The AI Waste Wave: What is Coming? Can we Sustainably Handle It?

The AI e-Waste Wave: What is Coming and Can we Sustainably Handle It?



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hyperscaling

(n.) — to scale horizontally without limit



$7 trillion

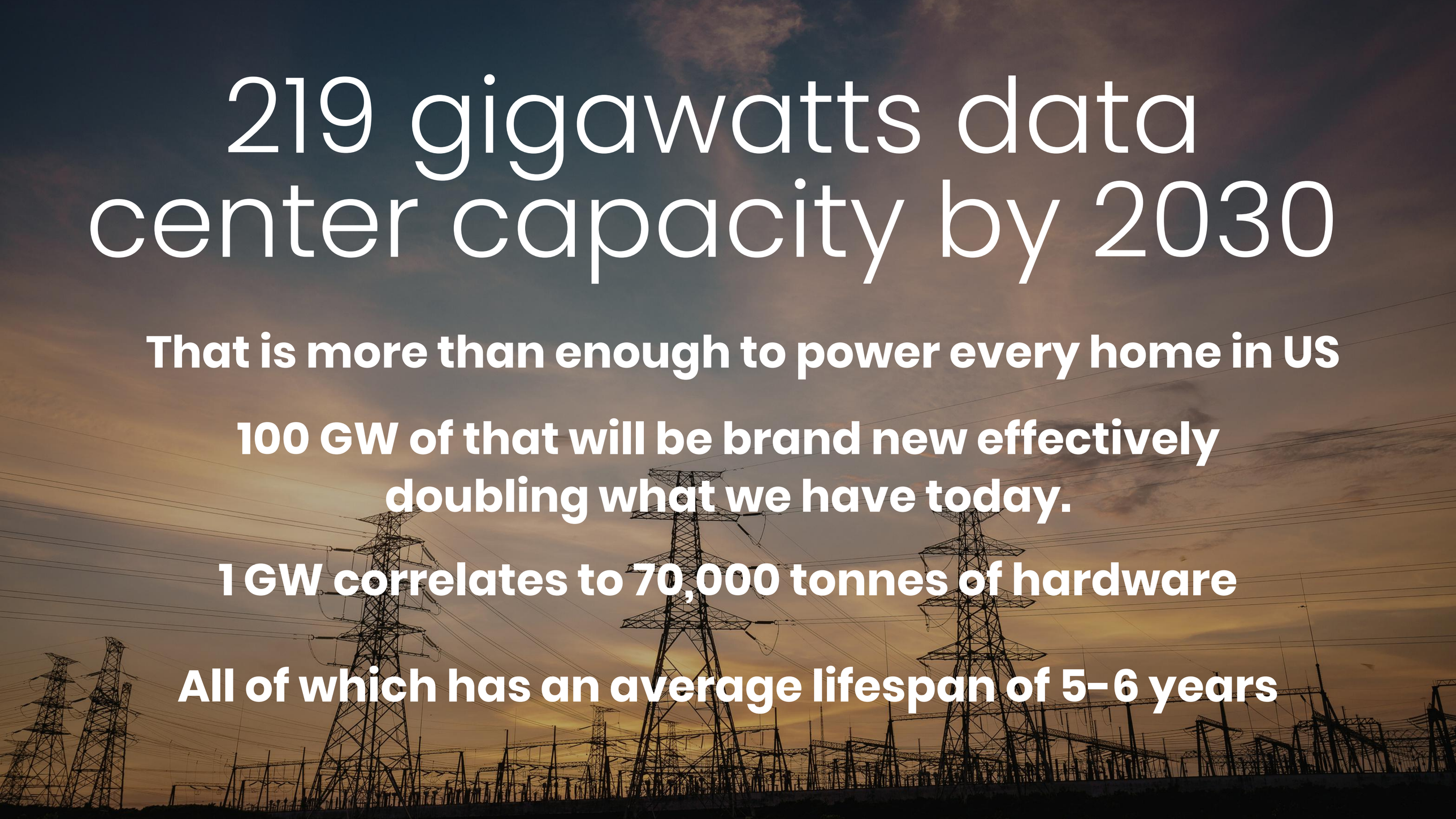
- **the cost to end world hunger for the next 75 years...**
- **or fund a $10,000 higher-eductation trust for every child born on Earth (700 million) during those 5 years**


