure within our supply chain, Citrix is analysing environmental data from its top-tier goods and services providers. The process provides primary climate-related information and gives insight into lower carbon supply chain opportunities.

Citrix's Real Estate and Facilities (REFS) and Travel teams also play a large role in ensuring our procurement practices align with our sustainability goals. For everyday purchases like office supplies and corporate travel, we have the opportunity to source lower-carbon alternatives.

PHOTOGRAPHY GETTY IMAGES

100% of electricity consumption at Citrix data centres in Santa Clara and Doral are sourced from renewables

4

HELPING CUSTOMERS ON A SUSTAINABILITY JOURNEY

Citrix products and solutions help enable business efficiency and allow customers to transition to a flexible work model, accelerating their own sustainability goals in tandem. There are a number of ways in which Citrix Workspace technology can help organisations to advance their sustainability programmes.

Citrix solutions are device agnostic and therefore customers can easily choose computing devices with low energy consumption and reduce their carbon footprint by up to 90%.

50 million metric tonnes of electronic waste is produced annually, yet only 20% is recycled sustainably. Citrix Workspace requires very low computing power and needs fewer asset refresh cycles. This lengthens the useful life and environmental impact of these devices from three to seven years.

Transportation accounts for 14% of global GHG emissions. By encouraging work-from-home practices, organisations can attract top talent and significantly reduce local commuting. This results in lower transportation sector pollution, better air quality, reduced dependency on fossil fuels, reduction in chronic health issues and healthier cities.

Power and cooling cost more than the IT equipment itself. Customers switching to a Citrix Cloud solution can rest assured they are buying into an effective, carbon-zero method to boost efficiency.

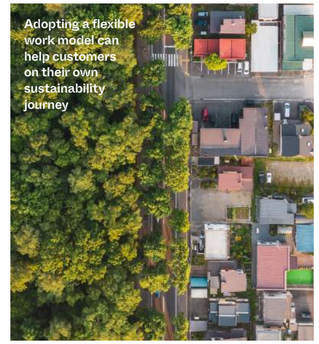
5

RESPONDING TO THE CLIMATE CRISIS

Climate change is an existential threat and challenge that transcends national borders and industry sectors. Record-breaking heat waves, droughts, wildfires, floods, hurricanes and the threats of rising sea levels, food shortages, pestilence, war, depletion of natural resources and species extinctions all require organisations to work with world leaders in the move to a low-carbon, clean energy economy with advocacy for those most impacted.

Citrix discloses its climate information and aligns reporting strategy to global frameworks such as CDP (Carbon Disclosure Project) and the Task Force on Climate-related Financial Disclosures (TCFD) framework.

Environmental stewardship can be compared with the digital revolution; it promises to change the game, can be a great source of competitive advantage and opens new opportunities while meeting current and near-future compliance mandates. Investors, employees, business partners, regulators and other stakeholders are demanding to know more about companies' ESG performance and their metrics. We know that taking baby steps is not enough to tackle a global issue that sincerely requires an overhaul of conventional thinking. It's exciting to be part of Citrix's sustainability journey, knowing we are passionate about tackling this problem head-on.



Adopting a flexible work model can help customers on their own sustainability journey

Find out more

- Citrix solutions are used by more than 400,000 organisations, including 99% of the Fortune 100 and 98% of the Fortune 500. Discover the people-centric solutions at **citrix.com**

HOW TO MAKE HARDWARE GREEN

Green IT hardware can save money and emissions in everyday scenarios

The information and communications technology (ICT) sector is responsible for higher CO2 emissions than global air travel. This was true even before the Covid-19 pandemic, which has exaggerated the difference.

ICT has experienced exponential growth due to demand for remote working and learning, while air travel has obviously declined due to travel restrictions.

In addition to increased personal adoption, technological aspects such as the Internet of Things (IoT), accelerated digitalisation and changing consumer behaviour are driving future growth.

More and more online content is consumed in video form, which consumes significantly more server power and storage space.

There is great potential in ICT to reduce these CO2 emissions – and we can leverage this potential to achieve the global climate goals.

DEFINING GREEN IT

Prime Computer is a Swiss-based manufacturer of fanless mini PCs and servers; it develops green IT hardware to help reduce the greenhouse gas (GHG) footprint of ICT.

Green IT can be divided into two main approaches. The first is 'green *by* IT', or how ICT tech can make existing processes more environmentally friendly. For example, a video conference instead of a classic in-person meeting, to which participants would need to travel by car or even by plane.

The second approach is 'green *in* IT', which strives to make IT itself greener. Lower power consumption, longer lifecycles, optimised production and disposal and second use of IT hardware are all good examples.

HOW TO PRODUCE GREEN IT HARDWARE

When it comes to the 'green *in* IT' approach, the key words for a climate-neutral strategy in production are reduce, avoid and compensate.

Products and processes are designed from the outset in such a way that GHG emissions are reduced as much as possible, or even avoided all together.

In practical terms, this means the creation of energy-efficient, robust, durable, repairable IT hardware made from reusable or recyclable components and materials.

For example, all PCs and servers from Prime Computer are passively cooled, so they don't require energy-intensive mechanical components such as fans. This slashes energy demand and also increases reliability and a product's useful lifespan. In the long term, this reduces the need for new hardware, which saves resources, slashes GHG emissions and reduces e-waste. With a passively cooled PC or server, the most energy-efficient components must be installed to ensure the required computing power is still achieved.

In a world where no national grid can claim 100% renewable energy, less energy consumption still means lower GHG emissions – not to mention reduced utility bills.

CARBON-NEUTRAL HARDWARE

Before making claims of climate neutrality, Prime Computer had to offset remaining emissions that occur during the production of its hardware.

The GHG potential of a finished product must be measured precisely – which can be a big challenge for products with a global supply chain.

Prime Computer has done just that and can accurately quantify the GHG potential for production, transport, use in the first five years and disposal for all its products. The total is then calculated in CO2 equivalents (CO2e) and offset with certified projects.

GREEN IT IN REAL-LIFE TERMS

Prime Computer sent a mini PC from its current portfolio for independent testing by Px3. The goal was to find out what an energy-efficient PC looks like in real-life situations, in terms of both GHG emissions and cost savings.

Px3 is a research-focused IT consulting organisation that specialises in sustainability – specifically the reduction of GHG emissions created by the way we work today.

Unlike most third-party energy certification labels, Px3 measures power consumption in the real-world scenarios of a typical working day, rather than in 'non user present' benchmarks.

