Responsible Clouds and the Green Web Triangle

How to make the climate case for a diverse cloud ecosystem

GREENWEBFOUNDATION.ORG

Chris Adams

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Hello!

I’m Chris. My background:

Loco2 - Low CO2 Travel in Europe by train
A.M.E.E (Avoid Mass Extinction Engine) - CO2 calculation as an API
Icebreaker One - data infrastructure for a net zero future
Spend Network - direct public spending for net zero
Green Web Foundation - make the web green
Green Software Foundation - Policy WG chair
Branch Magazine - climate / tech magazine
Environment Variables - podcast on green software

Contact: chris@thegreenwebfoundation.org | @mrchrisadams

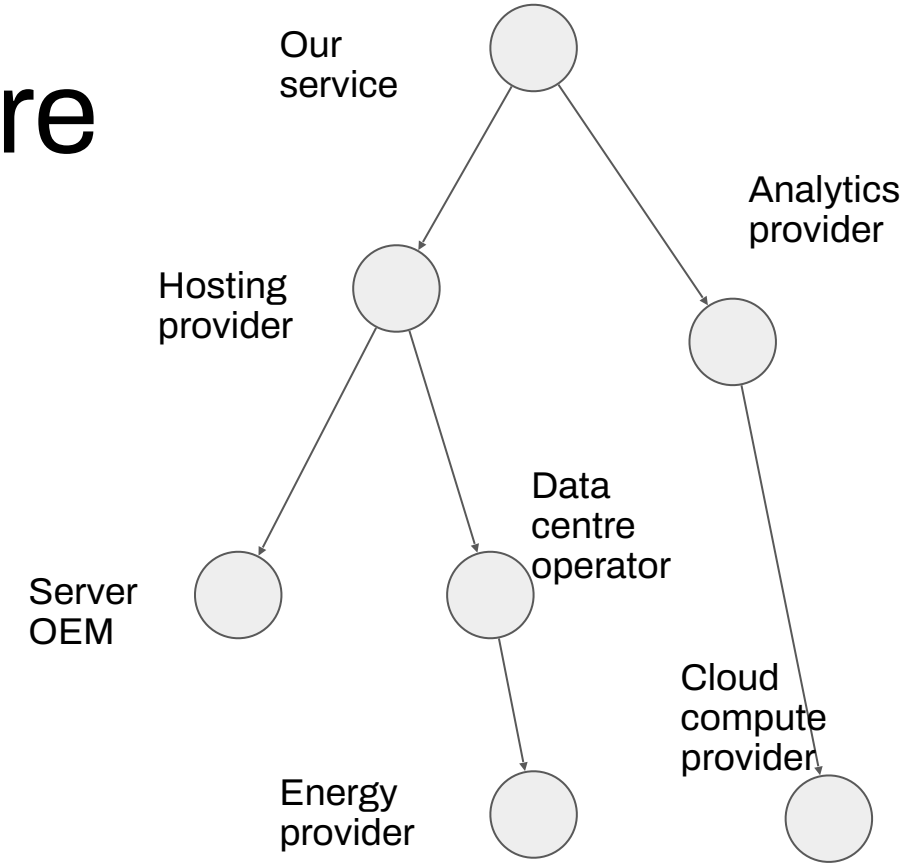
What we'll cover today

1. Framing the problem with the Green Web Triangle
2. Understanding the drivers for sustainability in tech at a regulatory level
3. Competing on transparency for a diverse cloud ecosystem

