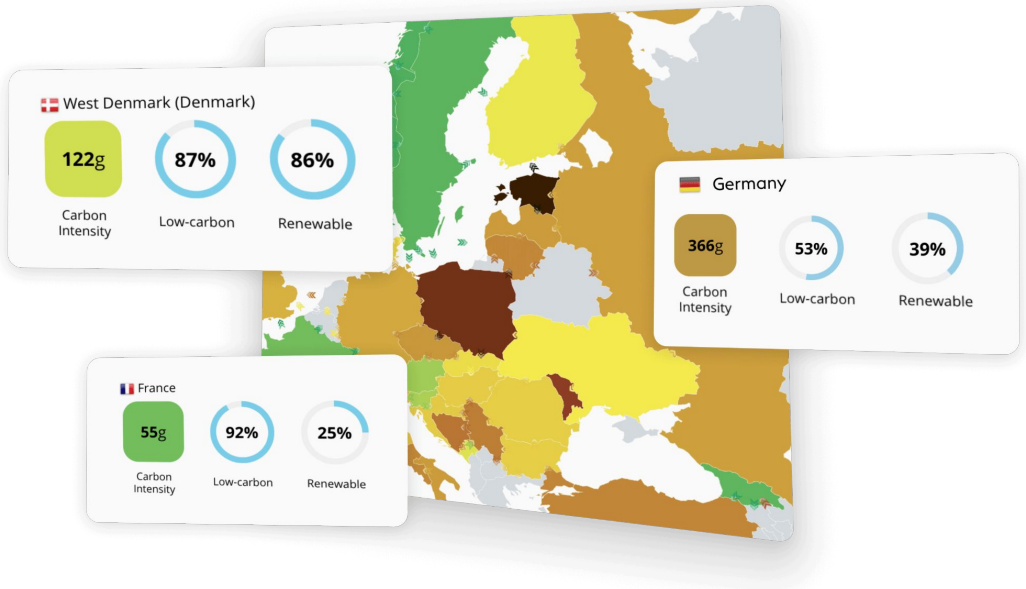
electricityMap

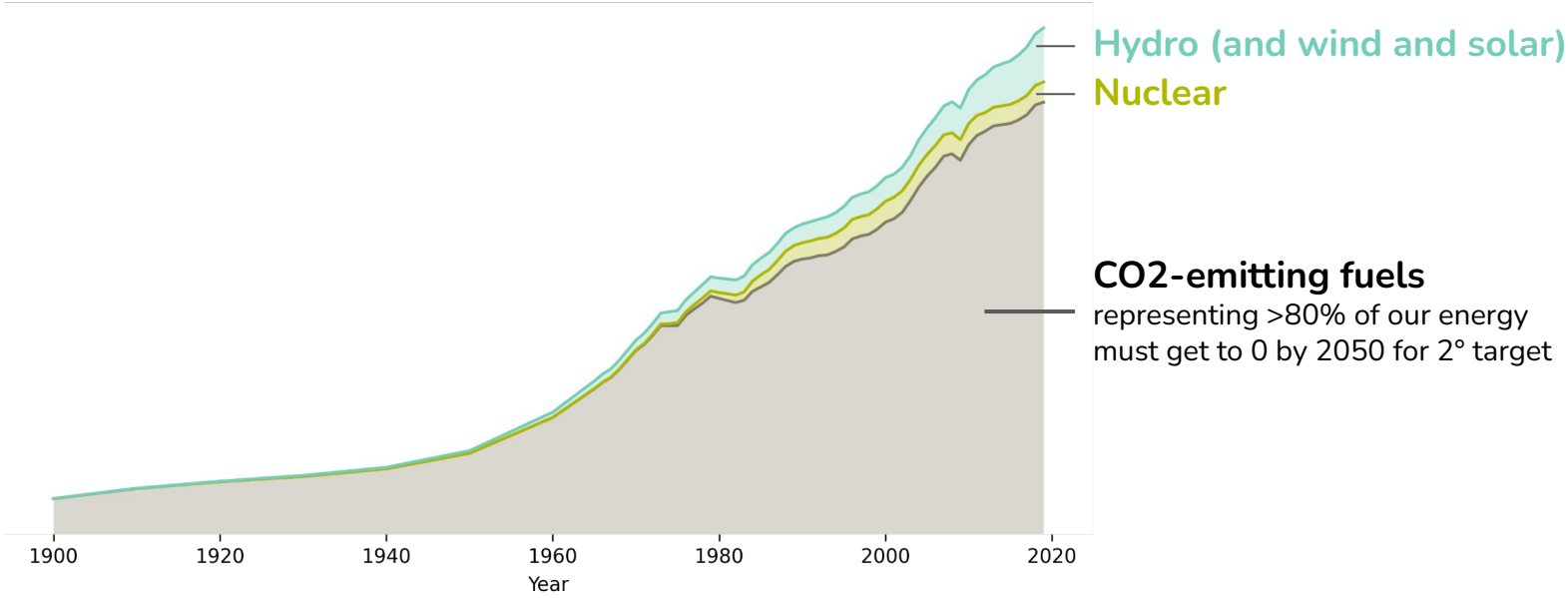
Today: **How does ML allow electricityMap to drive the transition towards a truly decarbonised electricity system?**

