A DARK MATTER FILM

CLOUDED II

DOES CLOUD CO$T THE EARTH?

IN ASSOCIATION WITH

Hewlett Packard Enterprise

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INTRODUCTION

In recent years, cloud computing has come under significant criticism. Following a decade of 'cloud-first' strategies, organisations, technologists and the public alike are developing a deeper understanding of the opportunities, challenges and limitations of 'the cloud'.

A collective conscience seems to be growing surrounding the impact of exponential data growth and our subsequent reliance on cloud technology, something that is leading to increased repatriation of data and workloads from public cloud environments.

DARK MATTER, in association with HPE, has gone on a journey of investigation to unpick the true cost of the world's commitment to innovate and digitise with cloud technologies.

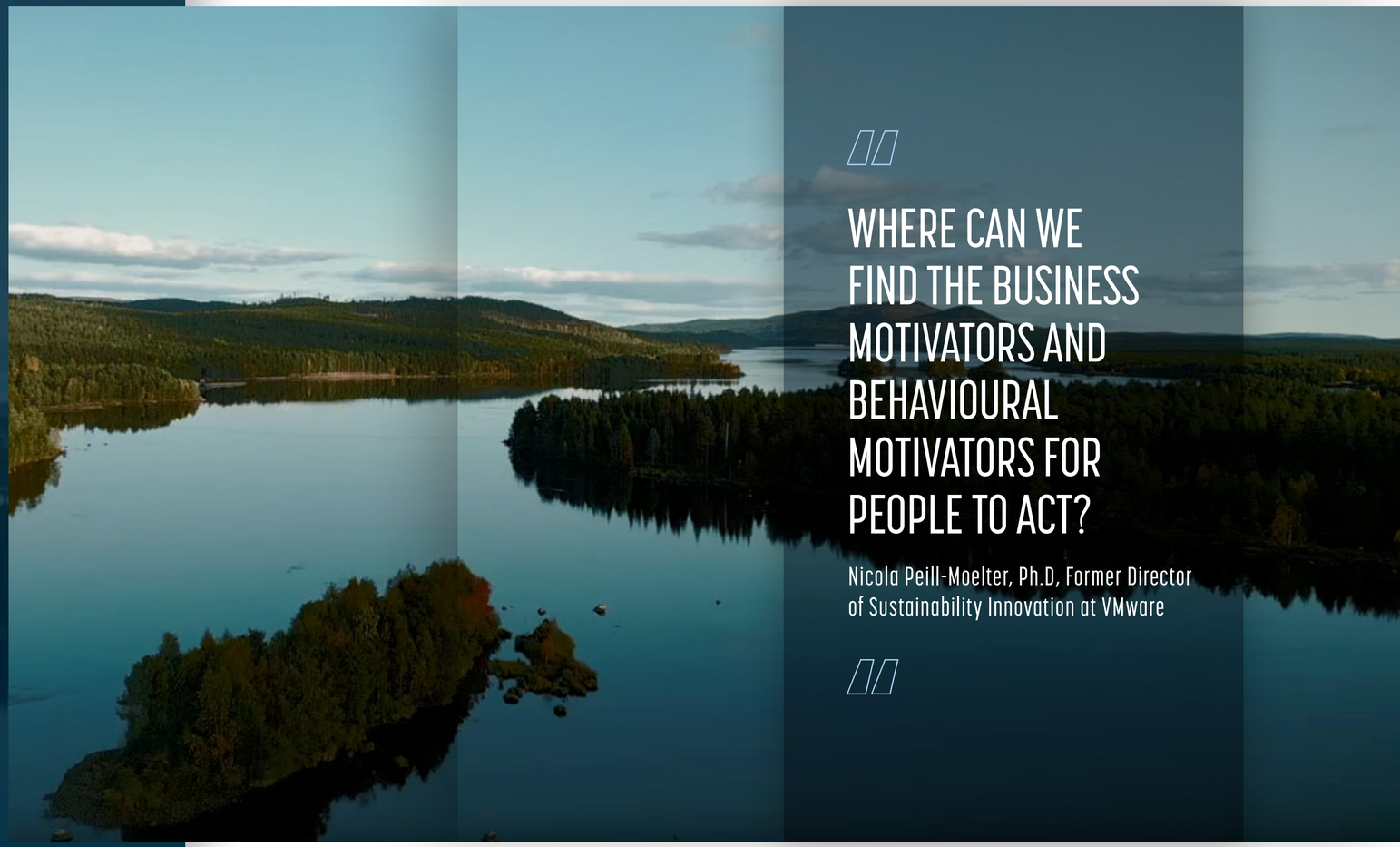
INTRODUCTION

Together, with the help of industry experts, we are broaching topics that are commonly avoided.
The culmination of our research can be seen in our second original feature-length documentary film, **Clouded II: Does Cloud Cost the Earth?**
The film addresses the definition of ‘cloud; we posit the duality of the term, namely the relationship between economic and environmental costs.

Our ambition is to highlight the impact technology decision-making can have on businesses and ultimately, the planet. Is the technology to blame or are we, as users, at least partially responsible?

Why now, you might ask. There is a groundswell of commentary and scrutiny around cloud computing with the market coming under fire from investigative bodies like Ofcom in the UK. It seems there is a growing appetite to democratise the cloud services market and truly consider the long term impact of cloud.

This guide has been created to complement the Clouded II film; to guide you through the key topics discussed and build upon them to provide greater detail for a more comprehensive view of the issues raised.



> “WHERE CAN WE FIND THE BUSINESS MOTIVATORS AND BEHAVIOURAL MOTIVATORS FOR PEOPLE TO ACT?”
>
> Nicola Peill-Moelter, Ph.D, Former Director of Sustainability Innovation at VMware

SECTION 2:

ECONOMIC CO$T

INTRODUCTION

Understandably, cost is a crucial factor for organisations to consider when procuring digital solutions. As demand for cloud services increases, and data continues to grow exponentially, so will the cost.

The race to the public cloud of the 2010s, was at least partly based on the promise of cost savings, however this actually led to a sizable increase in IT spend. As a result, many organisations now reside, at some degree, in both a public cloud and their own infrastructure.