Px3's measurements show that the Prime Computer mini PC's scope 2 emissions are 70% lower than a conventional office PC's, and its scope 3 emissions are 43% lower.

For a company with 250 PC workstations, the lower power consumption alone means a CO2e reduction of almost 10 tonnes over five years.

This is equivalent to the sequestering capacity of 11.5 acres of mature forest. The same company can save almost £10,000 over five years through reduced electricity consumption.

Even though Prime Computer takes responsibility for environmental stewardship and offsets the combined scope 2 and scope 3 emissions of its equipment for the first five years of use, the results from Px3 clearly show one outcome. Whatever your priorities are, it makes perfect sense, from both an environmental and a financial perspective, to adopt energy-efficient IT hardware.

'the ICT sector is responsible for higher CO2 emissions than global air travel'

Carbon ready?

Trevor Evans, MD of Consenna Ltd, explains how supporting the IT Channel will enable sustainability leadership

'Sustainability' is now an everyday word, and rightly so. Behaving 'more sustainably' is a priority within our personal and professional lives and its importance for businesses of all sizes cannot be underestimated.

Irrespective of potential material gain, businesses must do what is right rather than what is commercially expedient. However, businesses don't make decisions, people do. The time for indecision and procrastination has passed.

Recognising this is one thing; appreciating how to approach it successfully is often seen as an entirely different challenge. In fact, 'challenge' misses the point. Why should doing the right thing be considered a challenge? It's an expectation.

SUSTAINABILITY IN IT

IT and computing are responsible for 5% of all global carbon emissions. By comparison, the airline industry contributes 3.7%. IT's contribution is perpetuated by the throwaway mentality associated with devices and accessories, which leads to unforgivable mountains of e-waste.

It shouldn't be this way. It doesn't have to be this way. Consenna, as a leading digital enablement business in the IT Channel, believes resellers have a pivotal role to play and a strong desire to play it.

ETHICAL IT PRODUCTION

The journey starts with device manufacturers increasing commitments to reducing the environmental impact of their production processes, materials and supply chains.

Increasingly, well-informed customers are holding vendors to account in the best way they can, by offering their custom to those upholding the highest environmental credentials.

We recently worked with Acer and sustainability consultancy Px3 to launch 'Green Rewards' across Europe. Centred around an intuitive online portal and project calculator, it allows IT resellers to access, for the first time, immediate insights into the environmental impact of their customers' purchasing and recycling decisions – all in a personalised sustainability impact report.

Next is the distribution network – from vendors to resellers – that makes devices available. Ingram Micro, which already has a long-standing relationship with Fairphone, recently announced a partnership with sustainable IT specialist Circular Computing. The partnership gives resellers and customers easy access to carbon-neutral, remanufactured laptops.

Beyond this, up to 10,000 resellers engage daily with millions of end customers, where the greatest change can be realised. The potential for change is enormous if 'doing the right thing' becomes the policy we all choose to adopt.

FREE SUSTAINABILITY TRAINING

At Consenna, we know change doesn't need to be hard, expensive or time-consuming. However, we recognise resellers represent a very diverse community, engaging all manner of markets, products and customers. One size will not fit all.

Market focus defines the products resellers recommend to their customers. If you're unaware of a more sustainable choice, you're not going to be able to promote it.

While some resellers understand and promote sustainability, there are many more who would like to. Where is the objective support that many crave, but lack the time and budget to source?

With this in mind we created Consenna Carbon™. Simply, this is an entirely free-to-use platform designed to equip IT resellers with an extensive menu of self-serve sustainability-focused marketing campaigns, training and meaningful education modules on what it all means. It's free because it's the right thing to do.

The team at Consenna is helping customers understand their real options when it comes to sustainable IT

INFORMED PURCHASING DECISIONS

All resellers, regardless of size, need to be equipped with the knowledge, content and real-world data that will enable them to have bold, challenging conversations with their customers.

The fact a customer has always bought a certain brand, device or service shouldn't mean they continue to do so if more sustainable choices are available.

Is a printer necessary when a document management system makes more sense? Is a top-of-the-range smartphone required for every member of a workforce when a sustainable, robust, modular, designed-to-last Fairphone meets their needs?

Should a conversation around purchasing new devices end with a purchase order or include an action plan for the safe and responsible disposal, or remanufacture, of the existing devices? Customers will remember who posed those questions.

Beginning their sustainability journey just became a question of 'why not?' rather than 'why now?'

With access to knowledge, content and real-world examples to communicate sustainability effectively to their customers, Consenna Carbon provides a map for the journey that's free for everyone.

Our vision is to create IT Channel sustainability ambassadors, equipped to out-manoeuvre their competitors while providing those well-informed customers with a great choice. After all, sustainable IT is now. It is non-negotiable. It is right.

PHOTOGRAPHY ISTOCK

DISPLACE is the new REPLACE

PHOTOGRAPHY ISTOCK

Justin Sutton-Parker explores the sustainability capabilities of the displacement strategy

During the pandemic employees, consumers and students bought new desktop computers, thin clients, notebooks and tablets to enable home working, studying and entertainment.

In fact, in 2020 demand was so high that the number of shipped end-user computing units exceeded 450 million for the first time, representing the highest growth in 10 years.

Coupled with resource and manufacturing restraints caused by illness, travel and work restrictions, the excess demand also caused a shortage in the chipsets required to make devices compute.

Faced with the prospect that supply might be cut off, many businesses turned to alternative methods to extend the useful life of existing IT equipment and produce immediately available 'office in a box' secure home-working solutions.

THE DISPLACEMENT STRATEGY

Instead of seeking out new mobile or desktop devices to duplicate an office environment elsewhere, 'thin client' computers are created from existing devices and connected to IT services via the internet. Such a resourceful strategy could not only ride the supply constraint wave but also offer instant productivity and reduce internal costs.

In addition to the obvious impacts on people and profit, this kind of move also brings a third (and often masked) planet-focused benefit: avoiding the carbon footprint of creating a new replacement device. In sustainability terms this strategy is known as displacement.

BOOSTING IT PERFORMANCE

A good example of displacement occurred recently at a global financial services organisation, where a large workforce is now working remotely.

Instead of making a knee-jerk hardware procurement, the in-house IT team – together with international software and thin client manufacturer IGEL – made a considered and resourceful decision.

'the average commuter creates 1,031kg CO2e per year in transport emissions'

3,150 desktop computers, destined to be decommissioned and replaced due to an out-of-support operating system (OS) that was causing sub-optimal performance, were given a new life. In the spirit of 'displace and not replace', the team and IGEL agreed to remove the existing Windows OS and replace it with the IGEL OS, which is based on a Linux code that requires lowered compute power to operate. The rationale was that the performance of the device would improve, ensuring the new remote access points were fit for purpose during the ongoing pandemic.