Carbon Footprint
e-Waste Tsunami
Water Consumption

UN Global e-Waste Monitor, 2024

- 62 million tonnes of e-waste in 2022
- 82 million tonnes projected by 2030
- Only 22.3% is “properly managed”
- Growth rate of e-Waste is 5X faster than growth of proper recycling capacity!

These figures are alarming, but they do not include AI waste!



219 gigawatts data center capacity by 2030

That is more than enough to power every home in US

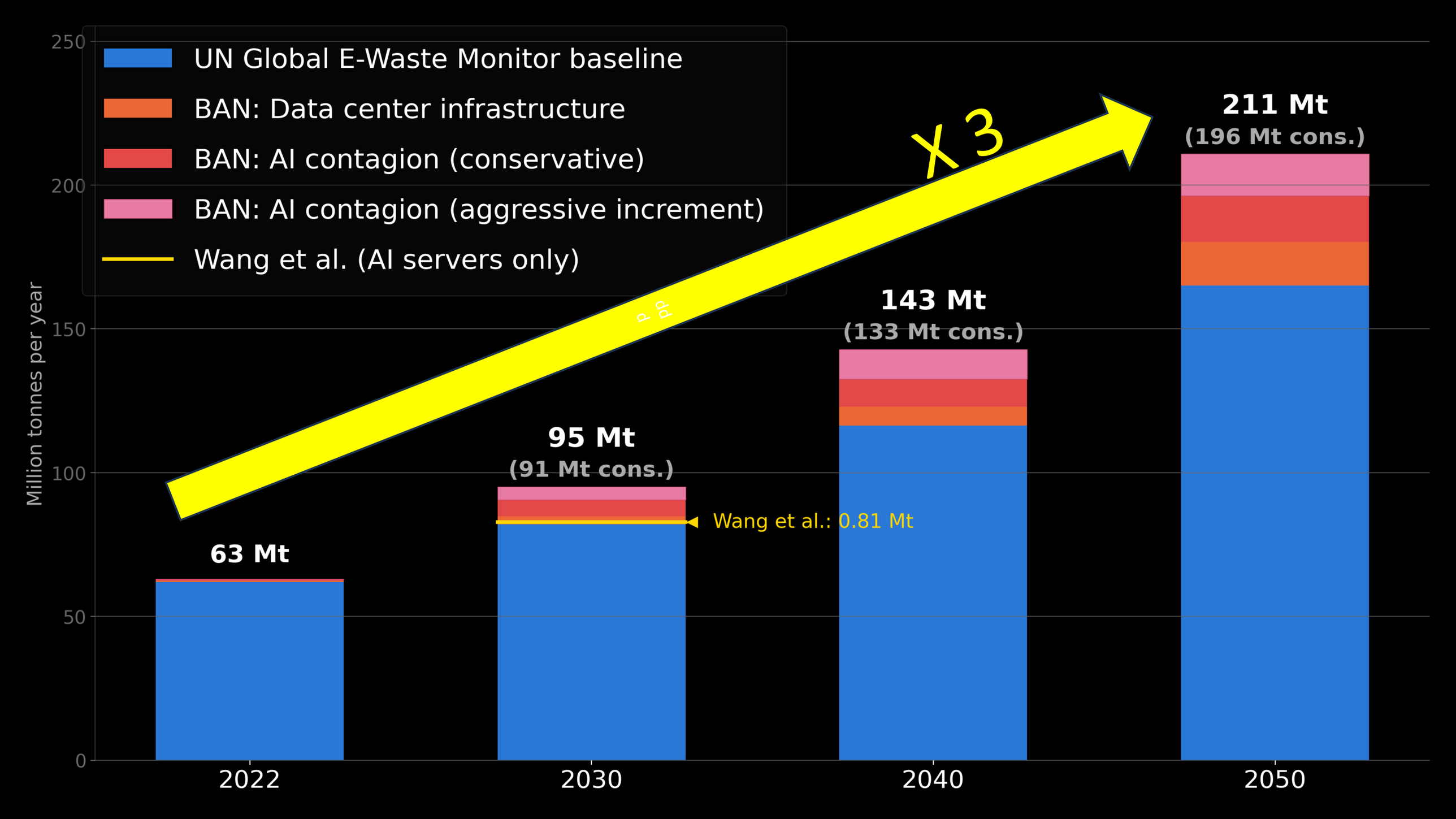
100 GW of that will be brand new effectively doubling what we have today.

