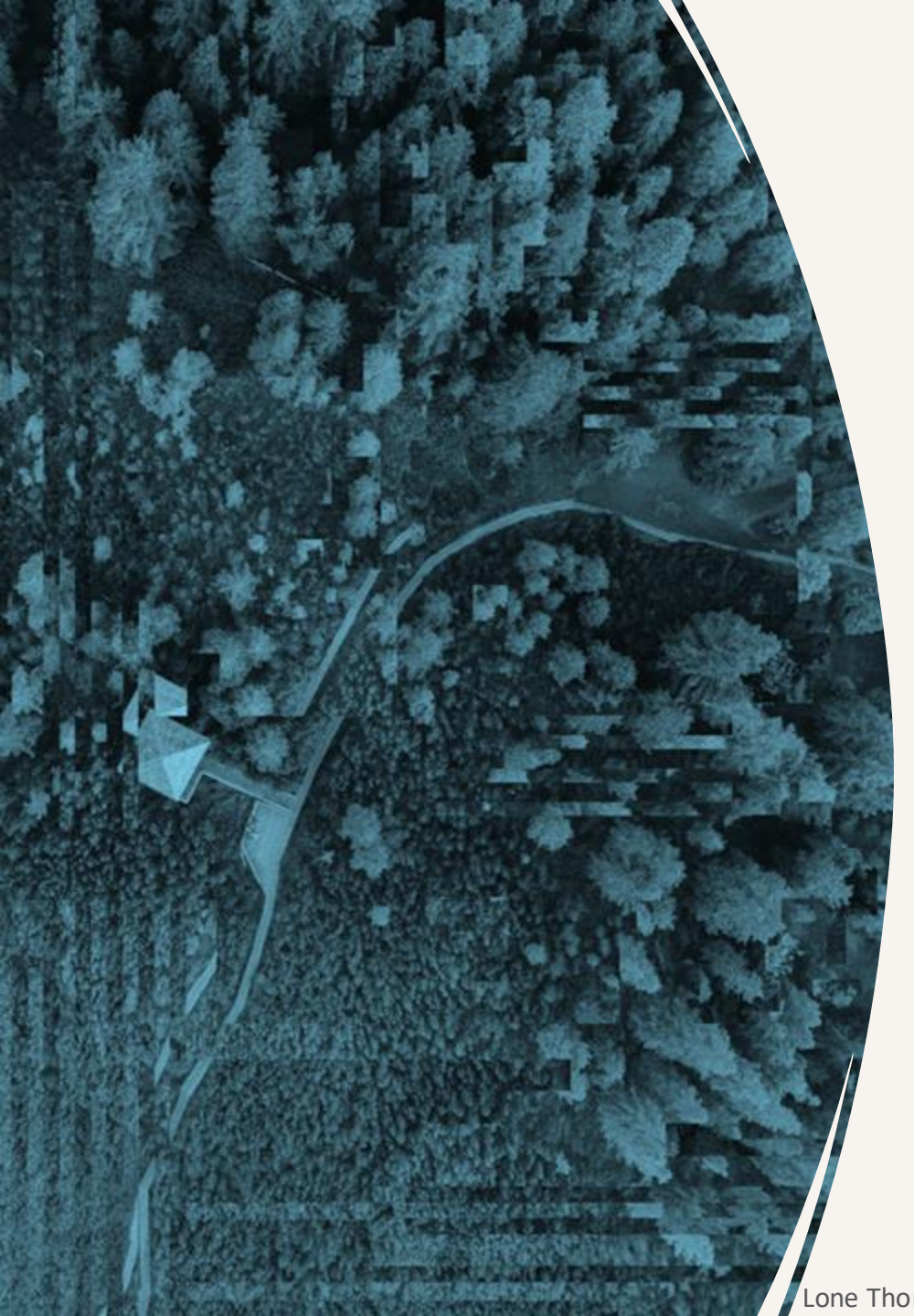


Beware of green AI –

Or what Big Tech likes to make of it

EcoCompute 13/11/2025

Dr. Anne Mollen

anne.mollen@uni-muenster.de

@AnMollen@chaos.social

Dr. Anne Mollen

- Postdoc researcher University of Münster,
  media and communication research
- B4: senior research associate AlgorithmWatch and
  project lead ”SustAIn: The sustainability index for Artificial Intelligence” (2020-2023)

What to expect?