SLASHING EMISSIONS WITH IT

In this instance, by not buying like-for-like new desktop devices, the finance-focused company avoided embodied greenhouse gas (GHG) emissions of 685,773kg CO2e. In a real-world context, this is equivalent to the pollution caused by driving an average car for just over 2,485,000 miles. Perhaps more astonishingly, it would take 823 acres of mature forest to sequester the amount of carbon that was avoided.

This second point is perhaps of key interest considering COP26, which will this year be hosted in the UK where the company is based.

RETHINKING NET ZERO

'Net zero' is a term often used to position a solution to the issue of global warming. The idea is that if equal actions, such as tree planting, are taken to offset our carbon emissions, then we will have built a more sustainable world that creates anthropogenic interference with one hand and clears it away with the other.

Naturally, there is a counter-argument that a tree's potential to capture carbon will be realised when it reaches maturity, not when it is planted.

Perhaps, as with this example of reuse, avoiding the impact of new carbon footprints in the here and now will help to accelerate the concept of net zero by limiting emissions growth.

EFFICIENT DEVICES

The re-imaged devices fulfilled expectations and delivered the remote working experience with an increase in performance. However, improvement wasn't restricted to productivity – it also began to emerge in the form of reduced electricity consumption.

In fact, extensive power-draw analysis conducted by sustainable IT consulting specialists Px3 highlighted that by working with the new IGEL OS, the average device energy demand was reduced by 22%.

During the 20 months to date that the converted computers have been in operation, almost 20,000kg CO2e GHG emissions have been abated through reduced electricity consumption.

Reverting back to tangible analogies, such reductions mean that the equivalent pollution of driving over 72,000 car miles were never emitted into our atmosphere.

IGEL's UD Pocket connects remote staff to a central cloud network, and boots the Linux OS through a USB on any device

PREVENTION OVER OFFSET

Perhaps equally interesting is that these revitalised IGEL OS devices not only reduced energy consumption and supported displacement, they also ensured that secure and productive work could be conducted from home.

During the same 20 months, commuting to access IT did not occur for over 3,000 workers. Considering that the average commuter creates 1,031kg CO2e per year in transport emissions, their carbon footprint was cut by an estimated 5,412,750kg CO2e – the equivalent of 19.6 million car miles.

Remote working will most likely harmonise at two days per week, but the abatement already achieved releases an impressive 6,495 acres of forest from sequestering duty, suggesting that prevention is clearly more effective than offset.

BETTER BUYING DECISIONS

All technology inevitably requires replacement; as innovation accelerates, our computers finally become obsolete or simply fail beyond repair. At this point, informed choice is essential for prudent economic procurement decisions that include sustainability as a criterion.

Research highlights that manufacturing and transport emissions generate approximately one half of end-user computing emissions; the electricity used to power computing devices emits the other half, with recycling squeezed in between at approximately 1%.

Considering that devices such as notebooks and desktops create 1% of our global annual GHG emissions, if we all acted in concert and made better buying choices then one-hundredth of our global warming source could be mitigated.

CHOOSING SUSTAINABLE IT

One sustainable option is to pair the IGEL OS with a desktop device that offers a small carbon footprint from both an embodied and use perspective, such as an HP T640 thin client. 115kg CO2e of GHG emissions are required to create and ship a single device, meaning the environmental impact is approximately one-third less than the industry average.

In the context of the previous financial organisation, should the company eventually replace the repurposed devices to continue remote working capabilities, then selecting the HP T640 with an IGEL OS would deliver an abatement of over 850,000kg CO2e of embodied emissions compared with a standard device.

Add to this the incredibly low electricity required to power the thin client during a standard working day, use-phase emissions could also be reduced by as much as 75% when compared with similar desktop computers.

From a retention perspective of five years, when combined with the embodied abatement, the equivalent pollution created by driving over 370,000 car miles could be avoided through simple considered choice.

The next time you think about replacing an end-user computing device, remember to consider two things before you commit to a purchase. Always examine the carbon footprint of any IT product before you buy it but first – and even more importantly – decide whether displacement would be a feasible alternative. It could become the new 'replace' in the fight for net zero.

Find out more

- Discover how IGEL helps businesses cut their carbon footprint at **igel.com/sustainability**

Can cloud computing drive sustainability?

Michael Wyatt, head of Chrome Enterprise EMEA, Google, on how Google is working to drive sustainability in the tech sector

In 2007, Google became the first major company to go carbon neutral, and in 2017 it became the first major company to match 100% of its annual electricity consumption with renewable energy.

The company has signed agreements to buy power from more than 50 renewable energy projects, with a combined capacity of 5.5GW, and plans to get all its data centres and campuses operating on carbon-free energy – 24/7 – by 2030.

This is vital because the amount of computing done in Google data centres continues to grow. This was especially true in 2020 – a year when many people's work, school, doctor's appointments, first dates and visits with loved ones moved online.

Even as Google Meet and Duo hosted over a trillion minutes of video calls in 2020, its renewable energy procurement kept pace.

But can cloud computing bring additional benefits to customers by reducing their emissions from data centres and devices?

PHOTOGRAPHY ISTOCK

REDUCING EMISSIONS AND ENABLING CHANGE

Recent Accenture analysis suggested migrations to the public cloud can reduce global carbon emissions by 59 million tonnes of CO2 per year. This represents a 5.9% reduction in total IT emissions and equates to taking 22 million cars off the road.

The analysis also found that cloud migration that considered sustainability as a factor could deliver a 'double helix' benefit of shareholder and stakeholder value by simultaneously reducing costs and carbon emissions.

For any organisation, but particularly for data-intensive businesses, a reduction of this magnitude is a significant step towards meeting climate change commitments. Cloud computing has one other major advantage: it enables the use of lower energy devices and the move to new ways of working, through which even more significant sustainability benefits can be achieved.

THE BENEFITS OF CHROME OS

Google's Chrome operating system was born in the cloud, and introduced a modern, more efficient and sustainable way of computing.

Chrome OS devices from partners such as Acer, Asus, Dell and HP are offered in versatile form factors such as clamshells, tablets and convertibles.

