

A World Health Organization study reveals:

3.6 billion people live in areas highly vulnerable to climate change.

250,000 additional deaths per year are expected to be caused by climate change.

The period of impact is from 2030 to 2050.

Saving the Planet with AWS : What you can do as a Cloud Architect

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AWS Community Builder



APJ Community Builders Open Mic

Agenda

- What is climate change and why you should care
- How we in tech contribute to climate change
- What AWS is doing to slow down climate change
- Things you can do as an AWS cloud architect

Quick Intro about myself



- **Solar Power:** We have a solar system at home, making us net zero in terms of national grid usage.
- **Hybrid Vehicle:** We drive a hybrid car to reduce our oil consumption.
- **Water Borehole:** We have drilled a borehole to eventually have our own water supply, reducing energy usage at national level.
- **Vegetarian Diet:** 50% of our household is vegetarian, contributing to lower greenhouse gas emissions and reduced resource consumption.
- **Remote Work:** Working from home minimizes our travel-related carbon footprint.

Defining moments: My bond with the planet

The picture that was never taken

2015



1995
















What is Climate Change?

- Climate change refers to long-term shifts in temperatures and weather patterns.
- These shifts can occur naturally due to:
 - Changes in the sun's activity
 - Large volcanic eruptions
- Since the 1800s, human activities have become the main drivers of climate change.
 - Primarily the burning of fossil fuels (coal, oil, gas)

Why you should care?

- The Earth's average surface temperature is now 1.2°C warmer (compared to 1800s).
- Scientists believe:
 - 1.5°C is the maximum temperature increase we can tolerate without significantly impacting current livable conditions.
- By the end of this century, a projected increase of 3.0°C could have lasting impacts on the way we live.

Okay, but why
should you really,
really care?

