# The cost of AI

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# Introduction

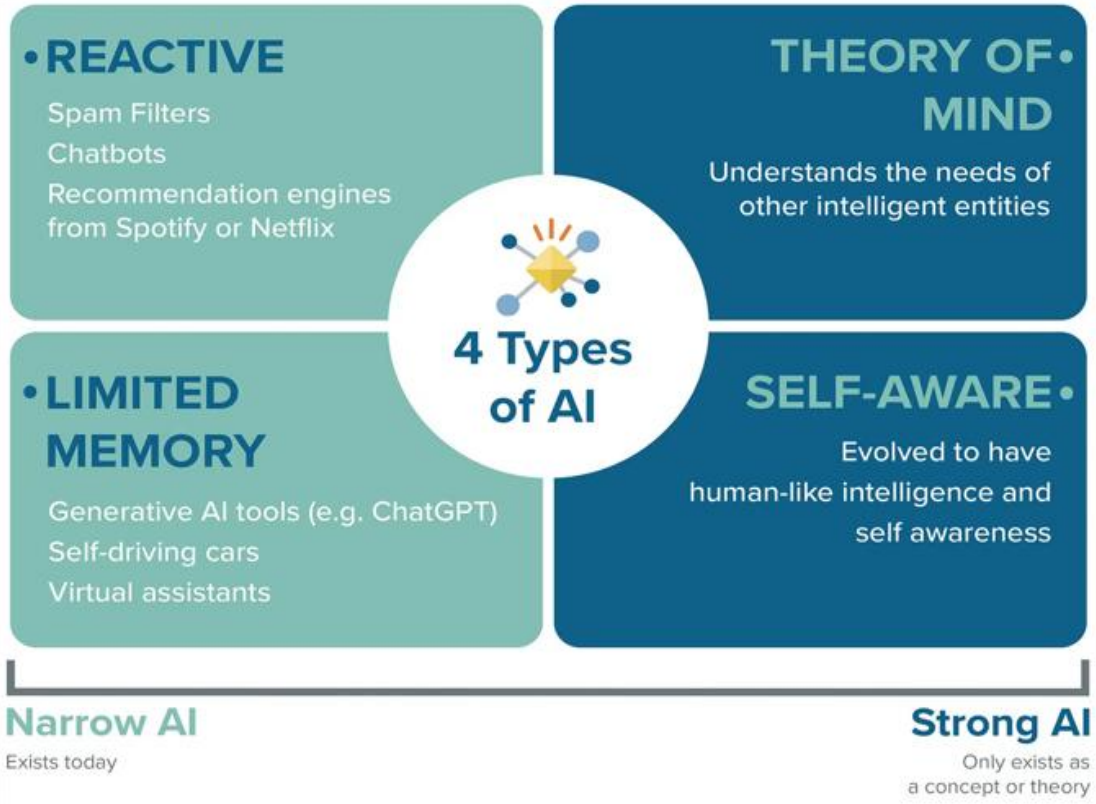
- The usual question about AI
  - How shall we use it?
- Often overlooked questions about AI
  - What is the cost of using it?
  - What is the benefit/ratio cost?
  - What are the implications behind its usage?
- Just like any tool
  - The potential to serve humanity exists, if used ***reasonably well***
  - It has a production cost in the equation
  - It also has consequences due to usage

The question we ***don‘t*** ask:

Under which conditions is it acceptable to use it?

# AI definition

- Group of technologies that **process information** and **simulate** human activities
- Such activities include **understanding, learning, creating, reasoning, decision making, …**
- Science aiming at automating the process of **learning** machines to **perform tasks**



