

BRAINBOX AI[®]

The role of AI in retailer's sustainability plan – Unlocking the Scope 2 level

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October 2023

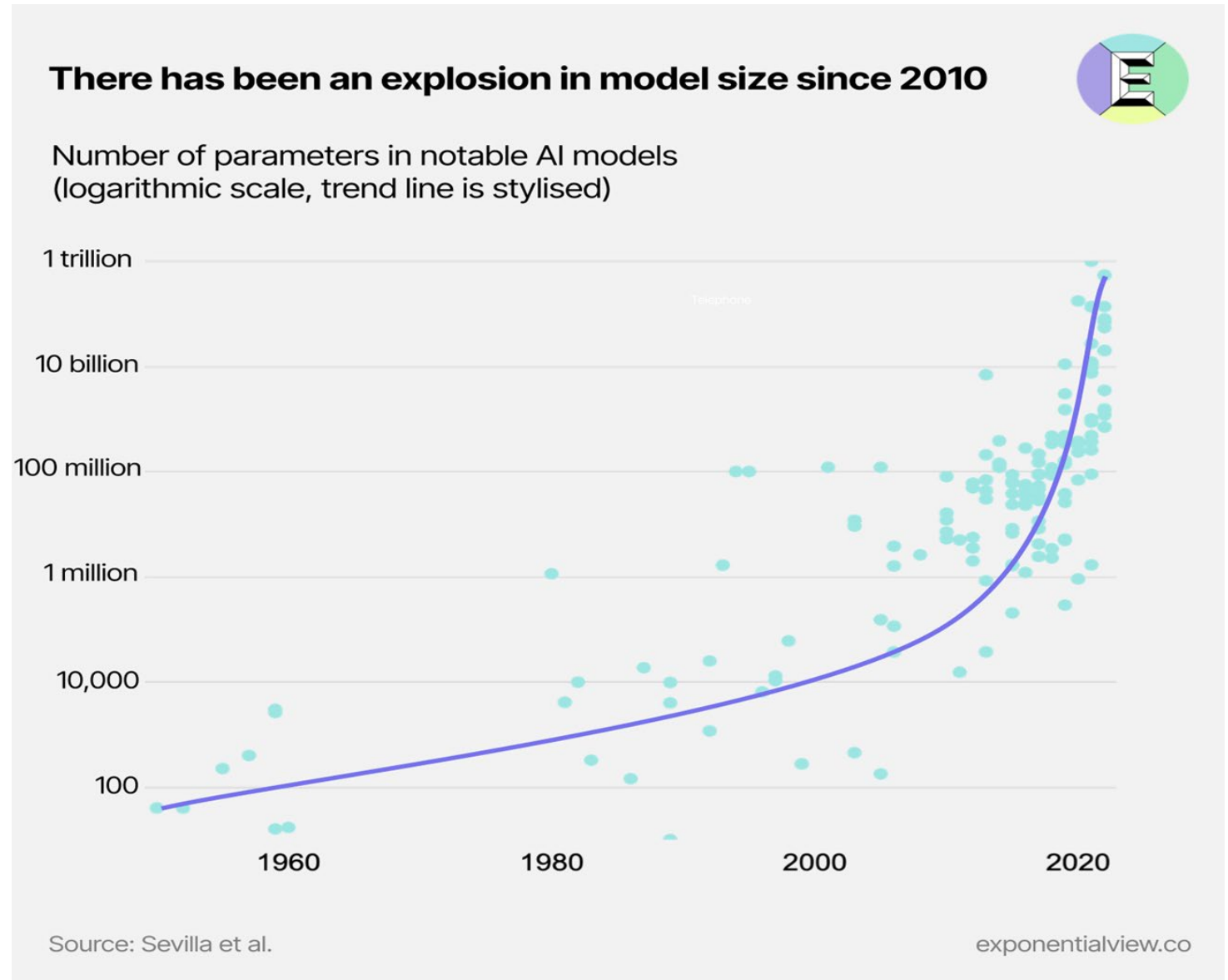
An aerial photograph of a dense, lush green forest. The trees are tightly packed, creating a textured canopy of various shades of green. The lighting is soft, suggesting a slightly overcast day or a time of day like dawn or dusk. The overall mood is serene and natural.

SAVE THE PLANET WITH AI

The exponential growth of AI

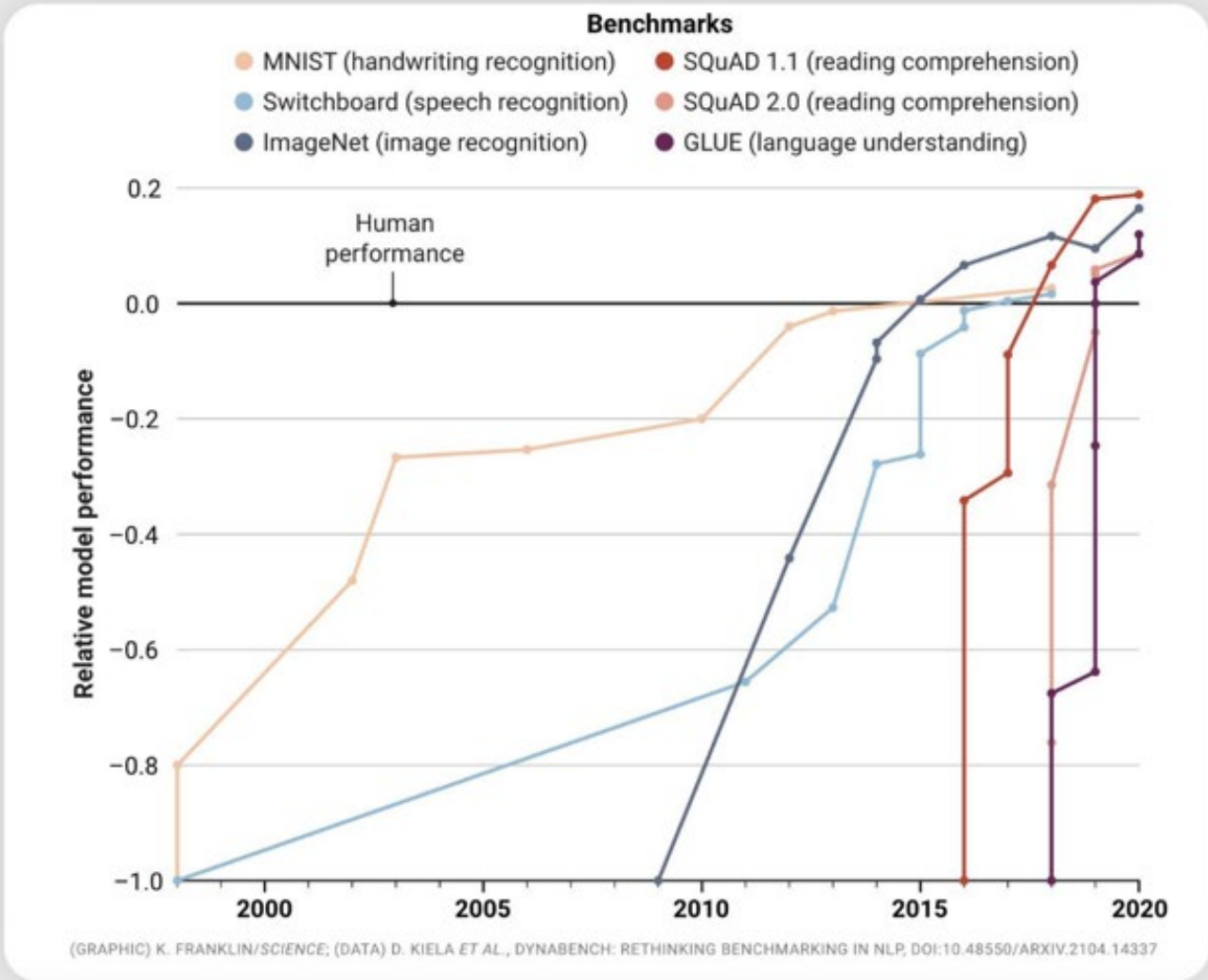
Since 2010, the scale of AI models has exploded.