So much so, over 98% of organisations use cloud technology.[1] and it has been estimated that cloud spending will surpass US$1 trillion in 2027.[2]

A staggering statistic, but is this trend shifting as organisations now have better visibility of spending?

The acknowledgment of the true cost of cloud is rising in importance on the corporate agenda. Why? Because for many, public cloud costs are rising exponentially. We conducted a survey of more than 120 organisations to gauge the perception of cloud computing costs.

But this isn't the only cost. Every cloud decision has an economic cost and an environmental cost. These two costs are inextricably linked, however they aren't often discussed in the same room, by the same people. We believe both topics can and should be collectively discussed. If financial costs are rising, so will the impact on the biosphere.

How do we unpick the world's relationship with the cloud to gain better control of spend and reduce its impact? The true cost of cloud is often hard to determine, siloed or disparate data can provide a very real challenge to decision makers.

Let's take a look at economic cost in more detail, in particular some of the reasons why costs are rising.

90%

STATED THAT THEIR CLOUD COSTS ARE RISING,

35%

OF WHICH SAID THE RISE WAS BEYOND EXPECTATIONS.

1. Charles Griffiths, The Latest Cloud Computing Statistics (updated October 2023), 2 October 2023
2. IDC, Worldwide Spending on Public Cloud Services is Forecast to Reach US$1.35 Trillion, According to New IDC Spending Guide, 29 August 2023

CLOUD COMPUTING
GLOBAL MARKET **2010**

$24.63 bn

CLOUD COMPUTING
GLOBAL MARKET **2020**

$156.4 bn

That's a 635% increase.[3]

3. Cody Singerland, 101+ Cloud Computing Statistics That Will Blow Your Mind (Updated 2023), 23 August 2023

‘CLOUD CONFUSION’

LACK OF TRANSPARENCY AND BILL SHOCK

Organisations are increasingly discovering the complexity of cloud bills and the stress and confusion that comes with it. Cloud spending is the biggest challenge for 82% of organisations.[1]

Obscurity of the bill means that those responsible for cloud budgets are having to analyse usage, justify spend and unpick ill-defined line items.

As a result, we heard how organisations are struggling to see where, what, when and how their cloud spending is allocated.

A report by Anodot found that of those surveyed, 54% felt that lack of visibility is largely to blame for their ‘cloud waste.’[4] This could explain why a PwC survey found that over 50% of organisations struggle to see cloud ROI.[5]

For 6 out of 10 organisations, cloud costs are higher than anticipated.[5]

If organisations cannot understand their cloud spend, how can they be sure that their infrastructure is efficient without waste?

> “THE LANGUAGE AROUND CLOUD SERVICES, FOR CONSUMERS, HAS OBFUSCATED THE PHYSICALITY OF INFORMATION STORAGE... AND HELPED CREATE THIS FANTASY OF ABUNDANCE.”[6]
>
> Steven Gonzalez Monserrate,
> Cloud Anthropologist at Goethe University

7 OUT OF 10 organisations are unaware of exactly what their cloud budget is spent on.[7]

1. Charles Griffiths, The Latest Cloud Computing Statistics (updated October 2023), 2 October 2023
4. Anodot, Survey: Nearly 50% of Businesses Are Struggling to Control Cloud Costs, 17 August 2022
5. Cody Singerland, 101+ Cloud Computing Statistics That Will Blow Your Mind (Updated 2023), CLOUDZERO, 23 August 2023
6. Dark Matter, Clouded II: Does Cloud Cost The Earth? Film, 2024
7. CLOUDZERO, The State of Cloud Cost Intelligence Report 2022

> There's a duty... from the cloud providers [to say] are you really using this data... [do] **you really need to pay and keep the power on in this data storage when you're not using it?**[6]

Karl Havard, Managing Director at Taiga Cloud part of Northern Data Group

6. Dark Matter, Clouded II: Does Cloud Cost The Earth? Film, 2024

EFFICIENCY vs EASE

MISUSE OF DATA

90% of data is irrelevant 3 months post-creation.[8]

Cloud waste, overspend, egress fees and spiralling cost is currently a fundamental, widely documented issue when it comes to public cloud deployments.

Organic data growth and AI initiatives are only perpetuating the problem. Many of the public cloud's perceived benefits have fostered a culture of abundance, sprawling scale and habit of 'hoarding' data, because one day, it might be useful. Extracting value from this data is an entirely different conundrum.

When you start to unpack this belief that the cloud is endless in its abundance, you may start to wonder if it's because we have lost touch with the physicality of technology, cloud abstracted the physical hardware layer. Steven Gonzalez Monserrate, Cloud Anthropologist at Goethe University highlights that the cloud has created this, "fantasy of abundance." If we fail to attach any kind of physicality, it means we aren't acknowledging the physical impact our data usage has - on our storage bill, or on the environment.

> "BY 2035, WE'LL BE PRODUCING ABOUT 2,000 ZETABYTES OF DATA AND TYPICALLY WE STORE ABOUT 10% OF THAT... (YOU'LL) NEED OVER A BILLION SERVERS![6]"
>
> Gerry McGovern, Author & Consultant

6. Dark Matter, Clouded II: Does Cloud Cost The Earth? Film, 2024
8. ComputerWeekly.com, Why we can no longer afford to overlook the environmental impact of the cloud, 10 February 2023

EFFICIENCY vs EASE - MISUSE OF DATA

CONTINUED

This ethereal or nebulous view of cloud, coupled with the proposed ability to infinitely scale if required, has contributed to the need for more conscious data management to avoid waste. This will become increasingly important with common estimates suggesting that about 30% of the average cloud bill is waste. **If cloud spending is set to exceed $591bn in 2023, that means a whopping $177bn is waste.**

These numbers are not only concerning through the eyes of CFO's. Cloud expenditure is one thing, but every workload, every data lake, every instance the technical team spins up is being stored and accessed within a physical data centre that requires physical resources, which has a material impact on the environment.

If data growth is to continue on its current trajectory, waste will surely follow suit. Avoiding data hygiene or data management processes to maximise efficiencies will only exacerbate the issue, and that 30% of wasted spend might be considered a 'small' percentage.