Many are also designed with a focus on durability, including ruggedised devices with long-lasting components such as spill-proof keyboards and scratch-resistant Gorilla Glass, which extend device lifespan and require less maintenance. Recent benchmarking tests by independent consultancy Px3 reveal the Acer Spin 513 Chromebook would reduce emissions from a typical end-user computing estate by around 70%, with savings of 84% possible compared with legacy Windows desktop PCs.

These impressive energy savings are driven by innovations in processor design and power management capabilities, which provide efficient charging and optimised device performance.

MINIMISING E-WASTE

Chromebooks also receive up to eight years of OS updates and don't slow down over time, which means they stay useful and productive for longer and minimise e-waste.

As well as prolonging device lifecycles, Chrome OS's cloud-profile capability facilitates sharing between multiple users. Device sharing is a simple yet highly impactful way for organisations to remain efficient with fewer resources, and ultimately results in less waste.

'Grab and Go' and kiosk mode on Chrome OS allow businesses to set multiple profiles and user modes. The result is that one device is able to accommodate many without compromising on speed and delaying workflows.

BRINGING SUSTAINABILITY EFFORTS TO LIFE

When Kingston and Sutton London Borough Councils deployed over 3,800 Chrome OS devices, they did more than just achieve their goals of modernising computing for their employees. The councils have also enabled a mass move to remote working as part of their pandemic response and seen annual drops in their greenhouse gas (GHG) emissions and energy consumption.

Analysis from Px3 recorded a 32% reduction in energy from the move to Acer Chromebooks. If this is combined with the reduced commuting from more than 95% working remotely, you would need 3,700 acres of mature forest – roughly one and a half times the size of the local Richmond Park – to remove the equivalent amount of pollution from the atmosphere.

Find out more

- Discover what else Google is doing to foster sustainability at scale at **sustainability.google**

A special Women+ in Climate Tech thank you to the brilliant minds behind...

The Taskforce for *Equity* in Climate-related Financial Disclosures


Hannah Slodounik

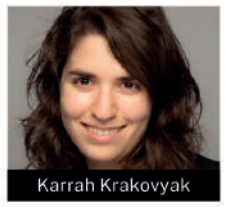

Daniella Rough


Latonia Viverette Batiste


Nehali Anupriya


Erfana Hossain


Maya Dhanjal


Karrah Krakovyak


Lakshmi Suryan


Tanya Barham


Heidi Nguyen


Neha Bhambhani


Katie Wu


Madhuban Kumar


Emily Wasley


Shadnoush Pashaei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Angela Hollowell


Jamie Alexander


Neila Vorano


Suzanna Buck


Laura Kimes


Zlata Huddleston


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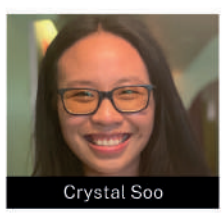
Crystal Soo


Susana Vidal


Jaycie Weathers


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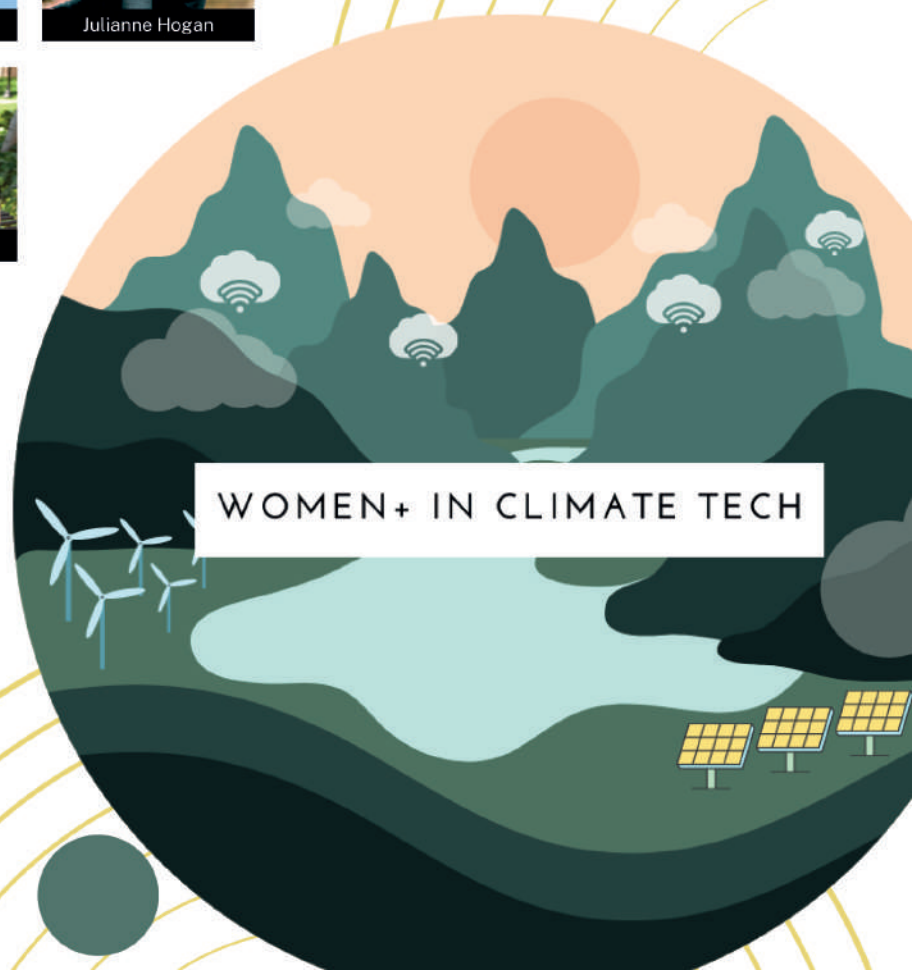


SAVING THE WORLD, ONE LAPTOP AT A TIME

Sustainability strategy drives investment and innovation in design, packaging and software

Earlier this year Acer announced that it had joined the RE100 initiative, pledging to use 100% renewable energy by 2035.

The Acer Group, including its global operations and subsidiaries, has already achieved its 2020 target of reducing its global carbon emissions by 60%.

Acer decided to take its environmental commitments further by establishing Earthion (blending 'Earth' with 'mission'), a platform to tackle environmental challenges that combines the strengths of the company, its supply chain partners, consumers and employees. The platform covers the use of renewable energy, recycling, product and packaging design and production and logistics.

RECYCLED AND REIMAGINED

In 2020 all Acer notebooks switched to recycled paper for packaging, saving 8,750kg of paper pulp and 20 million plastic bags. In addition, over 50 metric tonnes of batteries were recycled and remanufactured.