The number of parameters in the most notable AI models approach one TRILLION.



AI model performance relative to human performance

AI is at an inflection point

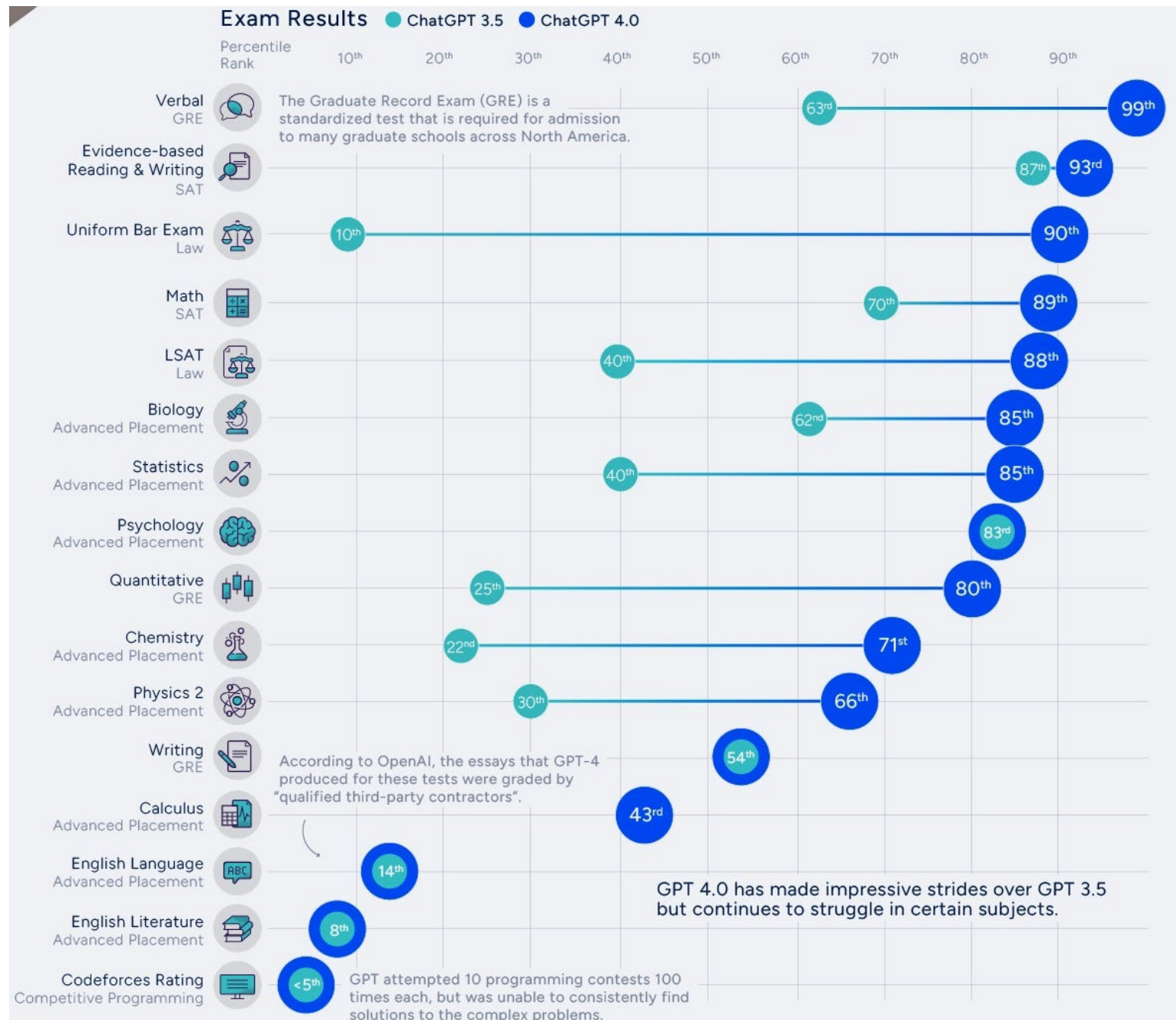


Source: K. Franklin/Science, Kiela et al.

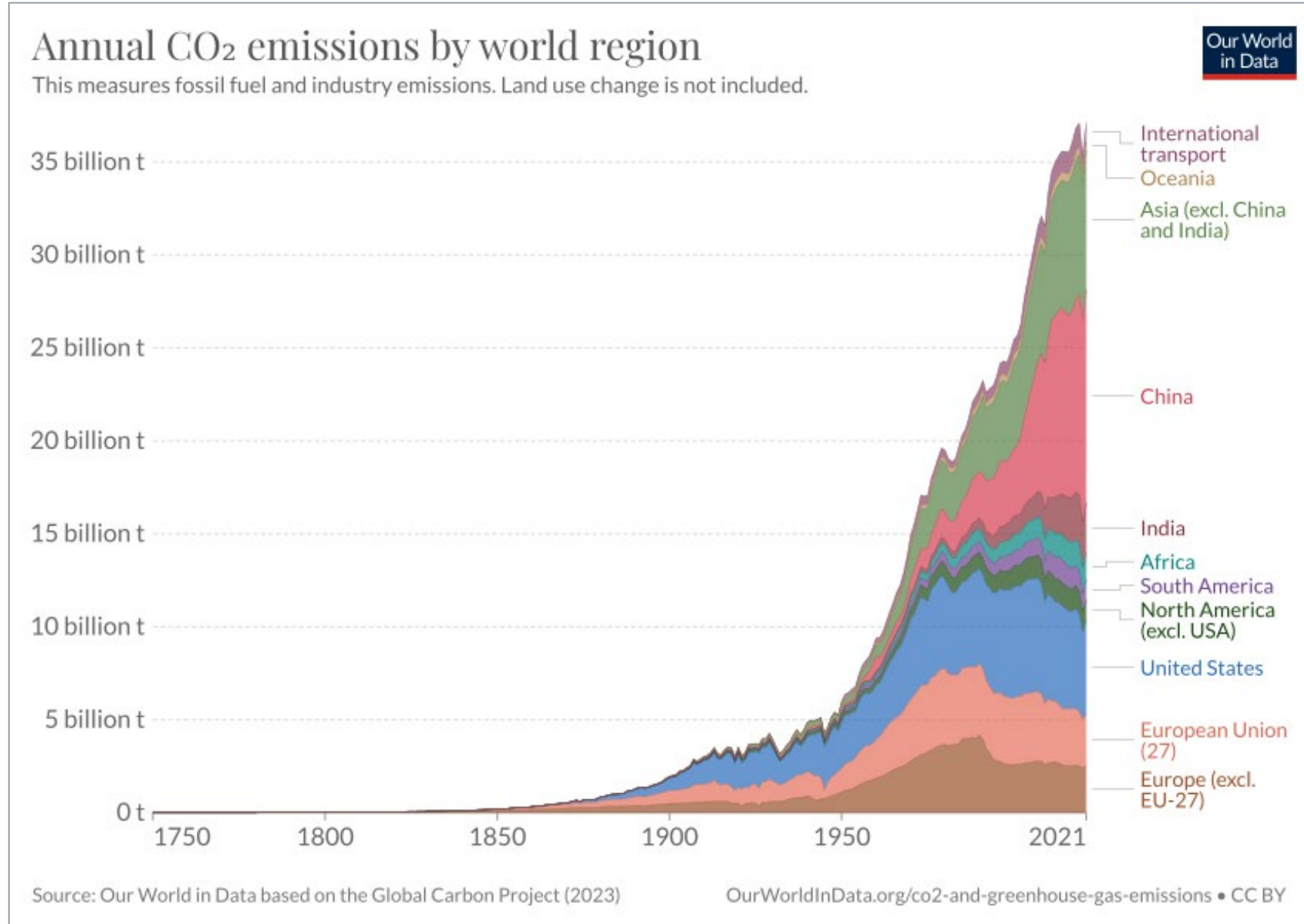
exponentialvie

Uneven progress

Some areas perform much better than others



In parallel with this AI evolution, we are not reducing our emissions.