1 GW correlates to 70,000 tonnes of hardware

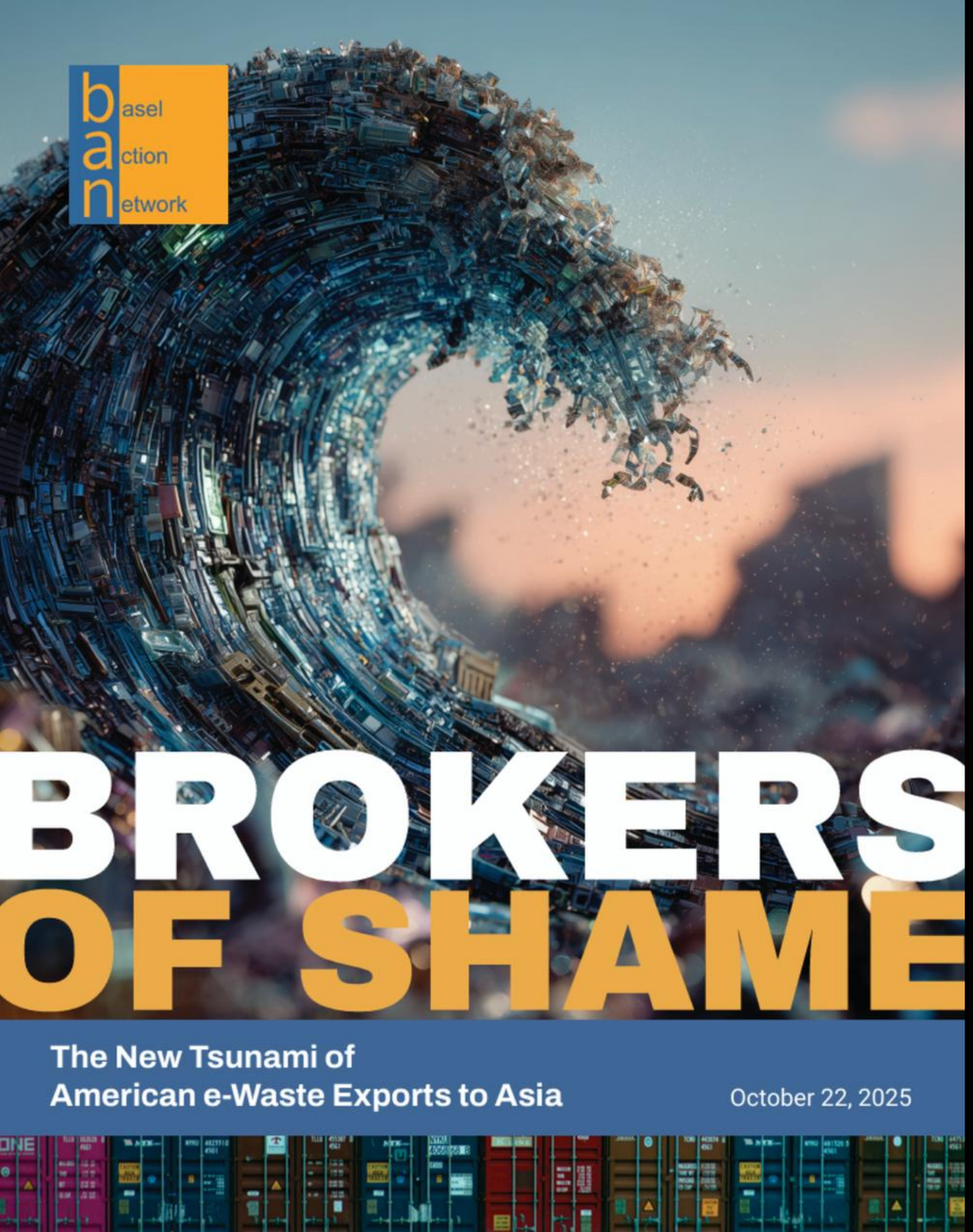
All of which has an average lifespan of 5-6 years