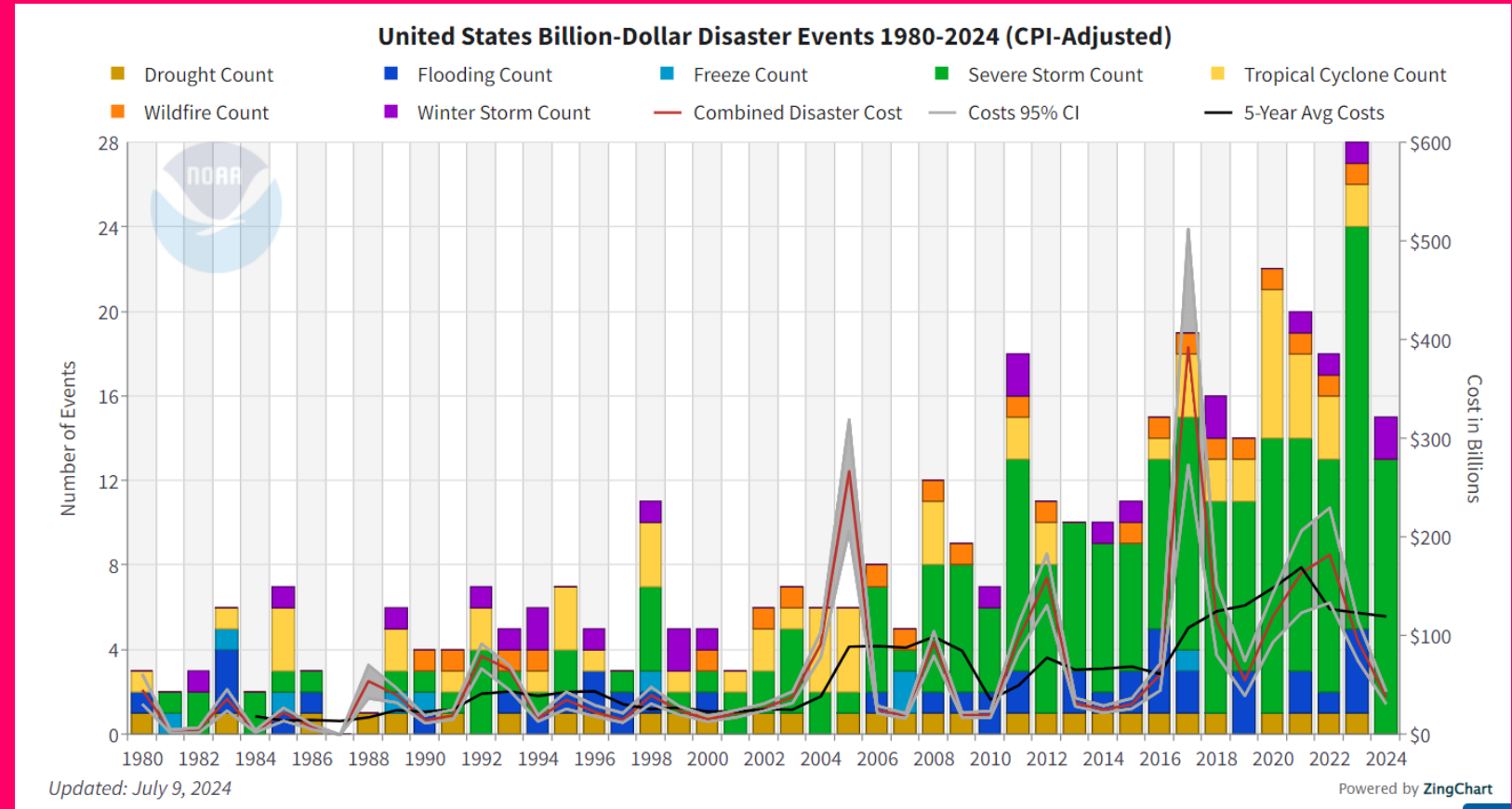
Temperature Increase	Health Impacts	Ecosystem Shifts	Agriculture Impacts	Water Stress Impact	Major Events
1.5°C - 2°C	 Moderate Risk	 20% Impact	 Mixed Impact	 Affects Millions	 Significant Seal Level Rise Possible
2°C - 2.5°C	 Higher Risk	 Over 20% Impact	 Declines in Productivity	 Severe Impact	 Catastrophic Events Likely
2.5°C - 3°C	 Widespread Mortality	 Drastic Changes	 Widespread Declines	 Intensified Stress	 Extreme Events Highly Probable

“Four decades ago:

3 climate events
average per year.

Last 5 years:

13 climate
events average per
year.”



How we in tech contribute to climate change

6% of global energy demand comes from Information and Communication Technology (ICT), including:



Data centers



Communication networks



User devices

3% of global energy demand is accounted for by data centers, which power our tech industry.

What AWS is doing to slow down climate change

4.1x

AWS infrastructure is up to 4.1 times more energy efficient than on-premises and can reduce workloads' carbon footprint by up to 99%

3.9 Billion

Liters of water are returned to communities each year from replenishment projects completed or underway

