

Navigating the Green Path

Plan A's Journey to Sustainable IT

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planA

goto;

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2/ Electricity

Build applications that are **energy efficient**



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Who is this?



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planA
confidential

planA



Collect & Process Complex Data



Measure Scope 1, 2 & 3 Emissions



Set Science-Based Targets



Leverage Granular Decarbonisation Actions



Receive Expert Guidance



Ensure Compliance with ESG Regulations

planA Collect & update data Measure emissions Reduce emissions Report & communicate

Overview Data collection

Data is the raw material of your emissions calculation – high quality and complete data yields accurate emissions estimations. The better your emissions estimations, the more targeted your decarbonisation actions will be.

Organisational data Update data >

Scope 1

Stationary combustion Update data >

Mobile combustion Update data >

Fugitive emissions Update data >

Scope 2

Purchased electricity

Purchased heating

Emissions Action Plan Compensation ESG

Action Plan

Here's a selection of action items to get you started. These items have been picked based upon your worst performing indicators as per your emission levels and sustainability commitments so far. Select an action and set the timeframe to create your pathway to reduction.

Targets Reduce my emissions to 200t CO2e by 2024

My Emission Forecast

Emissions over time Emissions trajectory Action end date t CO2e

Install light sensors in the office 667.35

Implement cycle-to-work programme 667.35

Switch to A+ equipment in the office 282.07

Switch to a green energy provider 282.07

Implement flight offsetting scheme 694.87

Clean your inbox 227.03

Switch to green servers 667.35

This chart shows your current emissions since you began monitoring them, and the predicted emissions trajectory for the next 1, 5 and 10 years based on your current emitting activities. Each time an action is planned, your emissions reduction trajectory line will decrease.

Plan A's Journey to Sustainable IT

01 How it started

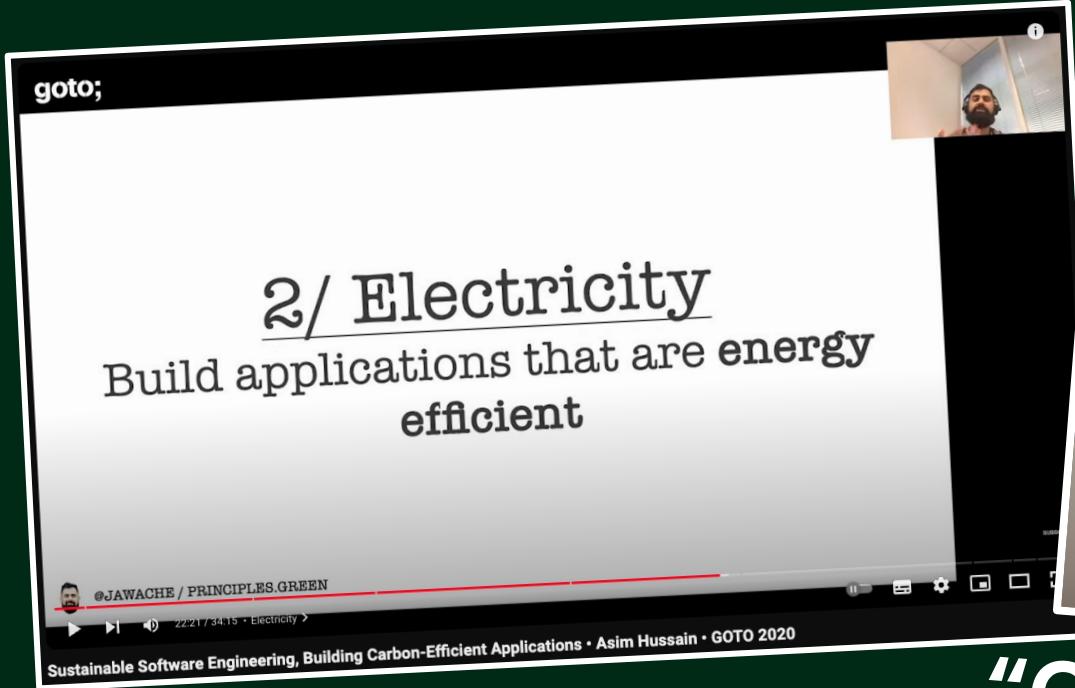
02 How it went so far

03 Where we are now

04 Where we want to be

How it started

How it started



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Build applications that are energy efficient

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Sustainable Software Engineering, Building Carbon-Efficient Applications • Asim Hussain • GOTO 2020



“Climate Quitting”

Plan A - 2 years ago

The Beginning

- No sustainable software engineering
- Unaware of own IT emissions
 - Spent based approach
 - Not granular
 - Not suited for optimization
- Unknown emissions of our customers