"(CLOUD) DOESN'T WIN IF YOU'RE REALLY MANAGING YOUR DATA PROPERLY.[6]"

Gerry McGovern, Author & Consultant

ONLY 15% of data is deemed business critical.[9]

ON AVERAGE, 50%

of data stored is ROT
(redundant, obsolete or trivial).[9]

6. Dark Matter, Clouded II: Does Cloud Cost The Earth? Film, 2024
9. Veritas, Consumer Sentiment on the Environmental Impact of Hoarding Unnecessary Enterprise Data Original research, Veritas Technologies, March 2023

THE CLOUD MARKET

& VENDOR LOCK-IN

The cloud market is widely consider an oligopoly, it has come under increased scrutiny in recent years, with the regulators launching investigations into some of the world's largest public cloud service providers. Ofcom in the United Kingdom attributes, "inherent technical barriers to switching cloud infrastructure services... (which) can raise the cost of customers deploying applications across multiple clouds...(along with) egress fees,"[10] as reasons for vendor lock-in and therefore vexation of market monopolisation.

These challenges only increase with the age of the organisation and subsequently the amount of applications they have in the cloud.[10]

Many believe this domination of the cloud market by a few major corporations has led to lack of competition, interoperability and essential customer choice. Becoming beholden to a handful of hyperscale cloud service providers presents a number of challenges.

Firstly, the risk of price rises can have a significant impact on organisations, not least any publicly funded or government entities.

Secondly, egress charges are regularly cited as a potential concern as they will grow with usage, essentially preventing some organisations from moving from their selected provider.

With many organisations still developing applications using proprietary public cloud technologies, it becomes extremely difficult if not impossible to migrate applications.

6. Dark Matter, Clouded II: Does Cloud Cost The Earth? Film, 2024
10. Ofcom, Cloud services market study - Final Report, 5 October 2023

CONCLUSION

While the scalability, flexibility, and pay-as-you-go models of the cloud can offer advantages for some organisations, there are cost implications that are sometimes discovered the hard way. In the fullness of time, many have now discovered that a cloud-first or cloud-only approach is not what it seemed. We continually witness strategies that have pivoted towards 'Hybrid Cloud'. Enjoying the benefits of both models.

That allure of the cloud's seemingly limitless scalability had lead to unforeseen expenses as organisations grappled with the challenge of managing and optimising their cloud resources. Spiralling costs are often driven by inefficient resource allocation, overprovisioning, underutilisation, or adjusting to multiple operating models.

Navigating **"Bill shock,"** through the unexpected surge in cloud service charges will continue to be a common concern for technologists who are increasingly under pressure to commit to FinOps processes. Effective budgeting, continuous monitoring, and optimisation are quickly becoming organisational imperatives if leaders want to mitigate the risk of financial surprises and ensure that the economic benefits of the cloud are realised without compromising digital transformation or innovation projects.

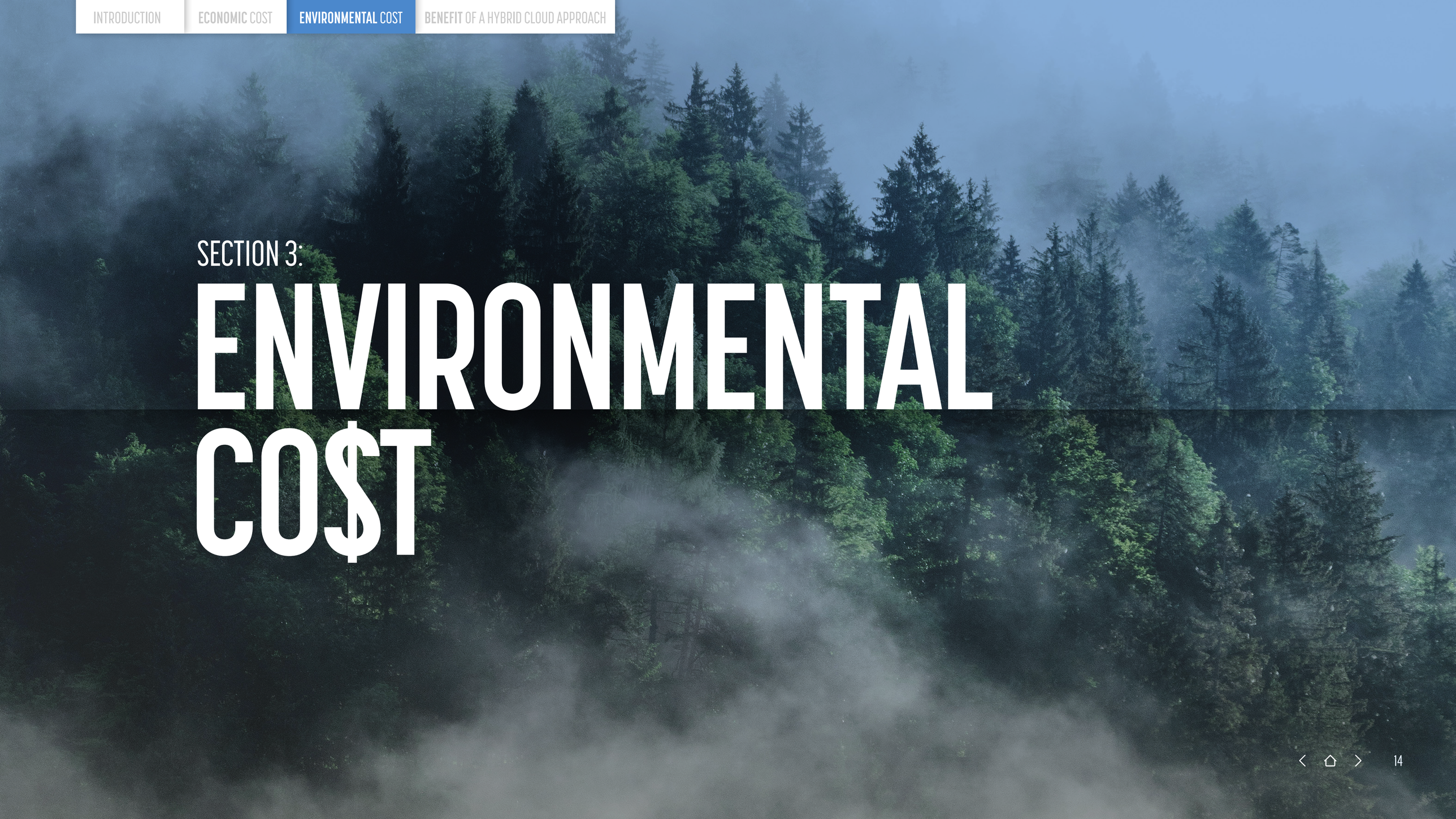
Exponential data growth, fuelled by the proliferation of big data projects and the increasing volume of data storage poses another economic challenge. The cost of storing, and transmitting large volumes of data in cloud environments requires careful consideration to avoid unnecessary expenses and ensure that economic investments align with business objectives.

