Cabinet Office

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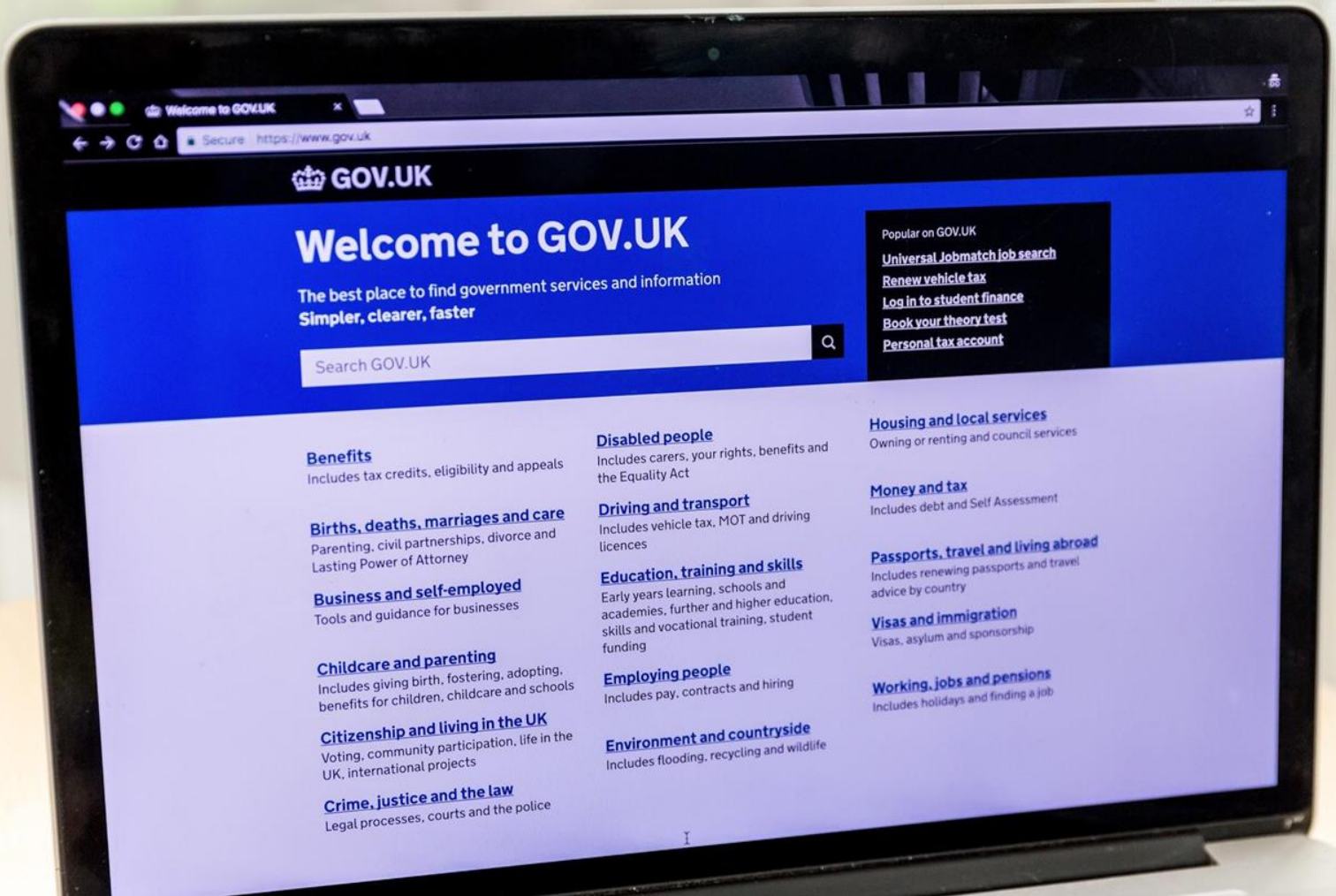
How much CO2 is produced by our digital services at GDS?