100%

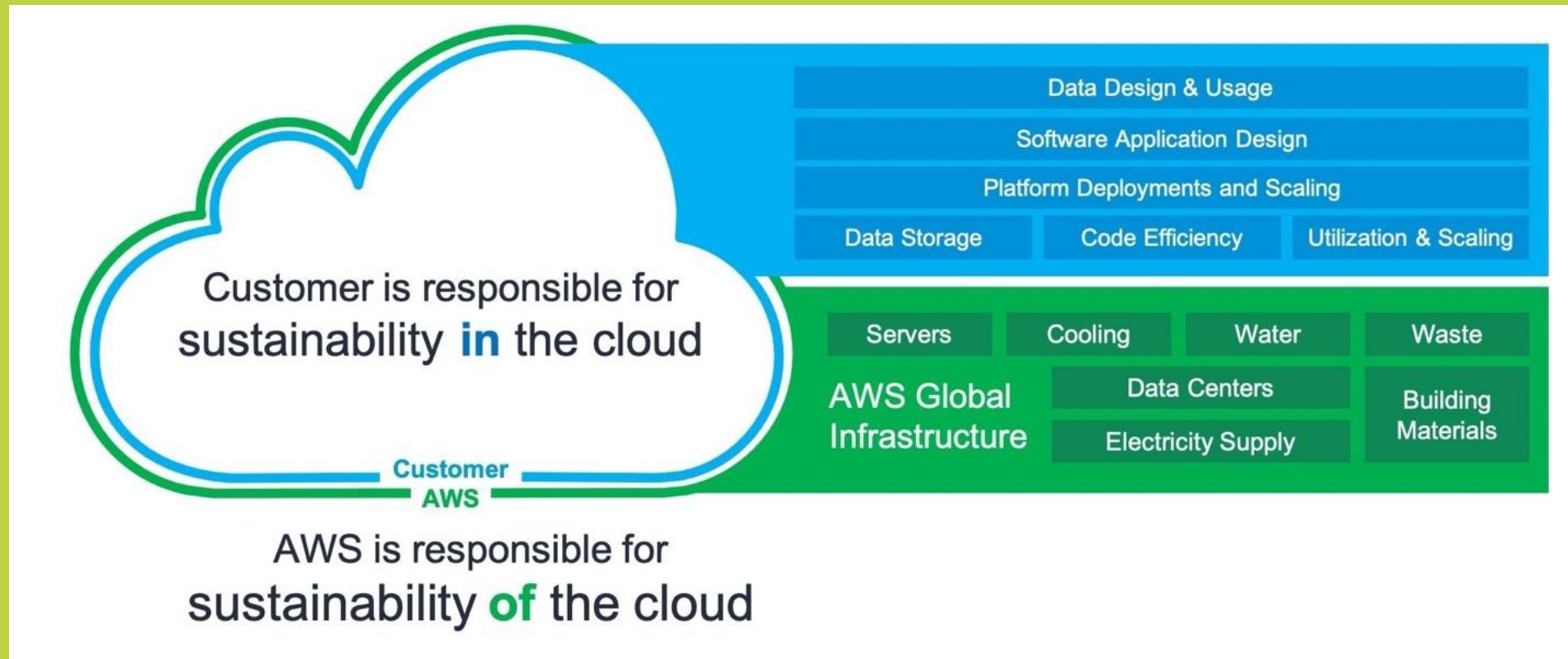
Of electricity consumed by Amazon was matched with renewable energy sources in 2023

Net-zero - AWS aims to achieve net-zero carbon emissions across its operations by 2040 through investments in carbon-free energy and scaling solutions.

Net-zero refers to the balance achieved when the amount of greenhouse gases emitted into the atmosphere is equal to the amount removed, resulting in no net increase in atmospheric greenhouse gas levels.



AWS Well-Architected Framework - Sustainability pillar



Things you can do as an AWS Cloud Architect



Infrastructure Optimization



Data Management



Application Design



Renewable Energy and Offsets



Operational Practices

Infrastructure Optimization



Right-Sizing Instances: Regularly review and adjust the size of your instances to match the actual workload needs.



Instance Scheduling: Turn off non-essential instances during off-peak hours.



Spot Instances: Utilize spot instances for non-critical workloads to reduce costs and energy consumption.



Implement containerization with AWS Fargate: Run containers without managing servers, optimizing resource use and reducing energy consumption.



Auto Scaling: Implement auto-scaling to ensure resources are used only when necessary.



Serverless Architectures: Use AWS Lambda and other serverless services to eliminate the need for always-on infrastructure.



Use Graviton-based EC2 instances: Save up to 60% more energy with AWS Graviton-based instances, offering superior efficiency and the best price-performance ratio.

Data Management



Data Lifecycle Policies: Implement policies to automatically move data to cheaper and less energy-intensive storage classes.