Perhaps the answer is control. With control comes visibility, transparency and the ability to consciously review spend and cloud requirements. We heard that often storage is purchased at the wrong tier, does all data need to be accessible immediately? There are wildly differing costs for each tier of data storage in the cloud, this is where reportedly organisations can make significant savings.

Crucially, as organisations assess the economic impact of public cloud computing, it is essential to recognise the interconnected nature of economic and environmental costs. The resource consumption and associated pollutants of digital infrastructure cannot be divorced from economic considerations. A holistic approach to cost management should encompass both financial and environmental impacts, acknowledging that conscious cloud decisions can contribute to both the long-term economic viability and ecological goals.

SOME COMPANIES ARE ENDING UP SPENDING 2x WHAT THEY EXPECTED TO SPEND ON THE CLOUD.[11]

11. Sarah Wang & Martin Casado, The Cost of Cloud, a Trillion Dollar Paradox, Andreessen Horowitz, 27 May 2021



SECTION 3:

ENVIRONMENTAL CO$T

INTRODUCTION

With the global spotlight shining squarely on climate change, many believe we are edging closer to the precipice of irrevocable damage, the technology sector, in particular cloud computing, is not immune from scrutiny. Not only is data; its volume and value, increasingly becoming an area of contention for organisations, the data centres that house it have become subject to a rising number of questions concerning transparency of resource utilisation.

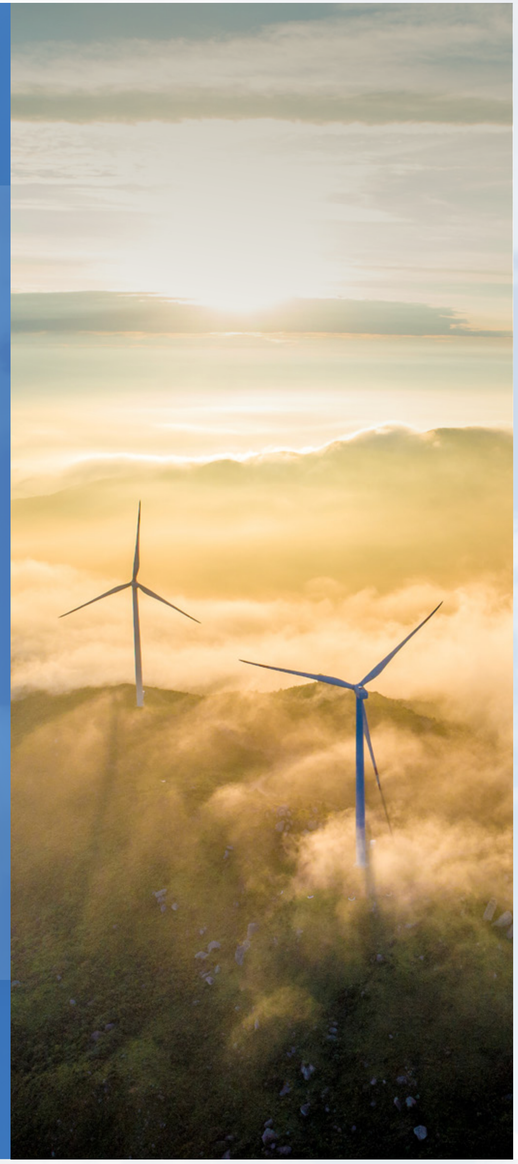
COP28 in 2023 brought a spotlight to the effect our 'modernity' has on the climate, as the world's first global environmental stocktake is completed.[12] This stocktake is an opportunity for governments to identify their progress,or lack thereof, towards fulfilling the agreed requirements of the Paris Climate Change Agreement.[12]

According to a study by The Shift Project, cloud computing is responsible for up to 3.7% of global greenhouse emissions.[13] **By 2025, Greenpeace estimates that 20% of the world's electricity could be depleted at the hands of the technology sector.[14]**

With cloud computing now surpassing the airline industry in terms of carbon footprint,[15] it seems apt that serious action be taken to initiate a more conscious approach to the cloud and its impact. We should be asking where, how and why we are using our apparently infinite and abundant 'clouds'.

In this section we explore how the public cloud affects our world's finite resources as we ask how does it really affect the planet?

> "I THINK IT'S REALLY IMPORTANT FOR PEOPLE TO RECOGNISE THAT THE CLOUD IS MATERIAL, THAT COMPUTATION IS METABOLIC.[6]"
>
> Steven Gonzalez Monserrate,
> Cloud Anthropologist at Goethe University



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12. United Nations Climate Change, About COP28
13. The Shift Project, "Lean ICT: Towards Digital Sobriety:" Our New Report On The Environmental Impact Of ICT, 6 March 2019
14. Adele Beardmoore, Uncovering the Environmental Impact of Cloud Computing, Earth.org, 12 October 2020
15. Cook et al., "#ClickClean"; Donaghy, Henderson, and Jardim, "Oil in the Cloud."