electricityMap



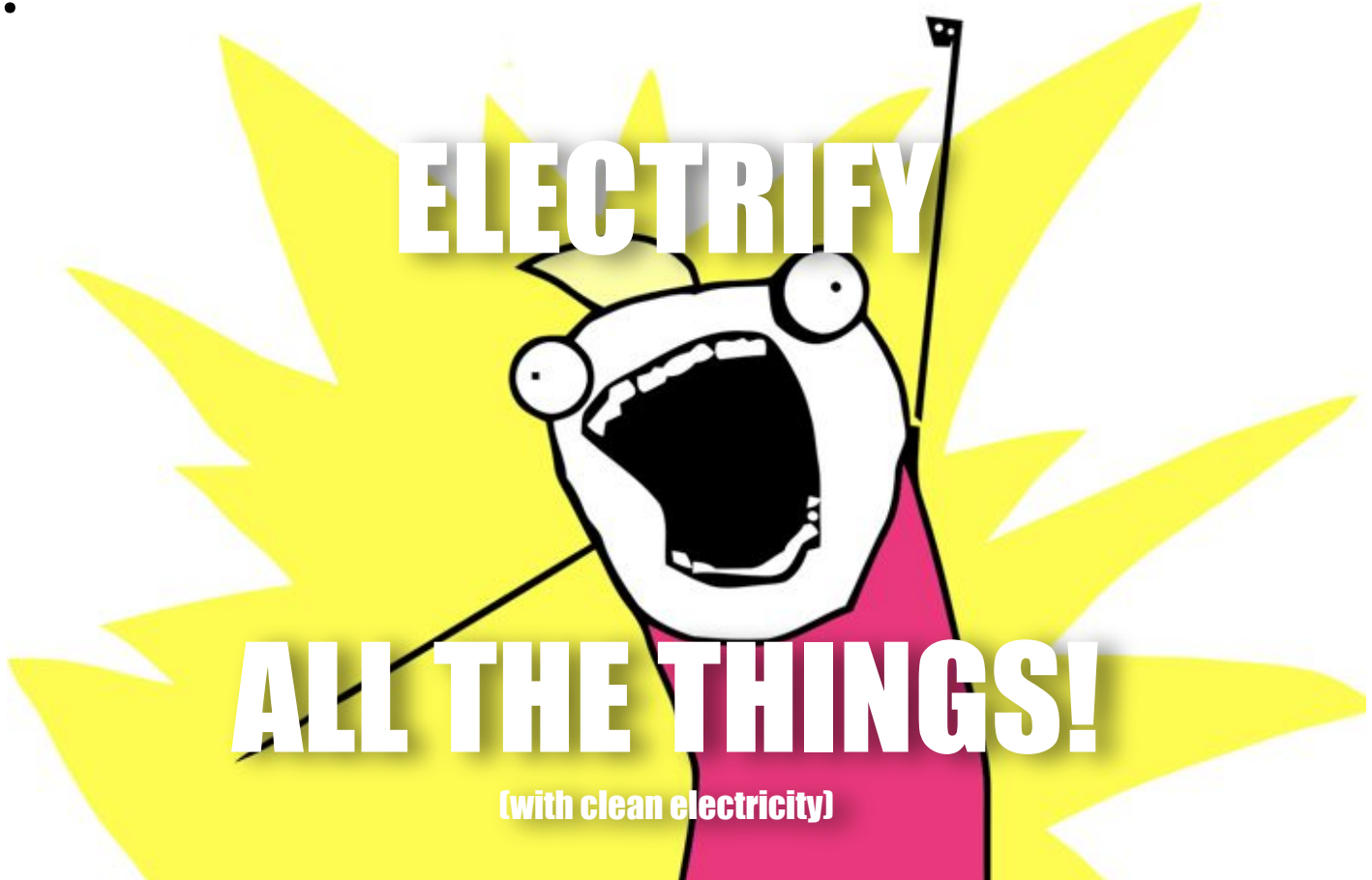
Climate change is caused by fossil fuels