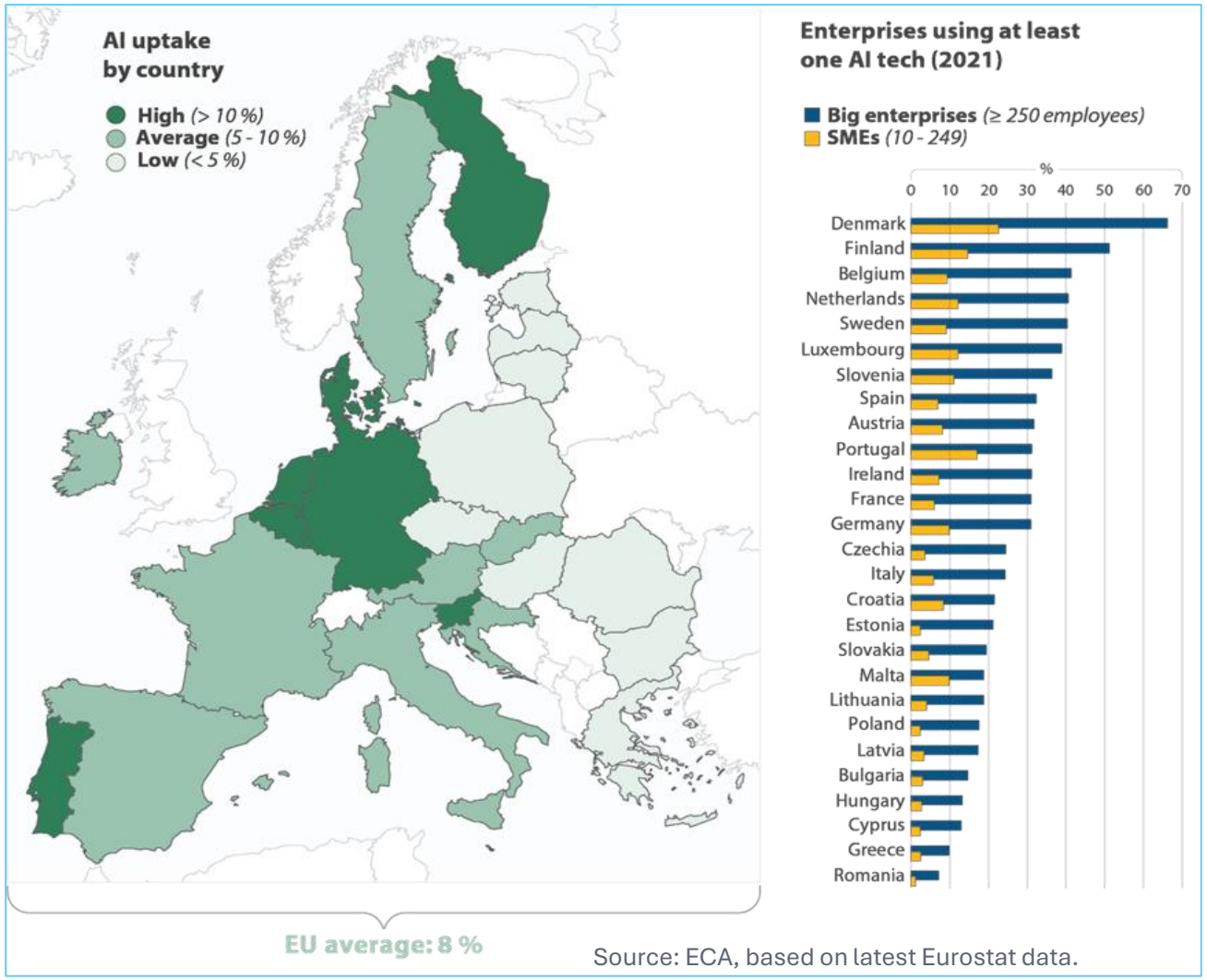

https://www.aitechboss.com/types-of-ai/

# AI benefits

- Makes everyday tasks faster
- Usually works like an assistant
- Through interactive prompt
- Simulates human dialogue
- Provides some support
- Needs to be double-checked

- Usual AI task examples
  - Summarize long documents
  - Write draft emails
  - Manage and schedule tasks
  - Help with decisions
  - Generate creative contents
  - Help with trip planning
  - Give short definitions