Welcome to GOV.UK
Secure https://www.gov.uk
GOV.UK
Welcome to GOV.UK
The best place to find government services and information
Simpler, clearer, faster
Search GOV.UK
Popular on GOV.UK
Universal Jobmatch job search
Renew vehicle tax
Log in to student finance
Book your theory test
Personal tax account
Benefits
Includes tax credits, eligibility and appeals
Births, deaths, marriages and care
Parenting, civil partnerships, divorce and Lasting Power of Attorney
Business and self-employed
Tools and guidance for businesses
Childcare and parenting
Includes giving birth, fostering, adopting, benefits for children, childcare and schools
Citizenship and living in the UK
Voting, community participation, life in the UK, international projects
Crime, justice and the law
Legal processes, courts and the police
Disabled people
Includes carers, your rights, benefits and the Equality Act
Driving and transport
Includes vehicle tax, MOT and driving licences
Education, training and skills
Early years learning, schools and academies, further and higher education, skills and vocational training, student funding
Employing people
Includes pay, contracts and hiring
Environment and countryside
Includes flooding, recycling and wildlife
Housing and local services
Owning or renting and council services
Money and tax
Includes debt and Self Assessment
Passports, travel and living abroad
Includes renewing passports and travel advice by country
Visas and immigration
Visas, asylum and sponsorship
Working, jobs and pensions
Includes holidays and finding a job

How much CO2 do we produce keeping sites like GOV.UK up and running?

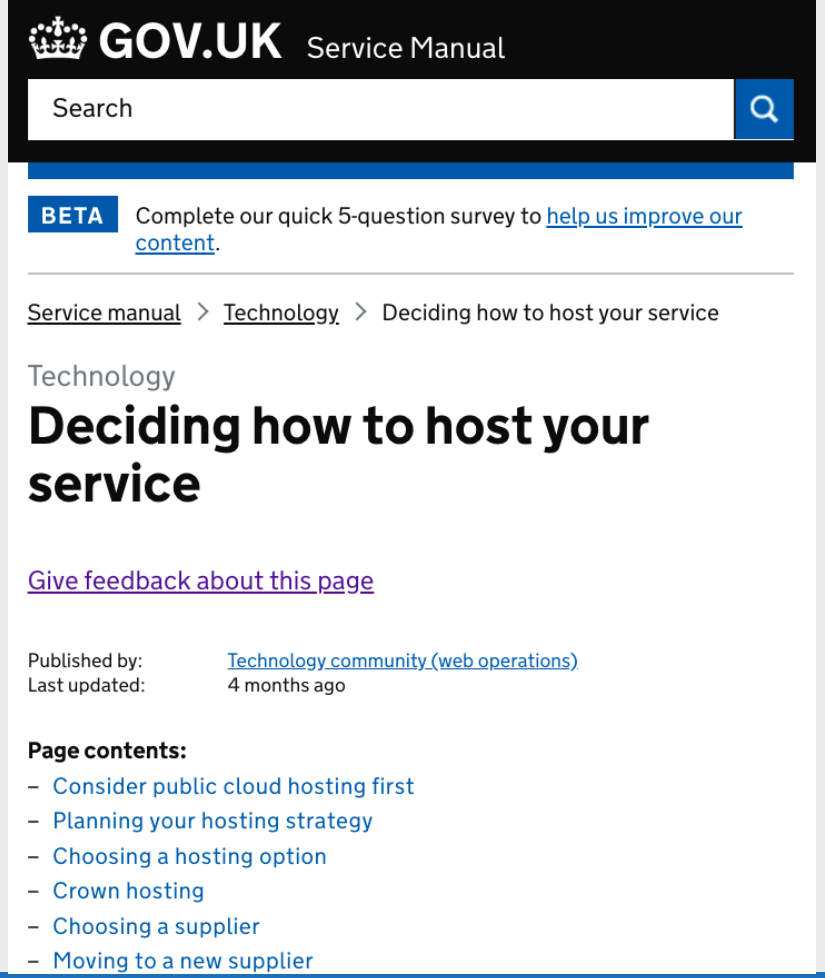
Why did we do this?

Government has committed to reduce emissions to zero by 2050

“We will need to be sure that we are using **clean and green digital and technology services and practices**”

The Greening Government Sustainable Technology Strategy 2016-2020

Teams in government don’t have guidance on sustainable hosting



Why do digital services produce CO2?

Websites like GOV.UK run on computers in data centres

These computers are powered by electricity

“ICT currently accounts for around 3.6% of global electricity use and 1.4% of greenhouse gas emissions”

The Energy and Carbon Footprint of the Global ICT and E&M Sectors 2010–2015, Malmodin and Lunden

How did we measure it?