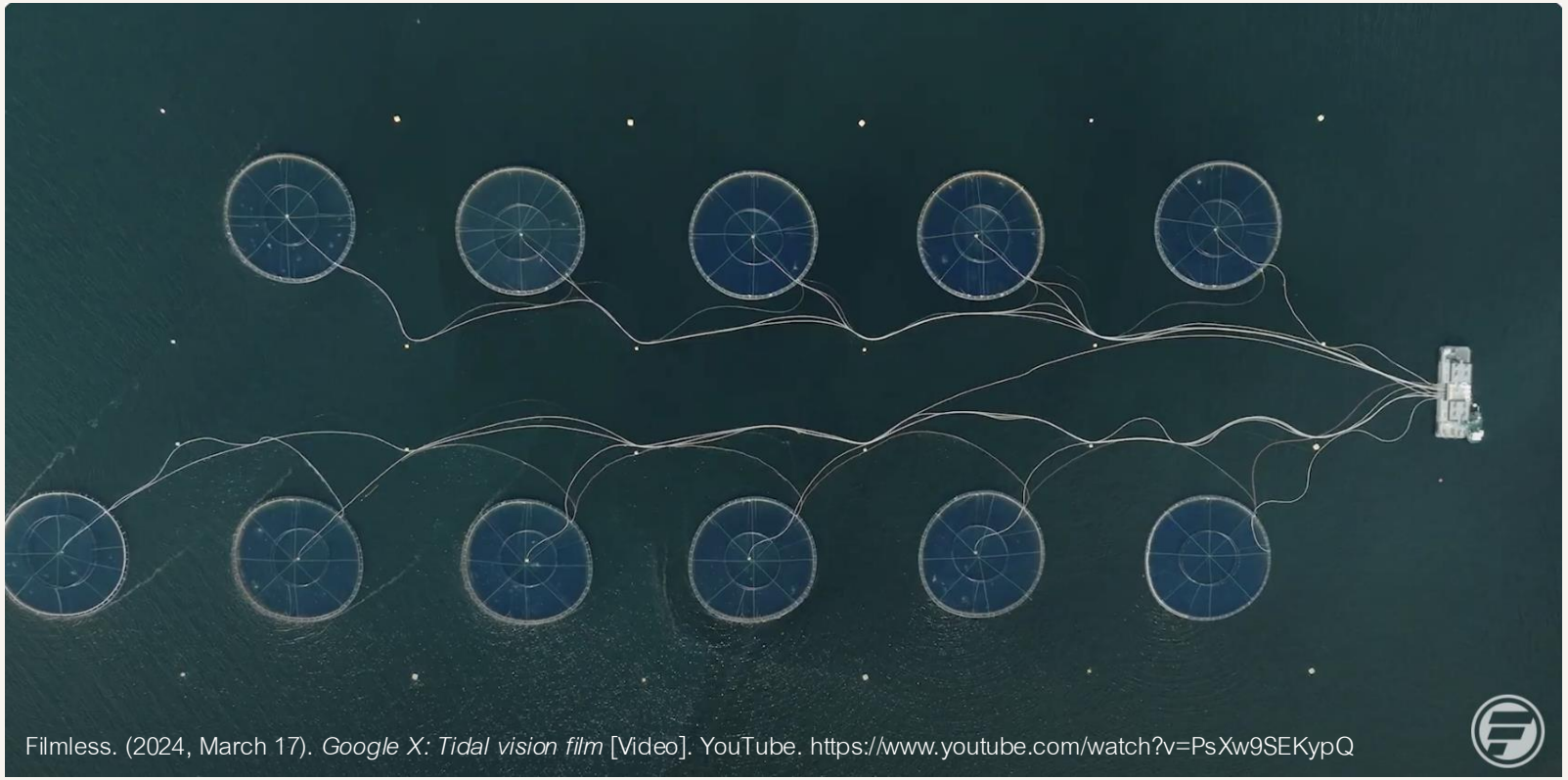
„Sustainable“ extraction powered by AI

How Big Tech is corrupting Green AI

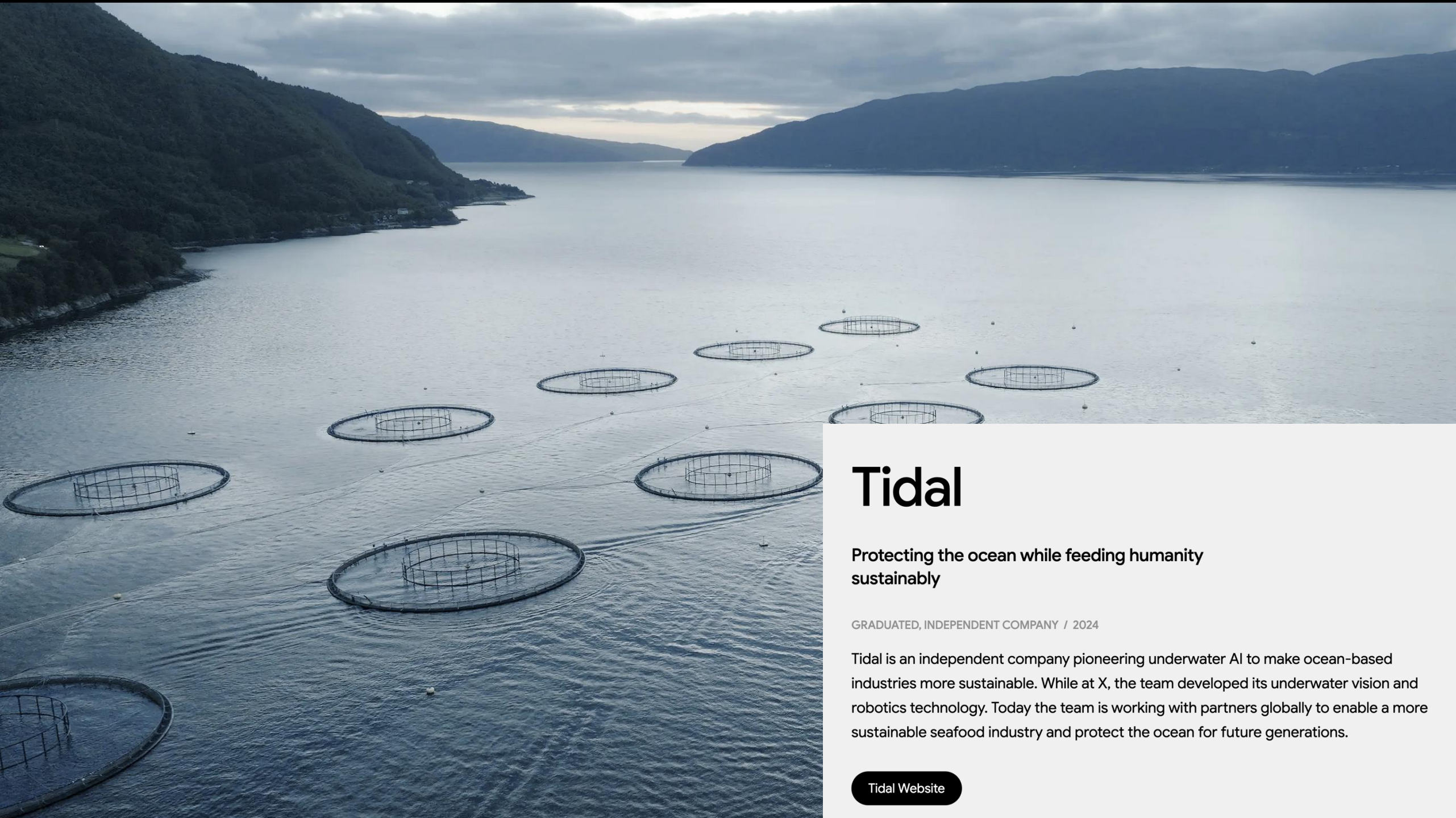
Distributional Justice and what to do about it

Sustainable extraction powered by AI?

Image taken from Brodie, Patrick (2026): Aquaculture, AI, and the Planetary Domestication. In: Mollen, Anne/Jansen, Fieke/Kannengießer, Sigrid/Velkova, Julia: AI infrastructures and sustainability. Palgrave Macmillan: London.



Filmless. (2024, March 17). *Google X: Tidal vision film* [Video]. YouTube. https://www.youtube.com/watch?v=PsXw9SEKypQ



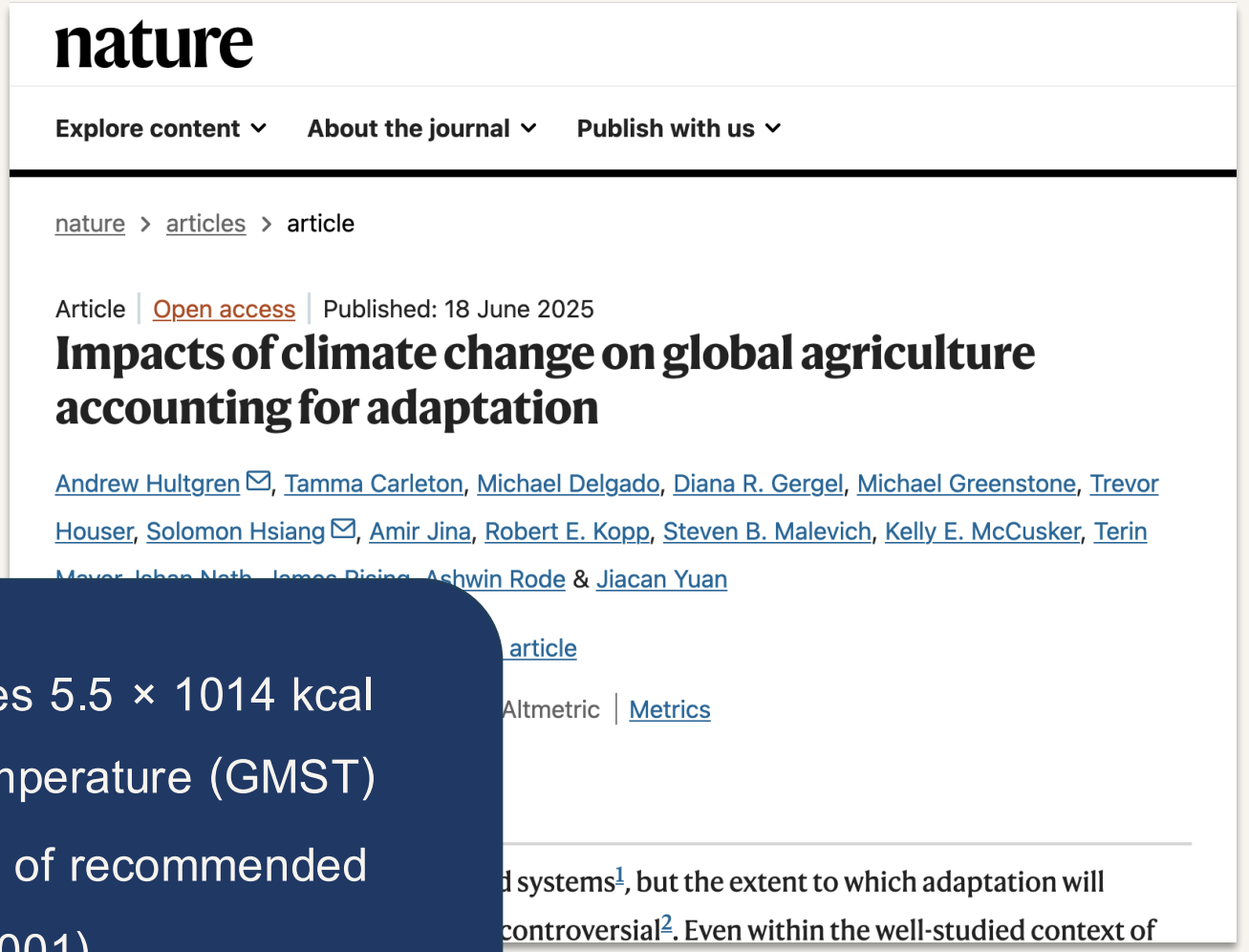
Tidal

Protecting the ocean while feeding humanity sustainably

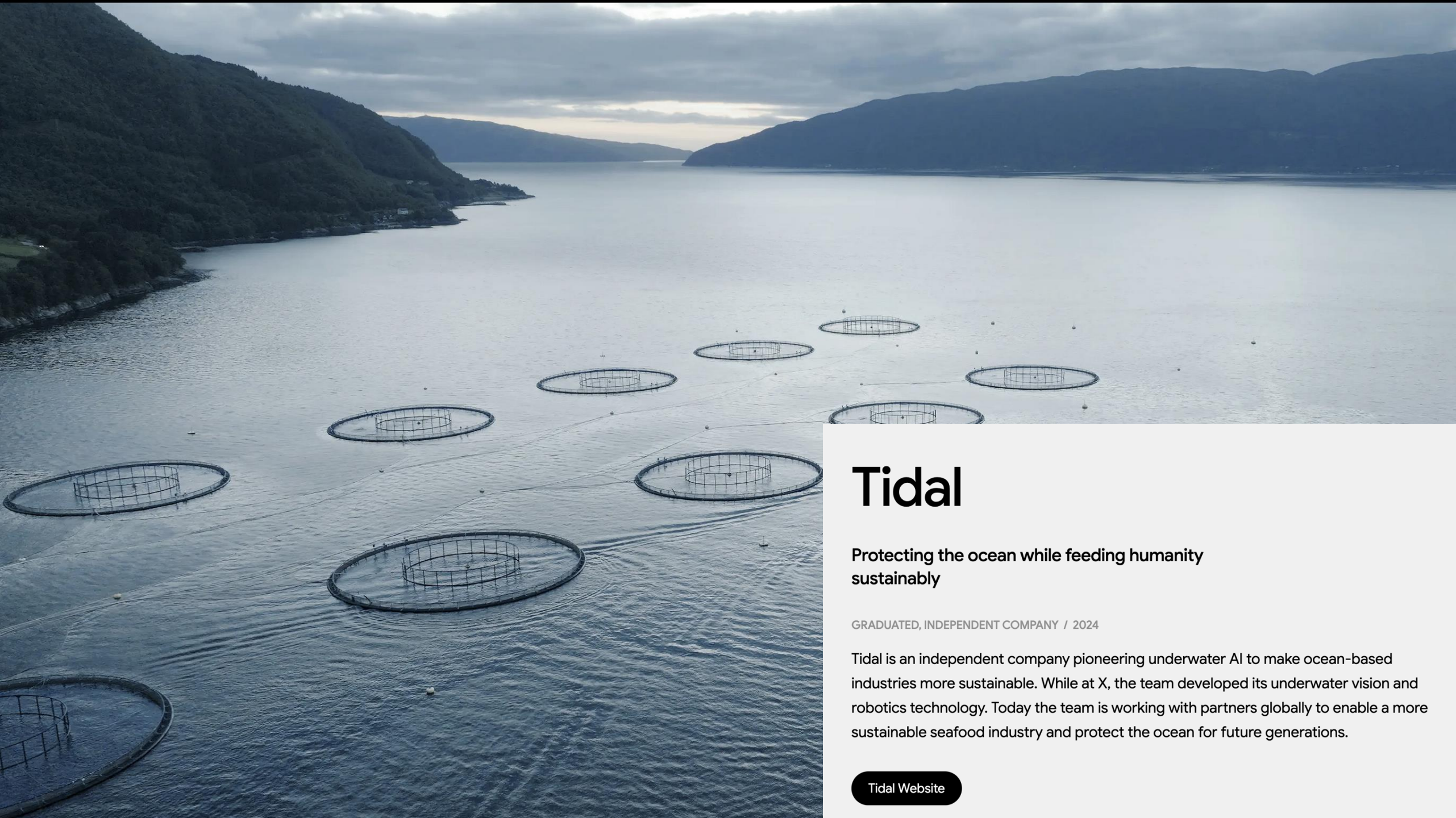
GRADUATED, INDEPENDENT COMPANY / 2024

Tidal is an independent company pioneering underwater AI to make ocean-based industries more sustainable. While at X, the team developed its underwater vision and robotics technology. Today the team is working with partners globally to enable a more sustainable seafood industry and protect the ocean for future generations.