To mark what Acer calls the beginning of 'a reimagination of computer manufacturing', the Aspire Vero uses post-consumer recycled (PCR) plastic throughout the device's chassis and keyboard caps. It ships in a box made from 80-85% recycled paper pulp, replaces the plastic bags for adapter protection with paper sleeves and uses 100% industrial recycled plastic for the laptop bag and the sheet between the keyboard and screen. To further reduce environmental impact, all graphics on the shipping boxes are printed with soy ink, with no paint on the notebook chassis itself.

The Aspire Vero is constructed with easily accessible, standardised screws for a simpler disassembly process, and the text on the R and E keys is inverted, highlighting 'the three Rs': reduce, reuse and recycle.

The Acer ConceptD, launched in 2019 and designed for visual creatives, has won two international Red Dot design awards, including one for its eco-friendly packaging in the Sustainable Packaging category. Most components now use shared packaging, and all LDPE foam packaging was removed without compromising protection.

Plastic bags and film covers were eliminated wherever possible and soy ink printing has been used to remove pollution during future reclamation. Overall, the packaging is nearly free from virgin plastic, 100% recyclable and made from 90% recycled pulp.

The Acer Chromebook Spin 513 LTE is designed around performance and mobility; it has an excellent battery life, meaning it can easily support new hybrid work styles and match the highest priority selection criteria.

DEVICE EMISSIONS

End-user computing is a significant contributor to environmental pollution and climate change, causing 1% of global emissions. Up to 50% of this is down to use rather than manufacture and disposal.

Acer worked with Px3 to provide an independent benchmark of the Acer Spin 513 LTE. According to the study, the device would reduce emissions from a typical estate (mixed desktops and laptops) by around 70%, with savings of 84% possible compared with legacy Windows desktop PCs. For a typical 500-user organisation, the annual saving was calculated to be equivalent to reducing travel by 9,460 UK car miles, or having an additional 3.2 acres of mature forest. Even benchmarking the SPIN 513 LTE against comparable market-leading notebooks, energy (and therefore emissions) savings of up to 50% were recorded.

SUSTAINABILITY IN THE UK

Acer is running a survey to calculate the carbon emissions of every UK employee, and will create a carbon-reduction plan that includes installing electric vehicle charging points in all UK offices. Acer UK will work with a certified UK body to offset the remaining emissions to make employee travel carbon neutral.

A tree is planted for each device sent out as a PR or marketing sample for review, and all postage bags have been switched to more sustainable materials that are easier to recycle.

PERSONALISED IMPACT REPORTS

This September, Acer launched Acer Green Rewards, an online portal that allows Acer's channel partners to easily demonstrate to customers not only the financial aspects of digital transformation, but also the likely impact on the environment – a factor that more and more businesses rightly demand.

Uniquely, the portal enables resellers to deliver new product quotes, provide recycle trade-in values and present added-value offers available on Acer product lines. It also gives customers a customised sustainability impact overview report delivered by the Px3 sustainability application, all delivered within a few minutes on a single platform.

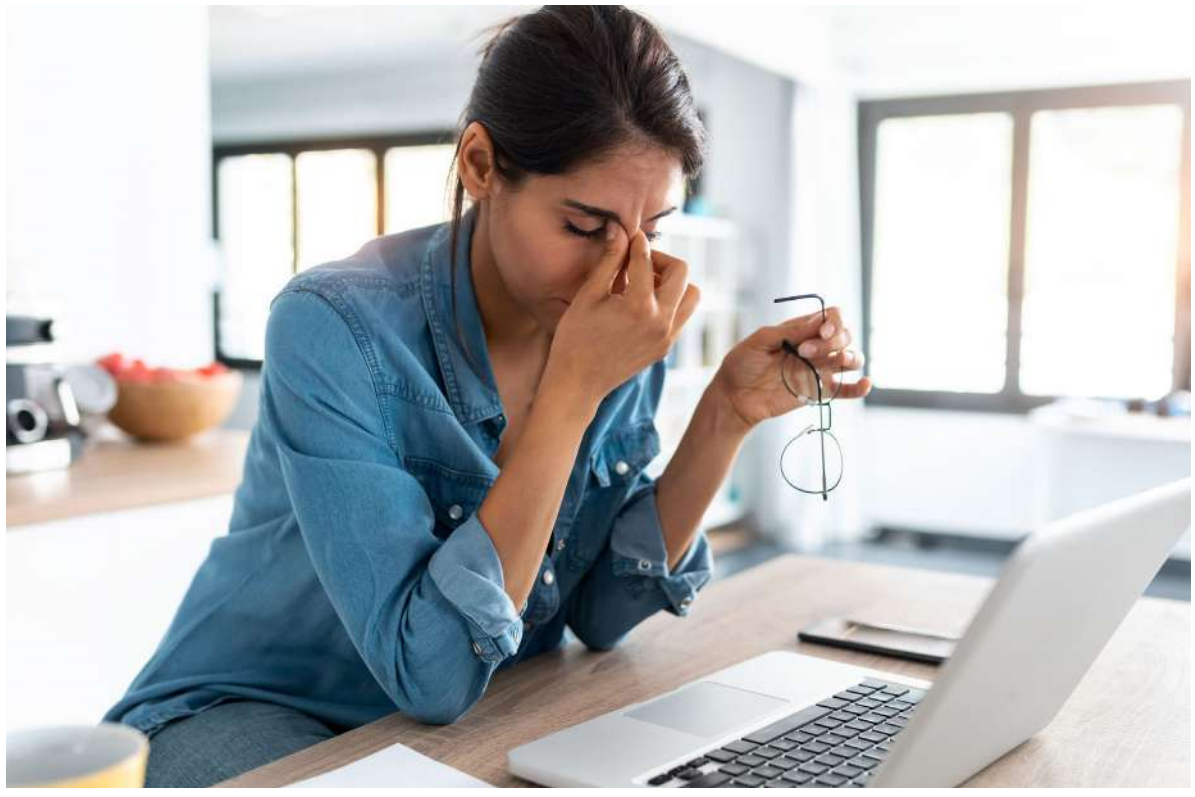
EMBRACING NEW WORK PATTERNS

Recognising the fundamental workplace shift to mobile-led hybrid working patterns, Acer is enabling customers to embrace this transition and also evaluate the environmental impact of their purchasing decisions.

By combining instant quotes, trade-in values and sustainability data, Acer is demonstrating the value the company can offer to partners and customers, positioning itself as an innovator in both products and programmes.