1

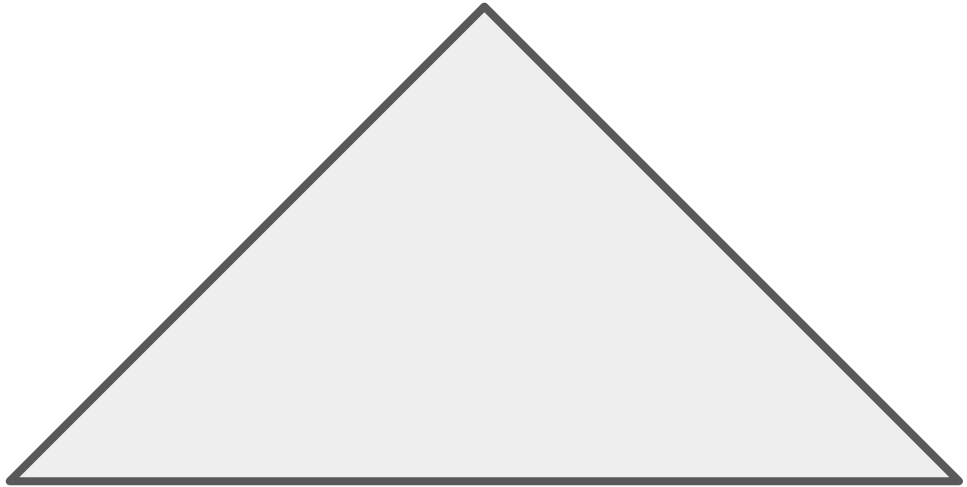
Framing the problem with the Green Web Triangle

Digital services are increasingly built by assembling supply chains of other services



Convenient

(So you can focus on what matters)



Diverse

(Healthy ecosystems are diverse ecosystems)

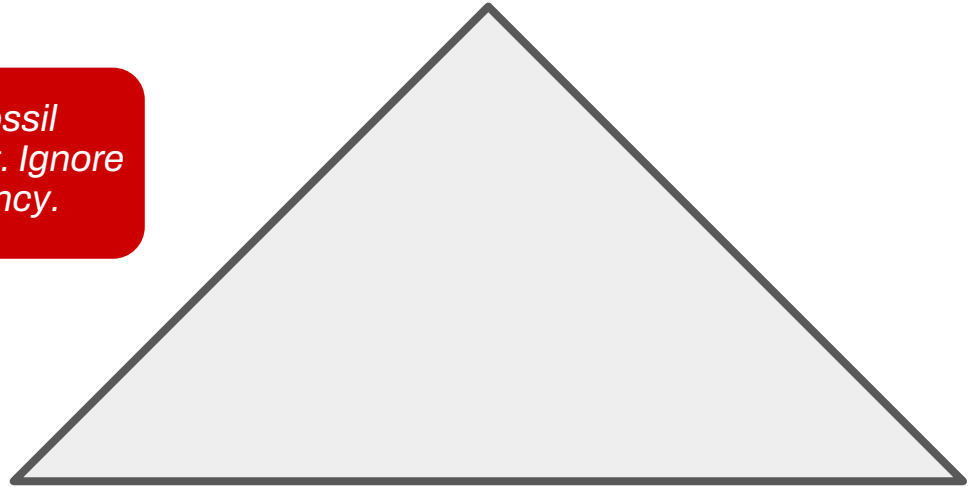
Fossil free

(Climate emergency, remember?)

Convenient

(So you can focus on what matters)

Continue with fossil powered default. Ignore climate emergency.



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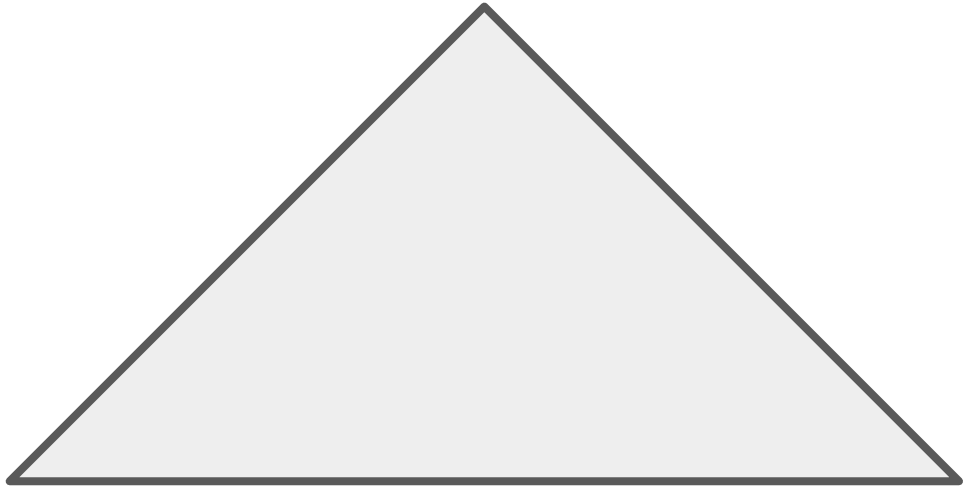