Tidal Website



We estimate that global production declines 5.5 × 1014 kcal annually per 1 °C global mean surface temperature (GMST) rise (120 kcal per person per day or 4.4% of recommended consumption per 1 °C; P < 0.001).



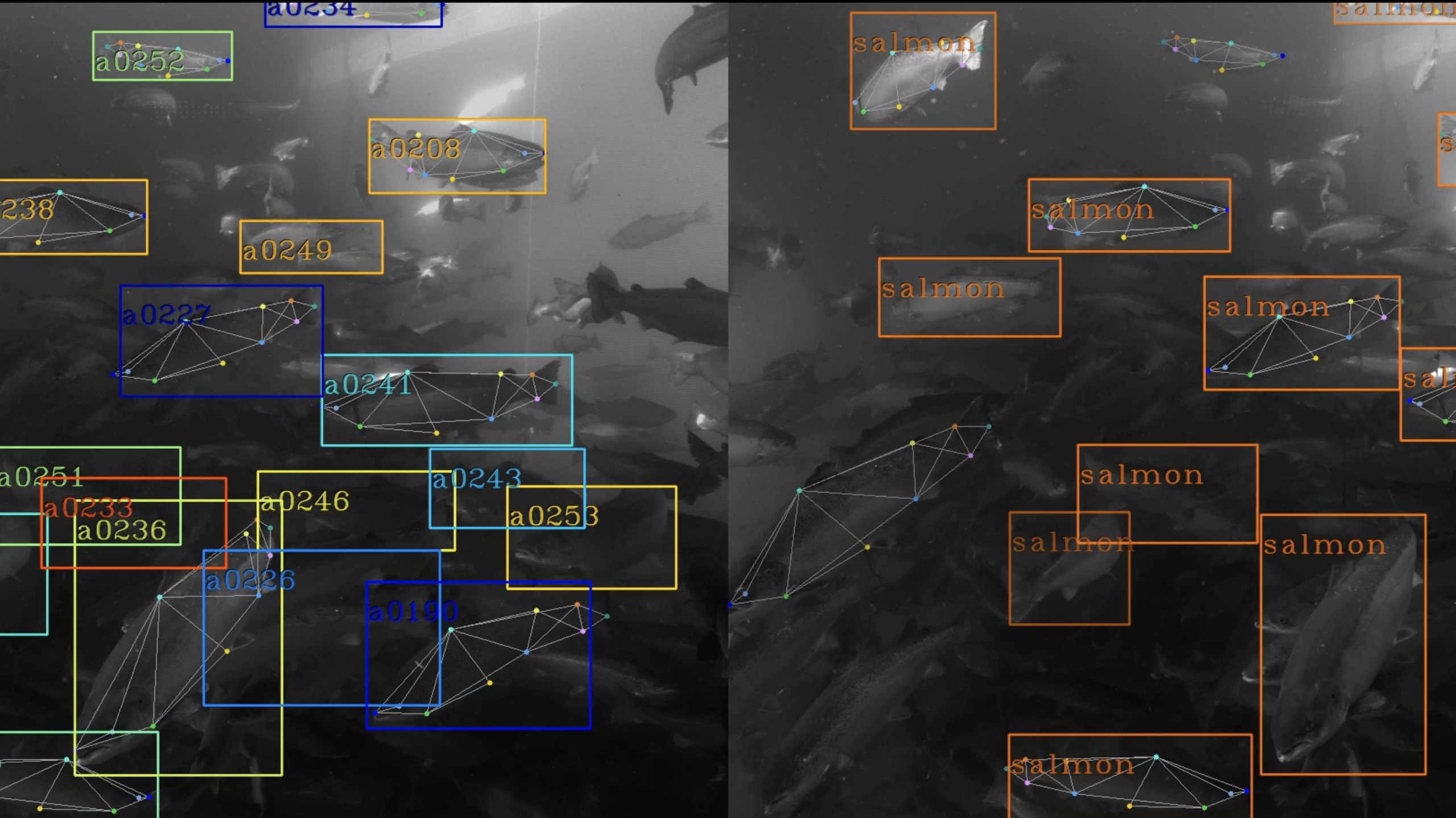
Tidal

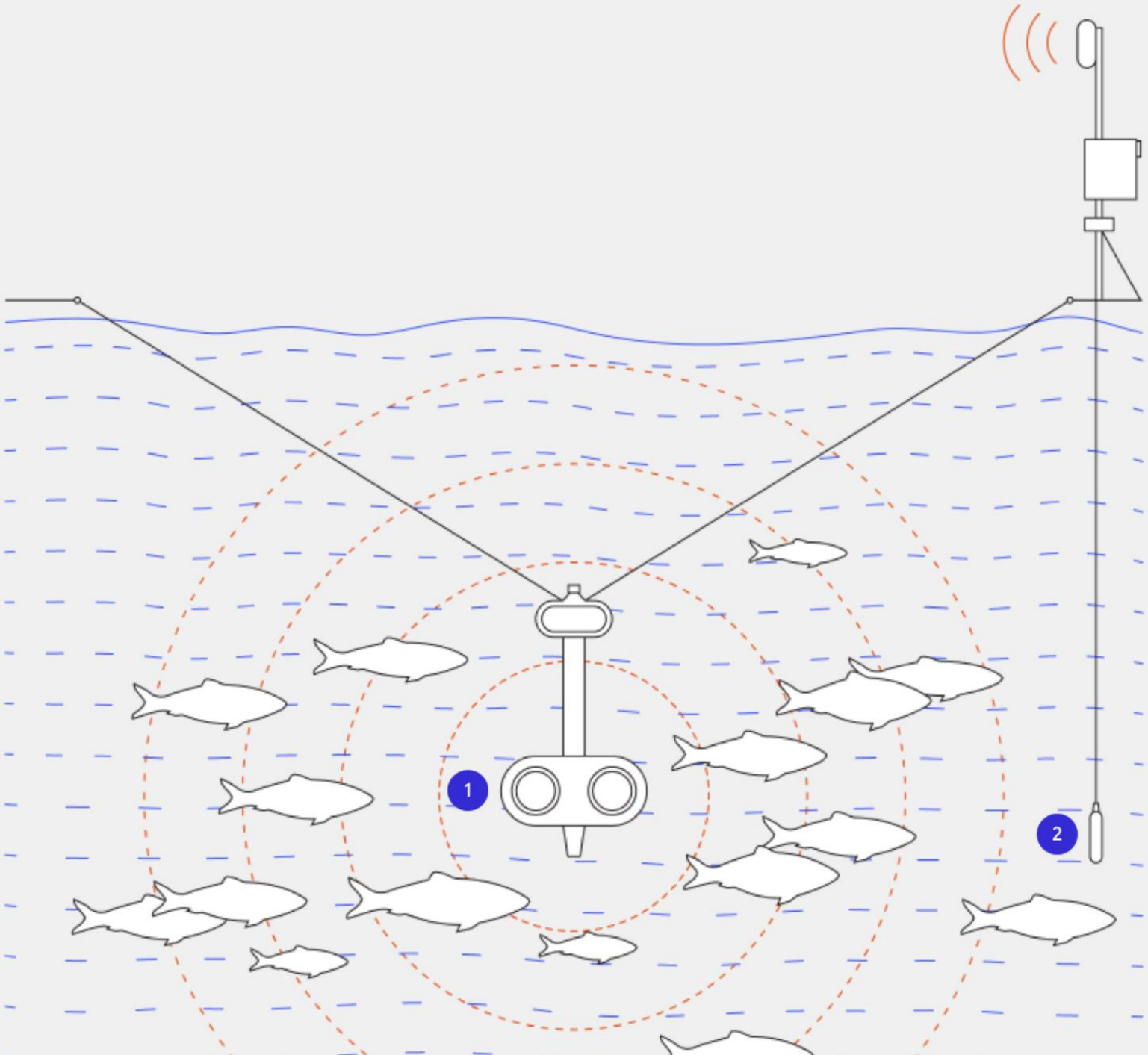
Protecting the ocean while feeding humanity sustainably

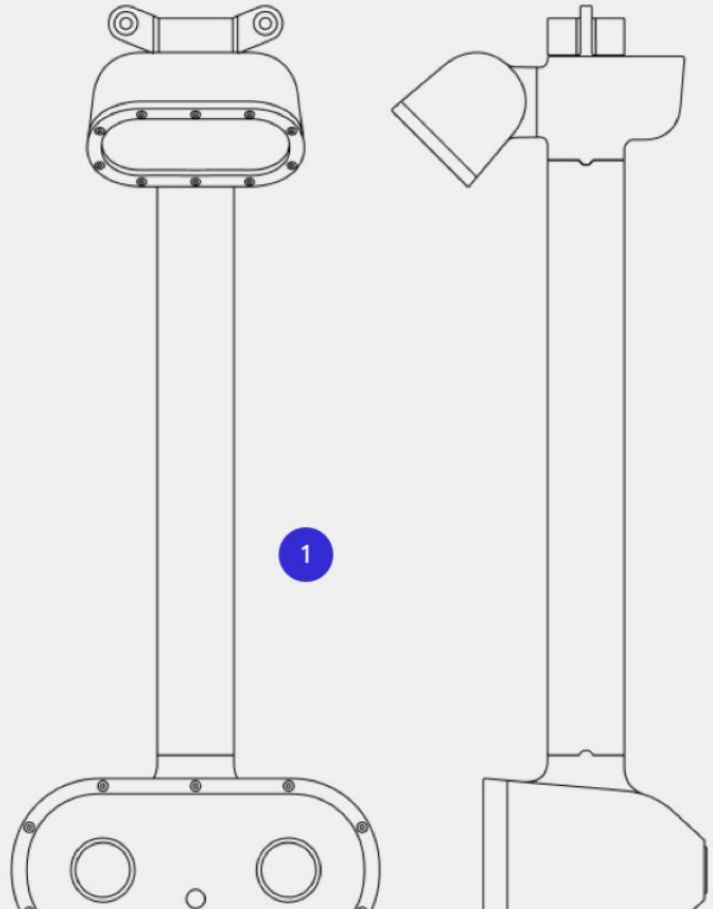
GRADUATED, INDEPENDENT COMPANY / 2024

Tidal is an independent company pioneering underwater AI to make ocean-based industries more sustainable. While at X, the team developed its underwater vision and robotics technology. Today the team is working with partners globally to enable a more sustainable seafood industry and protect the ocean for future generations.