What we did differently from others to calculate the AI Waste Wave

- We based our projections on what the industry says it will build — not on theoretical AI demand models
- We derived a mass-to-power ratio — 70,000 tonnes/gigawatt
- We counted all five categories of datacenter hardware, not just servers/GPUs (13%) when power, cooling, networking, batteries = 87% of the mass others ignore.
- We calculated the AI Contagion — waste from forced obsolescence of IT equipment outside of data centers


UN Global E-Waste Monitor baseline
BAN: Data center infrastructure
BAN: AI contagion (conservative)
BAN: AI contagion (aggressive increment)
Wang et al. (AI servers only)
Million tonnes per year
250
200
150
100
50
0
2022
2030
2040
2050
63 Mt
95 Mt
(91 Mt cons.)
143 Mt
(133 Mt cons.)
211 Mt
(196 Mt cons.)
x 3
Wang et al.: 0.81 Mt


AI Waste Alone Generated (midpoint) from 2025-2050 = 500 million tonnes = 20 million 40-foot shipping containers = 6 rings around the earth’s circumference.
According to the UN Global E-waste Monitor, only one ring will be managed properly. Where is the rest going to go?



We know what improper management looks like.

10 US e-waste brokers

26 months

10,026 containers

exported to developing countries

$1 billion declared value

8 of 10 brokers R2v3 certified





Malaysia


Thailand



Philippines


India



Pakistan

What the hyperscalers say about their waste

Microsoft (2024): Zero waste/2030. 90.9% hardware reused/recycled.

Google (2025): Zero waste to landfill — no target date. 84% waste diverted.

Amazon (2024): 99% landfill diversion to reuse/recycling.

Meta (2025): 80%+ operational waste diverted from landfills.

These are all downstream commitments made without qualifying how the recycling is done or where!