Develop a green mindset among developers

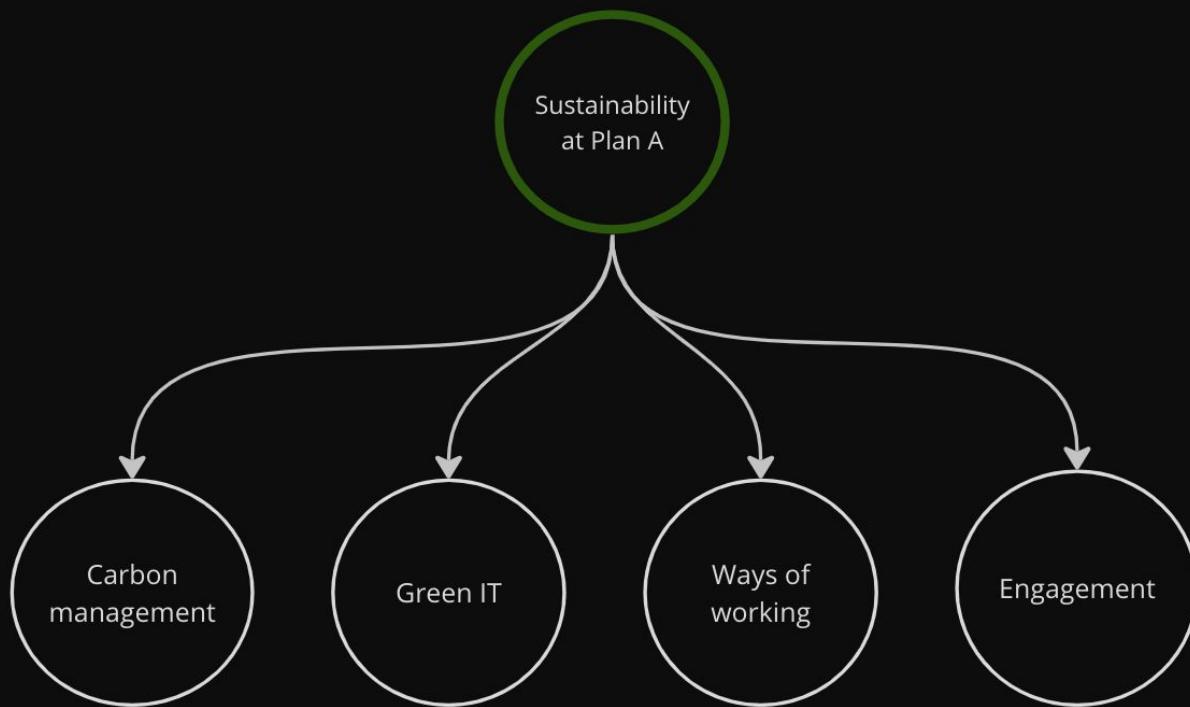


Let's get started

- GreenTech company
 - Sustainability minded people
- Start talking about carbon emissions of software
 - E.g. Pull vs Event-Driven
- Being active
 - Social Media
 - Articles
 - Conference talks
 - Inhouse sessions
- Forming the Green IT Chapter