Tidal Website


a0252
a0208
a0249
a0227
a0241
a0243
a0246
a0253
a0233
a0236
a0226
a0190
salmon
salmon
salmon
salmon
salmon
salmon
salmon


1
2


1

AI for sustainability

Green AI for sustainability

Big Tech is Corrupting Green AI

1. Green AI serves as an excuse to invest in more AI.
2. Green AI alludes that sustainability of AI is a technofix.
3. Green AI is used to narrow down understandings of sustainability.

Green AI serves as an excuse to invest in more AI.

What is Green AI?

Ressource efficiency of AI (Schwartz et al. 2019)

AI for sustainability

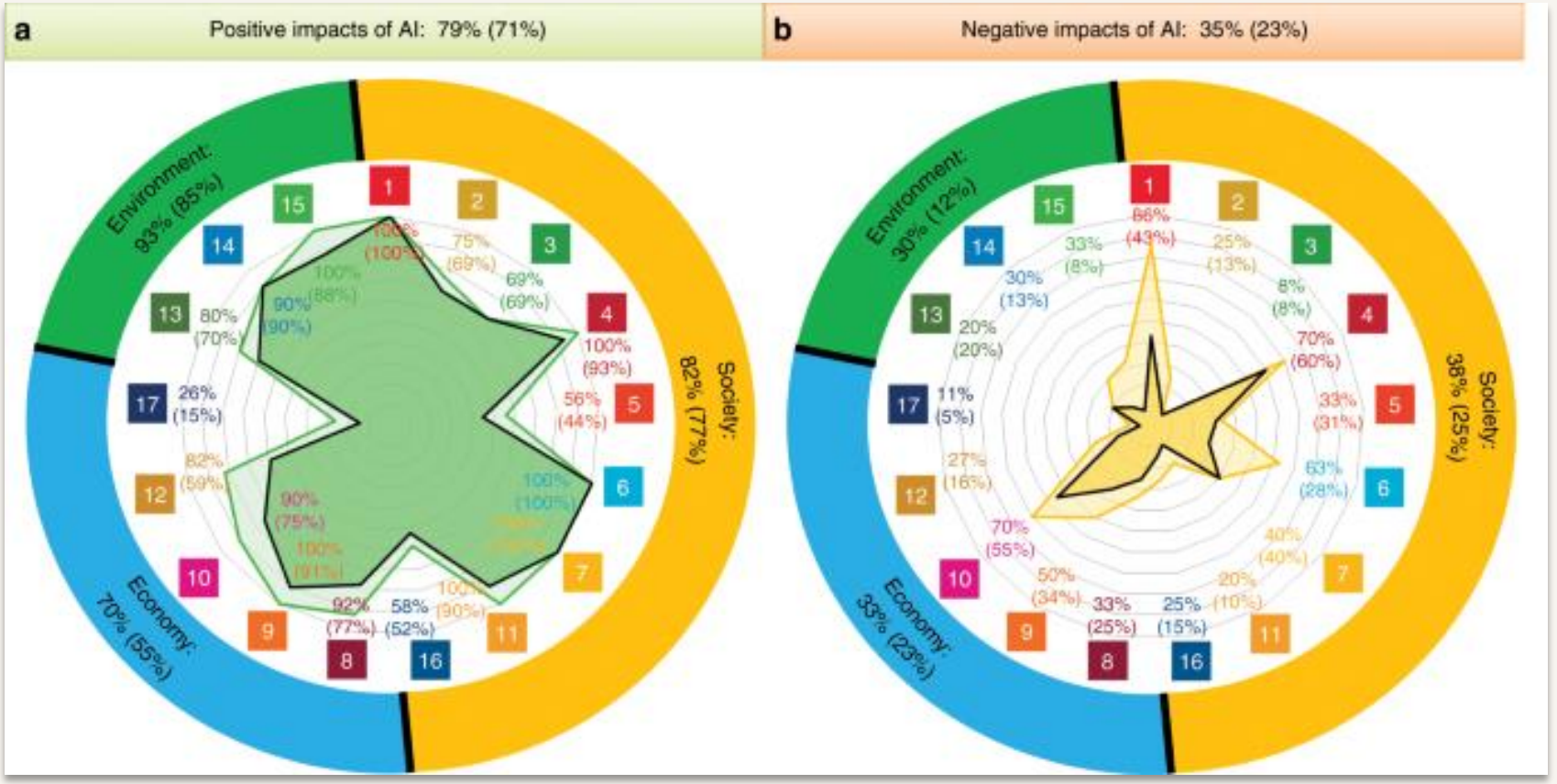
Sustainability as inter- and intragenerational justice

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"

(United Nations, 1987, S. 37)

AI and the SDGs

„we find that AI can enable the accomplishment of 134 targets across all the goals, but it may also inhibit 59 targets.“



Vinuesa, R., Azizpour, H., Leite, I. *et al.* The role of artificial intelligence in achieving the Sustainable Development Goals. *Nat Commun* **11**, 233 (2020). https://doi.org/10.1038/s41467-019-14108-y

		Causal inference	Computer vision	Interpretable models	NLP	RL & Control	Time-series analysis	Transfer learning	Uncertainty quantification	Unsupervised learning
1	Electricity systems									
	Enabling low-carbon electricity		•	•		•	•		•	•
	Reducing current-system impacts		•				•		•	•
	Ensuring global impact		•					•		•
2	Transportation									
	Reducing transport activity		•				•		•	•
	Improving vehicle efficiency		•			•				
	Alternative fuels & electrification					•				•
	Modal shift	•	•				•		•	
3	Buildings and cities									
	Optimizing buildings	•				•	•	•		
	Urban planning		•				•	•		•
	The future of cities				•			•	•	•
4	Industry									
	Optimizing supply chains		•			•	•			
	Improving materials									•
	Production & energy		•	•		•				
5	Farms & forests									
	Remote sensing of emissions		•							
	Precision agriculture		•			•	•			
	Monitoring peatlands		•							
	Managing forests		•			•	•			
6	Carbon dioxide removal									
	Direct air capture									•
	Sequestering CO_2		•						•	•
7	Climate prediction									
	Uniting data, ML & climate science		•	•			•		•	
	Forecasting extreme events		•	•			•		•	
8	Societal impacts									
	Ecology		•					•		
	Infrastructure					•	•		•	
	Social systems		•				•			•
	Crisis		•		•					
9	Solar geoengineering									
	Understanding & improving aerosols						•		•	
	Engineering a planetary control system					•			•	
	Modeling impacts						•		•	
10	Individual action									
	Understanding personal footprint	•			•	•	•			
	Facilitating behavior change				•					•
11	Collective decisions									
	Modeling social interactions			•		•				
	Informing policy	•	•		•				•	•
	Designing markets					•	•			•
12	Education				•	•				
13	Finance				•		•		•	

Table 1: Climate change solution domains, corresponding to sections of this paper, matched with selected areas of ML that are relevant to each.

Examples: AI for Sustainability

- **Resource efficiency**: Energy supply, building and transport planning, predictive maintenance, smart farming, material optimization, etc.
- **Climate modeling**: Prediction of extreme events, analysis of climate data and climate forecasts
- **Circular economy**: Recycling of materials, identification and sorting of substances, etc.
- **Food security and health**: Efficiency and optimization in food production, AI-based diagnoses and early detection
- **Equality**: Early detection of domestic violence and calculation of recidivism rates for prisoners

Rolnick, D., Donti, P. L., Kaack, L. H., Kochanski, K., Lacoste, A., Sankaran, K., ... & Bengio, Y. (2019): Tackling climate change with machine learning. arXiv preprint arXiv:1906.05433.