PUBLIC CLOUD IS THIRSTY

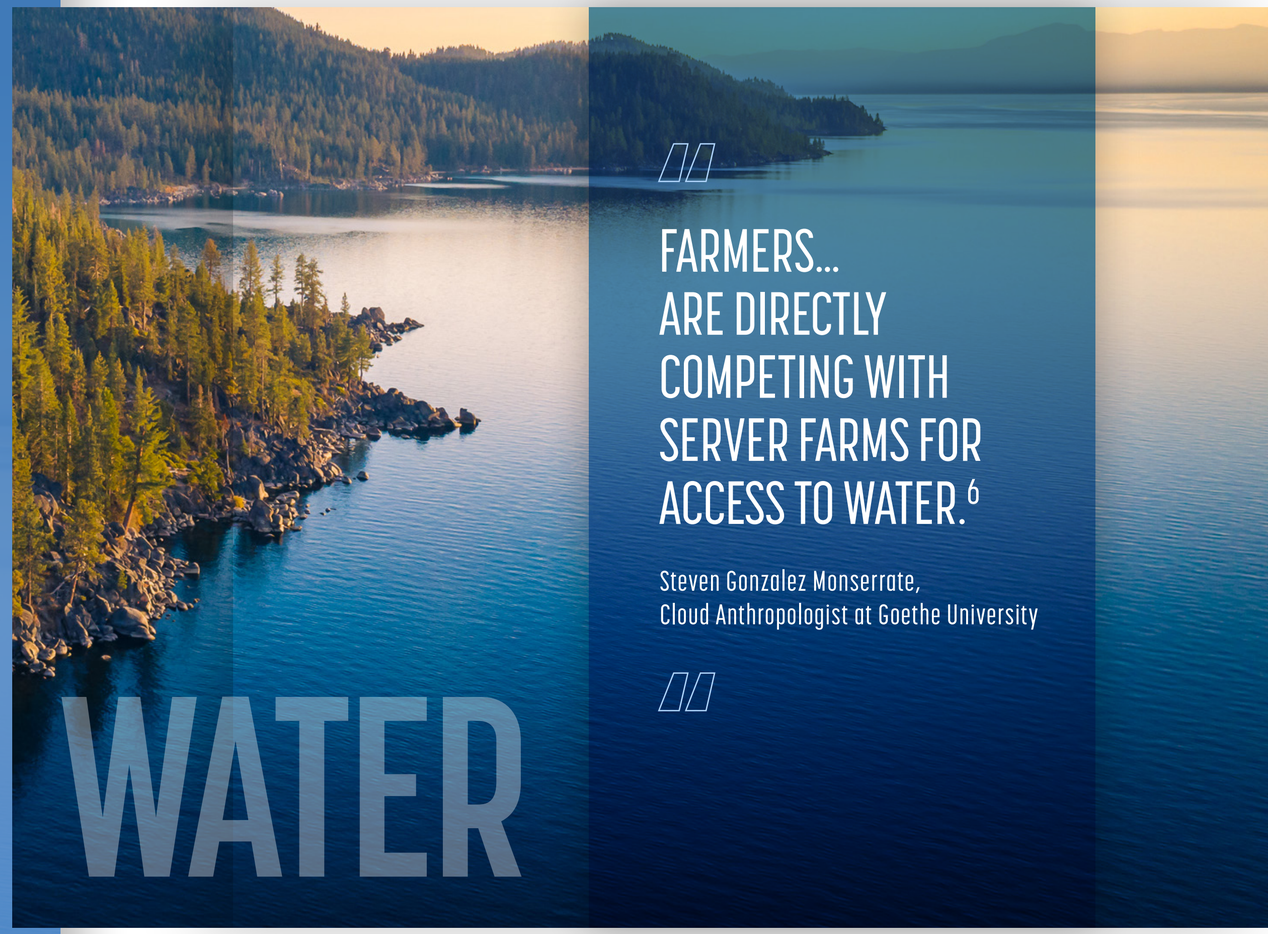
HOW DOES THIS AFFECT WATER USAGE?

Most data centres use an inexplicable amount of water in the cooling process, and with there being over 7.2 million data centres in the world that constitute the public cloud,[8] it is no wonder that so much of our most precious resource is depleting.

The main use for water in data centres is to ensure they remain cool and able to operate at their optimal temperature. Researchers claim that a single data centre can consume 1 million to 5 million gallons of water per day.[16] Figures suggest that Europe's data centre water consumption will increase from 145.2 million cubic metres in 2020 to 546.7 in 2030.[17] To put this in perspective, this means that Europeans will be using more water for their internet use than for drinking.[17] Extreme water depletion in more arid regions is undoubtedly worsened by data centres.

Water-quenched states like Arizona,[18] with 52 data centres,[19] present evidence of this. Whilst California suffers even more. The US state is one of the 'driest in the US'[20] and yet it is home to 248 data centres, the most in the country.[19] The current situation seems somewhat bleak, especially considering global temperatures are set to reach record levels within the next 5 years.[21] One major consequence of this is that **droughts have risen by 29% since 2000, according to the UNCCD 2022 report.**[22] These numbers will assuredly increase if we continue on our current trajectory.

There are efforts in the industry to develop waterless cooling technologies, which is undoubtedly a positive step. However, retrofitting existing data centres with this technology seems like a challenge that will continue for some time.



"FARMERS... ARE DIRECTLY COMPETING WITH SERVER FARMS FOR ACCESS TO WATER.[6]"