How it went so far

Sustainability Initiative



Obstacles on the way

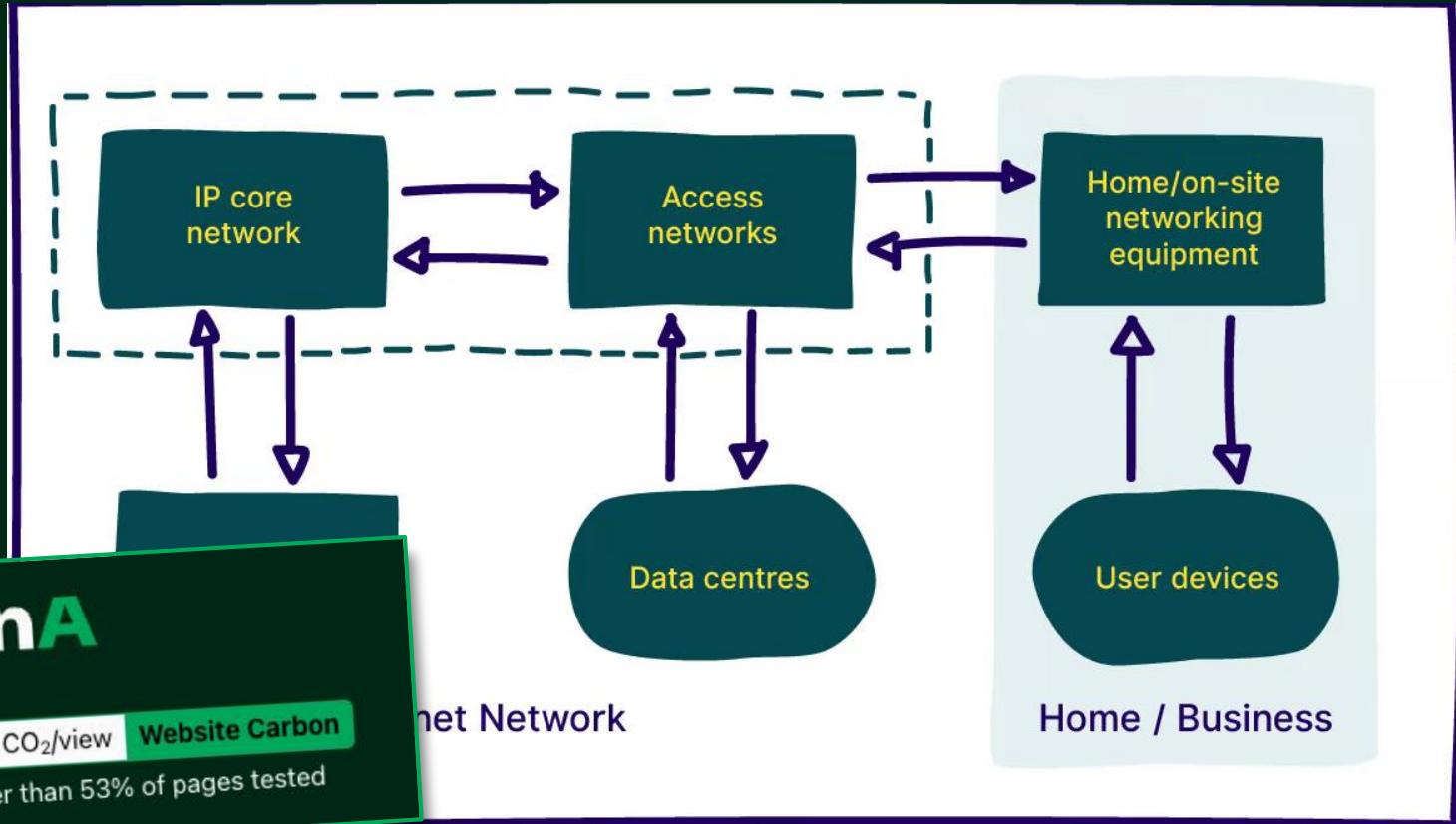
Obstacles

- Ignorance
 - “Has no effect anyway”
- Management
 - “Emissions are too small”
- Workload
 - Not enough time during sprints

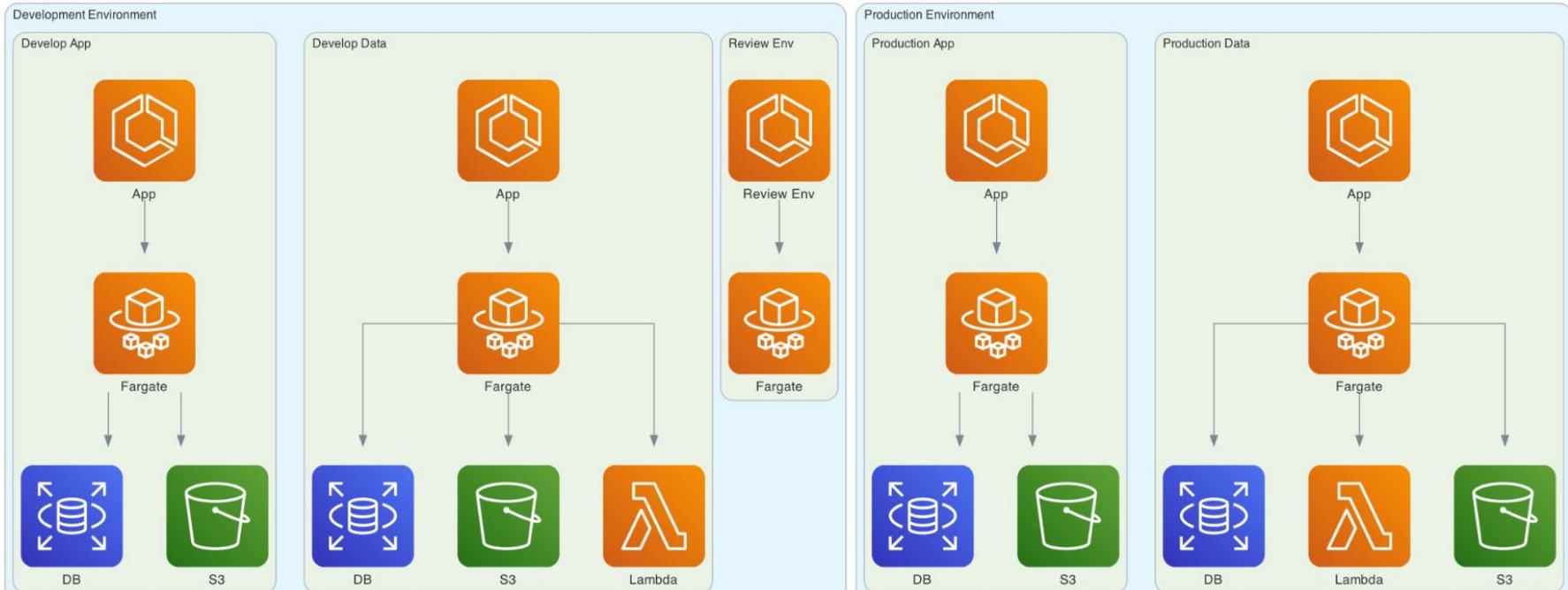
Remedies

- Be resilient
- Be patient
- Keep the narrative
- Find allies
- Go that extra mile
- Showcase

How to measure IT emissions?



Our infrastructure (excerpt)



Plan A

AWS Customer Carbon Footprint “Tool”

Start month End month

May 2021 ▾ Jan 2024 ▾ [Download](#)

Your carbon emissions summary
Compares your carbon emissions with on-premises computing equivalents

0.0 MTCO ₂ e	0.0 MTCO ₂ e
Your estimated AWS emissions	Your emissions saved on AWS

Your emission savings

0.0 MTCO ₂ e	0.0 MTCO ₂ e
Saved from AWS renewable energy purchases	Saved by using AWS computing services

Your emissions by geography

You don't have any carbon emissions for this time period.