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Spend all your time on undifferentiated heavy lifting

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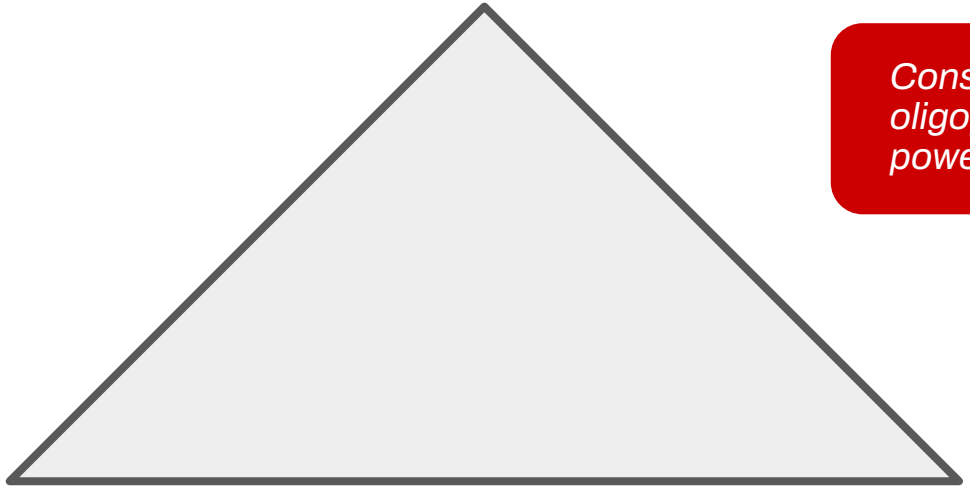

Consolidate existing oligopoly and corporate power in technology

Diverse

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Understanding the drivers for sustainability in tech at a regulatory level