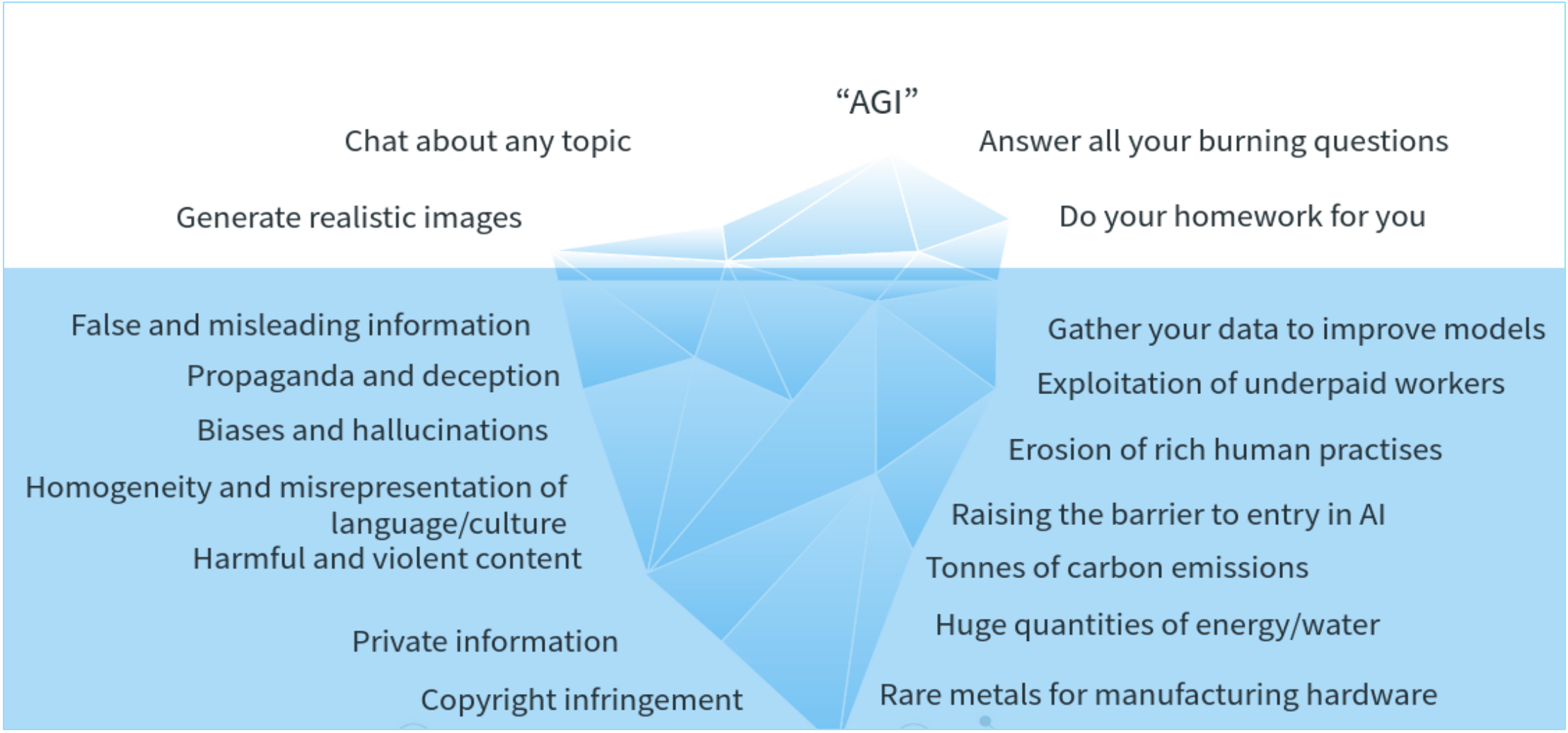
# AI uptake in Europe




Source: ECA, based on latest Eurostat data.

- **Massive adoption**
  - Large companies
  - Followed by SME
- **Not only companies**
  - 1/3 of the 16-74 population used AI in 2025
  - 25% for personal purposes
  - 15% of them for work
  - 9% for formal education

# AI issues




© Dr. Sasha Luccioni. Source: https://arstechnica.com/gadgets/2023/04/generative-ai-is-cool-but-lets-not-forget-its-human-and-environmental-costs/