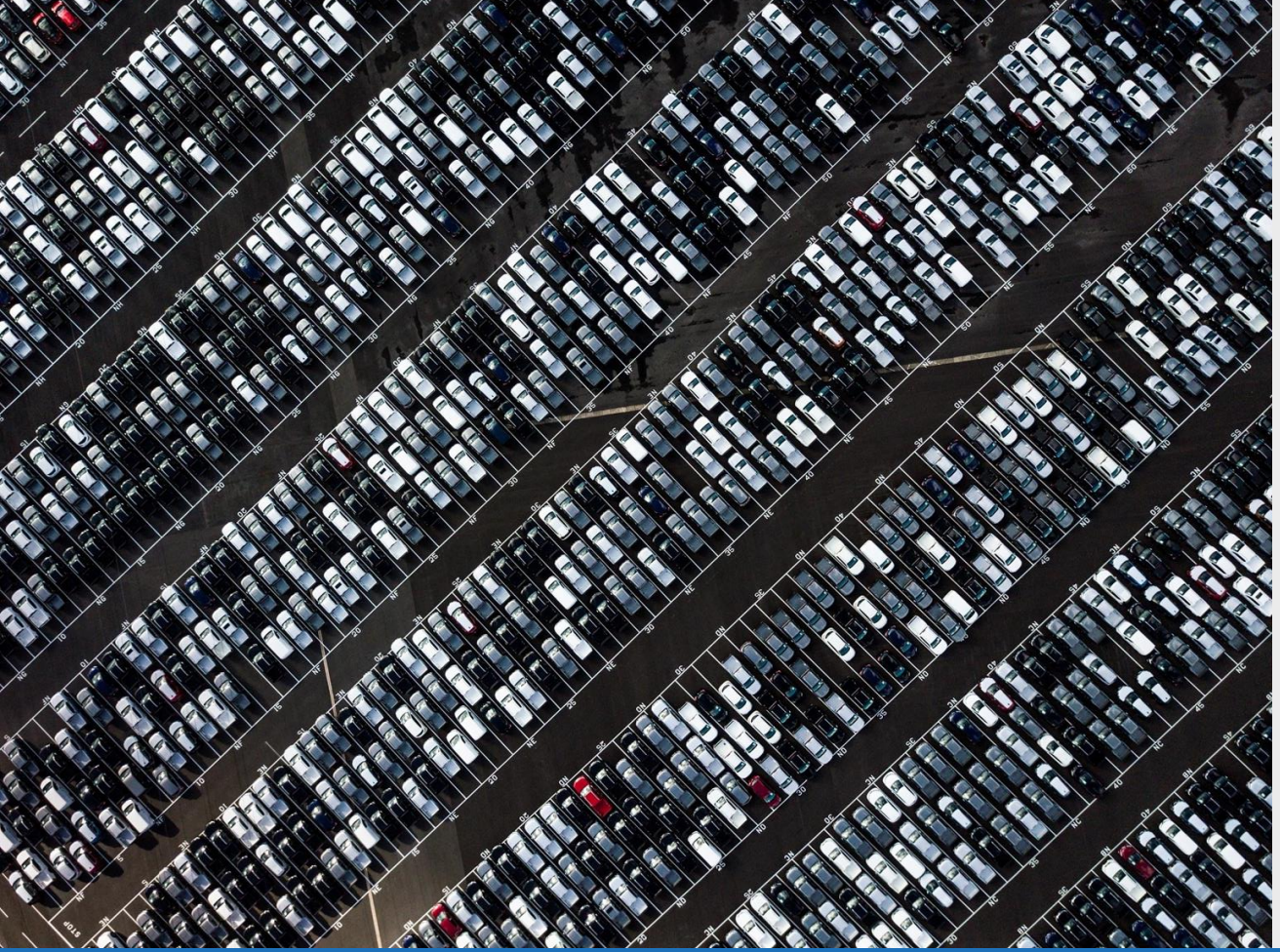
We estimated overall CO_2 based on:

1. Hosting costs per year (£)
2. Minus profit (-30%)
3. Minus costs that aren't energy (-40%)
4. Converting that cost to electricity (assuming 12p per KWh/month)
5. Converting electricity to CO_2 (assuming the average UK grid, or 0.352g CO_2/kwh)

What did we learn?