2

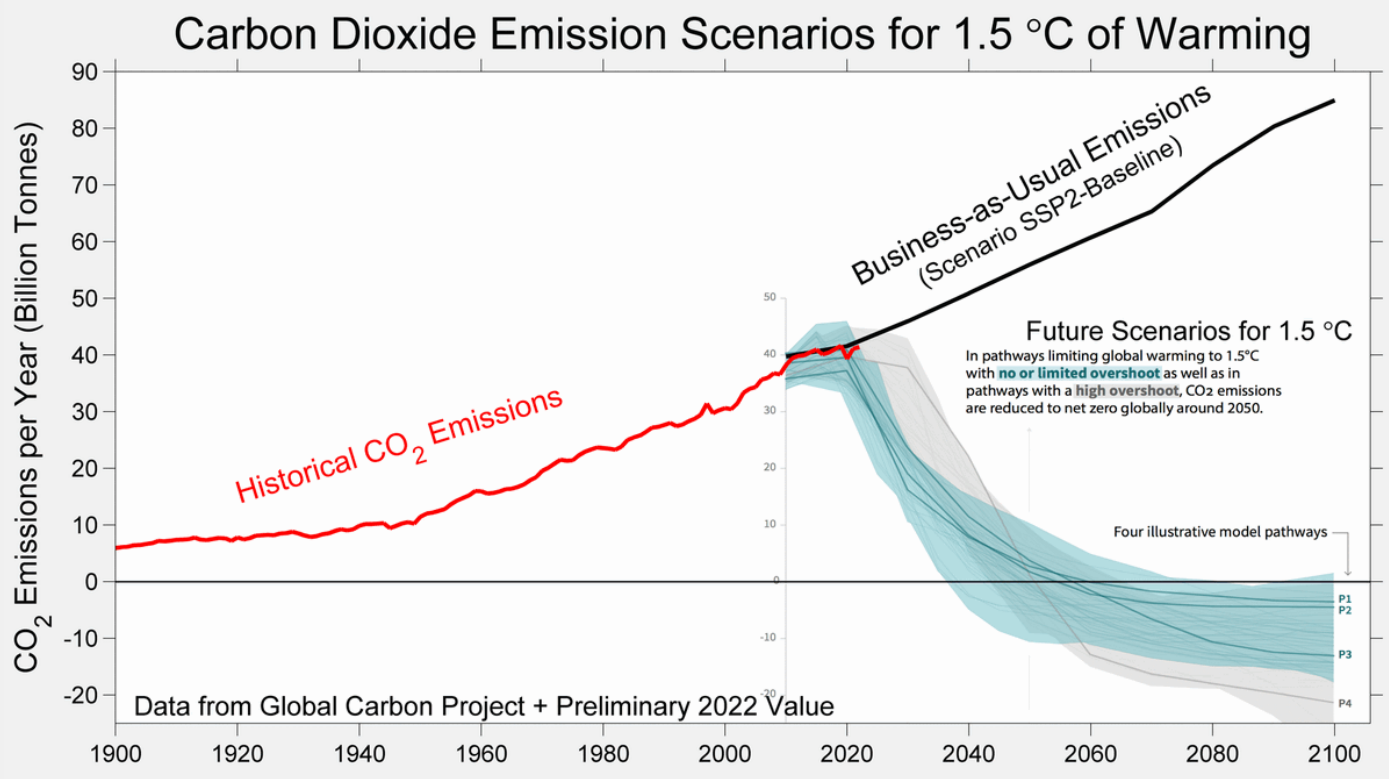
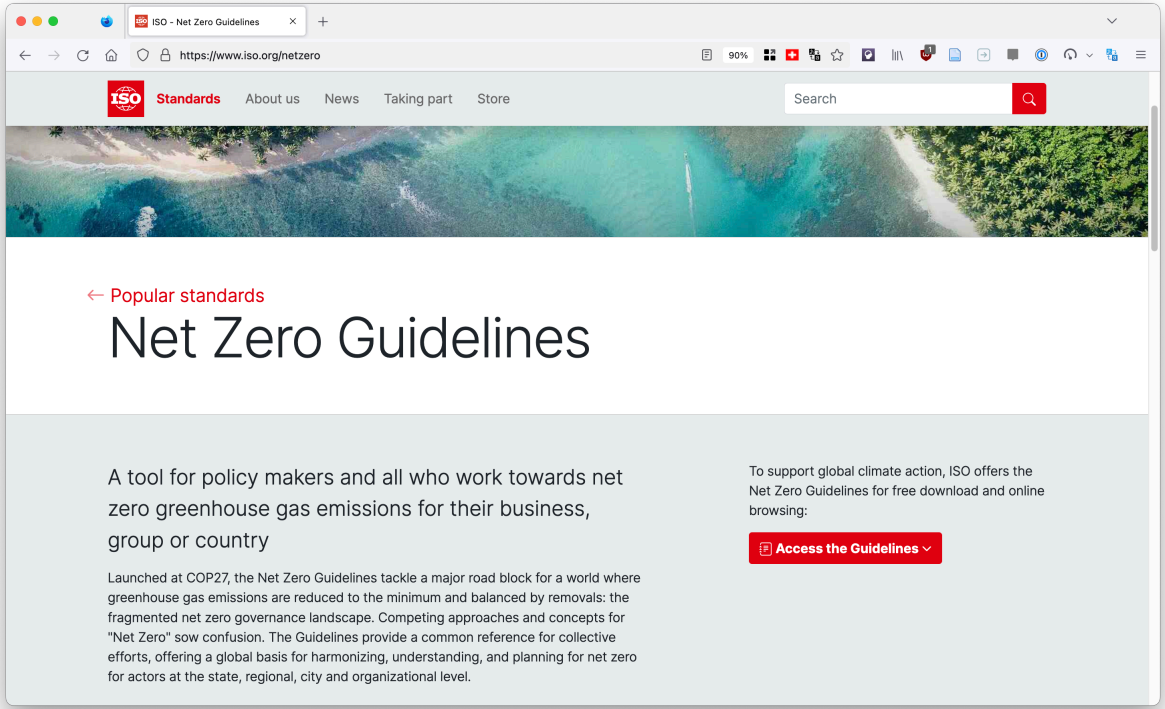