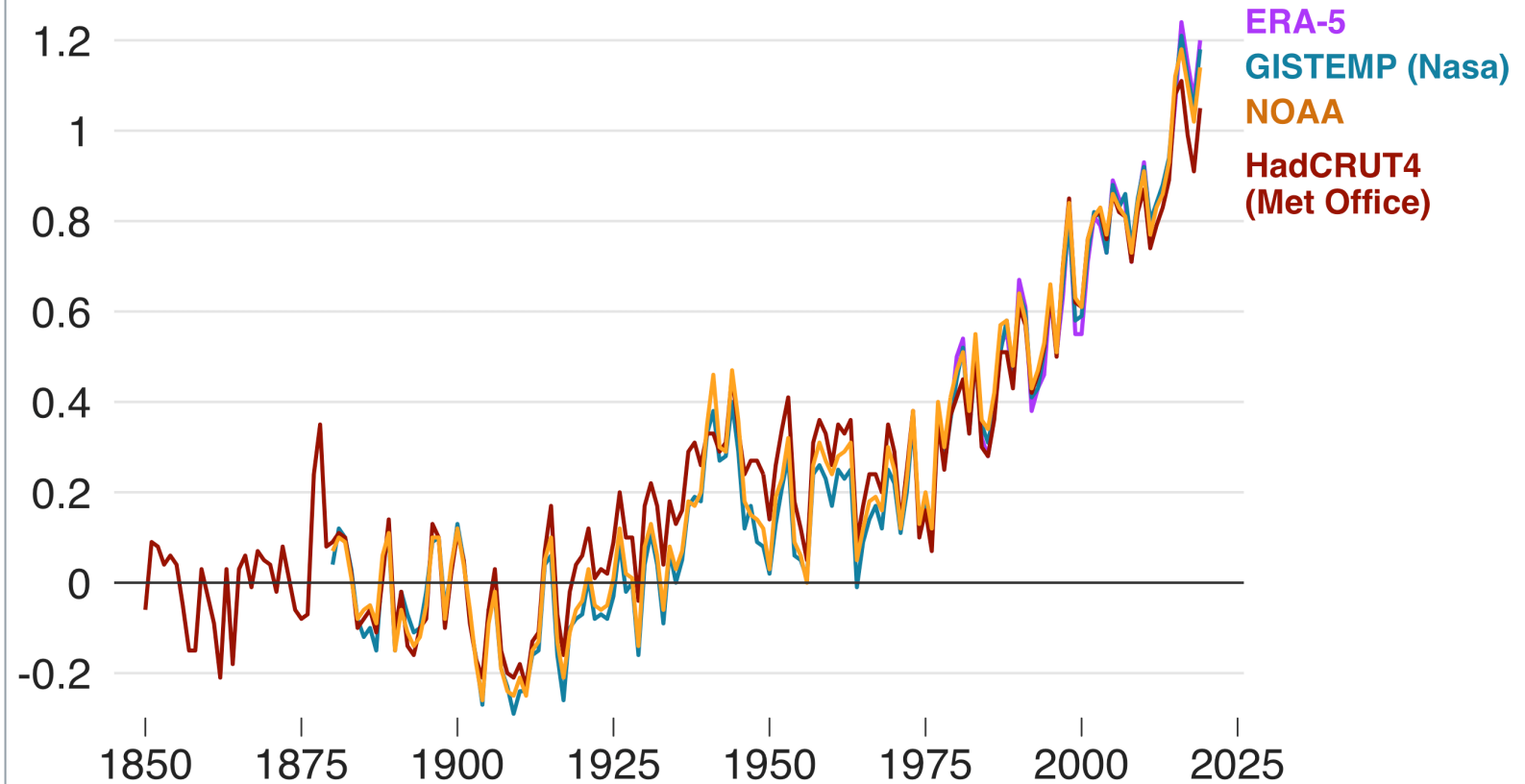


The average temperature is rising quickly

- +1.5C is inevitable
- +2C is very likely
- +3C is a possibility

Temperature rise since 1850

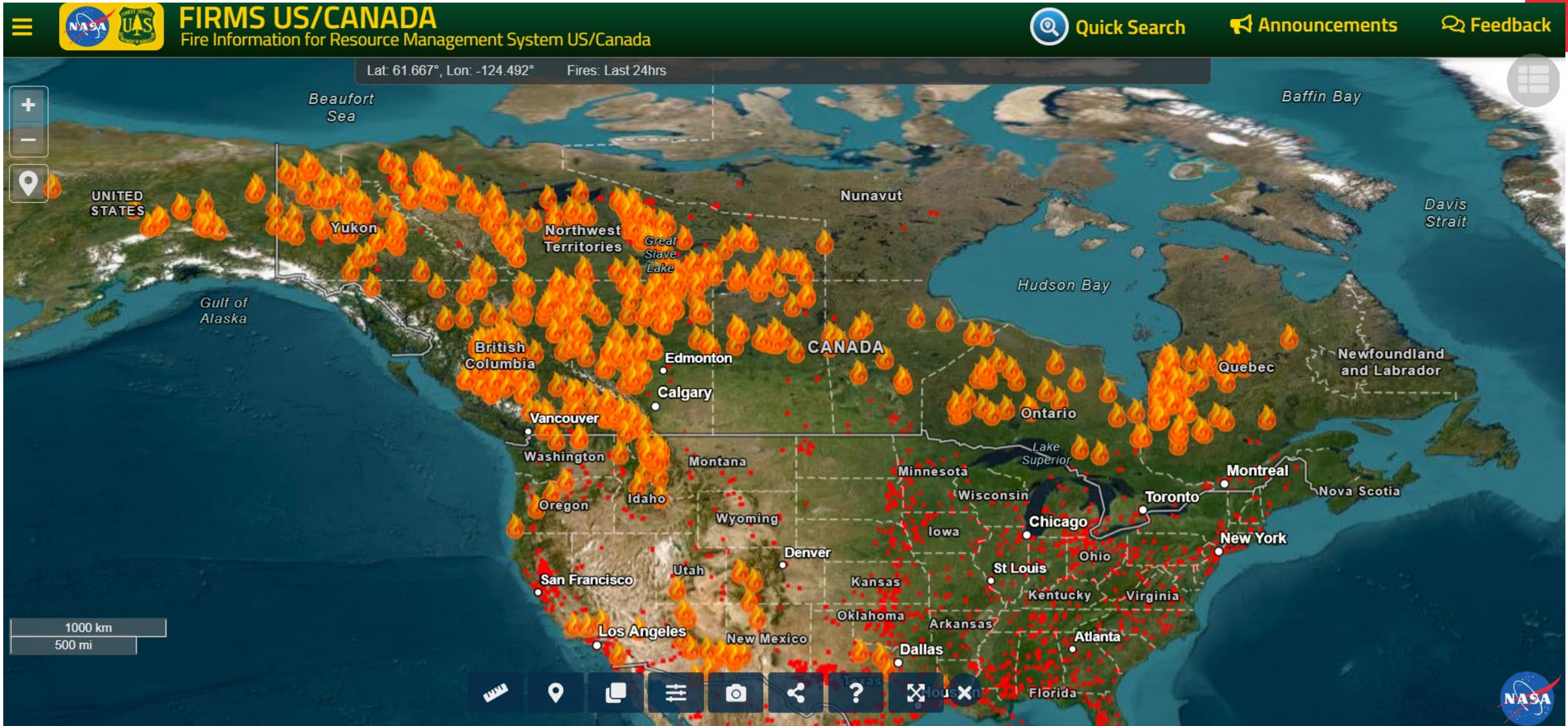
Global mean temperature change from pre-industrial levels, °C