GDS services produce up to **4,000 tonnes of CO_2 a year**

As much as a village of 470 homes



Or 700 cars

(photo by Ryan Searle on Unsplash)

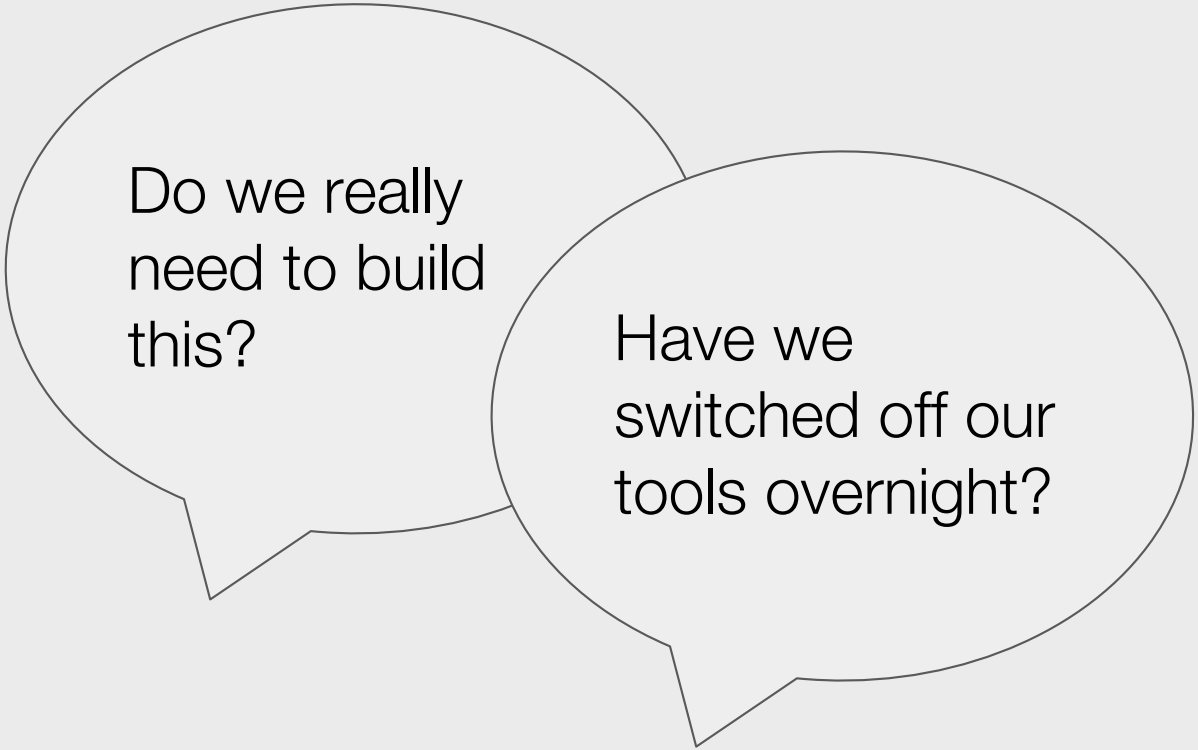
How do we reduce these emissions?

Zero carbon is possible!

“The size of the average web page increased at least threefold from 2010 to 2018.”