United Nations | Department of Economic and Social Affairs

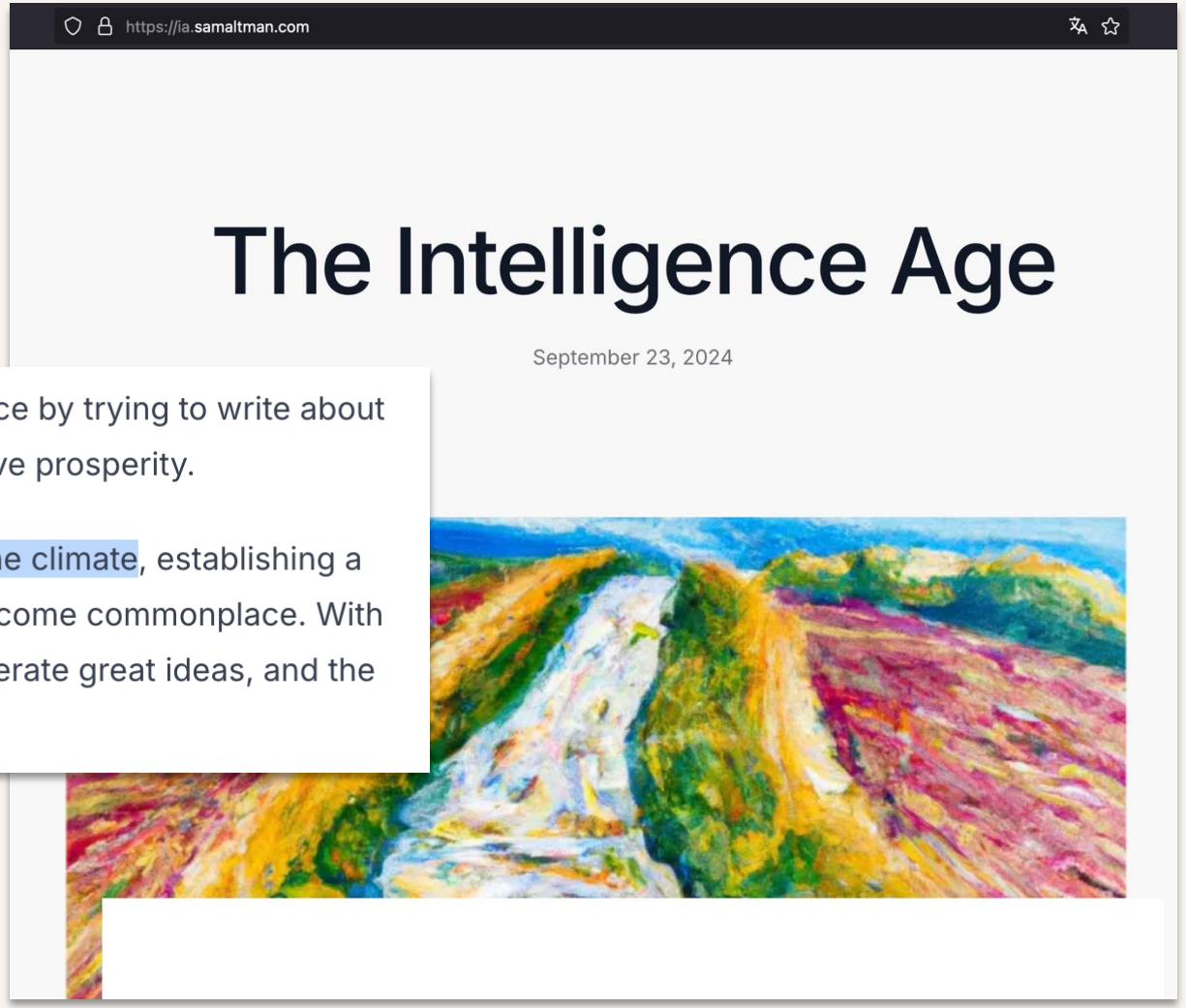
Home | About Us » | What We Do » | Key Topics » | Latest from DESA | Products » | UN DESA Voice | Highlights Report » | Calendar

Artificial intelligence saving the natural world

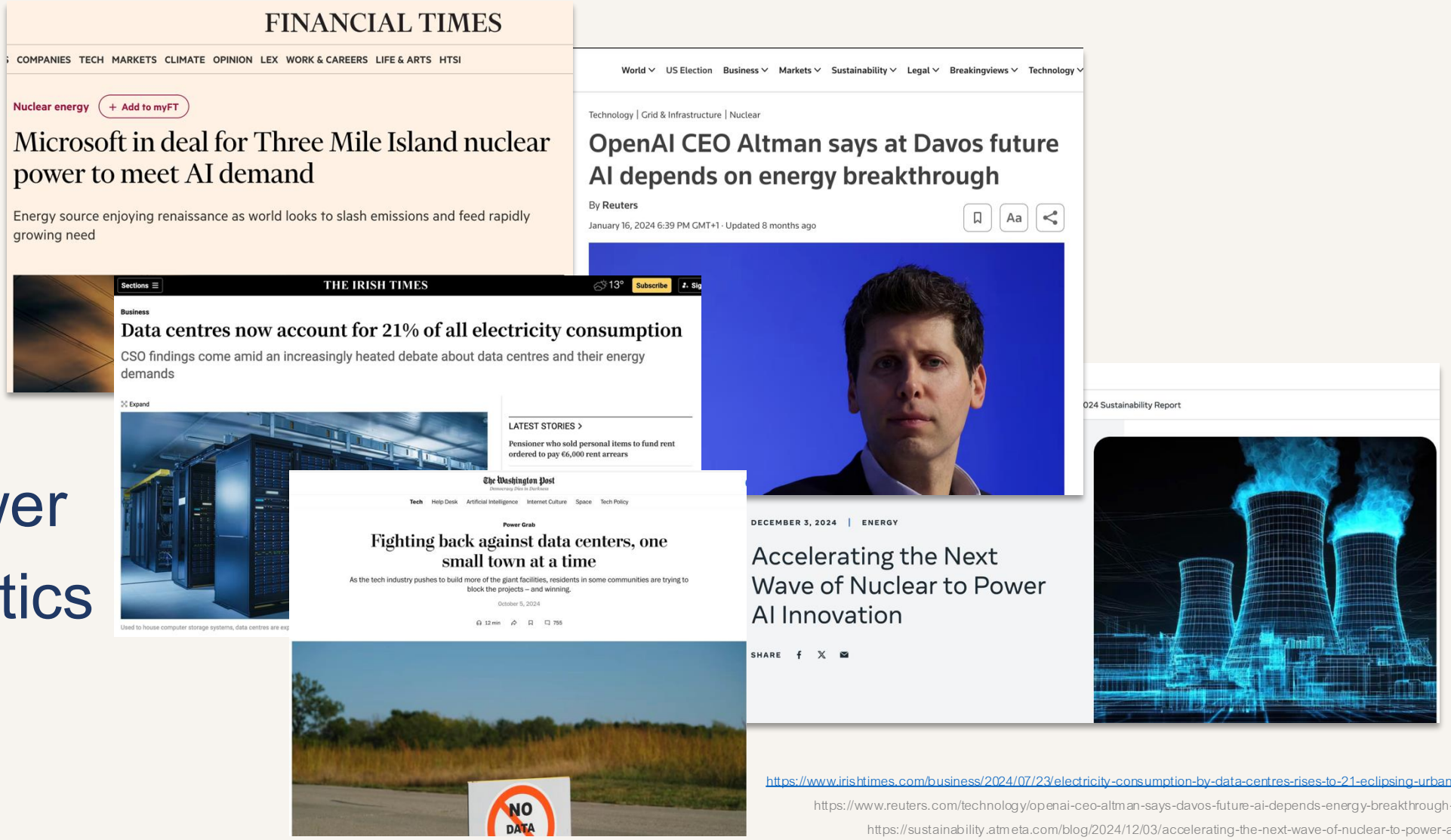
Sam Altman,
CEO Open AI

I believe the future is going to be so bright that no one can do it justice by trying to write about it now; a defining characteristic of the Intelligence Age will be massive prosperity.

Although it will happen incrementally, astounding triumphs – fixing the climate, establishing a space colony, and the discovery of all of physics – will eventually become commonplace. With nearly-limitless intelligence and abundant energy – the ability to generate great ideas, and the ability to make them happen – we can do quite a lot.



Market Power Energy Politics



Dr. Anne Mollen

Quellen:

https://www.irishtimes.com/business/2024/07/23/electricity-consumption-by-data-centres-rises-to-21-eclipsing-urban-households

https://www.reuters.com/technology/openai-ceo-altman-says-davos-future-ai-depends-energy-breakthrough-2024-01-16/

https://sustainability.atmeta.com/blog/2024/12/03/accelerating-the-next-wave-of-nuclear-to-power-ai-innovation/

https://www.washingtonpost.com/technology/2024/10/05/data-center-protest-community-resistance/

Green AI alludes that sustainability of AI is a technofix.

AI Technofixes?

AI provides technofixes for sustainability.

Sustainability of AI can be techno-fixed.

Kaack, L. H., Donti, P. L., Strubell, E., Kamiya, G., Creutzig, F., & Rolnick, D. (2022). Aligning artificial intelligence with climate change mitigation. *Nature Climate Change*, *12*(6), 518–527. https://doi.org/10.1038/s41558-022-01377-7

„This will require a holistic portfolio of approaches (…) to incentivize uses of ML that support climate change strategies while mitigating the impacts of use cases that may counteract climate change goals."