Image: Dr. Robert Rohde / Data: Global Carbon Project & IPCC

> the Paris Agreement will require the information and communication technology (ICT) industry to reduce greenhouse gas (GHG) emissions by 45 per cent from 2020 to 2030

2020 - ITU, GeSI, GSMA & SBTi set science-based pathway in line with Paris Agreement - ICT industry to reduce greenhouse gas emissions by 45 per cent by 2030

Emerging sustainability reporting standards



Emerging corporate reporting standards

ISO Net Zero Guidelines: Net zero claims are no longer considered credible without halving emissions by 2030, if they don't include all supply chain, and if they don't have interim targets every 3-5 years.

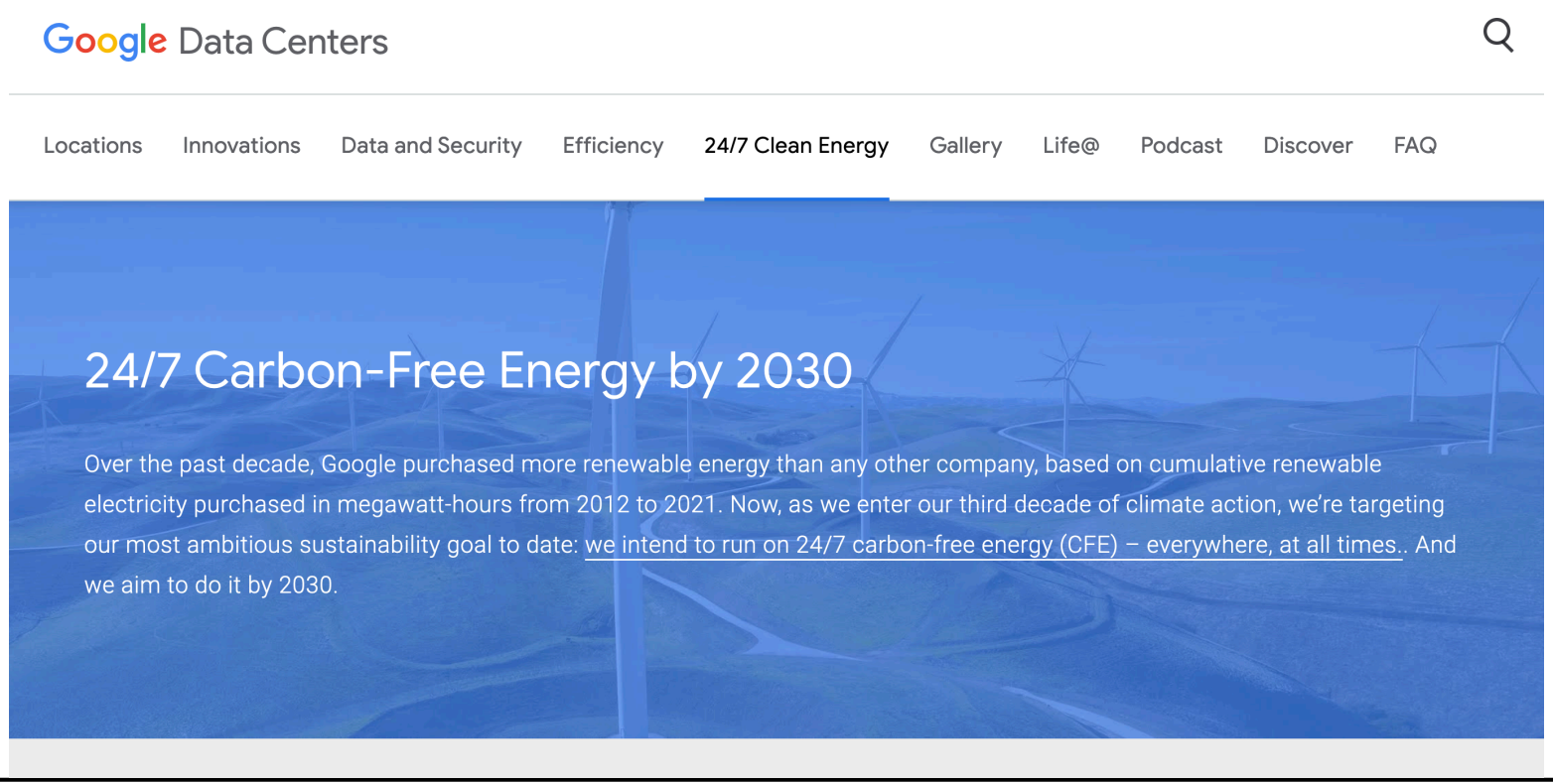
EU CSRD (European Union Corporate Sustainability Reporting Directive): Comes into force in 2024, for every company with more than 250 employees. *You need to start collecting data in 2023 to report for 2024!* 😱