Database Optimization: Optimize database queries and indexes to reduce compute cycles and energy consumption.



Efficient Data Transfer: Use AWS DataSync or Transfer Acceleration to optimize data transfer processes.



Data Compression: Compress data to reduce storage space and energy usage.



Data Archiving: Archive infrequently accessed data to Glacier or other cold storage options.



Deploy managed databases: Implement managed databases like Aurora to adjust capacity based on demand, optimizing resource usage.

Application Design



Optimize Code: Write efficient, optimized code to reduce the compute power required.



Use Efficient Algorithms: Choose algorithms and data structures that are known for their efficiency.




Implement Caching: Use caching solutions like Amazon ElastiCache to reduce the load on your compute resources.




Microservices Architecture: Break down applications into microservices to ensure they can scale independently and more efficiently.


Renewable Energy and Offsets


 **Leverage AWS Regions with Renewable Energy:** Prefer regions powered by renewable energy.


 **Purchase Carbon Offsets:** Invest in carbon offset programs to neutralize your energy consumption.

 **Carbon Footprint Monitoring:** Use tools like Customer Carbon Footprint Tool to monitor and manage your carbon footprint.

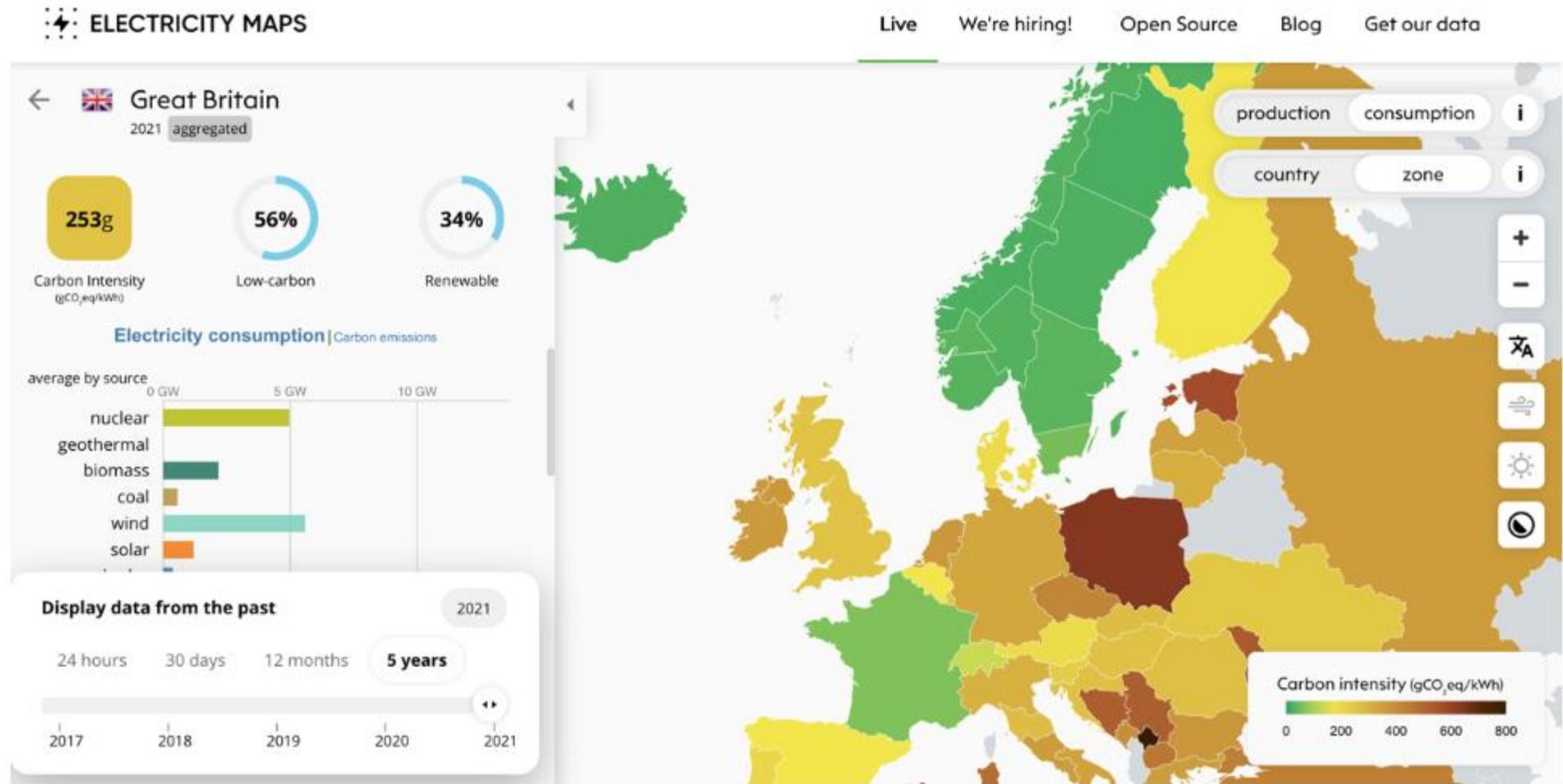
Operational Practices

 **Continuous Monitoring and Optimization:** Continuously monitor and optimize resource utilization using AWS tools.

 **Employee Awareness and Training:** Educate and train employees on energy-efficient practices and the importance of sustainability.

 **Green Coding Practices:** Adopt green coding practices such as minimizing resource-intensive operations and optimizing memory usage.

Electricity Map - <https://app.electricitymaps.com/map>



Example - Europe (Stockholm) Region has a lower carbon intensity of electricity consumed compared to the Europe (London) Region.

Customer Carbon Footprint Tool

Home

Billing

Bills

Payments

Credits

Purchase orders

Cost & usage reports

Cost categories