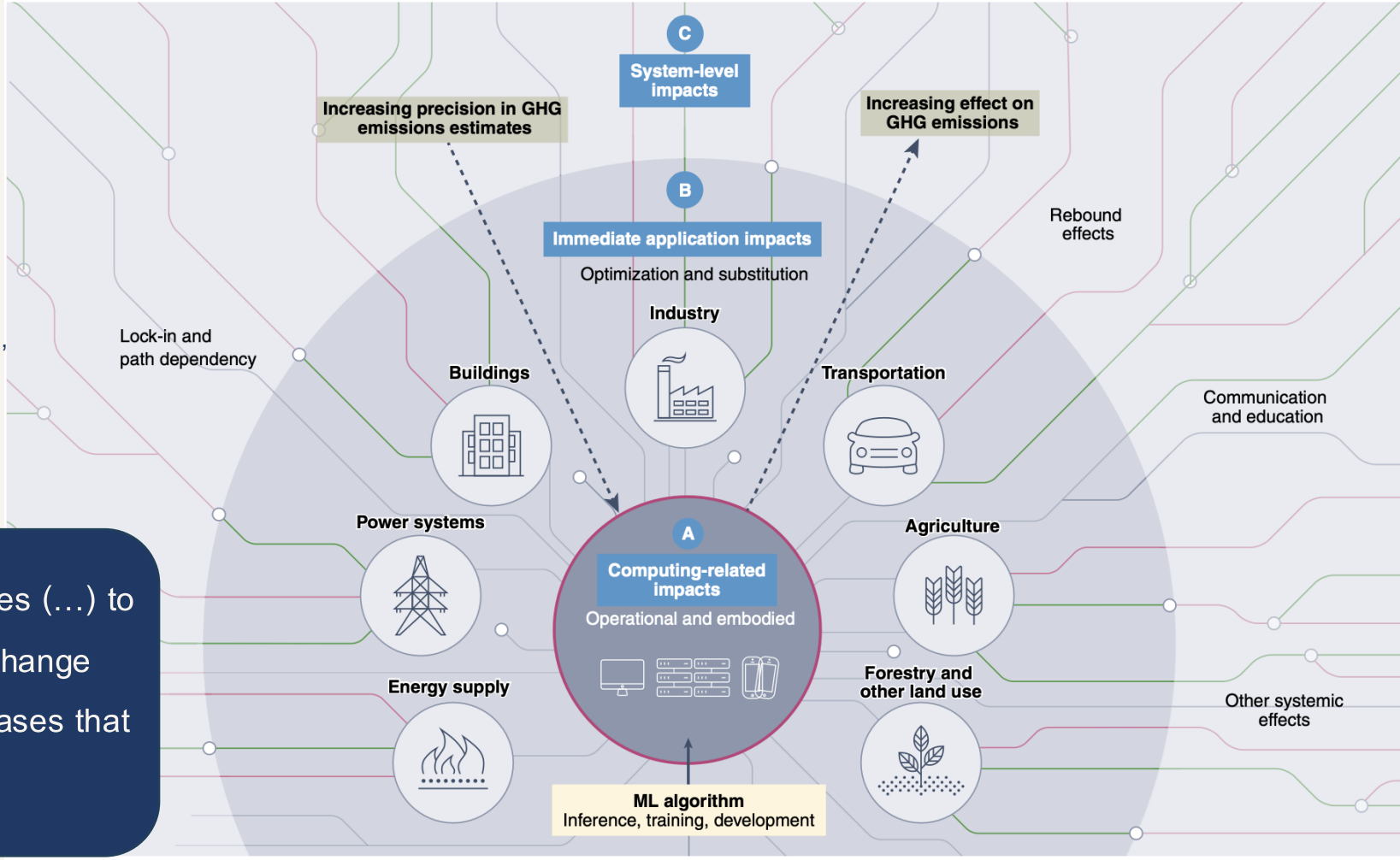


Fig. 1 | Framework for assessing the GHG emissions impacts of ML. We distinguish between three categories (A, B and C) with different kinds of potential emissions impacts, estimation uncertainties, and associated decarbonization levers. Green lines denote effects relating to reductions in GHG emissions, magenta lines relate to increases in emissions, and grey lines symbolize uncertain and/or negligible effects. We provide specifics of Category A of this framework in Fig. 2 and Category B in Fig. 3. Icons adapted with permission from the IEA.

SustAIn:

The Sustainability Index for Artificial Intelligence

ALGORITHM WATCH

i|ö|w INSTITUT FÜR ÖKOLOGISCHE WIRTSCHAFTSFORSCHUNG

DAI-Labor TU Berlin

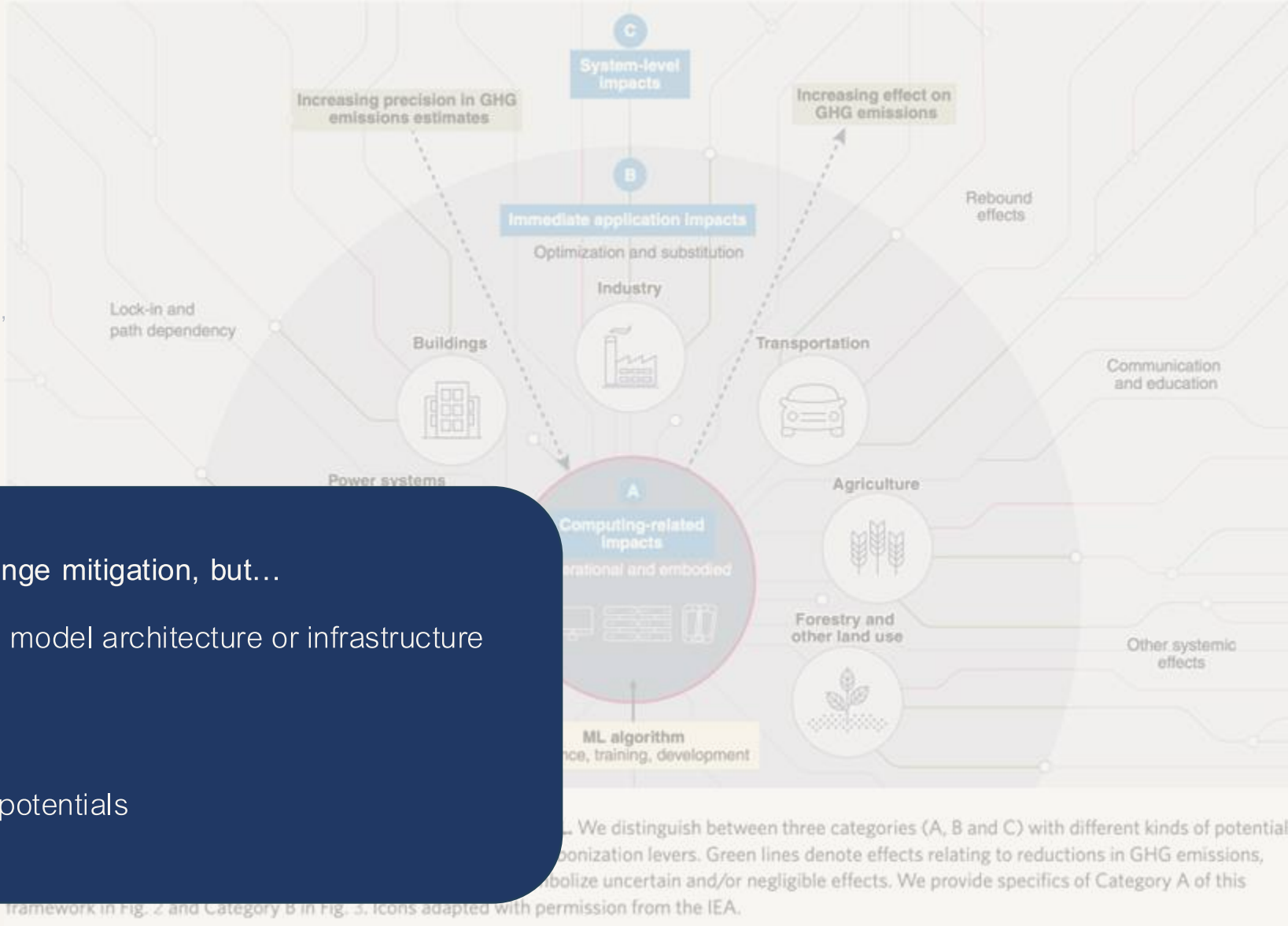
Gefördert durch: Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz aufgrund eines Beschlusses des Deutschen Bundestages

Set of Indiciators along whicht to define and evaluate Sustainability of AI

Rohde et al. 2021: Nachhaltigkeitskriterien für künstliche Intelligenz. Schriftenreihe des IÖW, 220/21.

Ecological Sustainability	• Energy Consumption • CO2 Emissions • Sustainability potentials in use and application • Indirect Resource Consumption
Social Sustainability	• Transparency & Accountability • Non-discrimination & Fairness • Self-Determination & Data Protection • Technical Reliability & Human Oversight • Co-Design and Participatory Design • Cultural Appropriateness
Economic Sustainability	• Market Diversity & Unlocking of Innovation Potential • Distribution Effects in Target Markets • Working Conditions & Jobs

Dr. Anne Mollen

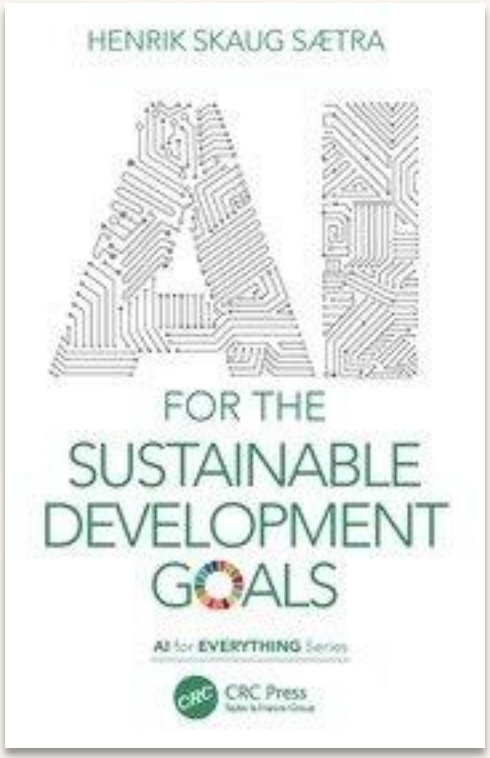


We distinguish between three categories (A, B and C) with different kinds of potential
onization levers. Green lines denote effects relating to reductions in GHG emissions,
bolize uncertain and/or negligible effects. We provide specifics of Category A of this
framework in Fig. 2 and Category B in Fig. 3. Icons adapted with permission from the IEA.