Find out more

- Information about Acer Green Rewards is at **emea-greenrewards.acer.com**



Liberation and isolation

Tom Fox, MD of Thoughtify, discusses the mental dichotomy of remote working

Research determines that IT-enabled remote working will help save the planet – but in my experience, there is a cost to people in the form of mental health.

At Thoughtify, we specialise in providing training and education for businesses in relation to supporting and maintaining employee mental health.

For many, the global pandemic has transformed the way we work. For some, seeing our immediate family more offers liberation from the nine-to-five, but for others dramatic change represents isolation and challenges mental wellbeing.

ENFORCED ISOLATION

Having the option to work from home is one thing, but in 2020 we were made to work from home due to a government-enforced lockdown, and this – coupled with the extended home working that ensued – is something else entirely.

Many people familiar with working from modern, well-designed office spaces, away from the home and with regular in-person contact with friends, colleagues and clients, suddenly found themselves having to work from kitchen tables, bedrooms, balconies and sheds.

Consequently, many have been coping with isolation, ill health and domestic issues. Prevailing studies highlight a rise in work-family conflict where the demands of work impinge on domestic and family commitments. Such friction creates an ongoing strain that is taking its toll on the mental wellbeing of many workers.

WORK AND MENTAL HEALTH

According to a survey from the Royal Society for Public Health (RSPH), home working is having an impact on employee mental health. 67% of respondents to the poll said they felt less connected to their colleagues and 56% said they found it harder to switch off.

Those who live with multiple occupancy were more likely to think that working from home was worse for their health and wellbeing (41%), compared with people who live on their own (29%) or with just their partner (24%). Despite the findings, only a third of respondents had been offered employer support for their mental health.

Another major consideration for employers is the impact of the subsequent increased workload. Many clients feel their workload has increased over the last 18 months, noting they have actually been busier than usual due to perceived endless availability. As an example, an individual's day is often filled with consecutive Zoom calls, listening to more company updates and attending more management meetings, yet they still need to keep on top of the flow of daily emails, telephone calls and other normal day-to-day tasks.

From personal experience, I know that it's easy to start feeling exhausted and overwhelmed. This can lead to burnout and mental exhaustion that happens swiftly and unexpectedly. Sadly, by the time you know something's wrong it may be too late. To exacerbate the issue, it's not only mental strain we have to consider. Research links work overload and high blood pressure, heart disease and possibly certain cancers. Mental and physical illness are not mutually exclusive.

Tom Fox interviewed by Sarah Hewson, Sky News, about PTSD and anxiety

PHOTOGRAPHY ISTOCK

FINDING BALANCE

Conversely, if managed properly home working can be beneficial and bring many positives that couldn't perhaps previously be enjoyed by permanent office workers.

Taking a balanced view, an RSPH survey also indicated the vast majority don't want to return to working in an office full time. In fact, three-quarters of respondents (74%) suggested they wanted to split their time between home working and working in an office.

So how do employers find a balance that works for all? In my opinion, they must educate employees about mental health and wellbeing, and look to provide more in-depth training for leadership teams and managers.

Mental health education needs to become part of organisational strategy, not just an afterthought satisfied by ad hoc wellbeing 'Lunch & Learns' that arguably achieve very little in the longer term.

SPOTTING THE SIGNS

Awareness and engagement is key. Signs that an employee may be experiencing a period of low mental health can be recognised early if we know what to look for. Education around how to notice those signs in ourselves causes a ripple effect.

Understanding how to position simple and effective – but often difficult – questions such as 'I've noticed some changes in you and I'm concerned thing's might not all be OK, how are you managing?' are vital for supporting and helping to maintain employee mental wellbeing.

Thoughtify exists because we know it is important for organisations and employees alike to understand the key causes that lead to mental ill health. It is possible for organisations to plan ahead and incorporate measures to help avoid some of the negative outcomes of working from home. Isolation can be nurtured to become liberation.

Find out more

- Employee wellbeing support is at **thoughtify.co.uk**

Justin Sutton-Parker and Sara Grundström of Hydro66 provide a fresh perspective on digital currencies

Green Gold

Until 700-600 BC, when China invented paper money and the Lydian society minted coins, humans were comfortable with bartering.

Following unforeseen situations such as global pandemics and planned innovations – such as our smartphone becoming our new wallet – we have become much more accepting of a cashless society.

Computing facilitates this digital exchange; countless streams of data requests travel across internet technologies, adding and subtracting to and from balances all over the globe.

If it is all just binary code, then why do we even need a physical currency that is determined in value by various governments' economic and political objectives? One answer is that if the balance of what's available versus who holds it becomes infinitely flexible, then we return to the problem of limited perceived value.

A DECENTRALISED CURRENCY

The arguably smarter answer is that we have evolved, by way of the fourth and digital industrial revolution, to a point where we simply don't need physical currency. If that's the case, why not use a digital cryptocurrency, such as bitcoin?

One of the most compelling benefits of cryptocurrency is that it is truly decentralised. Bitcoin is not issued by a central authority; it is immune to government interference and manipulation – and therefore control.

Obviously, this concept is viewed by some as a threat to the status quo. Shifting from an economic strategy based on closed systems and centralised power to one without censorship creates opportunity for apparently overwhelming change.

THE DIGITAL CURRENCY FOOTPRINT

Considering anthropogenic interferences such as excessive consumerism are driving the current 1°C global warming, are concerns around losing centralised control valid – or simply a reaction to protect institutions from necessary evolution? Focusing on climate change, the loudest voices of opposition suggest digital currencies are bad for the environment. Using this perspective to discredit emerging monetary technology feels counterintuitive.

Sara Grundström, business development manager for Hydro66, a Northern Data company that uses 100% renewable energy from the local hydropower system (see opposite page)

Following the death of the gold standard in 1971, the world has relied on the US dollar standard. Almost 90% of international currency transactions are conducted in dollars, 60% of foreign exchange reserves are held in dollars and almost 40% of the world's debt is issued in dollars – even though the US only accounts for around 20% of global GDP.

The dominance of the dollar is in part facilitated by foreign policy that ensures most traded oil is bought and sold in US dollars. This is why it is known as the 'petrodollar'.

As the current global reserve currency of choice is only viable due to the promotion of the most polluting industry on the globe, it's reasonable to ask why the environmental card is being played so hard against a digital currency that offers a credible global reserve alternative.

The environmental charge levelled against digital currency is around excessive electricity consumption. Digital currency is mined, not in a conventional sense, but using sophisticated computers to effectively solve highly complex computational maths problems.