Cloud Providers: 4 of 4

Accounts: 16 of 16

Services: 8 of 8

Start Date → End Date

1M 3M 6M 12M ALL

Cloud Usage

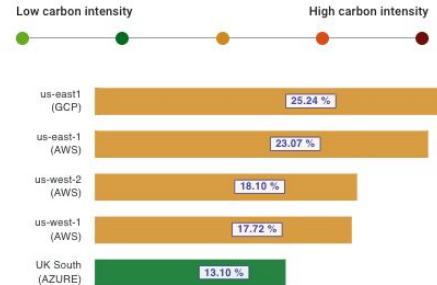


Your cumulative emissions are
14.1 metric tons CO2e

that is equivalent to

Emissions Breakdown

Region ▾



Cloud Carbon Footprint

missions from

<https://www.cloudcarbonfootprint.org>the way flights
C to London

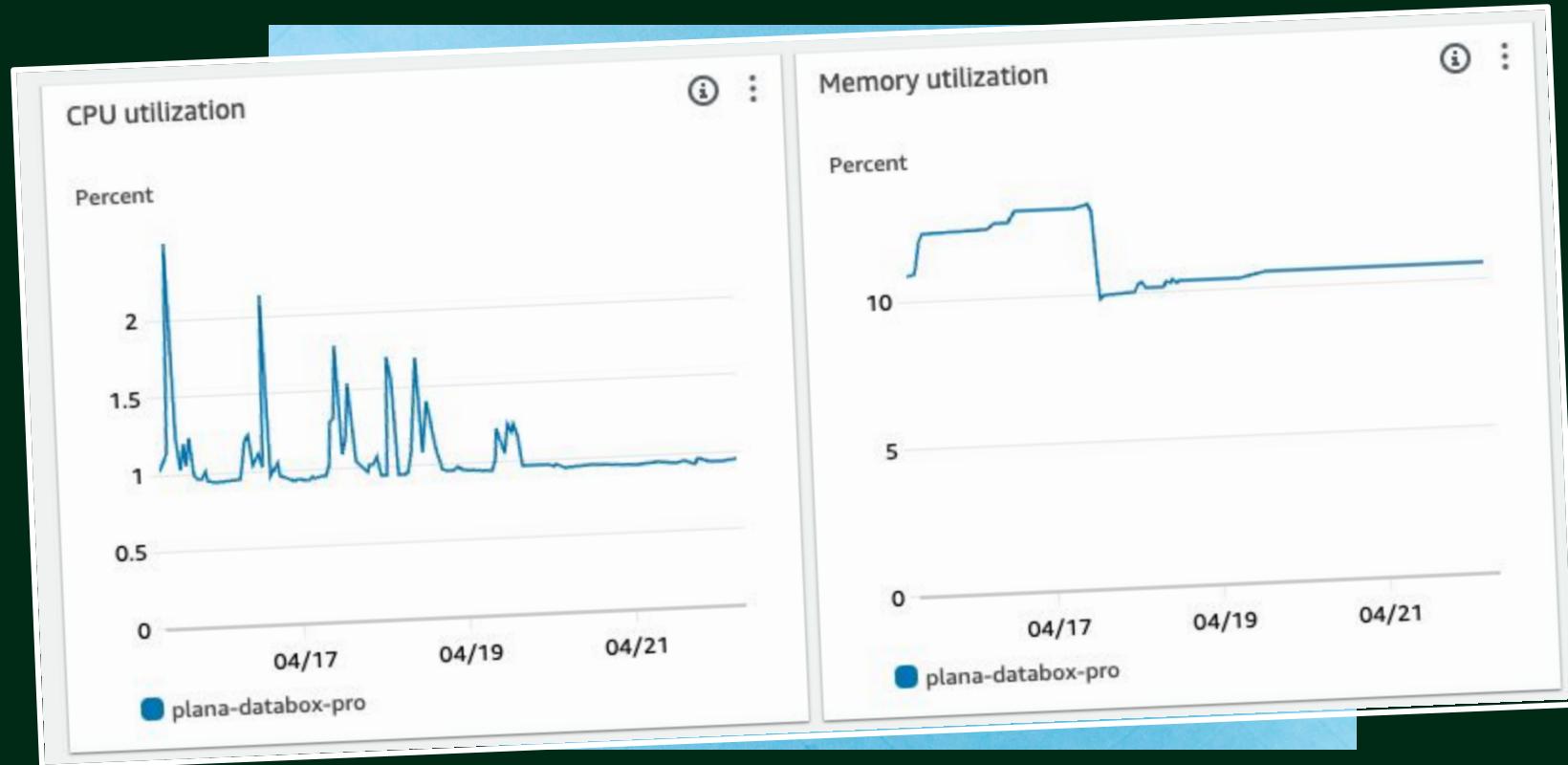
Where we are right now

Cloud emissions (last 12 months)