Kaack, L. H., Donti, P. L., Strubell, E., Kamiya ,G., Creutzig, F., & Rolnick, D. (2022). Aligning artificial intelligence with climate change mitigation. *Nature Climate Change*, *12*(6), 518–527. https://doi.org/10.1038/s41558-022-01377-7

Green AI might help aligning AI with climate change mitigation, but…

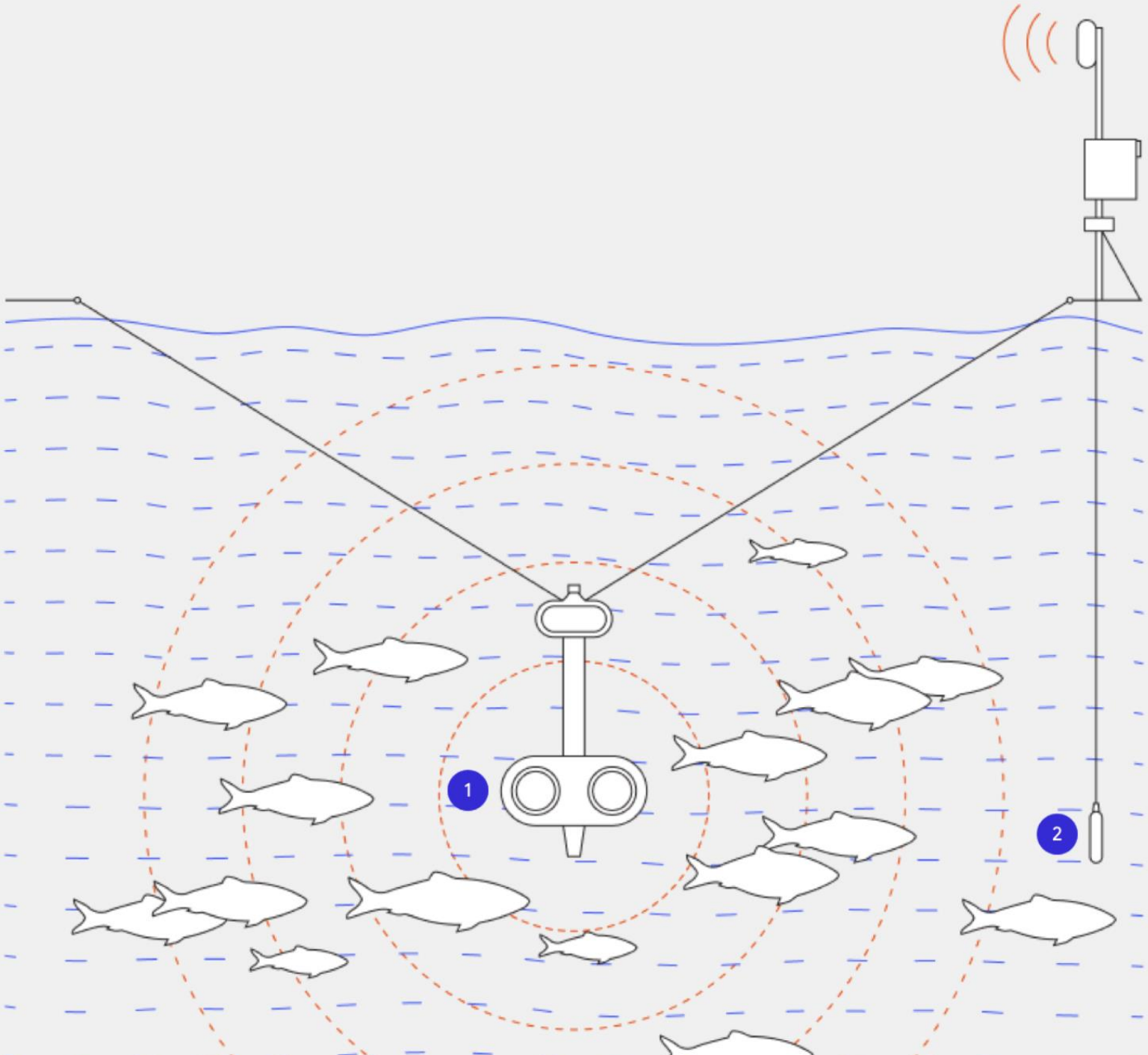
- Sustainability of AI is not solved in data sets, model architecture or infrastructure
- Quantification of AI impacts is flawed
- Gross-net calculations are impossible
- Theoretical potentials do not match realistic potentials

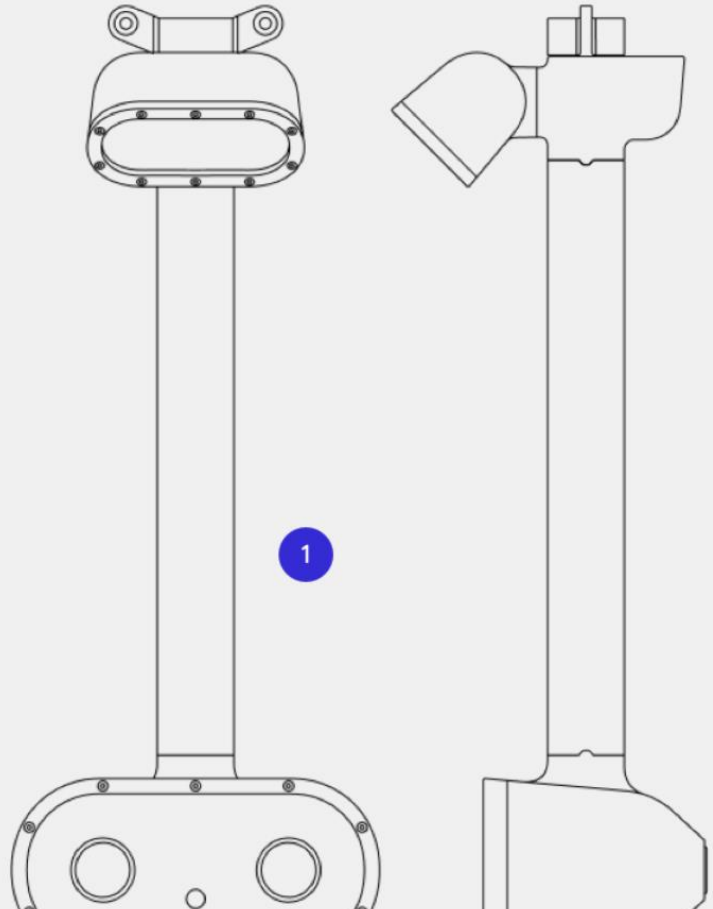


AI beyond technofixes

Sætra: „Take a look at the SDG 8, which is economic growth. A lot of people in the tech sector are saying: “The data economy is built on us, we further economic growth”. **But SDG 8 actually says that this growth should be inclusive and sustainable.** So it should be beneficial also for those most in need. It’s redistributive in a sense that all the justice-related aspects of economic growth must be there. As such, real contribution to SDG 8 can have positive impacts almost all across the board. And the other around way: **if you create more unsustainable and *uni*nclusive economic growth that promotes concentration of wealth among very few people or corporations, then it will have negative ripple effects on almost all the other goals as well.**“

Green AI is used to narrow down understandings of sustainability.


1
2


1

AI for sustainability | Emissions management | Energy management | ESG data management

AI:

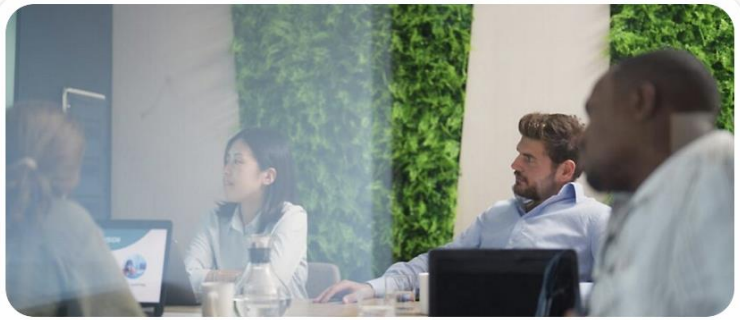
r advancing

Blog

3 ways AI is helping the planet

Microsoft is working to make datacenters and AI systems more energy and water efficient. We are also using carbon-free energy and enhancing access.

Read the blog



Blog

Simplify CSRD reporting with AI

Learn how sustainability data solutions in Microsoft Fabric can help you meet reporting needs.

Read the blog

Documentation

Discover intelligent insights

Learn how to use AI-generated intelligent insights in Microsoft Sustainability Manager.

Learn more

A Planetary Computer for a Sustainable Future

Supporting sustainability decision-making with the power of the cloud

The Planetary Computer combines a multi-petabyte catalog of global environmental data with intuitive APIs, a flexible scientific environment that allows users to answer global questions about that data, and applications that put those answers in the hands of conservation stakeholders.

"And that's why we need solutions like artificial intelligence that are capable of being deployed at a **planetary scale**. ... at ist core, AI is just an algorithm that solves for an objective function. It solves a problem. And the **biggest problem** we need to solve right now is how we, as humans, **can continue to grow and prosper** without destroying the very ecosystems that we all depend on."

(Microsoft Chief Environmental Officer, 2019)

The AI opportunity for Europe's climate goals

Apr 08, 2025
2 min read

AI policy recommendations to support EU climate and competitiveness goals.

Annette Kroeber-Riel
Vice President, Government Affairs and Public Policy for Europe

AI as a solution to sustainability narrowed down to

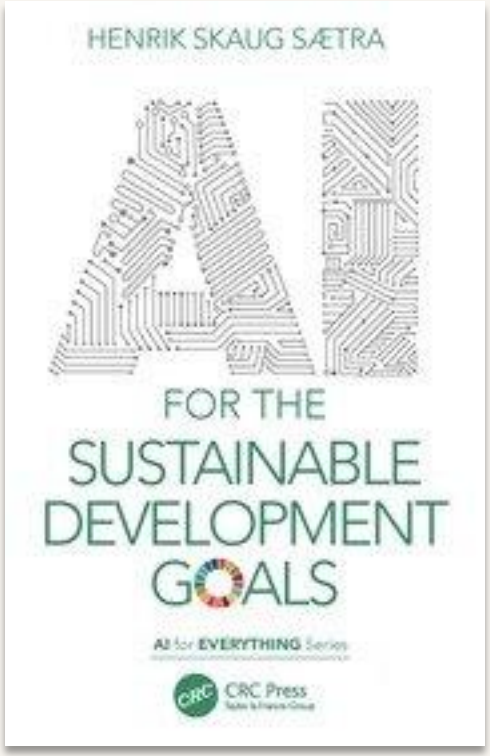
- information and knowledge
- efficiency and optimization
- technological innovation
- commodification

It manifests the status quo and prevents a fundamental transformation in alignment with the SDGs.

