CLOUD SUSTAINABILITY FUNDAMENTALS

Cloud Region Carbon Intensity Scorecard

Practical scorecard for engineers to cut cloud emissions by selecting a Green Deployment Region

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greenpixie

THE GREENOPS ACADEMY

Introduction

Why selecting region matters

Your cloud usage runs on power taken from the local grid of the hyperscale data centre your workload is running in. Due to the differing availability of renewables around the globe, local grids vary in their carbon intensity.

This means the same power consumption will emit more, or less, carbon depending on where the computation is happening.

What you can do

When choosing your cloud region, check this Greenpixie region score card and pick the region with the highest Sustainability Grade you can within your other requirements.

What does the grade mean?

A+	**Best - The lowest gco2/kwh regions available**
A	~1.4x -3x the carbon intensity of Grade A+
B	~3x – 6x the carbon intensity of Grade A+
C	~6x – 10x the carbon intensity of Grade A+
D	~10x – 15x the carbon intensity of Grade A+
E	~15x – 25x the carbon intensity of Grade A+
F	**Worst ~25x the carbon intensity of Grade A+**

These grades are calculated quarterly based on region-specific, hourly carbon intensity data provided by Greenpixie's GPX-Grid product. This data source is maintained by our internal research team to provide customers with as granular and accurate grid intensity data as possible, so they can make nuanced GreenOps decisions.

Grid carbon intensity fluctuates significantly across a 24 hour period. These grades are based on long term averages and used to give an indication to engineers of regional grid carbon intensity over months or years, in order to promote sustainable decision-making in the cloud at the point of deployment. This is not a live depiction of current grid carbon intensities around the world.

Cloud Region Carbon Intensity Scorecard (AWS)

AWS Region	Country	Grid Carbon Intensity Grade
eu-north-1	Sweden	A+
eu-central-2	Switzerland	A+
ca-central-1	Canada	A+
eu-west-3	France	A+
sa-east-1	Brazil	B
eu-south-2	Spain	B
eu-west-2	England	B
us-west-2	US	C
us-gov-west-1	US	C
us-west-1	US	C
eu-south-1	Italy	C
eu-west-1	Ireland	D
eu-central-1	Germany	D
us-gov-east-1	US	D
us-east-2	US	D
us-east-1	US	D
me-central-1	United Arab Emirates	D
il-central-1	Israel	E
me-south-1	Bahrain	E
ap-northeast-2	South Korea	E
ap-northeast-3	Japan	E
ap-northeast-1	Japan	E
mx-central-1	Mexico	E
ap-southeast-1	Singapore	E
ap-east-1	China	E
cn-northwest-1	China	E
cn-north-1	China	E
ap-southeast-7	Thailand	E
ap-east-2	Taiwan	E
ap-southeast-5	Malaysia	E
ca-west-1	Canada	E
ap-southeast-2	Australia	E
ap-south-2	India	E
ap-south-1	India	E
af-south-1	South Africa	F
ap-southeast-4	Australia	F
ap-southeast-3	Indonesia	F

Cloud Region Carbon Intensity Scorecard (Azure)

Azure Region	Country	Grid Carbon Intensity Grade
swedensouth	Sweden	A+
swedencentral	Sweden	A+
switzerlandwest	Switzerland	A+
switzerlandnorth	Switzerland	A+
canadaeast	Canada	A+
norwaywest	Norway	A+
norwayeast	Norway	A+
bleufrancesouth	France	A+
bleufrancecentral	France	A+
francesouth	France	A+
francecentral	France	A+
westus2	US	A
canadacentral	Canada	A
brazilsoutheast	Brazil	B
brazilsouth	Brazil	B
austriaeast	Austria	B
newzealandnorth	New Zealand	B
spaincentral	Spain	B
uksouth	UK	B
belgiumcentral	Belgium	C
westus	US	C
chilecentral	Chile	C
italynorth	Italy	C
attnewyork1	US	C
ukwest	UK	C
westus3	US	C
usgovarizona	US	C
northeurope	Ireland	D
usgovtexas	US	D
southcentralus	US	D
attdallas1	US	D
germanywestcentral	Germany	D
germanynorth	Germany	D
eastus2	US	D
eastus	US	D
usgovvirginia	US	D
northcentralus	US	D
eastasia	China	D
westeurope	Netherlands	D
uaenorth	United Arab Emirates	D
uaecentral	United Arab Emirates	D

israelnorthwest	Israel	E
israelcentral	Israel	E
koreasouth	South Korea	E
koreacentral	South Korea	E
japanwest	Japan	E
japaneast	Japan	E
attatlanta1	US	E
mexicocentral	Mexico	E
southeastasia	Singapore	E
sgxsingapore1	Singapore	E
centralus	US	E
attdetroit1	US	E
polandcentral	Poland	E
qatarcentral	Qatar	E
taiwannorthwest	Taiwan	E
taiwannorth	Taiwan	E
malaysiawest	Malaysia	E
malaysiasouth	Malaysia	E
westcentralus	US	E
australiaeast	Australia	E
australiacentral2	Australia	E
australiacentral	Australia	E
westindia	India	E
southindia	India	E
jioindiawest	India	E
jioindiacentral	India	E
centralindia	India	E
southafricawest	South Africa	F
southafricanorth	South Africa	F
australiasoutheast	Australia	F
indonesiacentral	Indonesia	F

Cloud Region Carbon Intensity Scorecard (GCP)

GCP Region	Country	Grid Carbon Intensity Grade
europe-north2	Sweden	A+
europe-west6	Switzerland	A+
northamerica-northeast1	Canada	A+
europe-west9	France	A+
northamerica-northeast2	Canada	A
us-west1	US	A
europe-north1	Finland	A
southamerica-east1	Brazil	B
europe-southwest1	Spain	B
europe-west2	London	B
europe-west1	Belgium	C
southamerica-west1	Chile	C
europe-west8	Italy	C
europe-west12	Italy	C
us-west2	US	D
europe-west7	Ireland	D
aws-eu-west-1	Ireland	D
us-east7	US	D
us-south1	US	D
europe-west5	Germany	D
europe-west3	Germany	D
europe-west10	Germany	D
aws-eu-central-1	Germany	D
us-east5	US	D
us-east4	US	D
us-west8	US	D
us-west7	US	D
us-west6	US	D
us-west5	US	D
us-east9	US	D
us-east8	US	D
us-central5	US	D
us-central4	US	D
us-central3	US	D
us	US	D
us-west4	US	D
asia-east2	China	D
europe-west4	Netherlands	D
me-west1	Israel	E
aws-ap-northeast-2	South Korea	E
asia-northeast3	South Korea	E

asia-northeast2	Japan	E
asia-northeast1	Japan	E
us-central2	US	E
northamerica-south1	Mexico	E
asia-southeast1	Singapore	E
us-central1	US	E
europe-central2	Poland	E
me-central1	Qatar	E
asia-southeast3	Thailand	E
asia-east1	Taiwan	E
me-central2	Saudi Arabia	E
us-west3	US	E
aws-ap-southeast-2	Australia	E
australia-southeast1	Australia	E
asia-south2	India	E
asia-south1	India	E
africa-south1	South Africa	F
us-east1	US	F
australia-southeast2	Australia	F
asia-southeast2	Indonesia	F

To be a GreenOps Advocate in your organisation, make sure you:

Use this scorecard every time you plan or deploy.

Even when you can’t act, simply ask the question to help shift culture and improve future decisions.

Remember, the best time to make carbon-aware choices is before you spin up infrastructure when architecture and automation are still flexible. Shift left!