Source: Met Office



Fires everywhere in Canada – Smoking the US like never before



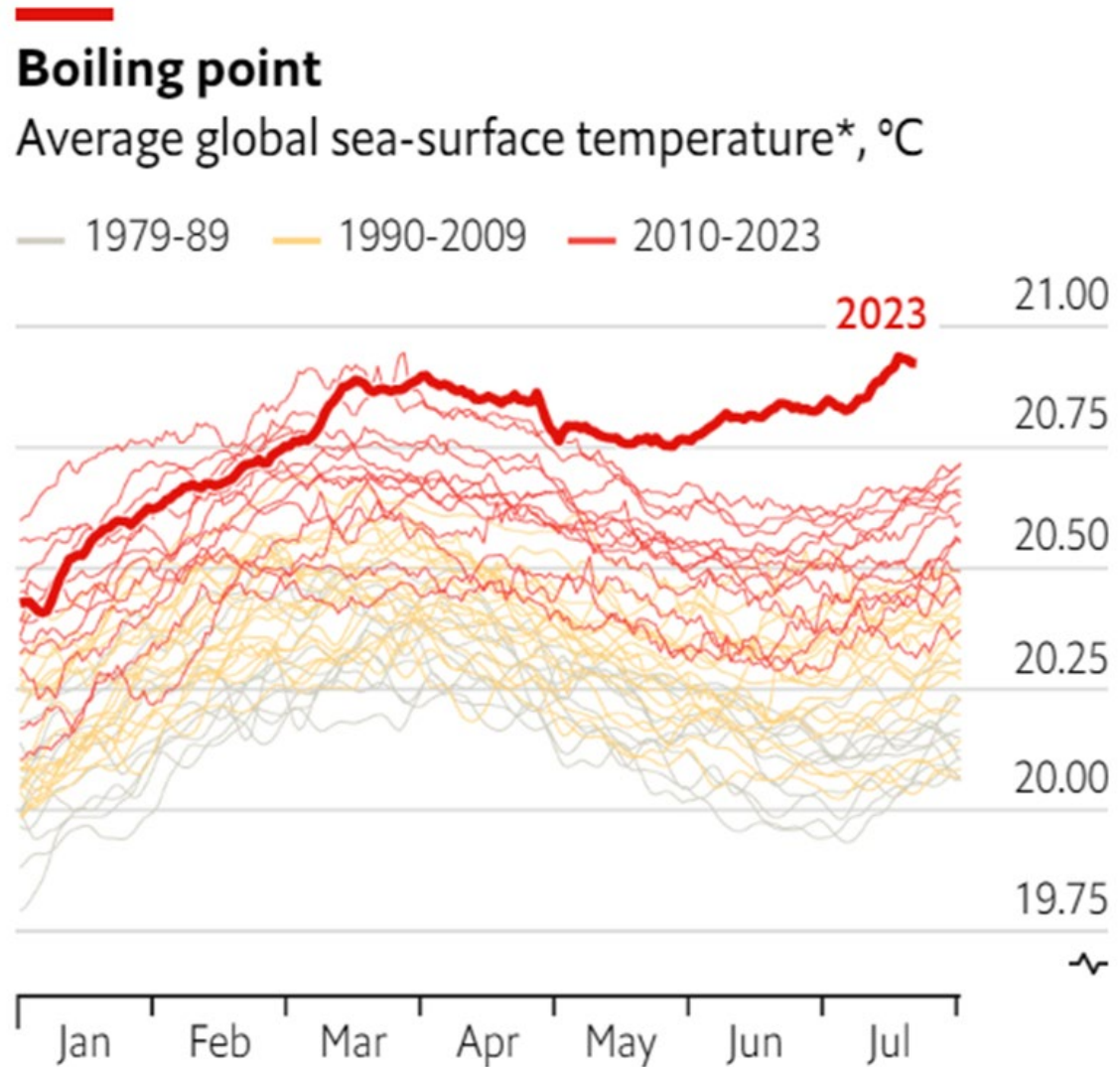


Lahaina summer 2023

Rhode summer 2023



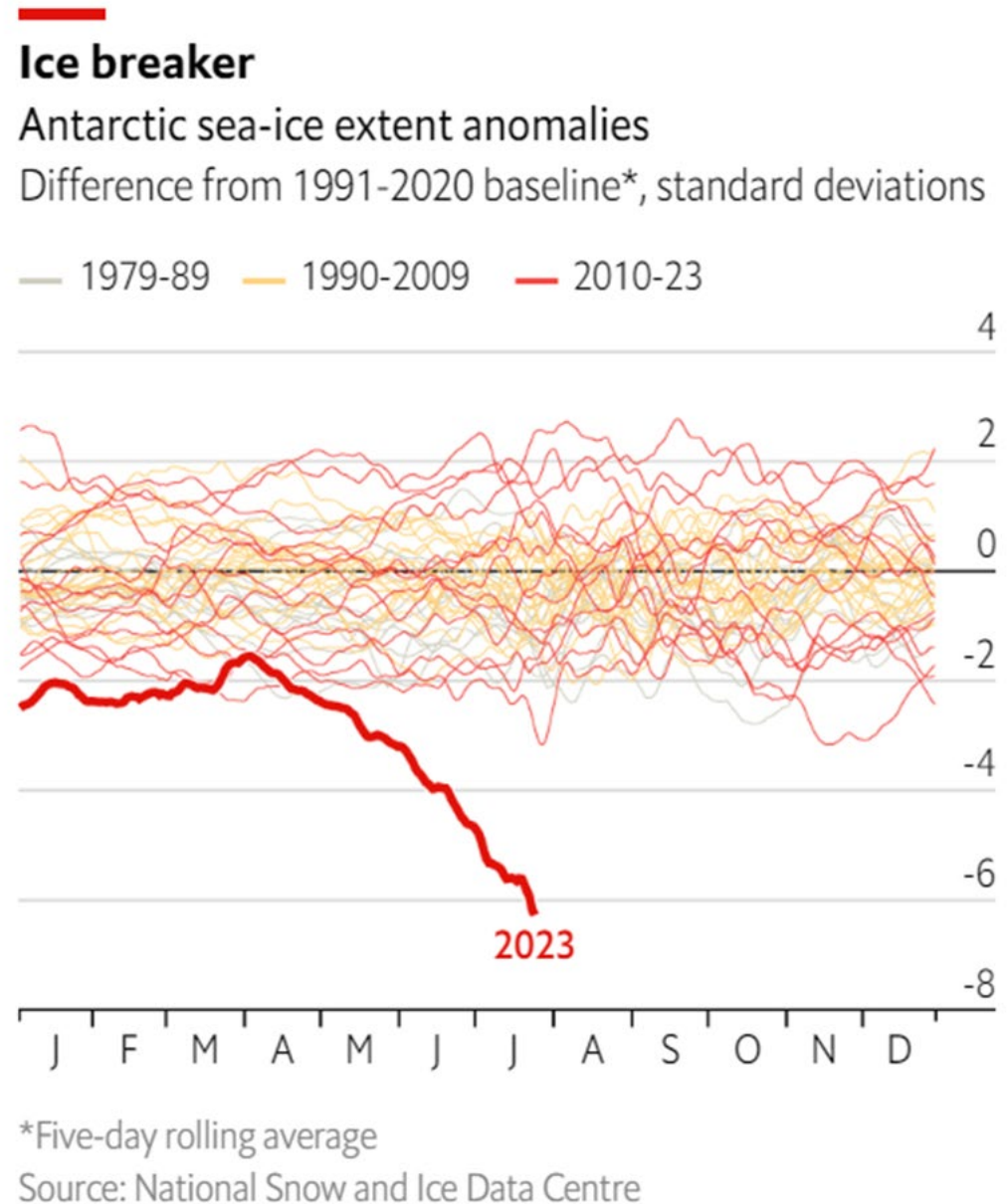
Ocean temperatures are rising very rapidly



*Excludes polar regions

Source: University of Maine, Climate Change Institute

The ice extension of the Austral winter is not happening.....