IFRS (International Financial Reporting Standards) Foundation: voted unanimously to require company disclosures on Scope 1, Scope 2 and Scope 3 greenhouse gases (i.e. entire supply chain).

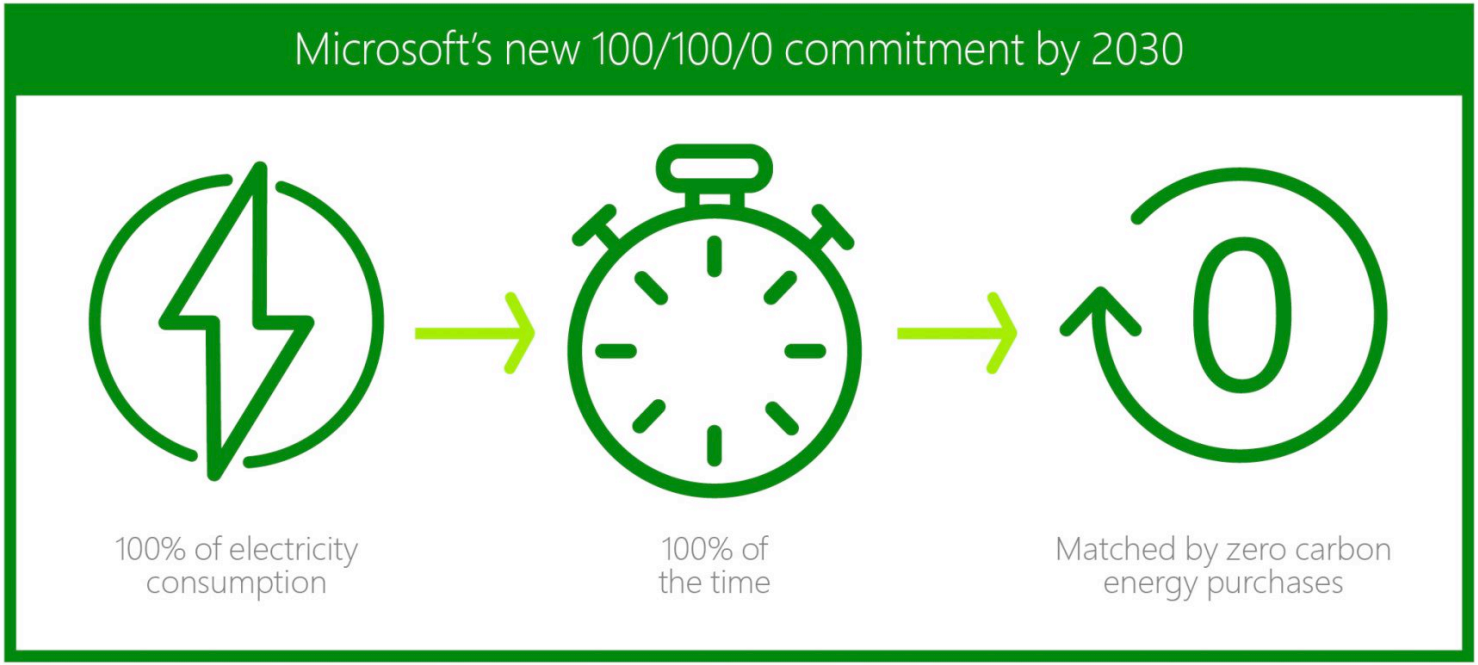
How are we doing so far?