www.httparchive.org

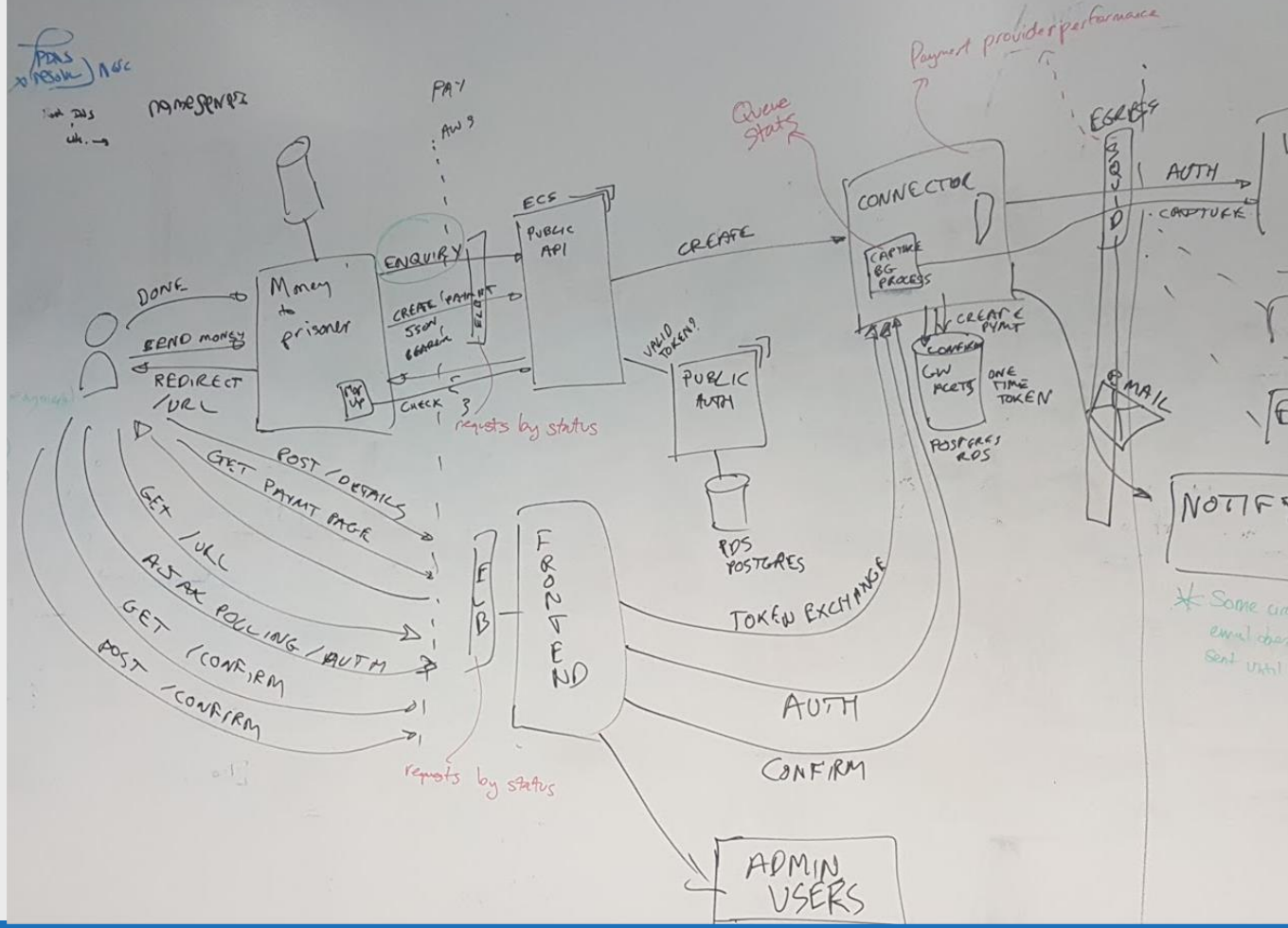
Use less
Waste less



“I reduced global emissions by an estimated 59 tonnes CO_2 per month by removing a 20KB JavaScript dependency”