Surging Seas RISK ZONE MAP

English (US) ▾

Water level ? ▾



Show current coast



What is the role of AI in this context?



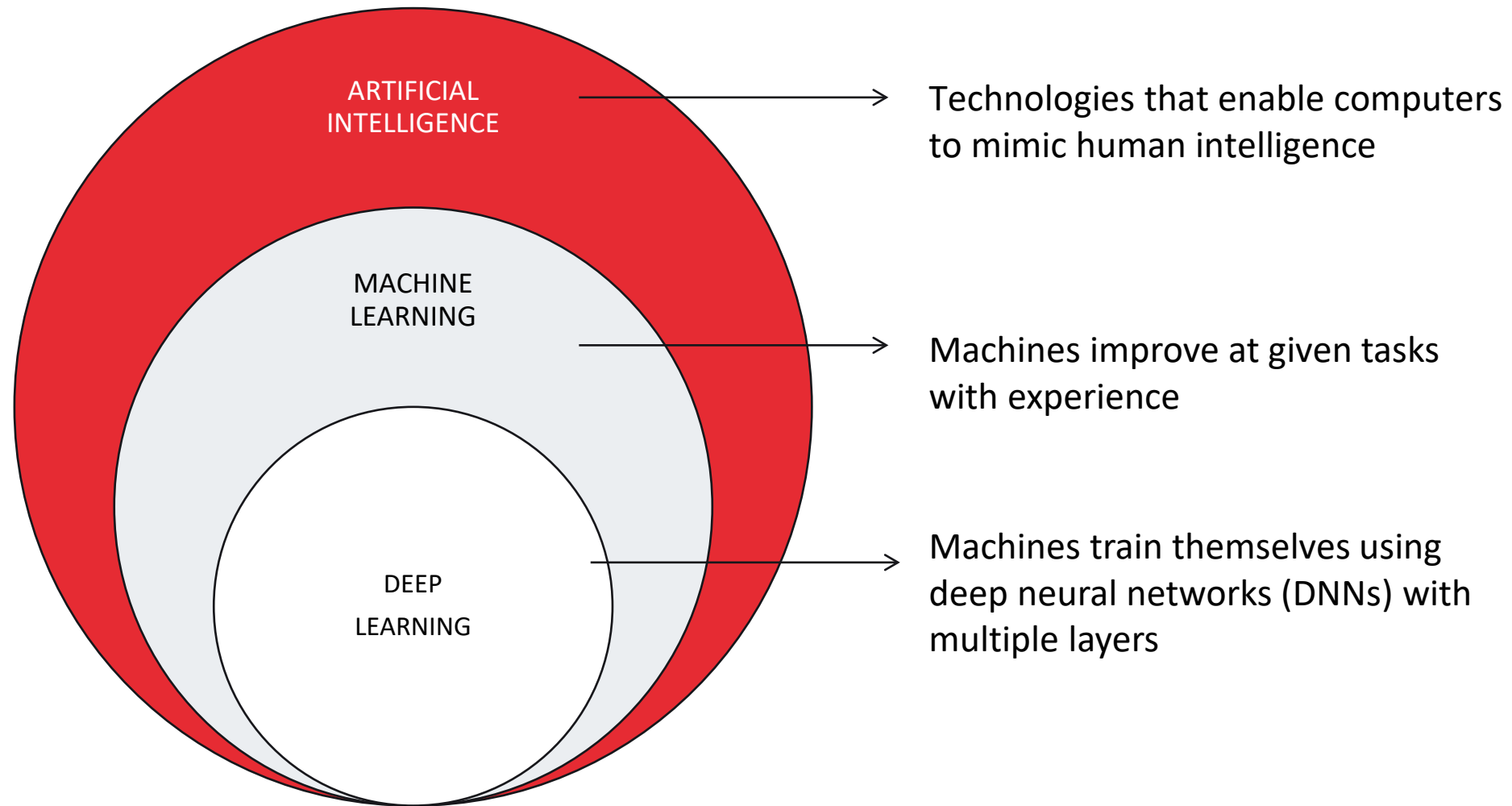
Generative AI/controlled AI ?



Control AI



Types of Artificial Intelligence



Deep Learning

Technological breakthroughs

- Computer vision
- Speech recognition
- Natural language processing
- Social media filtering
- Drug design
- Medical image analysis
- Robotics
- Games
- Control

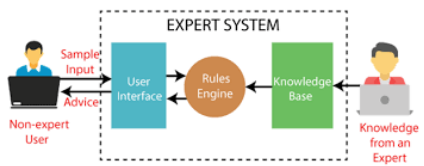


48 neural networks

70 000 training hours

Over 1 million distinct predictions for each decision.

The AI inflection point

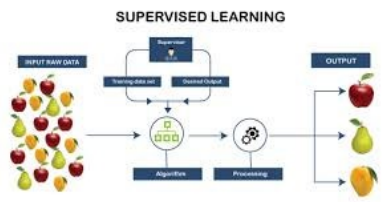


Expert Systems

- No use of data
- Manually authored rules

1970 ->

Big Data

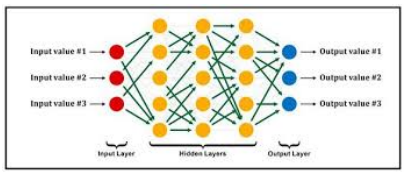


Machine Learning

- Labor intensive
- Demanding data prep

2000 ->

Massive data
+
Compute

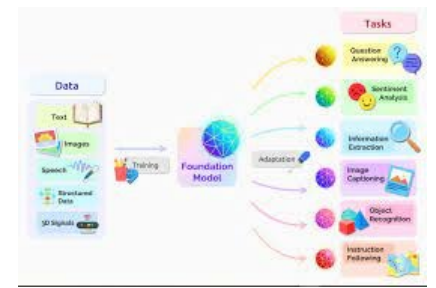


Deep Learning

- Automatically learn
- Need labeled data

2012 ->

Self-Supervision at scale
+
Massive data
+
Compute

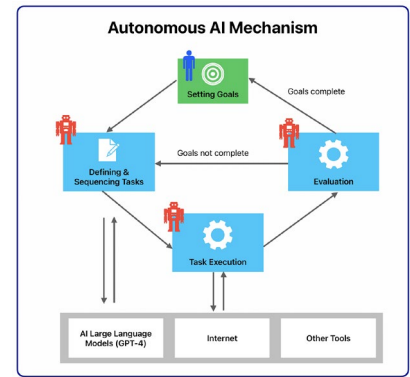


Foundation Models

- No data label required
- Adapt quickly

2022 ->

Autonomy
+
Self-Supervision at scale
+
Massive data
+
Compute



Autonomous AI Agent

2023 ->

Generative AI trends

- LLM are moving toward smaller and dedicated models
- Generative AI is introducing Autonomous Agents (AA)
 - Integrate different types of models and non-foundation model components
 - Try, Verify, check and rewrite
 - Run continuously
- Companies are evolving toward multimodal that will integrate in AA eventually
- Gen AI and AA are vectors to human augmentation (upskilling – Coaching)
- The data is the essential building block to do all this
 - Your operation data need to be extracted, mapped and tagged to be used.