and our world is powered by them



Read more at https://www.tmrow.com/climatechange

Easy.



Information precedes action

Our mission is to **organise the world's electricity data** to drive the transition towards a **truly decarbonised** electricity system.

electricityMap maps the footprint of electricity

worldwide and **in real-time**

See app.electricitymap.org

Popular with consumers
10K-15K daily active users on our live map (organic traffic only)

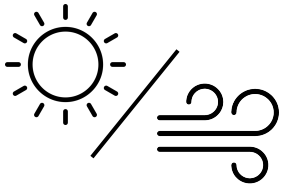
Publications & blog posts
Cited in +100 articles and global readership of our blog posts

Shaping emerging regulation
Used by ministers and head of states, enabling us to engage at policy level

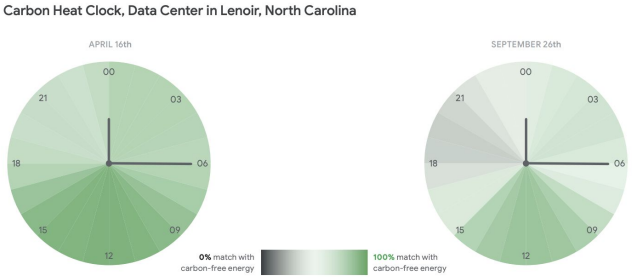
Open source integrations
1300 contributions led to 90+ countries. Most popular #climate-change project. +6000 Home Assistant integrations

Using ML to achieve electricityMap’s vision

Enabling granular carbon accounting (1/3)