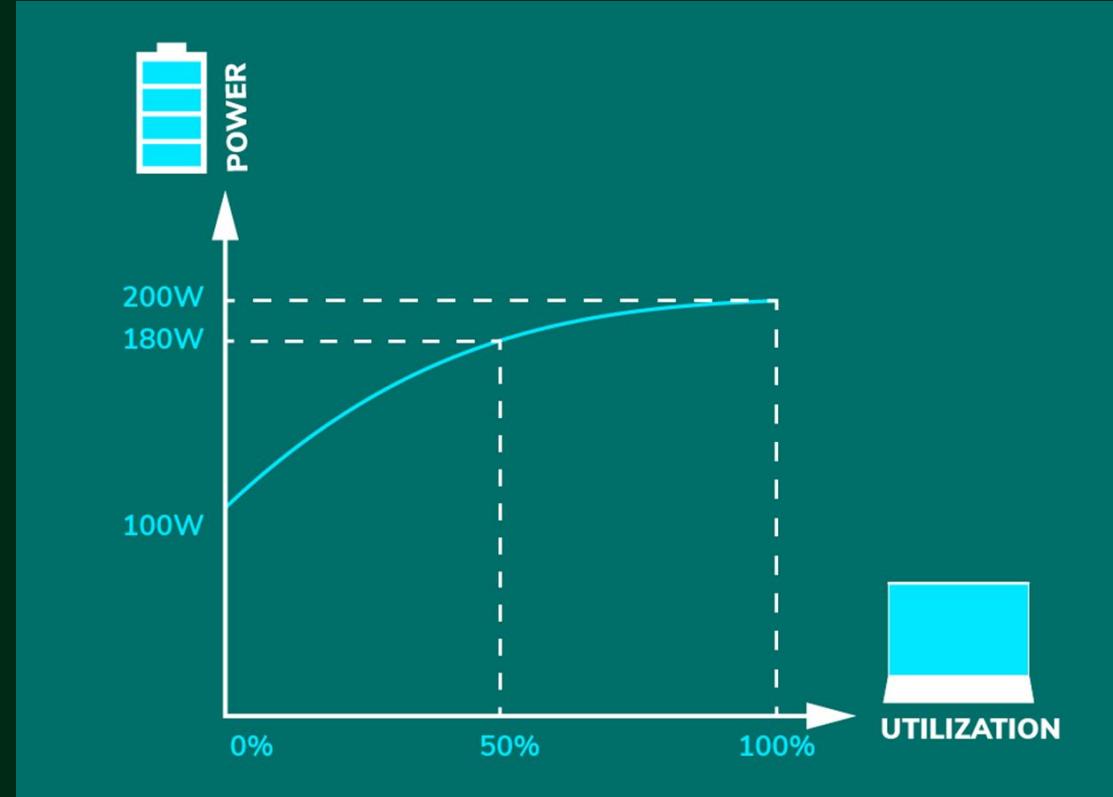
Cloud Usage



Cluster utilization



Energy proportionality



<https://learn.greensoftware.foundation/energy-efficiency#energy-proportionality>

Low hanging fruits



"Slightly" overprovisioned

- Auto-scaling
- Easy to set up

Carbon and money

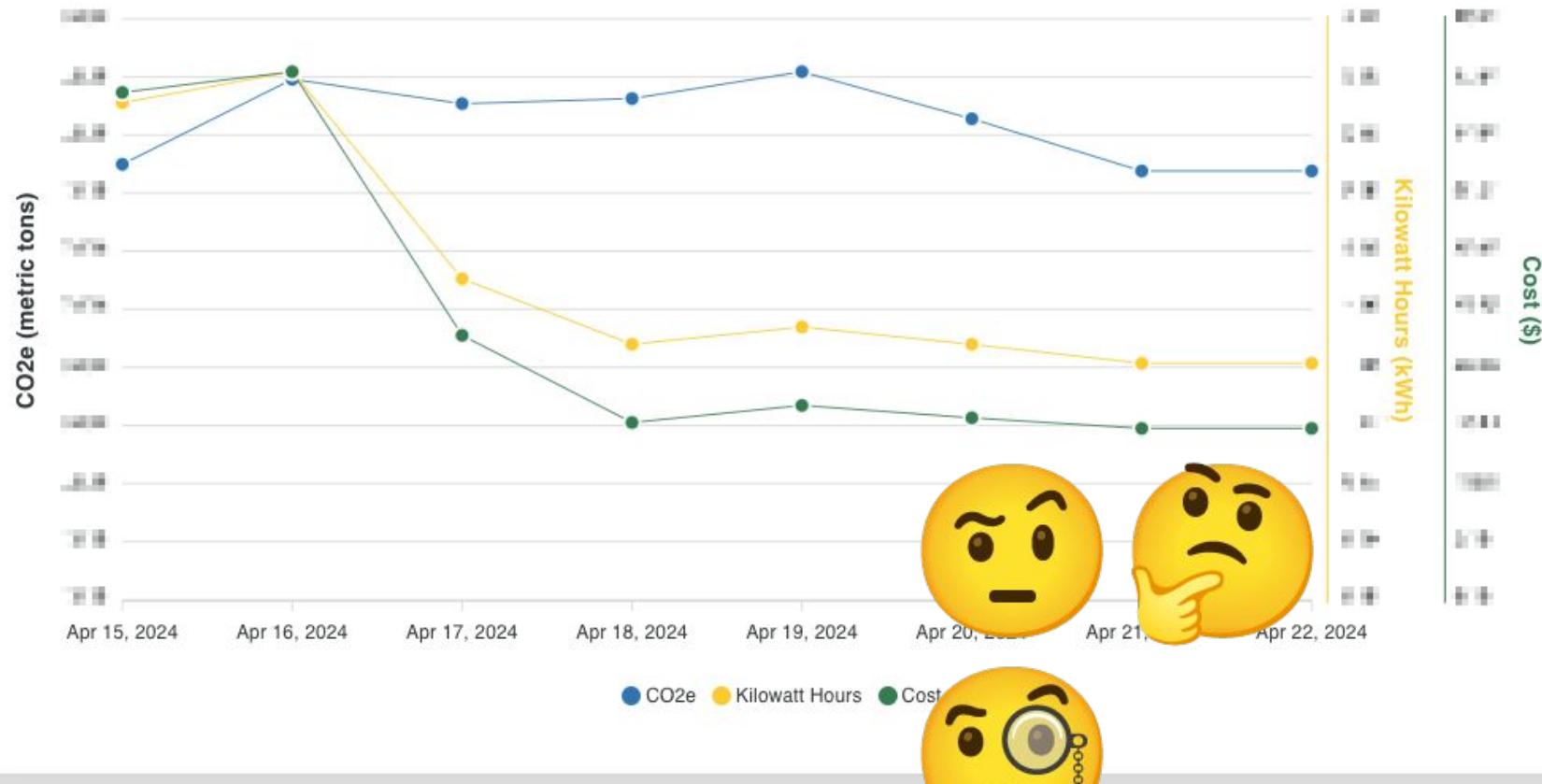
Carbon == money?