STUETZLE TOWER
43.0957° N 79.5494° W

EFFICIENCY



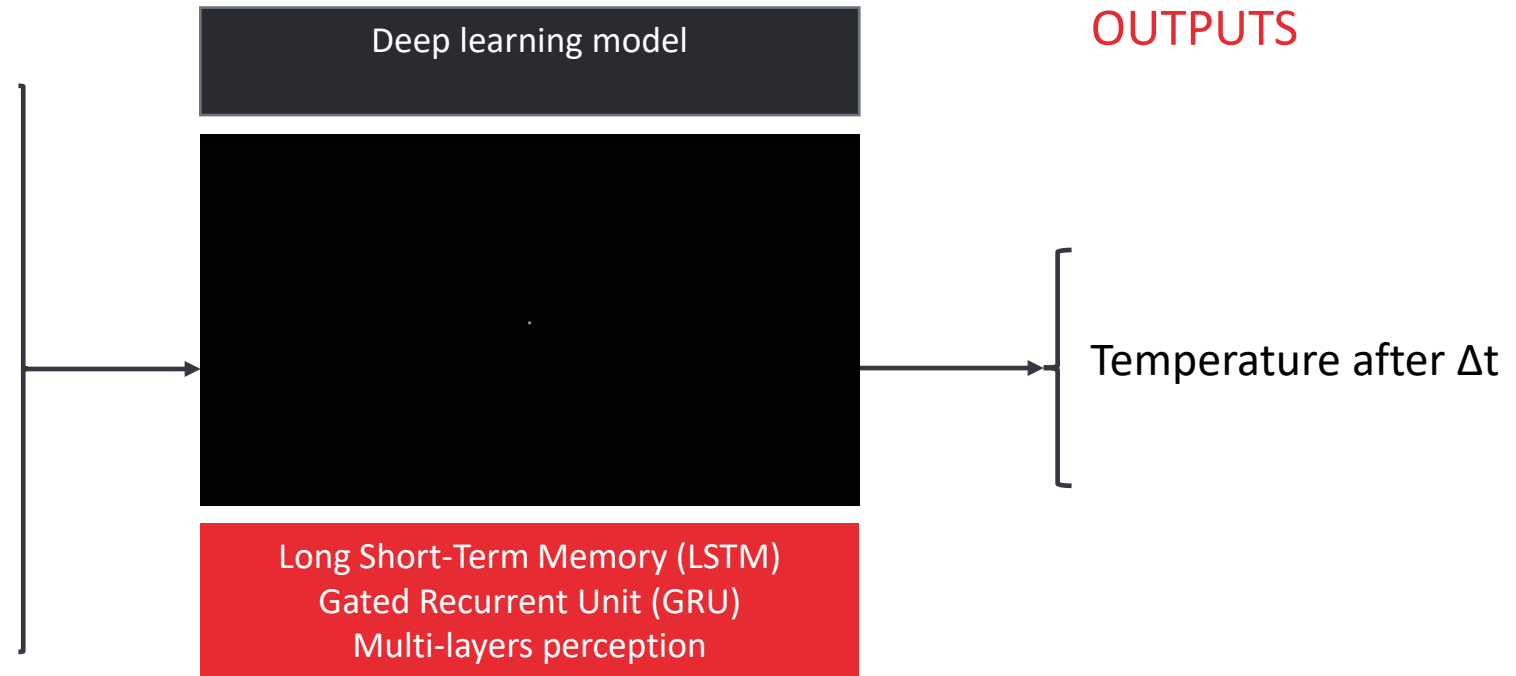
Use the power of AI to reduce energy consumption and emissions

The case of buildings

Buildings example – predictive control

INPUTS

Actual temperature
Outside temperature
Outside temperature
forecast
Mechanical equipment
values
Number of areas
Temperature variance
...
Heat leakage



Predictive ability

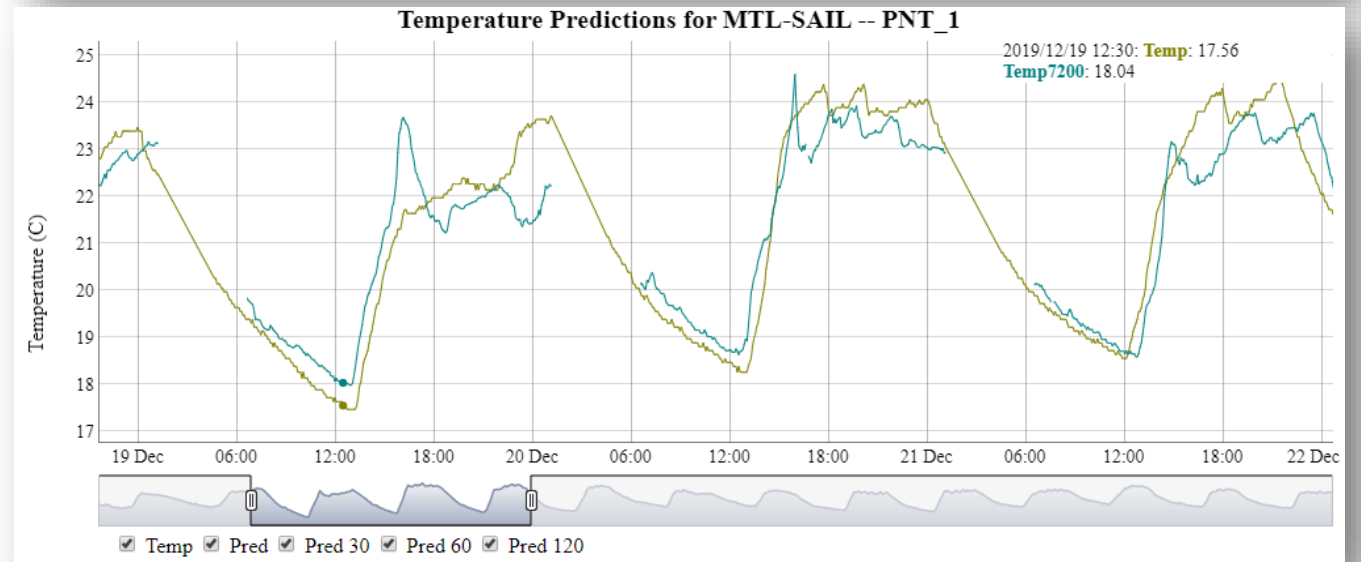
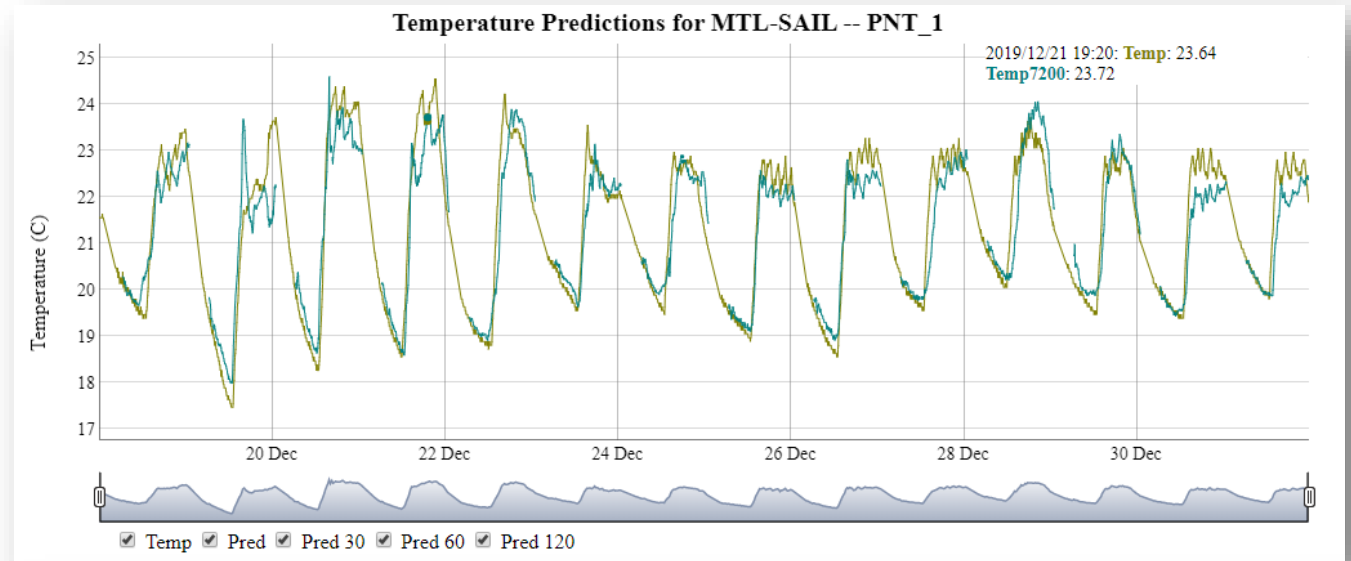
99,6 %

accuracy

$\pm 0,5$ °C

average
variation

Our AI models can very accurately predict the temperature forecast on a zone-by-zone level, allowing it to use this information to make real-time energy saving changes to HVAC systems