Each solved problem acts as proof of a completed transaction block, meaning the digital currency network is fully audited, verified and openly published for inspection every 10 minutes. At today's value, a successful bitcoin miner can earn £331,000 in newly issued bitcoin for completing a 1MB block.

'Ultra-efficient data centres such as Hydro66 are surely the answer to enabling digital currency whilst safeguarding the planet. With a power usage effectiveness (PUE) of 1.07, we use 50% less energy than the average EU data centre. Combined with 100% renewable local electricity, this means 7,500 times less CO2 is emitted from energy-intensive operations such as High Performance Computing – simply by siting data centres in the optimal location.'

SARA GRUNDSTRÖM
BUSINESS DEVELOPMENT MANAGER FOR HYDRO66, A NORTHERN DATA COMPANY

Creating just 0.05g CO2/kWh, the hydropower created at this Hydro66 site is over 5,000 times less CO2-intensive than the EU average electricity generation of 253g CO2/kWh

This computationally intensive process is designed to act as a peaceful barrier to entry for those who would otherwise seek to steal value or rewrite the chain of transactions. You could say bitcoin's energy consumption is a required feature.

LOCATION-BASED CARBON

At an estimated 110TWh per year, digital currency's total mining impact represents 0.1% of all global primary energy consumption. However, electricity consumption doesn't directly equate to greenhouse gas (GHG) emissions. In addition to the electricity consumed, 'location-based carbon intensity' calculations crucially add an emissions value to every kilowatt hour according to where it was consumed.

To explain, electricity is accounted for in GHG terms using a value called carbon dioxide equivalents (kgCO2e), and categorised as scope 2 emissions because the electricity is purchased for consumption. Every 1 kWh of energy consumed is multiplied by a factor that reflects the carbon intensity of the national grid of the country that produced the electricity. As a country adopts more low-impact energy sources such as wind, solar and hydro, the factor decreases.

As an example, if conducted solely in the USA, the global bitcoin mining impact of 110TWh would be 47.5m tCO2e. Conducting the same mining in Sweden, where the factor is 0.01189, would decrease the pollution 97% to 1.3m tCO2e.

Unlike oil prospecting or gold extraction, digital currency mining is not restricted by geography; it can be conducted in data centres where high levels of renewable energy supply already exist.

Recent research suggests that miners have been availing themselves of low-cost renewable energy for some time. Reports indicate that overall, bitcoin mining has globally adopted the use of 56% renewable energy sources. For context, the global average adoption for renewable energy per TWh is just 21%. This means that bitcoin mining is creating 125% less pollution per unit of electricity used than comparative human activities.

SUPPORTING RENEWABLES

As always, context is important. Despite being highlighted as an energy-intensive industry by concerned activists, accurately positioning bitcoin alongside other global electricity consumption sources reduces the crypto mining industry to insignificance.

Digital currency mining is equivalent to less than 0.25% of building-related consumption, or 0.3% of transportation. If the footprint does grow, research also hypothesises renewable energy for mining will support new solar developments underwritten by base-load guarantees offered by bitcoin miners.

Despite environmental concerns, the popularity of digital currency is swelling. This year, the aggregate value of cryptocurrencies peaked at $1.8 trillion, with bitcoin 47% of the total.

In a world where global powers seek to challenge the petrodollar system by suggesting oil be bought in alternative currencies such as the euro, ruble or yuan, the irony may be that they eventually drive wholesale bitcoin adoption.

Digital currency is decentralised, secured by cryptography and constantly verified; it answers the Byzantine Generals' Problem of how a society should establish a money that all members can trust and agree upon without having to trust each other.

If a cashless consumer society and the need for a new global reserve currency becomes a reality – and cryptocurrency is feasible from both a security and longevity perspective – perhaps it's worth exploring and debunking the myths around its environmental cost. An alternative approach may be to help stakeholders identify where best 'green mining' can drive further renewable adoption.

Considering bitcoin as a new global currency, or a mechanism for achieving financial inclusion for some of the world's most underserved populations, helps to explain the energy consumption of the new green gold.

As the mining network grows more transparent about its energy use, and as educational efforts about the value propositions take hold, we might achieve a broad consensus that bitcoin energy use is a justified and reasonable cost to society.

Find out more

■ Get support with green cloud infrastructure at **hydro66.com**

PLANET, PEOPLE AND PRODUCTIVITY

Justin Sutton-Parker reveals how thinking 'Px3' can help slash IT emissions

Anthropogenic interference has caused 1°C of global warming. A further increase to 1.5°C will be reached between 2030 and 2052 if emissions increases continue at the current rate.

Scientists have calculated that achieving net-zero global emissions by mid-century may halt global warming on a multi-decadal scale, causing temperature gains to begin to peak.

To realise this goal, we can't rely solely on key greenhouse gas (GHG) abatement strategies, such as vehicle electrification and renewable energy transition, as we wouldn't be able to adopt them fast enough to bridge the projected 32Gt CO2e annual emissions gap forecast for 2030.

The United Nations Environment Programme (UNEP) suggests that to bridge the gap, the world must combine existing technology with innovation to drive behavioural changes that could reduce societal emissions.

ACTING ON SUSTAINABLE IT

For many years, my research has focused on the role IT can play in the behavioural changes that would slash emissions. My MBA defines cloud computing as a driver for corporate and social responsibility and my PhD research develops new approaches to quantifying IT-related GHG emissions.

As most sustainability researchers would agree, the joy of proving theories begins when people use the findings to make an impact that supports a wider cause. That's why 10 years ago I adopted a life goal to remove the GHG emissions equivalent of 100,000 cars from the atmosphere by 2050, through the diffusion of sustainable IT.

This goal was accelerated when I co-founded Px3, a research-based consulting organisation that specialises in sustainable IT. Where most companies set financial goals, ours strives to create a sustainable future by safeguarding the environment. My personal goal is now our company goal.

The timing is good, as change is now urgent. In context, my research paper for SEIT 2020 determines that IT-related activities create 5% of global GHG emissions. That means a forest the size of Canada and Greenland is required to sequester the pollution created by the way we work today.