Steven Gonzalez Monserrate,
Cloud Anthropologist at Goethe University

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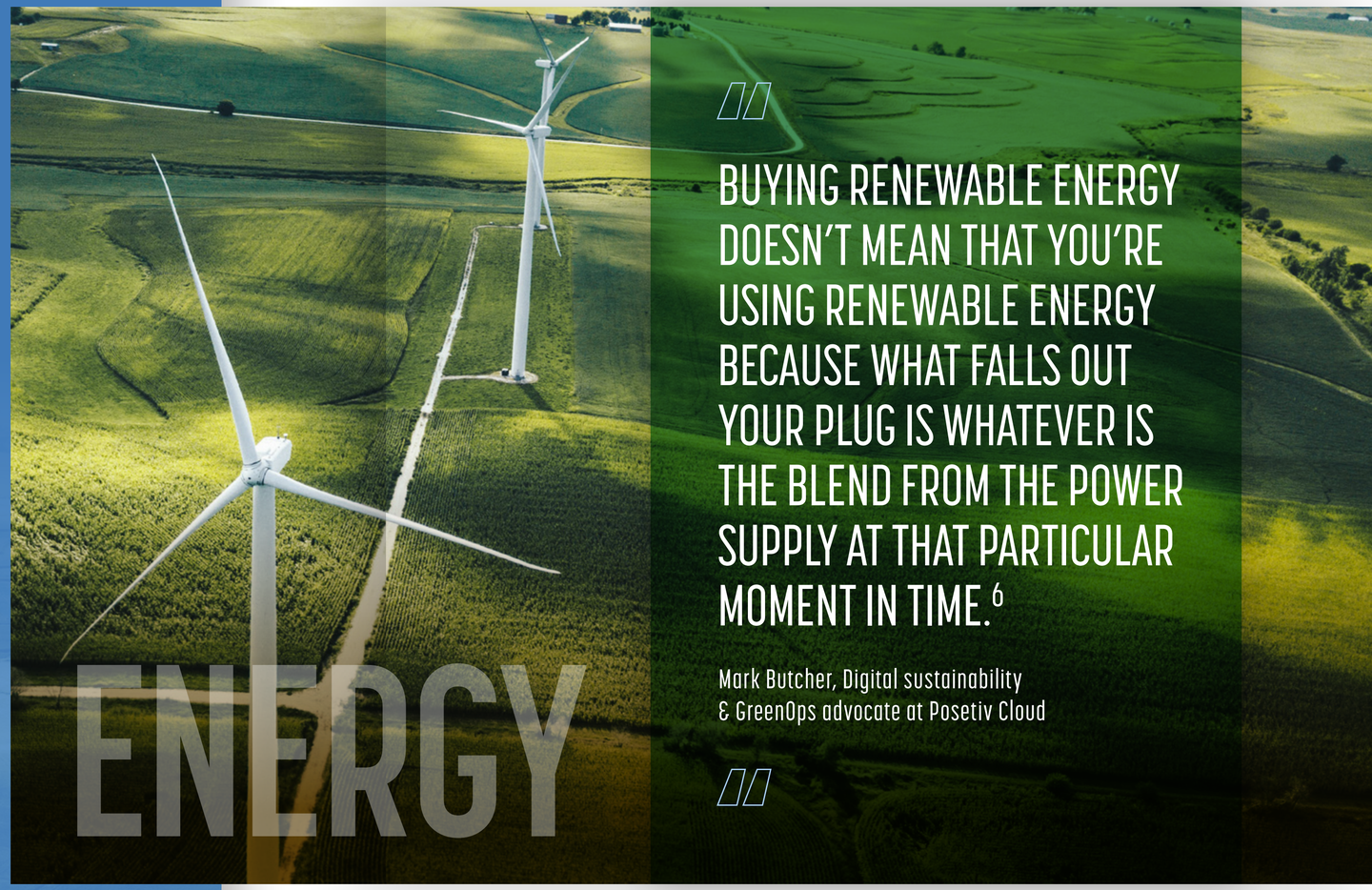
16. Shannon Osaka, A news font in the water wars: Your internet use, The Washington Post, 25 April 2023
17. A.Lohrmann & J. Frafan, Gone with the clouds, 15 August 2023
18. Olivia Solon, Drought-stricken communities push back against data centres, nbcnews, 19 June 2021
19. Data Center Map, USA Data Centers
20. Quench, 6 States With Water Shortages Today - Limiting Water Waste at Work, 6 April 2023
21. World Meteorological Organisation, Global Temperatures set to reach new records in next five years, 17 May 2023
22. United Nations Convention to Combat Desertification, Drought in Numbers 2022, COP-15 Cote d'Ivoire, 2022

EXPONENTIAL ENERGY

TO RENEW OR NOT TO RENEW?

Understandably, energy is required for data processing, however, it has been noted that a huge amount of energy is often used for purposes unrelated to actual data computation. Cooling of data centres requires roughly the same amount of energy as the servers need to actually 'do the work.'[23]

The air conditioning required to achieve this takes about 40% of a data centre's total energy requirement.[24] This rises to 80% if the centre resides in a warmer climate.[14] One data centre alone can use the same amount of electricity as 50,000 homes.[25]



"BUYING RENEWABLE ENERGY DOESN'T MEAN THAT YOU'RE USING RENEWABLE ENERGY BECAUSE WHAT FALLS OUT YOUR PLUG IS WHATEVER IS THE BLEND FROM THE POWER SUPPLY AT THAT PARTICULAR MOMENT IN TIME.[6]"

Mark Butcher, Digital sustainability & GreenOps advocate at Posetiv Cloud

6. Dark Matter, Clouded II: Does Cloud Cost The Earth? Film, 2024
15. Adele Beardmoore, Uncovering the Environmental Impact of Cloud Computing, Earth.org, 12 October 2020
23. Shehabi, Arman, Et Al. (2016). United States Data Center Energy Usage Report.
24. Thomas Liquori, How Much Energy Do Data Centers Use, DataSpan, 15 March 2023
25. Hu, Tung-Hui. A Prehistory of the Cloud. Cambridge, MA: MIT press, 2015 & Steven Gozalez Monserrate, The Cloud Is Material 27 January 2022

COOLING CLOUDS

HOW CAN WE REPURPOSE HEAT?

Data centres' optimal operational temperature sits anywhere between 15°C and 32°C (40°C for newer equipment).[26] A standard data centre can produce 20 to 50 MW of heat.[27] This means that there is a lot of superfluous heat, which has led experts to propose utilising this excess heat in other areas.