variations



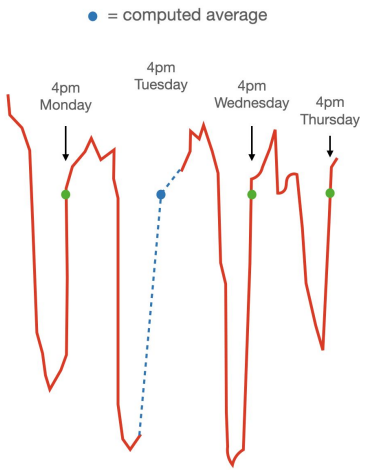
Hourly accounting

electricityMap must provide hourly carbon intensity everywhere needed

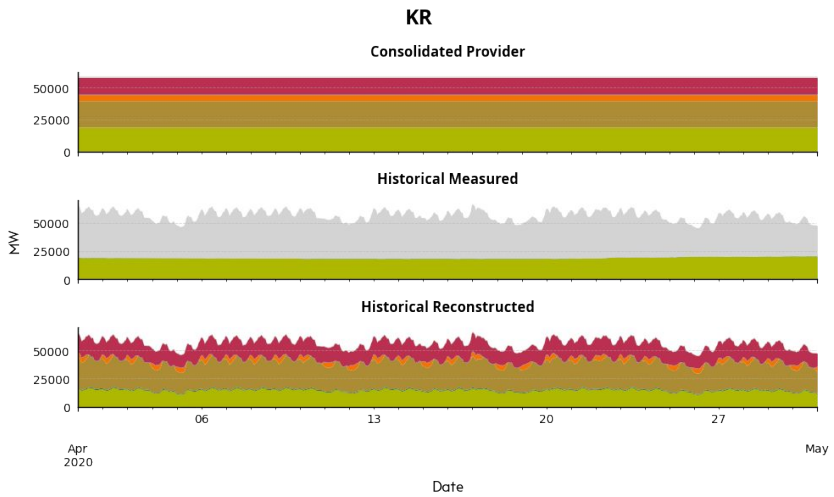
Read more at https://www.gstatic.com/gumdrop/sustainability/24x7-carbon-free-energy-methodologies-metrics.pdf

Enabling granular carbon accounting (2/3)

Estimations models



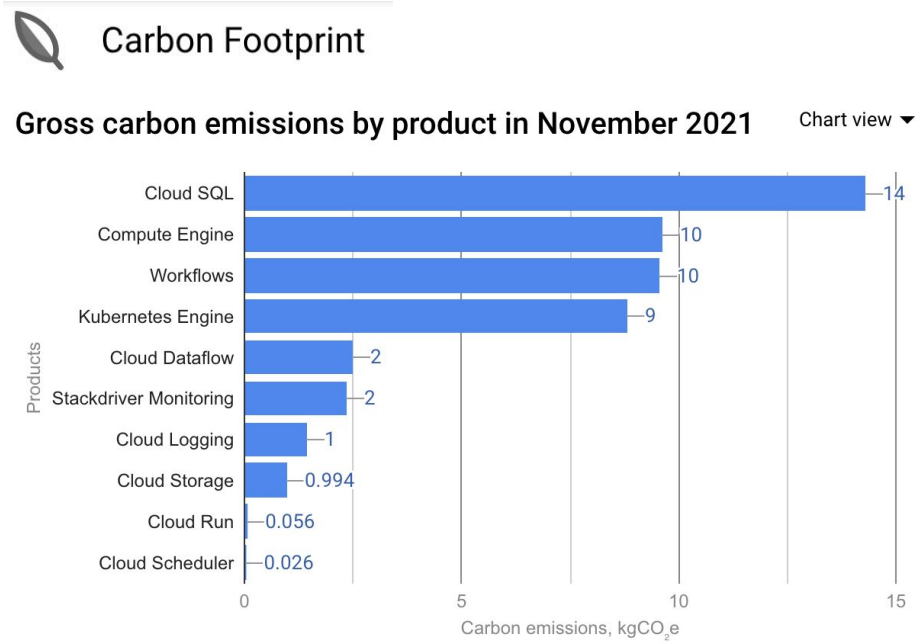
Gap filling



Production mix estimation

Enabling granular carbon accounting (3/3)

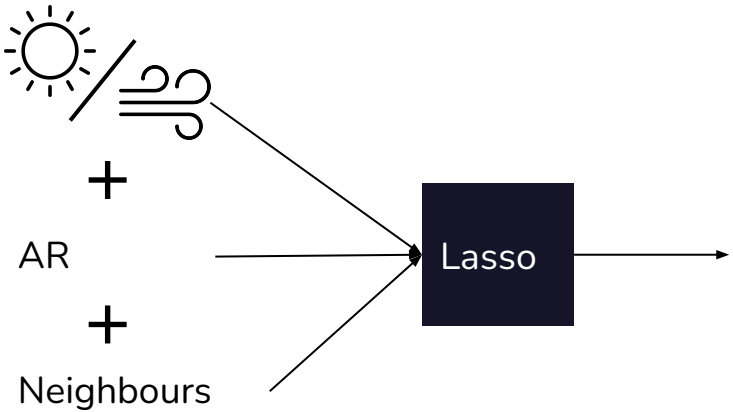
Information unlocks pathways for reduction