- Cloud computing
 - Money spent roughly indicates carbon emissions
 - Reducing emissions saves money
- How much carbon will we save?
- How much money will we save?

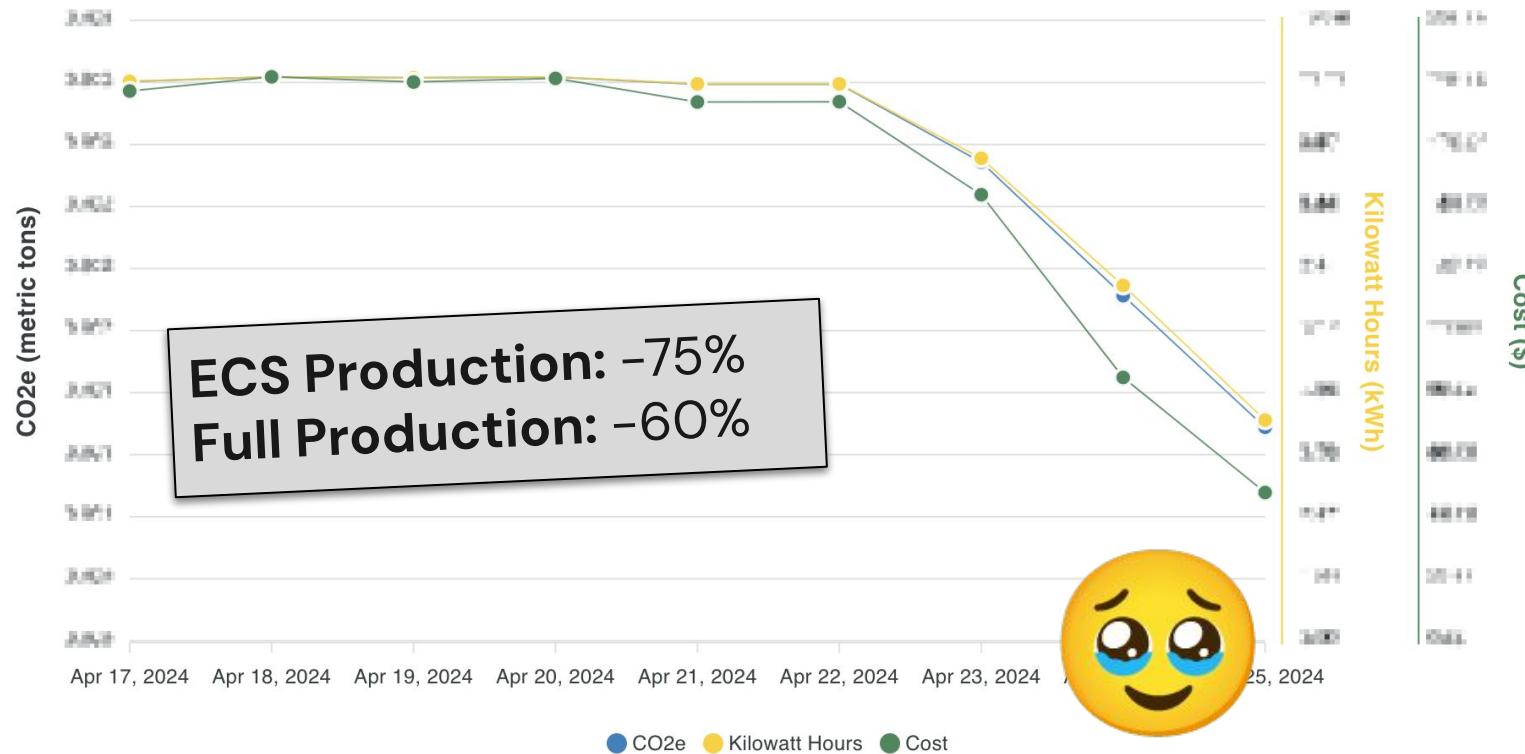


<https://www.pexels.com/photo/a-businessman-counting-money-bills-887240/>

Cloud Usage



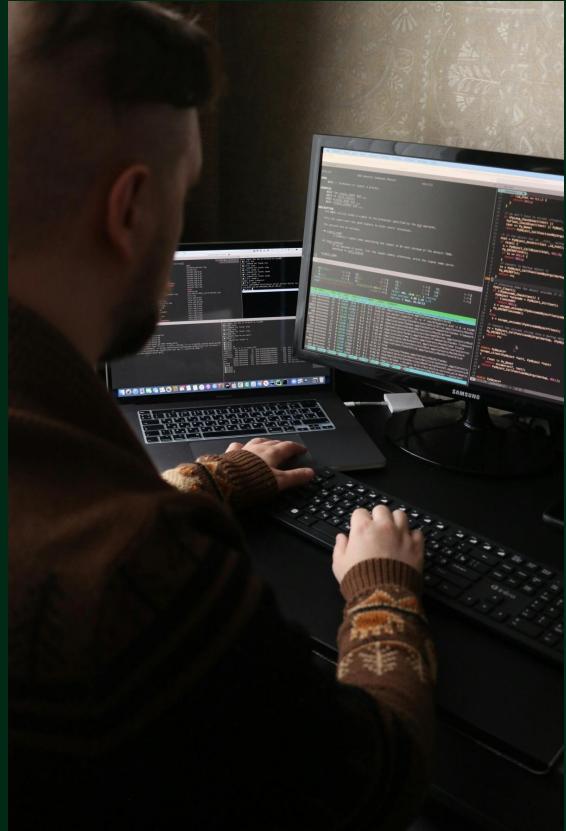
Cloud Usage



Carbon = money

But ... wasn't that a DevOps job?