	2015	2021	Change
Internet users	3 billion	4.9 billion	+ 60 %
Internet traffic	0.6 ZB	3.4 ZB	+ 440 %
Data centre workloads	180 million	650million	+ 260 %
Data centre energy use (excluding crypto)	200 TWh	220 - 320 TWh	+ 10-60%
Crypto mining energy use	4 TWh	100 - 140 TWh	+ 2,300 - 3,300%
Data transmission network energy use	220 TWh	260 - 340 TWh	+ 20 - 60%

24 / 7 green energy by 2030



2030 for Microsoft



Building targets into your governance

PENINSULA CLEAN ENERGY

"We have completely got rid of our dependency on Russian fossil fuels. It went much faster than we expected...

So we have the possibility to redirect or reorient the additional funding of REPowerEU – ≈€250 billion – to our net-zero industries."

European Commission President Ursula von der Leyen, 1st Feb 2023
https://ec.europa.eu/commission/presscorner/detail/en/ip_23_510

Competing on transparency for a diverse cloud ecosystem

3

Innovations from smaller providers

OVH Cloud: Early use of liquid cooling on servers - in use for at least ten years.

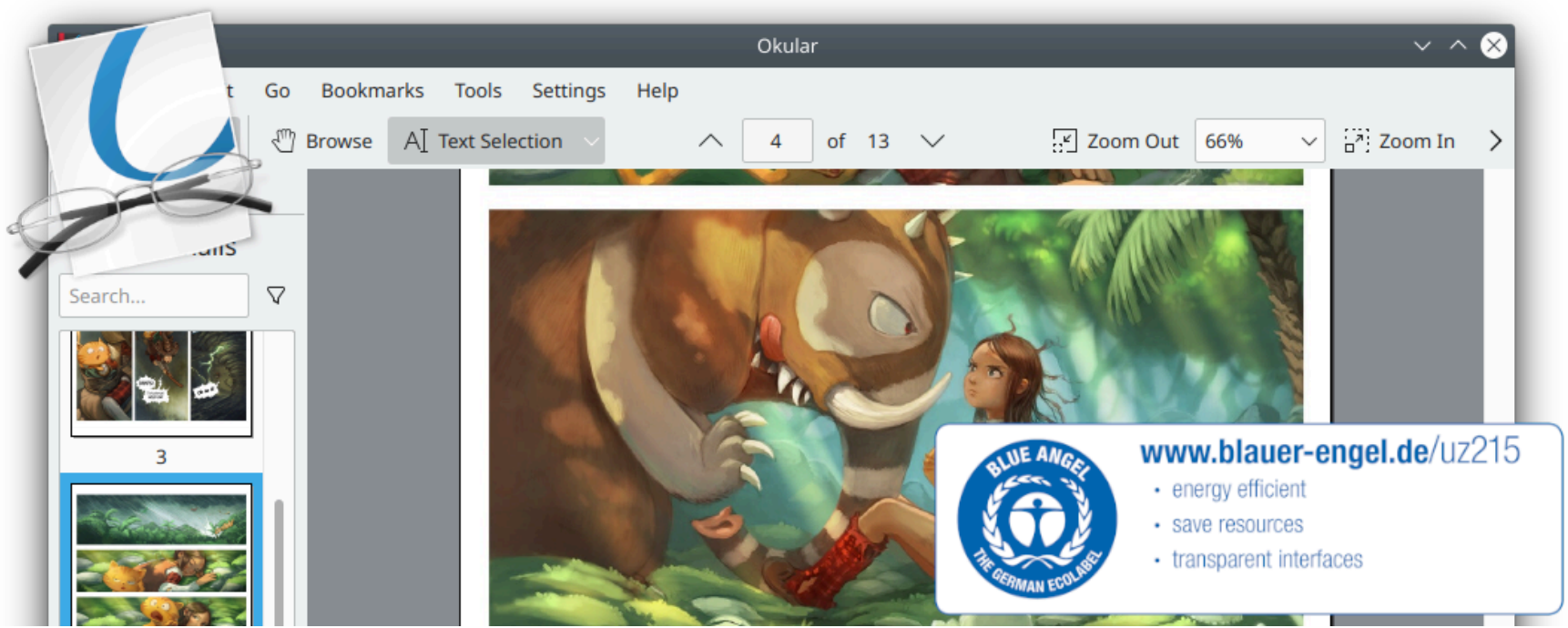
Scaleway: early use of ARM servers for efficiency, pioneers in adiabatic cooling to reduce water use for cooling.