Examples of this 'heat repurposing' lie in northern hemisphere cities; Amsterdam, Stockholm, Helsinki, Montreal and London, who are spearheading data centre innovation by recycling heat produced by their data centres and repurposing it to heat their homes and businesses.[28]

"NUMBER 1 WASTE PRODUCT COMING OUT OF A DATA CENTRE IS HEAT. WHERE CAN WE REUSE THAT HEAT?[6]"

John Frey - Chief Technologist, Sustainable Transformation at HPE

6. Dark Matter, Clouded II: Does Cloud Cost The Earth? Film, 2024
26. Sophia Waterfield, UK heatwave: Why data centres should hold up for now, Techmonitor, 8 July 2022
27. Matt Jacman, Data Centers Get Larger, Hotter, Making Them Attractive Sources of Heat, ACHRNews, 30 August 2022
28. Charlotte Clarke, The cities that are heated by recycled heat from Data Centres, QUANTA, 29 June 2023

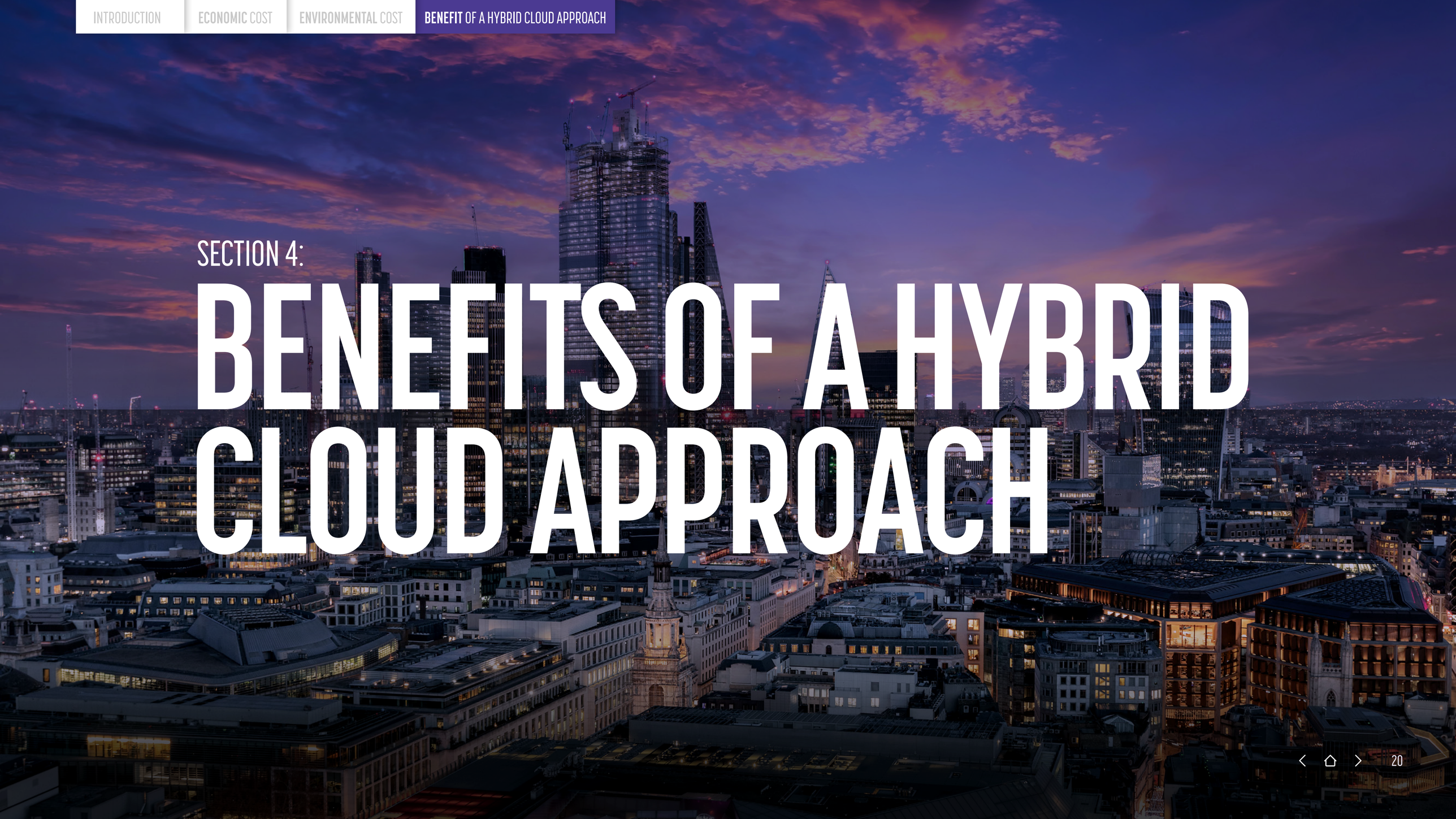
CONCLUSION

We heard that whilst the environmental impact of public cloud computing is a multifaceted issue that requires careful consideration, this is a journey that we can all play a part.

Hyperscale providers, often face scepticism regarding the true sustainability of their operations. Greenwashing, or the exaggeration of environmental friendliness without substantial evidence, can mislead consumers and organisations into believing that cloud services are inherently eco-friendly. This underscores the importance of transparent reporting, standardised and recognised metrics, with independent assessments to ensure the accuracy of environmental impact claims.

The environmental impact of cloud computing is intricately linked with its economic implications for organisations. By implementing sustainable practices, such as optimising data centre efficiency, adopting renewable energy sources, and promoting circular economy principles, organisations can not only reduce their ecological footprint but also realise cost savings over the long term. Energy-efficient operations often translate into lower utility bills and reduced capital expenditures, contributing to a more sustainable and economically viable operational model.

In essence, if the pursuit of environmental sustainability in cloud computing aligns with economic interests, we can realise the potential for a win-win scenario. As organisations increasingly recognise the importance of mitigating their environmental impact, the demand for genuinely sustainable cloud solutions will continue to grow.



SECTION 4:

BENEFITS OF A HYBRID CLOUD APPROACH

INTRODUCTION

Acknowledging the current economic and environmental pitfalls of cloud does not detract from its copious benefits. In fact, being able to recognise the negatives, and their impact, can help bring a fresh perspective to cloud strategies.

Clouded II reveals that the industry can no longer deny the cost of cloud and the price that organisations, and ultimately the planet, pays for technological innovation. We must remember, at its core, the cloud is a product of our abrupt ascension to a digitally dependent world, and as such, we haven't had much time to refine it. In its simplest form, cloud computation is now a utility which we cannot live without.

To overcome cloud's most salient issues, we believe a conscious hybrid approach paves a path of consideration and prioritisation of fit for purpose over abundance; providing intelligent solutions to the economic and environmental conundrums we face now and in the future.