Cost allocation tags

Free tier

Billing Conductor

Cost Management

Cost explorer

Budgets

Budgets reports

Savings Plans

Preferences

Billing preferences

Payment preferences

Consolidated billing

Tax settings

Permissions

Affected policies

AWS Billing > Cost and Usage Reports

Cost and Usage Reports

AWS Cost and Usage reports provide access to detailed data, enabling you to better analyze and understand your AWS costs as well as the specific product offerings and usage amounts underlying those costs. You can customize the content and delivery of your reports and manage them from the reports dashboard.

Create report

Analyze your cost and usage

AWS Cost Explorer lets you dive deeper into your cost and usage data to identify trends, pinpoint cost drivers, and detect anomalies.

View in Cost Explorer

Monitor your Reserved Instance (RI)

This report allows you to visualize your RI utilization, providing insight into increasing your RI usage efficiency.

View in Utilization Report

AWS Usage Report

You can download dynamically generated AWS usage reports that cover a single service.

Create a Usage Report

Customer Carbon Footprint Tool

Start month: May 2020

End month: Dec 2022

Download

Your carbon emissions summary

Compares your carbon emissions with on-premises computing equivalents

3,672.1 MTCO2e

Your estimated AWS emissions

12,181.3 MTCO2e

Your emissions saved on AWS

Your emissions by geography

Your emissions by services

Service	Carbon emissions	%
EC2	3,240.3 MTCO2e	88.24%
S3	377.9 MTCO2e	10.29%
CloudFront	57.9 MTCO2e	1.47%

CloudShell Feedback Language

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MTCO2e, or metric tons of carbon dioxide equivalent, is an industry-standard unit for measuring greenhouse gas (GHG) emissions. It allows comparison of different GHGs by quantifying their impact on the environment and global warming.

Energy Saving Tips :At the office or at home:



Turn off unnecessary lights



Unplug electronics



Walk instead of taking the elevator



Print less



Use energy-saving settings



Use natural light

Thank you!