Read more at https://console.cloud.google.com/carbon

Enabling demand side response (1/3)

Forecasting carbon intensity for smart consumption



Example: Germany (DE)

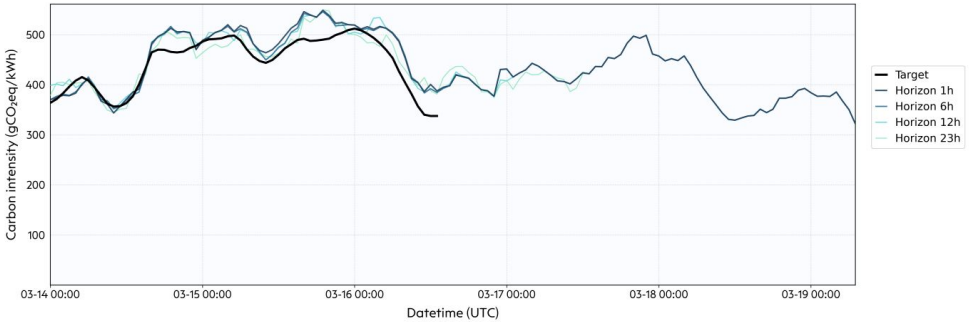
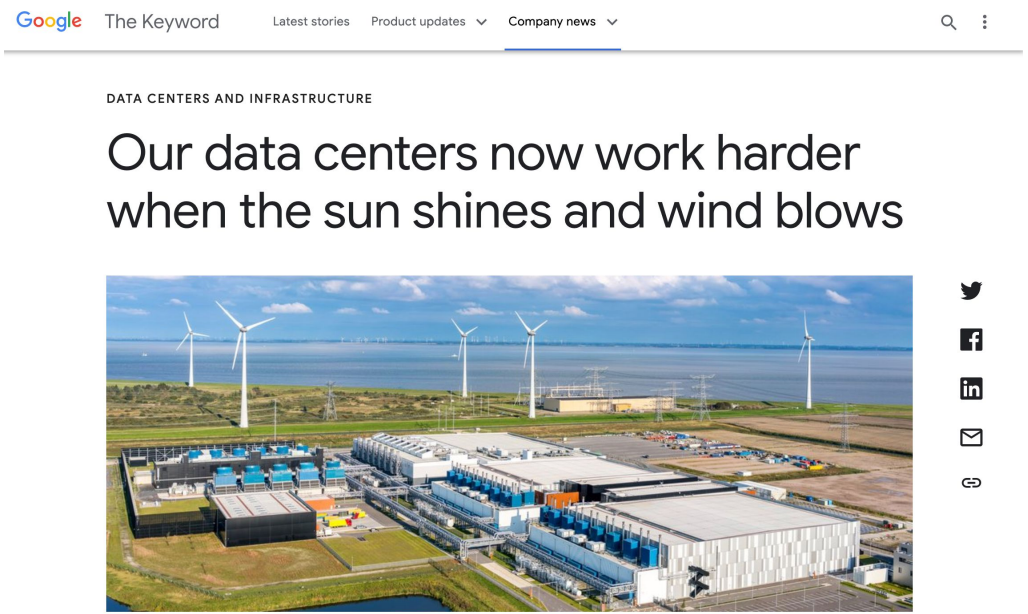
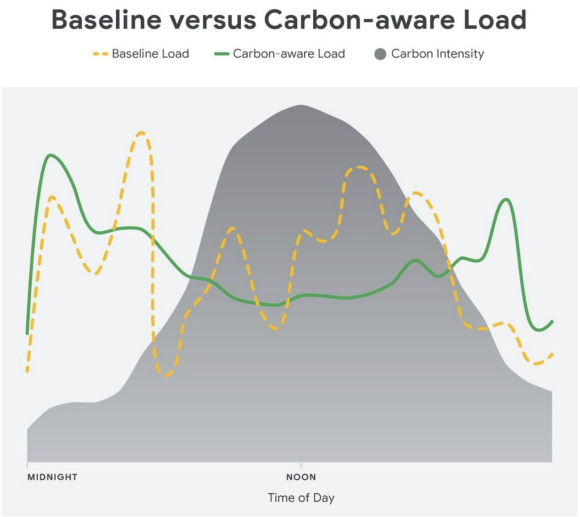