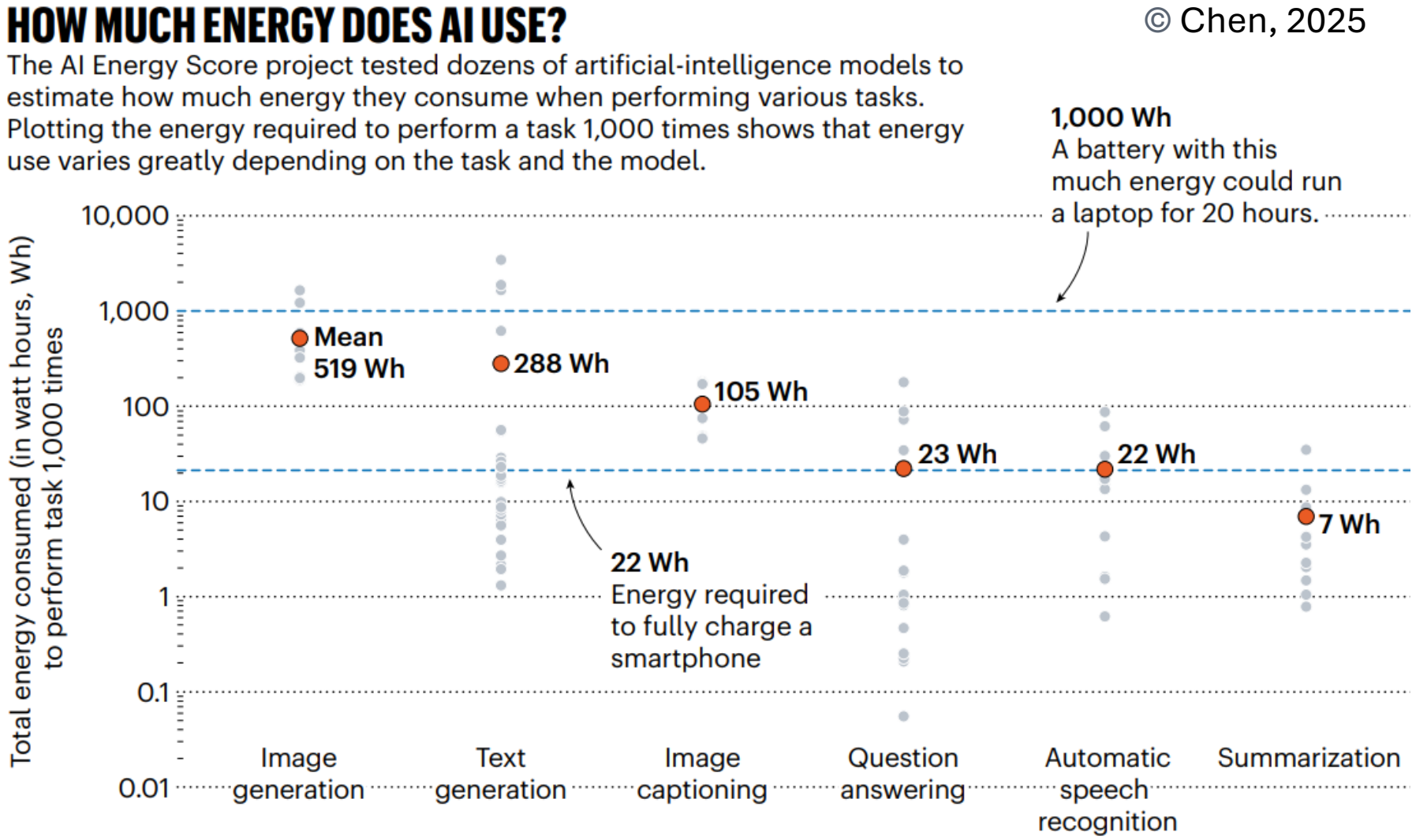
# AI cost: multiple dimensions

- Material resources
  - electricity, water, servers, chips, and data-centre infrastructure (de Vries, 2023; Li et al., 2025)
- Economical cost
  - low pay, economic dependency, outsourcing, surveillance, secrecy, and weak labour protections in parts of the AI data-work pipeline (Miceli & Posada, 2022; Miceli et al., 2024)
- Psychological damage
  - Data filtering work expose workers to significant mental-health risks (Miceli et al., 2024)
  - Also its usage can be damaging (Dang, Liu, 2025)