- Short answer: "Yes, but"
- Error in policy configuration
- Never checked due to "reasons"
- Green IT was the reason to optimize



<https://www.pexels.com/photo/person-in-brown-long-sleeve-shirt-typing-on-a-keyboard-9555909/>

Next steps



<https://www.pexels.com/photo/crop-kid-weighing-on-scale-4474052/>

Short-term measures

- Fine-tune autoscaling
- Network and storage
 - Logs
 - S3
- Other optimizations
 - PHP server settings
 - Python optimization
- Rightsizing
 - DB instances
 - Fargate instances
 - Lambdas

Rightsizing

Savings opportunities Info

Explore your savings opportunities using the filters below.

Resources with estimated savings

Group related recommendations

Filter distributions by text, property or value

< 1 >

Estimated monthly savings ▲	Top recommended action	Current resource summary	Recommended resource summary
US\$14.78	Rightsize	1024.0 vCPU/2048 MB memory	512.0 vCPU/2048 MB mem
US\$14.78	Rightsize	1024.0 vCPU/2048 MB memory	512.0 vCPU/2048 MB mem
US\$13.60	Purchase Reserved Instances (Reserved Node)	-	2 cache.t4g.micro in eu-west-1
US\$9.01	Rightsize	512.0 vCPU/1024 MB memory	256.0 vCPU/512 MB memo
US\$7.21	Rightsize	512.0 vCPU/1024 MB memory	256.0 vCPU/512 MB memo

Shorter lifetime of review environments

Services (7) Info						
		 Manage tags	Update	Delete service	Create	
		Filter launch type		Filter service type		
<input type="text"/> Filter services by value				Any launch type	Any service type	 1  
<input type="checkbox"/>	Service name	ARN	Status	Service type	Deployment	
<input type="checkbox"/>	feature-dc-1236-action-translation-content-crud	 arn:aws:ec...	 Active	REPLICA		
<input type="checkbox"/>	ar-482-be-export-methodology-columns-are-added-to-al...	 arn:aws:ec...	 Active	REPLICA		
<input type="checkbox"/>	onb-1893-change-closed-at-and-opened-at-types-on-the...	 arn:aws:ec...	 Active	REPLICA		
<input type="checkbox"/>	ar-468-be-create-an-endpoint-for-business-activity-charts	 arn:aws:ec...	 Active	REPLICA		
<input type="checkbox"/>	tools	 arn:aws:ec...	 Active	REPLICA		
<input type="checkbox"/>	traefik	 arn:aws:ec...	 Active	REPLICA		
<input type="checkbox"/>	feature-dc-933-introduce-new-categories	 arn:aws:ec...	 Active	REPLICA		

Software Architecture

Top 5 database operations

By time consumed



The background features abstract, semi-transparent green shapes resembling clouds or petals, positioned in the lower-left and upper-right corners.

Where we want to be

Milestones

What's next

- Measuring emissions
 - Cloud ✓
 - 3rd party services 📋
 - Break down by service 📋
- Optimizations
 - Infrastructure ✓ 📋
 - Architecture ✓ 📋
 - Code 📋
- Customer emissions
 - How to calculate? 📋



<https://www.pexels.com/photo/back-view-of-a-woman-standing-on-brown-wooden-blanks-1232594/>