Of course, the word “Recycling” sounds correct, clean, and circular

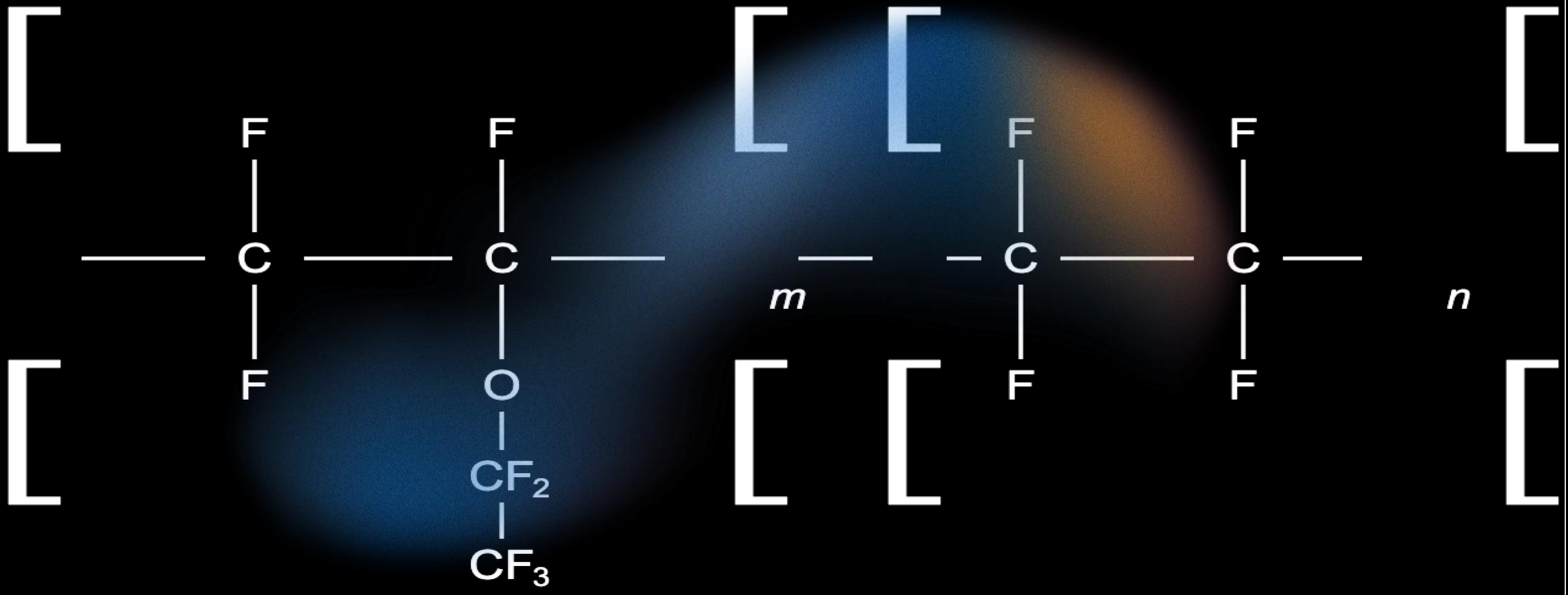
But too often its dirty, cheap, exploitative and linear.

Why reuse might not save us

- **Security-driven destruction**
  Hyperscalers shred hardware rather than risk data exposure
- **Next-gen hardware are complex integrated units**
  Components can no longer be separated and resold
- **Proprietary chips have no market**
  Google TPUs, AWS Trainium, META MTIA: No buyers
- **Market asymmetry**
  Largest reseller sold 11,000 GPUs last year; but millions are deployed
- **Residual value is collapsing**
  Each new generation makes the last obsolete within 2–3 years

To be examined in Part 2

“Technical Delphic Oracle Series Cartoons”



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PFAS in data centers

- **Immersion cooling fluids**
  Fluorocarbon dielectrics — "forever chemicals"
- **Semiconductor fabrication**
  Photolithography and plasma etch — no alternative
- **Circuit boards and cable insulation**
  Fluoropolymers and PTFE throughout
- **High-bandwidth memory dielectric layers**
  PFAS in every AI accelerator's memory packaging
- **Fire suppression systems**
  AFFF foam across data center facilities

To be examined in Part 3

The Age of Hyperscaled Harm?

Tech companies will hyperscale AI infrastructure.

<u>But will they also</u>: *hyperscale proper downstream waste management?*

Upstream design for longevity and reuse?

hyper actively seek PFAS alternatives?

Or will we be simply be scaling e-waste harm like never before?

In light of unprecedented scale, toxicity, and a lack of ethical recycling capacity, the AI-Waste Wave may well become an unprecedented nightmare.

All stakeholders, particularly the recycling industry, must be part of the AI harm-prevention plan. We all deserve full transparency on what is coming, and guarantees of ethical management.

Thank You!