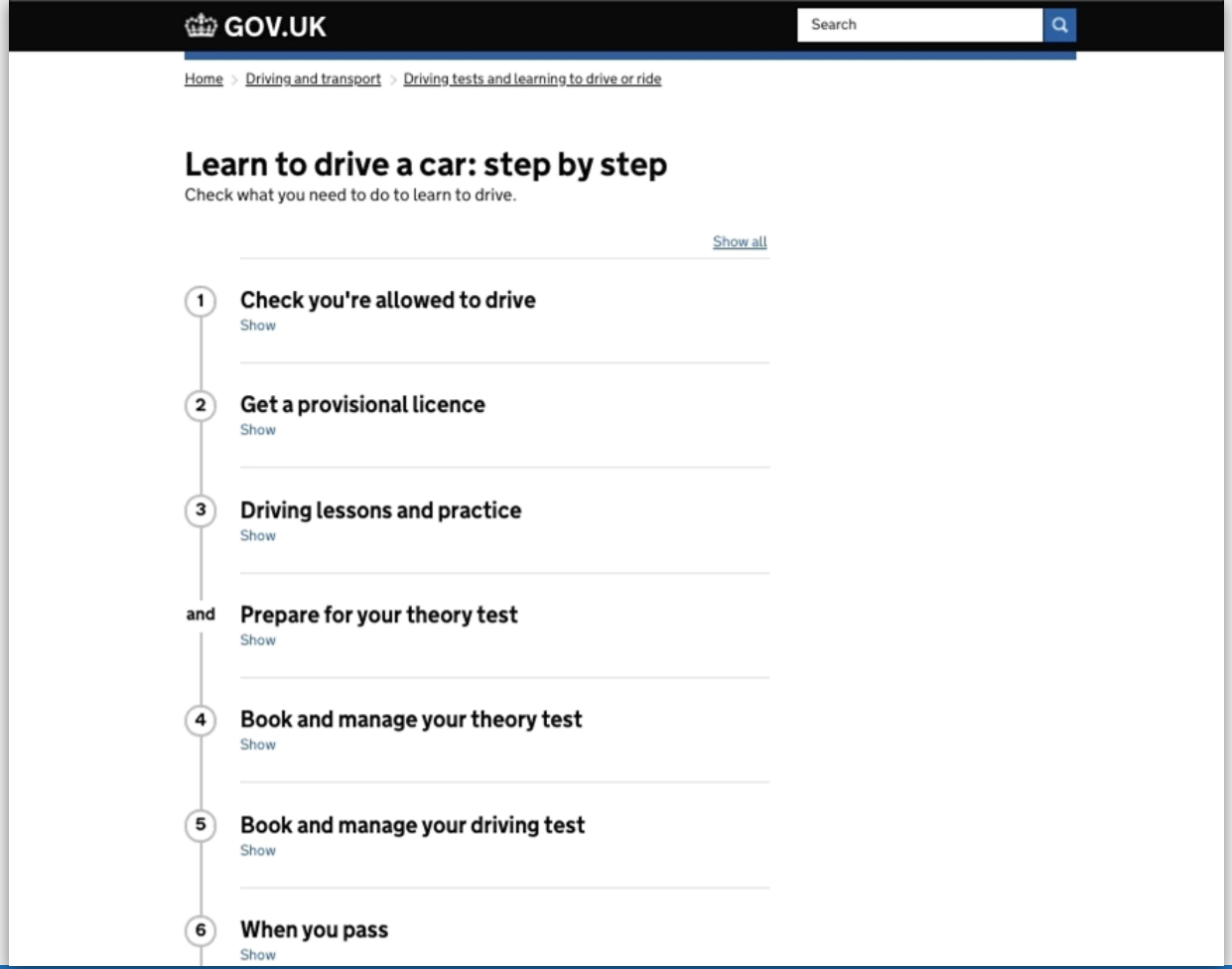
https://dannyvankooten.com/website-carbon-emissions/

Simplify



Payment provider performance
Queue stats
PAY
AWS
ECS
PUBLIC API
CREATE
CONNECTOR
CAPTURE BG PROCESS
EGRESS
SQUID
AUTH
CAPTURE
ENQUIRY
Money to prisoner
DONE
SEND MONEY
REDIRECT /URL
CREATE PAYMENT
CHECK
requests by status
VALID TOKEN?
PUBLIC AUTH
CREATE PYMT
CONFIRM
GW ACCTS
ONE TIME TOKEN
POSTGRES RDS
MAIL
NOTIF
POST /DETAILS
GET PAYMT PAGE
GET /URL
AJAX POLLING /AUTH
GET /CONFIRM
POST /CONFIRM
ELB
FRONTEND
PDS POSTGRES
TOKEN EXCHANGE
AUTH
CONFIRM
requests by status
ADMIN USERS