Building control

Predictive ability

The ability to see in advance the implications of all possible control scenarios

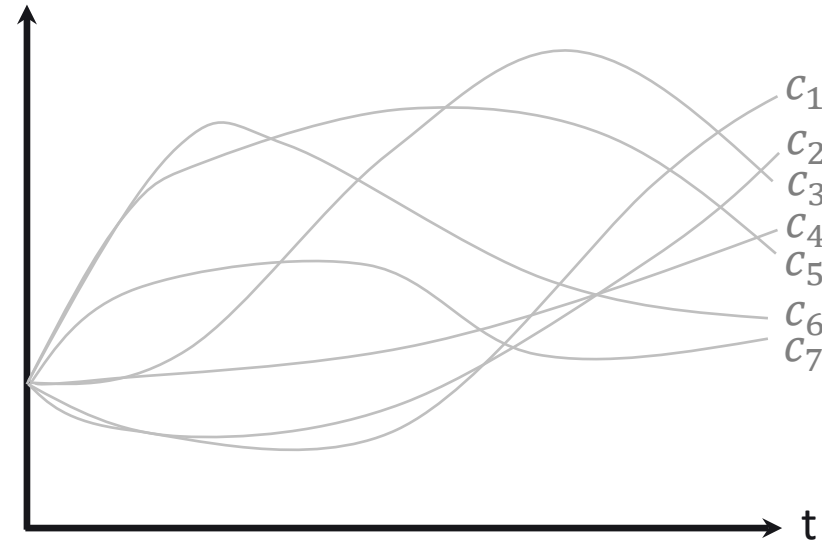
Buildings

Prediction available

- Temperature
- Power/Energy
- CO2
- Equipment

Rotation/Durability

- Costs of operations



Building controls

SETTINGS

Power peak constraint

Power limit

0,70

- +

Energy weight

1,00

- +

Power weight

1,00

- +

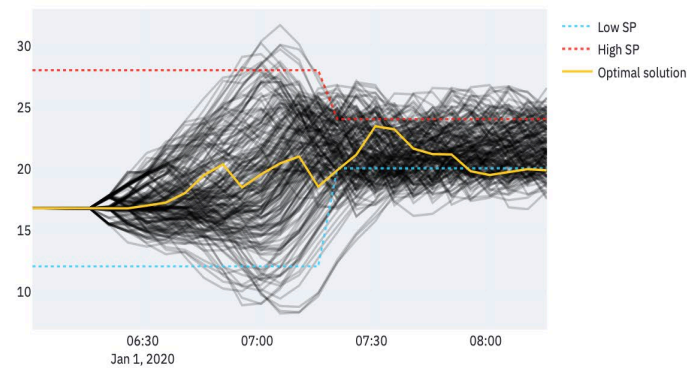
Comfort weight

1,00

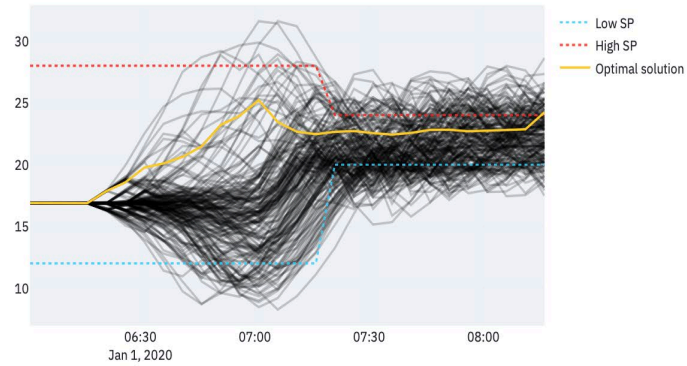
- +

ZONE TEMPERATURES

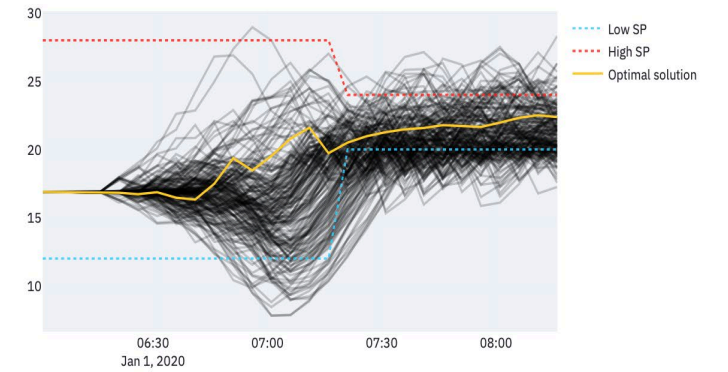
Zone 1



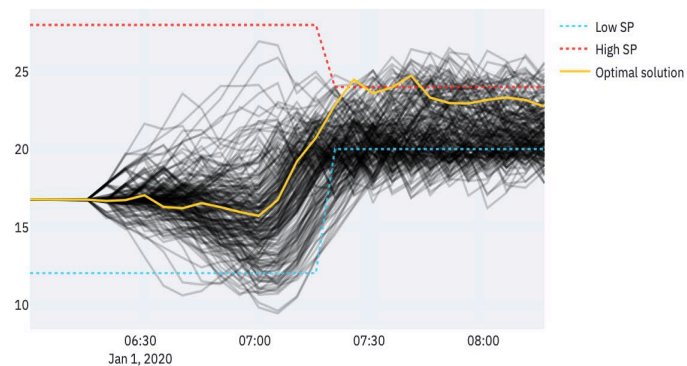
Zone 2



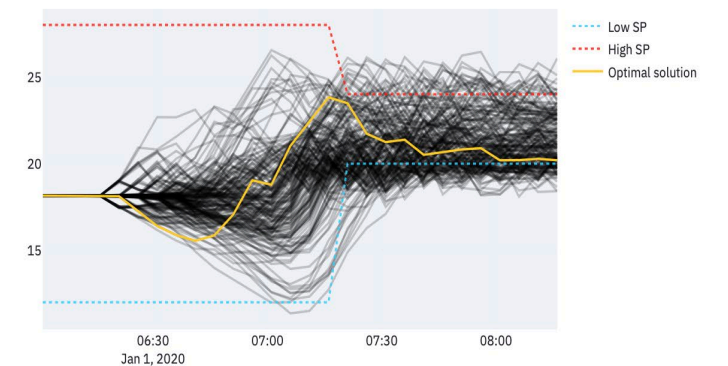
Zone 4



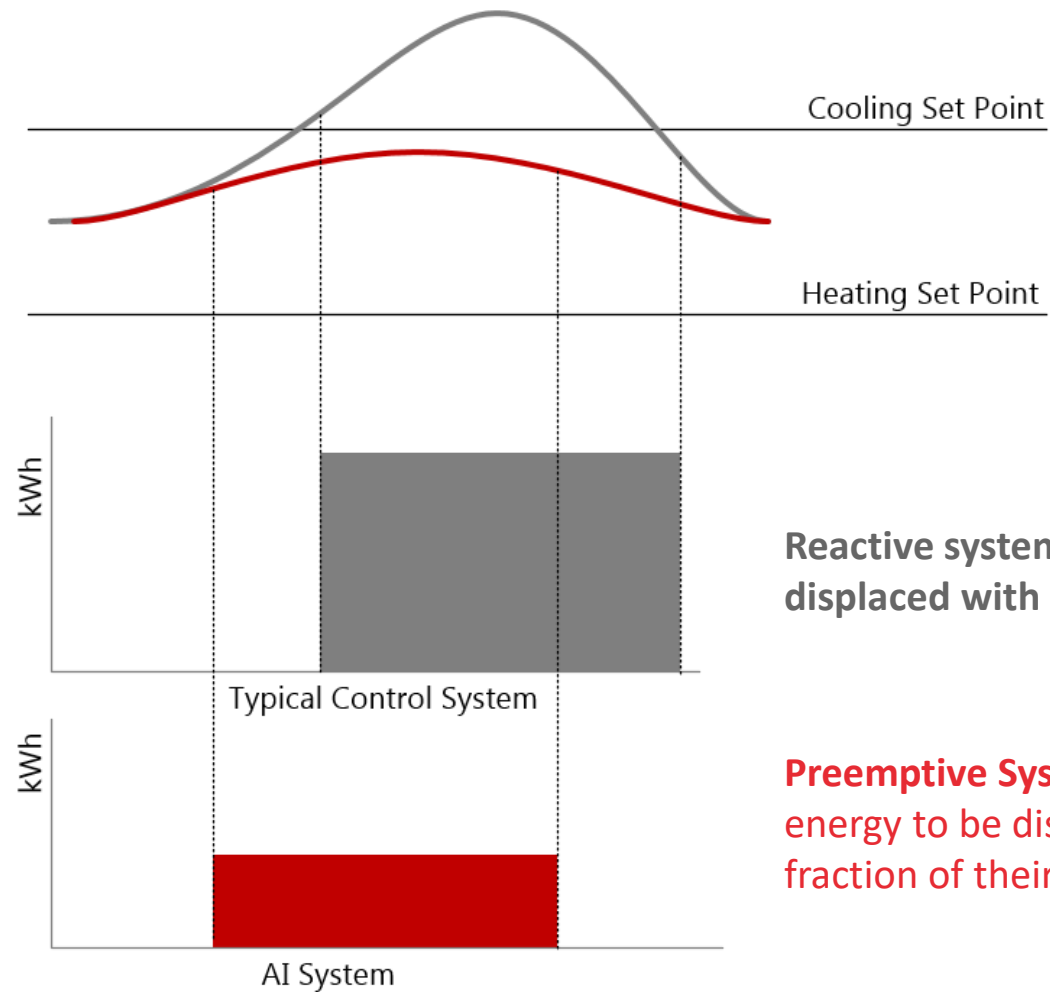
Zone 3



Zone 5



Scope of predictive control



Reactive system - A large quantity of energy to be displaced with equipment running at 100%