Penta Infra: Specialise in refurbishing datacentre buildings to save on embodied emissions.

Blockheating: integrating containerised datacentres into agriculture. Radical transparency on virtual machine metrics.

Examesh: datacentres inside wind turbine towers to use curtailed energy.

Emerging sustainable software standards



Getting the metrics for your own reporting

To report your own carbon emissions, you need to understand the emissions in your supply chain.

Very few organisations do this well, even when they are large and otherwise very well resourced.

(taken from a snapshot of research by Posetiv Cloud ltd, in summer 2022)

Cloud Provider		Microsoft Azure	Amazon AWS	Google Cloud Platform (GCP)	IBM Cloud	Oracle Cloud Infrastructure (OCI)
Your scope-3 and their	Scope 1					
	Scope 2					
	Scope 3					
Calculation level		Region	Country	Region	-	-
Calculation approach		Average for region	Average for country	Average for region	-	-
Calculation period		Hourly	Monthly	Monthly	-	-
Products included		All	EC2, S3 & "Others"	80	-	-
Carbon data age for Scope 2 calculation		1-month	3-months	1-hour	-	-
Lowest level of detail		Product	Country	Product	-	-
Chargeable		No	No	No	-	-
API access		Yes	No	Yes	No	No
Published roadmap		Yes	No	Yes	No	No

OSS cloud sustainability tooling

Cloud Carbon Footprint: Open source project maintained by Thoughtworks, works on-prem and for multi cloud.

Green Coding Metrics: End-to-end software energy / sustainability tracking for containerised services

Scaphandre: process-level energy usage metrics for virtual machines, compatible with Prometheus.

Kepler: Kubernetes-based Efficient Power Level Exporter - uses eBPF to probe energy related system stats and exports as Prometheus metric

Wrapping up

Green Web Triangle: ***convenient, diverse, fossil free*** - many users are forced to only pick two from most providers.

Regulatory pressure: the choice to pick one of the above is increasingly being made by users, by regulation on climate.

Competing on Transparency: Hyperscale cloud providers have been, and continue to be slow on sharing metrics needed for reporting carbon emissions. This is an area sovereign cloud providers can compete on, and OSS exists to do this.

Diverse Ecosystems are healthy ecosystems: policy support exists for greening infrastructure, as long as you can tell a story about how you help in the twin transitions (digital and sustainability)

Thanks!

If you want know more: we publish open source code and open data in this field, and if you want help we offer training and consulting. More below:

https://www.thegreenwebfoundation.org/fosdem/

Chris Adams | **@mrchrisadams / @mrchrisadams@mastodon.social**

chris@thegreenwebfoundation.org

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