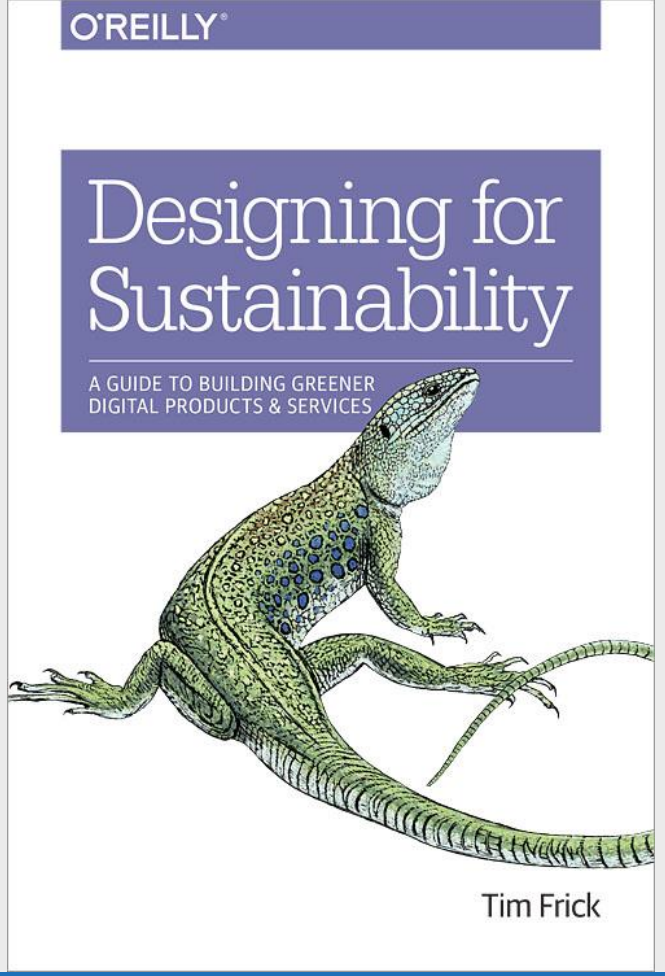
Simpler is better for everyone



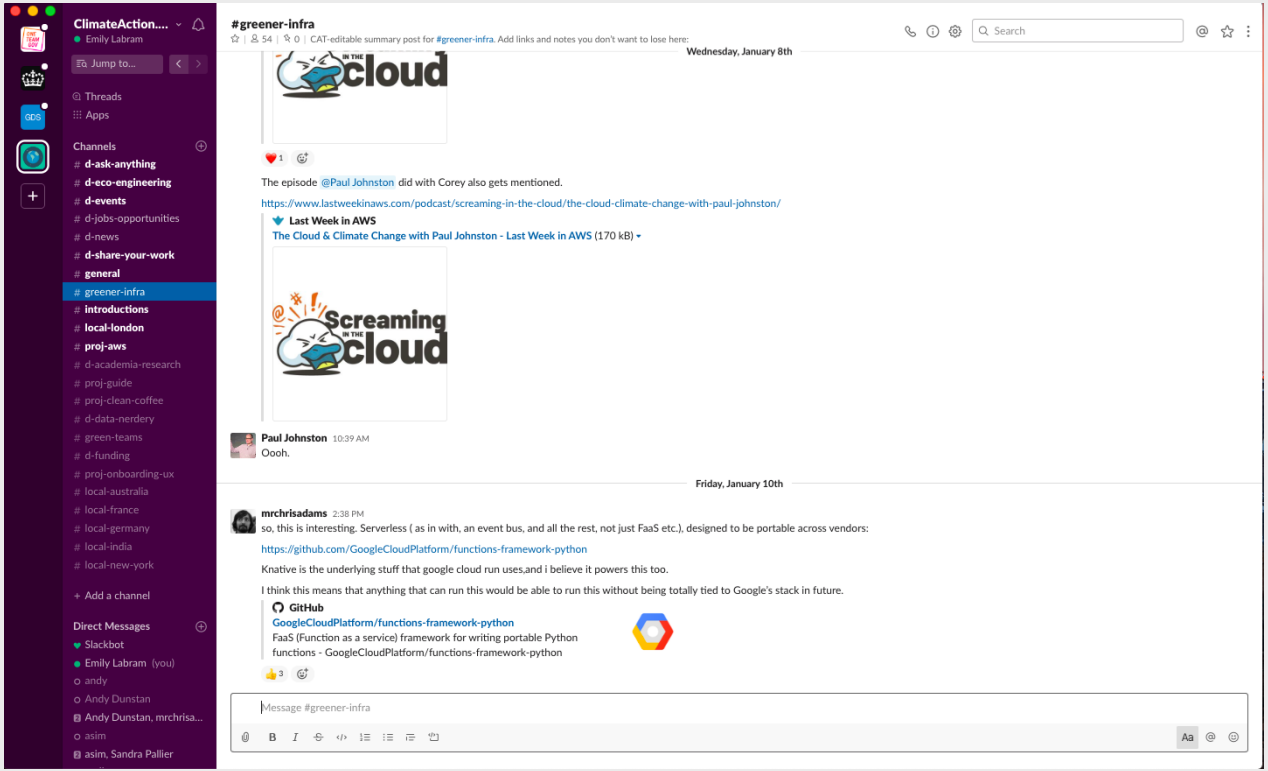
Show our Cloud Providers that we value sustainability

Google Cloud

Read more about Designing for Sustainability



Join the ClimateAction.Tech community



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Thanks!

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