Preemptive System— A much smaller quantity of energy to be displaced with equipment running at a fraction of their maximum capacity..

Use the power of AI to reduce energy consumption and emissions

The emission footprint is a dynamic equation



WHAT WE DO ▾

LEARN MORE

GET THE DATA ▾

NEWS & INSIGHTS

ABOUT ▾

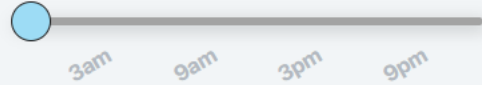
CONTACT

← SPP Kansas

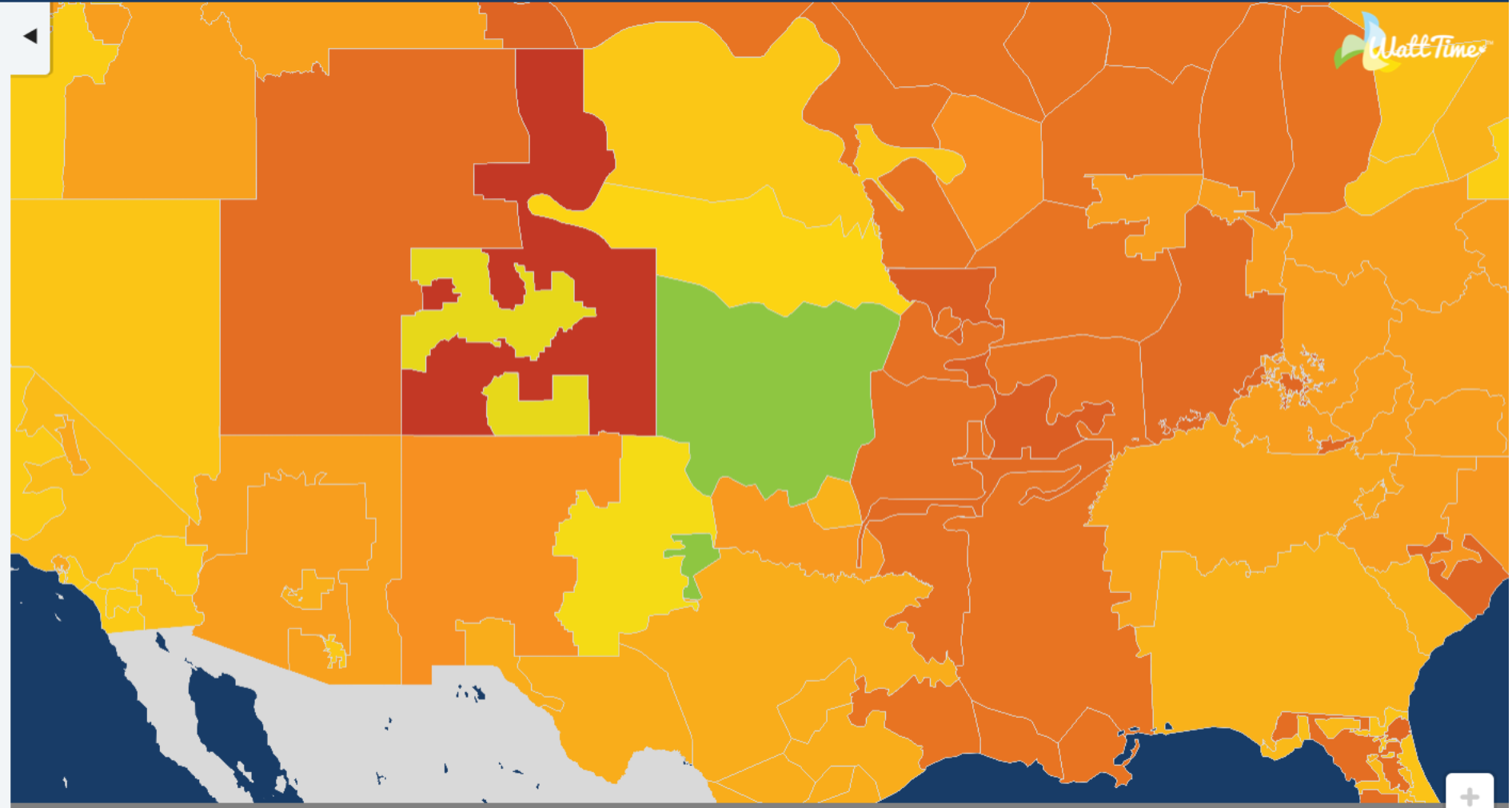
Sep 29th, 2023 4:55PM



Sep 30th, 2023 12:00AM



Grid Emissions Intensity





AI is delivering tangible results today



Up to 40 %

Reduction in carbon emissions



Up to 25 %

reduction in HVAC and/or refrigeration system energy costs



Up to 60 %

Improvement in customer and associate comfort



Up to 50 %

Extension of equipment service life

Making buildings smarter,
greener and more
efficient.

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