THE FOUR STEPS TO SUSTAINABLE IT

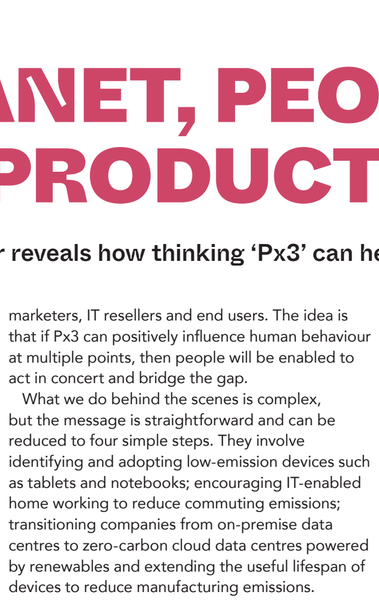
To reduce this footprint, Px3 consults throughout the 'IT Channel'. This ecosystem includes hardware manufacturers, software vendors, distributors, marketers, IT resellers and end users. The idea is that if Px3 can positively influence human behaviour at multiple points, then people will be enabled to act in concert and bridge the gap.

What we do behind the scenes is complex, but the message is straightforward and can be reduced to four simple steps. They involve identifying and adopting low-emission devices such as tablets and notebooks; encouraging IT-enabled home working to reduce commuting emissions; transitioning companies from on-premise data centres to zero-carbon cloud data centres powered by renewables and extending the useful lifespan of devices to reduce manufacturing emissions.

HOW TO MEASURE SUCCESS

Px3 uses several approaches to encourage these four steps. We publish research that identifies key IT-related GHG abatement opportunities; for example, we identified that Google Chrome OS laptops reduce energy consumption by 57-84% when replacing similar devices or desktop computers. We also determined the average GHG commuting to access IT (CAIT) impact of IT users in four continents – a useful statistic when planning international remote working.

Secondly, researching on behalf of end-user computing (EUC) device manufacturers, software vendors, the public sector and businesses, Px3 scientifically analyses computers for environmental performance in the workplace. This means we generate science-based findings that substantiate sustainable IT procurement and abatement strategies, and create valid and compliant data perfect for mandatory emissions reporting.



The dashboard on the Px3 app acts as an IT GHG emissions smart meter

IDENTIFYING SUSTAINABLE DEVICES

Our unique Device Use Phase Analysis methodology recently identified an Acer notebook capable of reducing energy consumption by 62% when benchmarked against comparable devices. When deployed to 500 users, we found that the Acer device delivered a 9t CO2e reduction in scope 2 emissions during a five-year period.

We also identified a Prime Computer desktop that reduced GHG emissions by 70% and an LG all-in-one computer that consumed less energy than a stand-alone monitor. We help organisations quantify and visualise their current IT-related carbon footprint by accurately determining scope 2 hardware electricity consumption and scope 3 supply chain and CAIT emissions. We do this using the Px3 Planet People and Productivity cloud and mobile analytics app, which produces a range of environmental metrics that are both informative and tangible.

We deliver the GHG accounting values in compliant kgCO2e units, calculate energy saving in monetary terms and convert the emissions data into real-life equivalents. These include car miles, forest acres to sequester pollution and a unique per capita ratio called the Employee Vehicle Equivalent (EVE). These little nuggets of real-life impact gain support from stakeholders across the entire organisation, and they are popular – this year Px3 has measured more than 600,000 devices across the globe.

A CLIMATE EMERGENCY STRATEGY

Understanding real-life impact is paramount if we are to achieve our goal. With Acer, Citrix and Google Chrome OS, Px3 determined an effective strategy to support the Kingston and Sutton councils' approach to the climate emergency. IT-related scope 2 and 3 emissions were reduced by 32% and 40% respectively and the outcome saw Px3 nominated for this year's CRN sustainable IT impact award. Afterwards, Jason Sam-Fat, digital and IT commercial manager at the Royal Borough of Kingston & London Borough of Sutton Shared Service, said, 'We presented Px3's findings at our last climate emergency meeting. It was the first time we'd had such detailed information about our carbon footprint and it was really good that IT had significantly more information about emissions than any other department and a clear roadmap for the future'.

This type of feedback makes everything worthwhile, but in some cases cost can be a very real barrier to creating the roadmaps we need. In fact, my research revealed that in the UK service sector, cost is the biggest barrier to the diffusion of sustainable IT.

Fortunately, the Px3 application accounts for this by highlighting the money that can be saved by adopting low-energy devices.

David Grasty, corporate head of Digital Strategy & Portfolio at Kingston and Sutton, said, 'We estimate about a £40k reduction in our annual electricity bill just going from the old devices to 'state-of-the-art' new ones.'

PHOTOGRAPHY ISTOCK

DISPLACING DEVICES

Saving money through sustainability is a theme that surfaces frequently in our work, especially during 'displacement' projects that extend a device's lifespan to prevent the manufacture of a replacement. This approach avoids embodied emissions as well as the upfront cost of having to buy new equipment.

Often, the device is re-purposed as a thin client for home working strategies. When this happens, a new, lighter operating system is loaded, ensuring the old device remains performant.

During research on behalf an international software vendor, we identified two sustainability gains: the new IGEL OS reduced device energy consumption by over 20% and displacement prevented 685,773kg CO2e scope 3 emissions for the customer.

That's equivalent to preventing over 2,485,000 car miles, or the amount of carbon sequestered by 823 acres of mature forest.

Data centres are integral to thin client solutions, but this doesn't necessarily lead to environmental burden. Last year's *Time IT changed* IT special edition of My Green Pod Magazine revealed that, if a data centre is highly efficient and uses renewable energy, GHG emissions per kWh consumed are greatly reduced.

IT reseller Getech realises this; leveraging my findings, it is combining the net-zero Google Cloud platform with low-energy Google Chrome OS devices and Citrix remote working solutions to offer an all-in-one 'sustainable end-user compute' solution.

GREEN REWARDS

All devices do eventually meet an end. To ensure disposal and replacement are approached in the most sustainable way, Px3 has recently worked with Acer and leading digital enablement business Consenna to create and launch Acer's Green Rewards programme.

Through the rewards scheme, which is powered by the Px3 application, IT resellers can for the first time access a portal and receive a bespoke report defining sustainability gains related to procurement and recycling. We will soon take the stage with DEFRA at the chartered institute of IT to diffuse our message further.

In the meantime, next time you think IT, think four simple steps and perhaps even think Px3. After all, planet, people and productivity is a balance we all desire – and it doesn't cost the Earth.

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FOUNDATION
amazonaid.org

GOLD

It's in our phones.
It's in our banks.
It's in the jewellery we wear.
It's also in the Amazon Rainforest.

Mining for gold is one of the fastest growing and most dangerous threats to the Amazon.

With the Amazon at the tipping point, the time for transformation is now.

Amazon Aid invites everyone to be part of the change. Watch **"River of Gold"** and join our **Cleaner Gold Network.**

Go to **Amazonaid.org** to learn more today.

Images courtesy of Tomas Munita