Risks of Big Tech corrupting Green AI

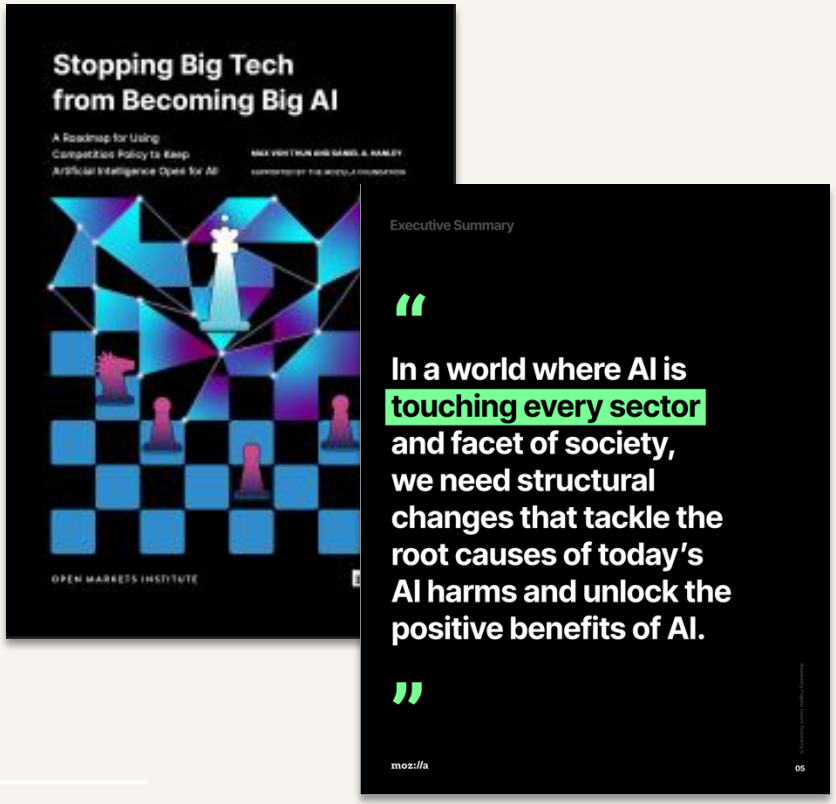
- Emission or resource fetishism
- Impossibility of global net calculations of AI impacts
- Inadequacy of Risk-Benefit-Dichotomies
- Commodification of sustainability crisis
- Manifesting of structural injustices

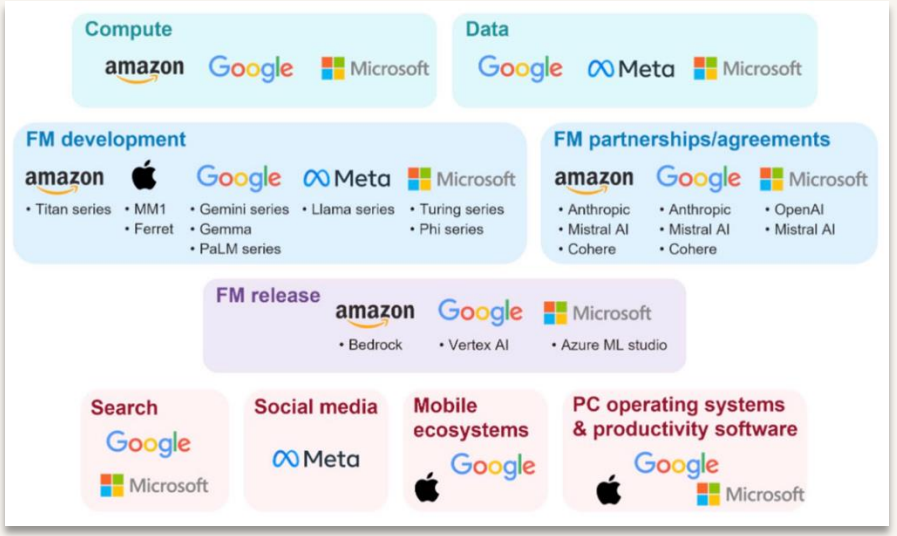
Global Distributional Justice

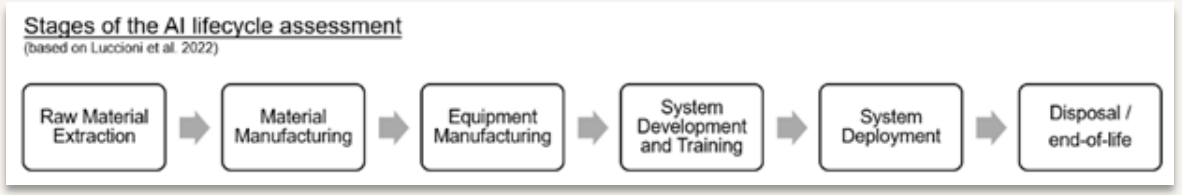


„The SDGs allow us to consider the impact of AI on our lives and environments, this requires us to understand the context of AI – the infrastructure it is built on, who develops it, who owns it, who has access to it, who uses it, and what it is used for – rather than relying on an isolationist theory of technology.“

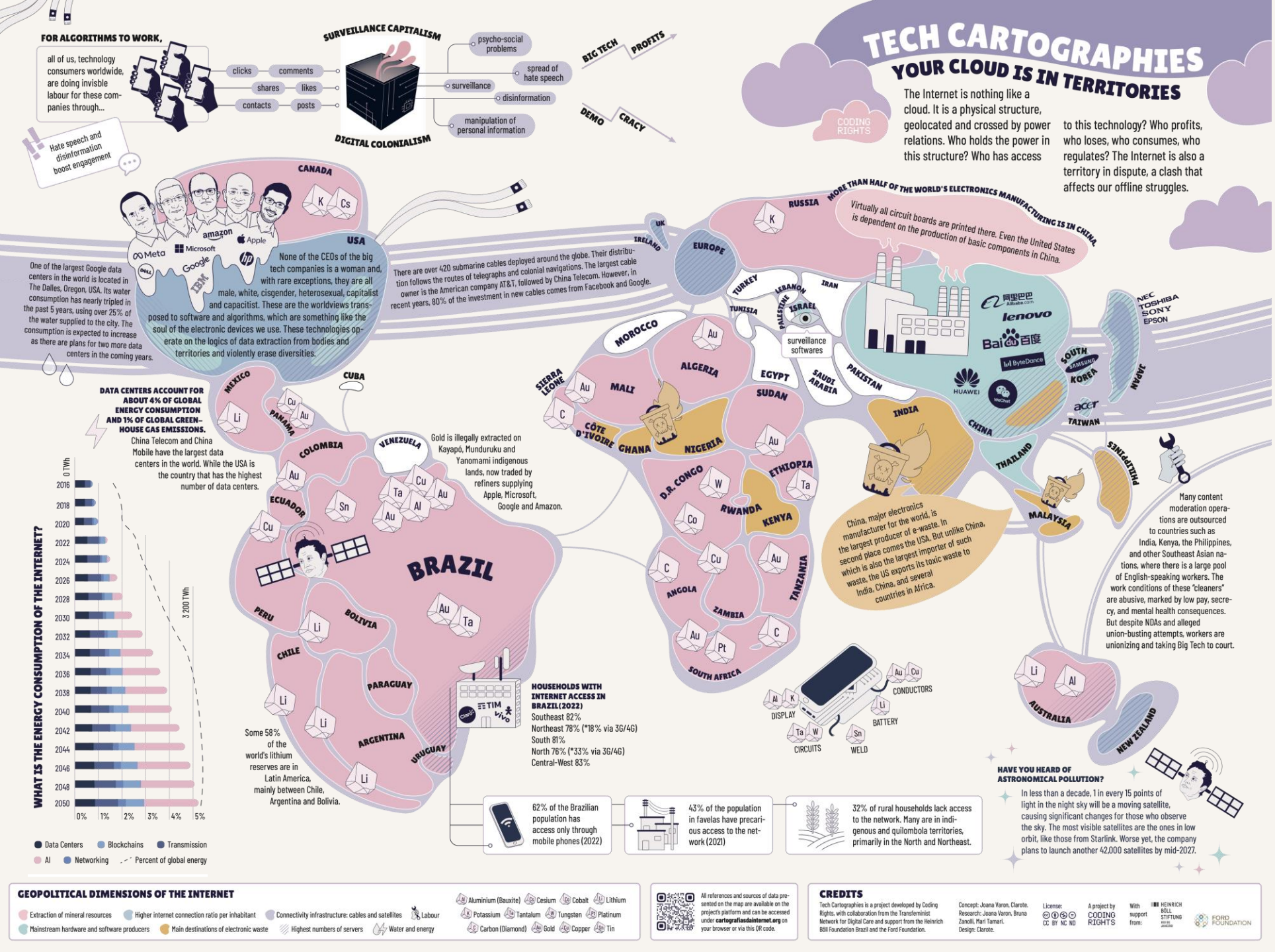
„Today's AI ecosystem is structurally flawed in ways that prevent us from realizing the full potential of AI, while also allowing AI harms to go unchecked."







Dr. Anne Mollen



Tech Cartographies is a project developed by Coding Rights, in collaboration with the Rede Transfeminista de Cuidados Digitais and with the support of Heinrich-Böll Foundation Brazil and Ford Foundation.

Concept: Joana Varon and Clarote
Researchers: Joana Varon, Bruna Zanolli and Mari Tamari
Design: Clarote
Interactivity: Diana Cury

Realization: CODING RIGHTS

Support: HEINRICH BÖLL STIFTUNG

License: CC BY NC ND

https://www.cartografiasdainternet.org/en

By Joana Varon

Works like magic….

„ (…) a defining feature of magic (…) is that it is ‘**costless**’ in terms of the kind **of drudgery, hazards, and investments** that actual technical activity inevitably requires. Production ‘by magic’ is production minus the disadvantageous side-effects, such as **struggle, effort**, etc.” (Gell, 1988, p. 9). To evoke magic is not only to provide an alternative regime of causal relations, but also to **minimize the attention to the methods and resources required** to carry out a particular effect.“

Elish & boyd 2017

What to do about it

- Be aware of what cannot be addressed on the (technical) system level
- Re-claim Green AI discourses
- Push for policies (individual, organizational and more broadly) to address distributional injustices of digital infrastructures
- De-mystify Big Tech narratives and lobbying on AI and sustainability

Thank you!