Figure 1: Comparison of the historical carbon intensity (Target) with forecasted carbon intensity for multiple horizons (Horizon h).

Enabling demand side response (2/3)

Forecasting carbon intensity for smart consumption



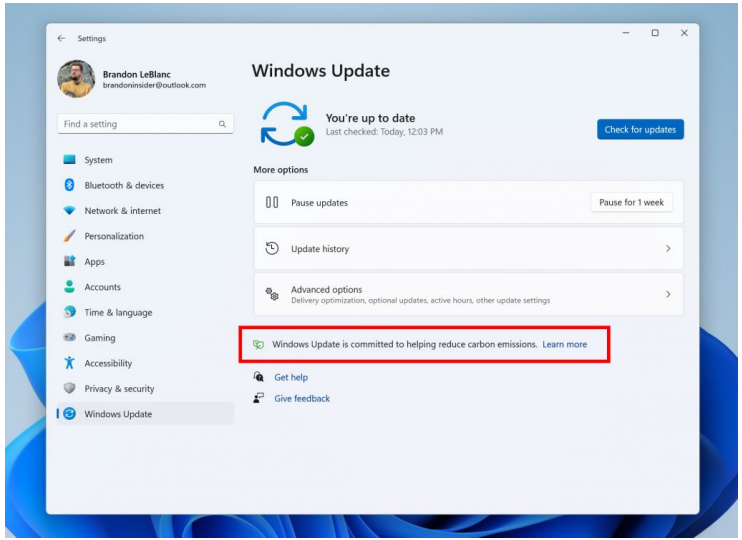


Read more at https://blog.google/inside-google/infrastructure/data-centers-work-harder-sun-shines-wind-blows/

Enabling demand side response (3/3)

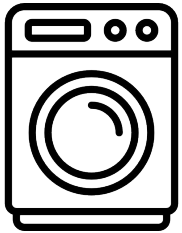
Forecasting consumption mix for smart consumption

For individual homes



For computing devices

For electric cars



For appliances

Read more at https://blogs.windows.com/windows-insider/2022/03/02/announcing-windows-11-insider-preview-build-22567/

Assessing the impact of decarbonisation projects - Long term marginal

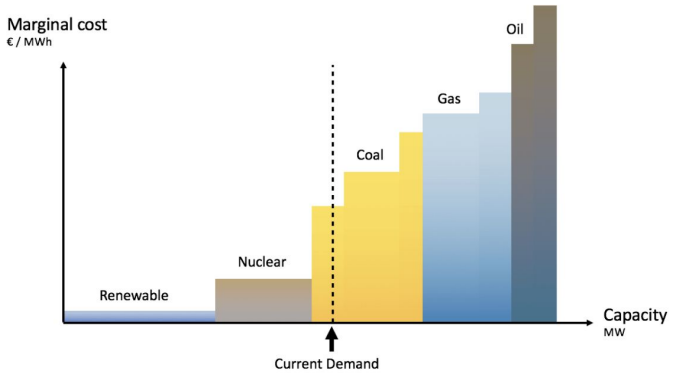
Changes in local generation (or import) from one hour to the other

due to **changes in local demand**

$$dX = f(z) + g(z)dL$$

due to **changes that are independent** of changes in local demand (changes of temperature, wind speed, cloud coverage…)

Marginal factor



Read more at https://electricitymap.org/blog/marginal-carbon-intensity-of-electricity-with-machine-learning/

The best minds of our generation are thinking about ~~how to make people click on ads~~ climate change.

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