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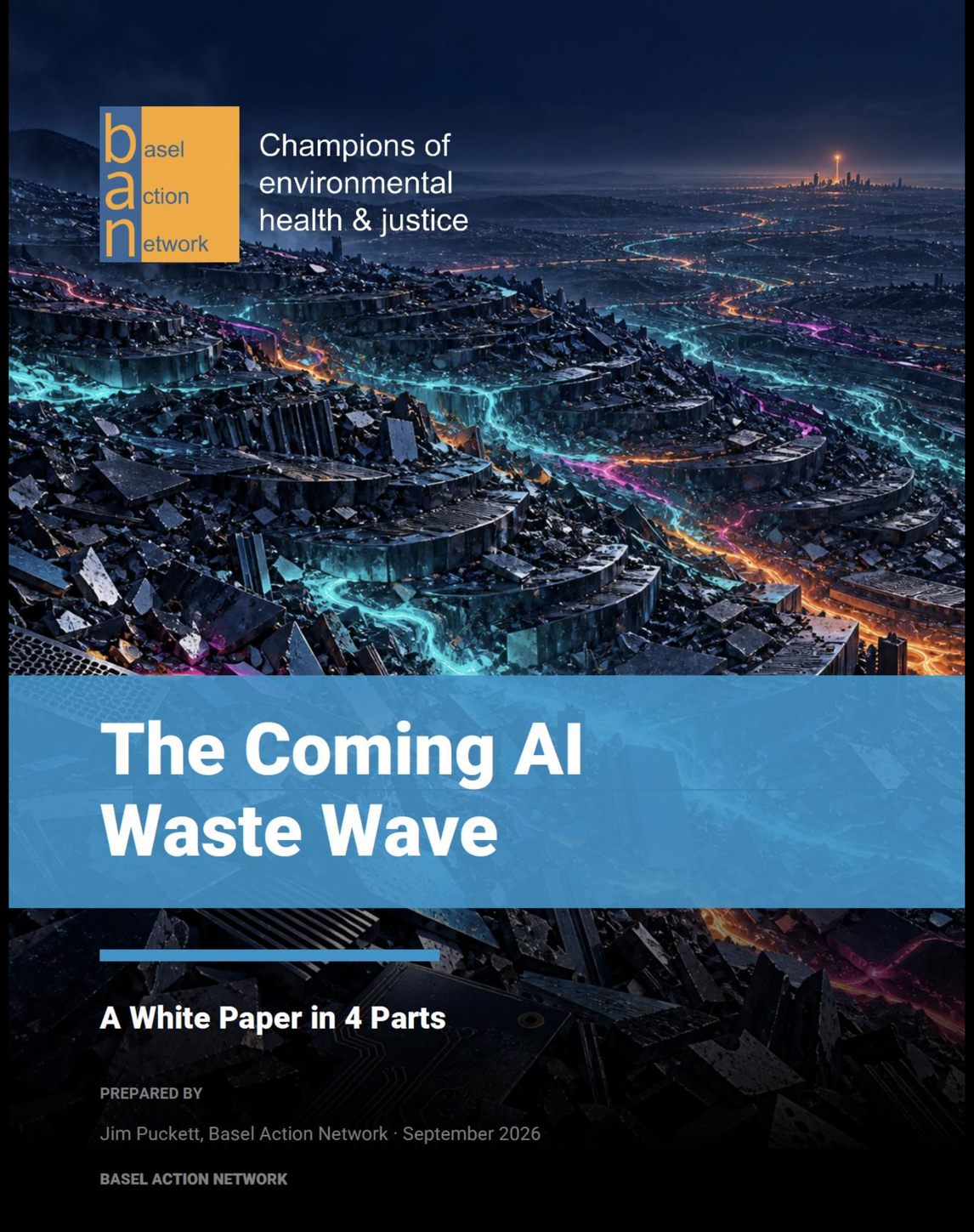

The Coming AI Waste Wave - Part 1

Thank You!



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