Not only does a hybrid cloud approach offer the benefits of cloud, it also provides the control, security, predictability and transparency of on-premise infrastructure; allowing organisations to innovate faster with control whilst avoiding overspending and wasting of natural resources. This can be achieved by hosting applications and data in the most suitable place; be it on-premises, at the edge or in a public cloud.

OVER 70%

OF 750 CLOUD DECISION-MAKERS/USERS USE MULTI-CLOUD, AS OF 2023.[29]

29. Flexera, 2023 State of the Cloud Report, 2023

> **We're seeing a lot of companies now** recognising that they can build their own sort of public cloud on-premises... with much higher efficiencies.[6]

Nicola Peill-Moelter, Ph.D, Former Director of Sustainability Innovation at VMware

BENEFITS OF A HYBRID CLOUD APPROACH INCLUDE:

1. OPTIMISED RESOURCE UTILISATION

Hybrid cloud solutions allow **organisations to balance their workloads between on-premises data centres and public cloud services.** This flexibility enables them to optimise resource utilisation based on the specific requirements of each workload.

By strategically deploying workloads on-premises or in the cloud, **organisations can choose the most energy-efficient and cost-effective** infrastructure for each application, reducing overall environmental impact and operational costs.

BENEFITS OF A HYBRID CLOUD APPROACH INCLUDE:

2. RENEWABLE ENERGY INTEGRATION

Organisations adopting a hybrid cloud strategy can select data centres and cloud providers that prioritise the use of renewable energy sources. This choice allows them to contribute to environmental sustainability by reducing reliance on non-renewable energy and lowering their carbon footprint.

BENEFITS OF A HYBRID CLOUD APPROACH INCLUDE:

3. SCALABILITY AND EFFICIENCY

Hybrid cloud architectures provide scalability and flexibility, allowing organisations to scale their infrastructure up or down based on demand. This adaptability ensures that resources are used efficiently, preventing over-provisioning and reducing unnecessary energy consumption.

Dynamic workload management and automated scaling in hybrid environments contribute to overall energy efficiency, as resources are allocated based on real-time needs.

BENEFITS OF A HYBRID CLOUD APPROACH INCLUDE:

4. DATA LOCALISATION AND COMPLIANCE

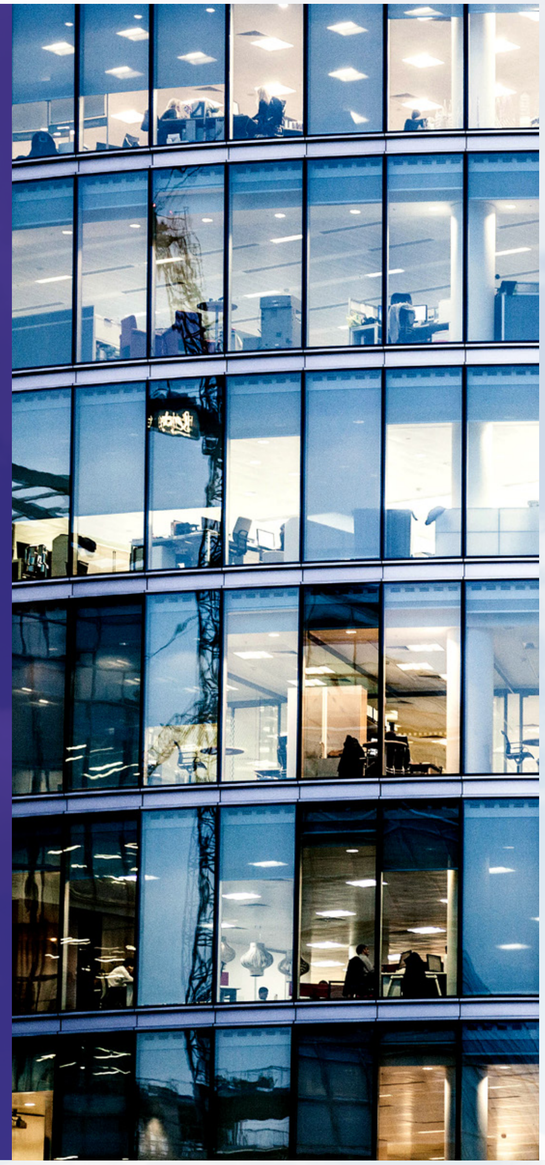
Hybrid cloud strategies allow organisations to keep sensitive or compliance-sensitive data on-premises while leveraging the scalability and services of the public cloud for other workloads. This approach helps meet data residency requirements and regulatory compliance, reducing the need for unnecessary data transfers and associated energy consumption.

BENEFITS OF A HYBRID CLOUD APPROACH INCLUDE:

5. COST OPTIMISATION AND ECONOMIC IMPACT

A well-implemented hybrid cloud strategy enables organisations to achieve cost savings by utilising cost-effective on-premises infrastructure for certain workloads and leveraging the pay-as-you-go model of the public cloud for others.

Cost optimisation directly contributes to economic sustainability, as organisations can allocate resources more efficiently, avoiding unnecessary expenses associated with fixed infrastructure.



BENEFITS OF A HYBRID CLOUD APPROACH INCLUDE:

6. DISASTER RECOVERY AND REDUNDANCY

Hybrid cloud environments offer robust disaster recovery and redundancy options. By strategically distributing workloads across on-premises and cloud infrastructure, organisations can enhance their resilience to outages and reduce the environmental and economic impact of downtime.

CONCLUSION

We heard time after time how a hybrid cloud strategy provides organisations with the flexibility to tailor their infrastructure to specific workload requirements, optimising resource usage, promoting sustainability, and achieving economic benefits. By strategically leveraging both on-premises and cloud resources, organisations can contribute to the environmental conservation while maintaining the agility and scalability needed in today's dynamic landscape.

Whilst reducing economic and environmental costs can feel daunting, Clouded II established that there is desire and appetite for a better way. As Mark Butcher, Digital Sustainability & GreenOps Advocate at Posetiv Cloud, aptly put it in Clouded II, **"people care - there is hope, it's about mindset, action and taking control of digital strategies."**

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