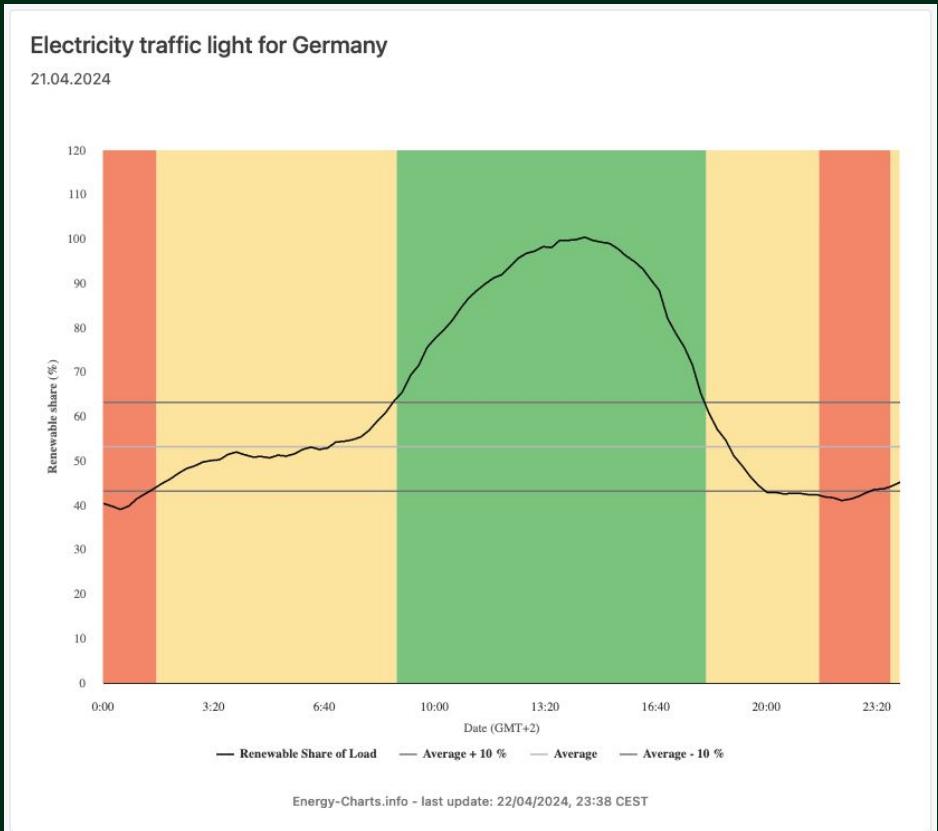
Go beyond optimization



Go beyond optimization

Carbon-awareness

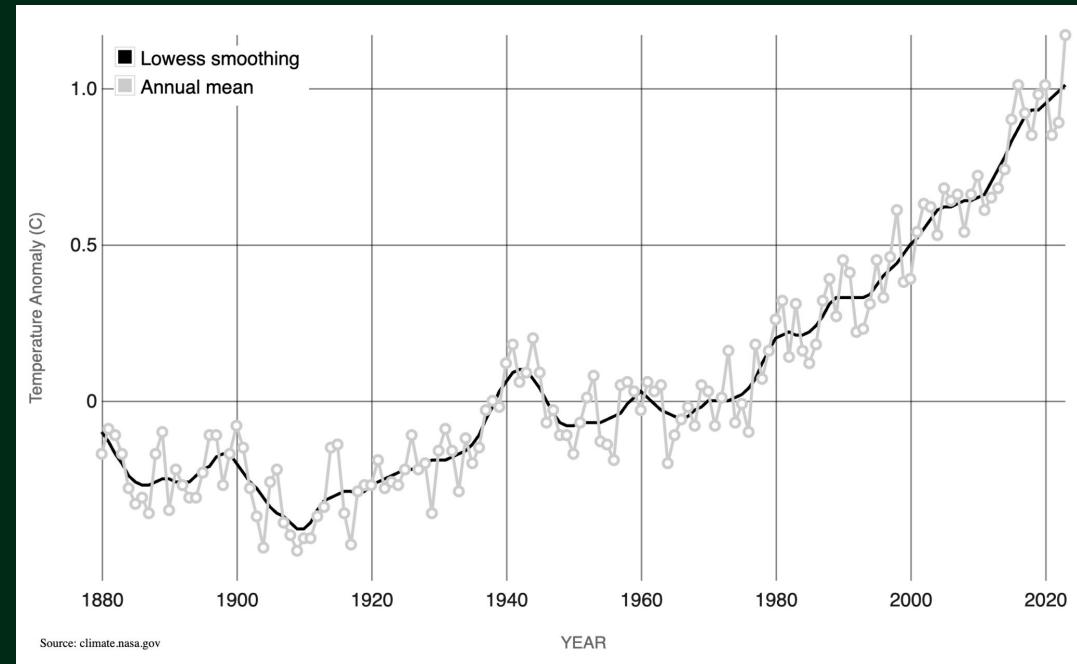
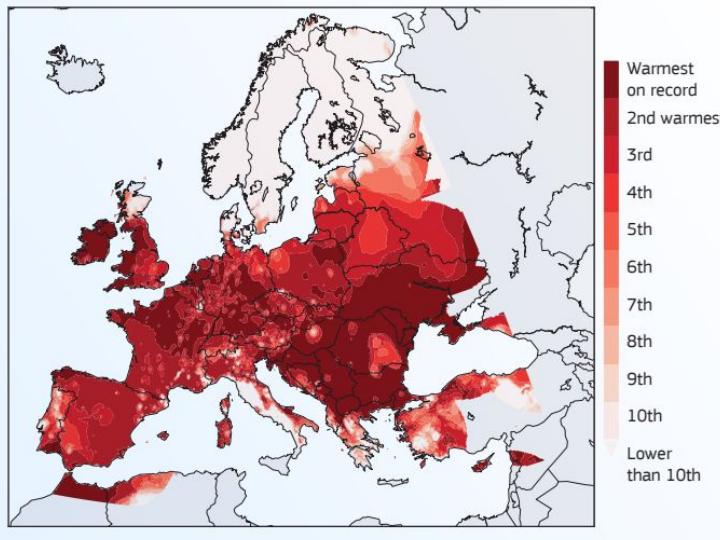
- Use energy when it's the greenest
- Criticism
 - Large scale?
 - How to measure savings?
- This is just the beginning
 - Exploring possibilities
 - Later: APIs which indicate best usage?



The background features abstract, semi-transparent green shapes. On the left, there are two large, rounded, overlapping shapes that resemble stylized leaves or petals. On the right, there are two smaller, elongated, curved shapes that also resemble petals or perhaps a stylized 'A' shape.

Is it worth it?

"It's not worth the effort"



It's worth the effort!

1. Emission reduction
2. Cost reduction
3. Transparency
4. Credibility
5. Pioneering
6. Employee attraction and retention





Lean more
about Plan A!

Thank you!

linkedin.com/in/cwindler