# AI cost: some numbers

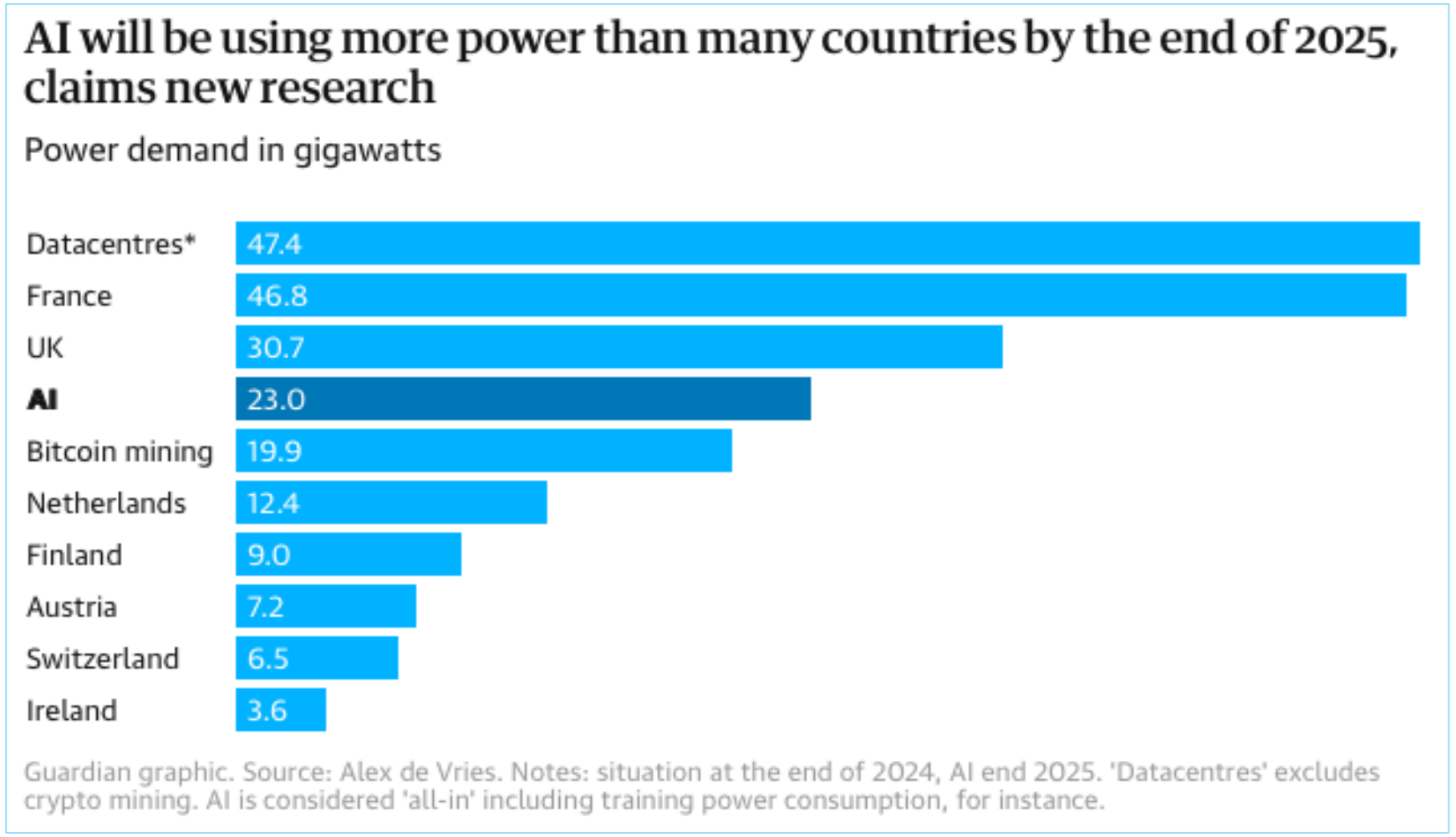
- Carbon footprint and water footprint
  - 1 short GPT-4o query consumes 0.43 Wh
  - Scale this to 700 million queries/day, you get…
- Huge environmental impact
  - electricity use comparable to 35,000 U.S. homes
  - freshwater evaporation matching the annual drinking needs of 1.2 million people
  - carbon emissions requiring a Chicago-sized forest to offset
- Estimation for GPT-3
  - Around 30 prompts consumes around ½ liter of water
- Energy needed for a prompt vs email
  - Estimated 10 to 100 times higher for a prompt

# Energy cost comparison

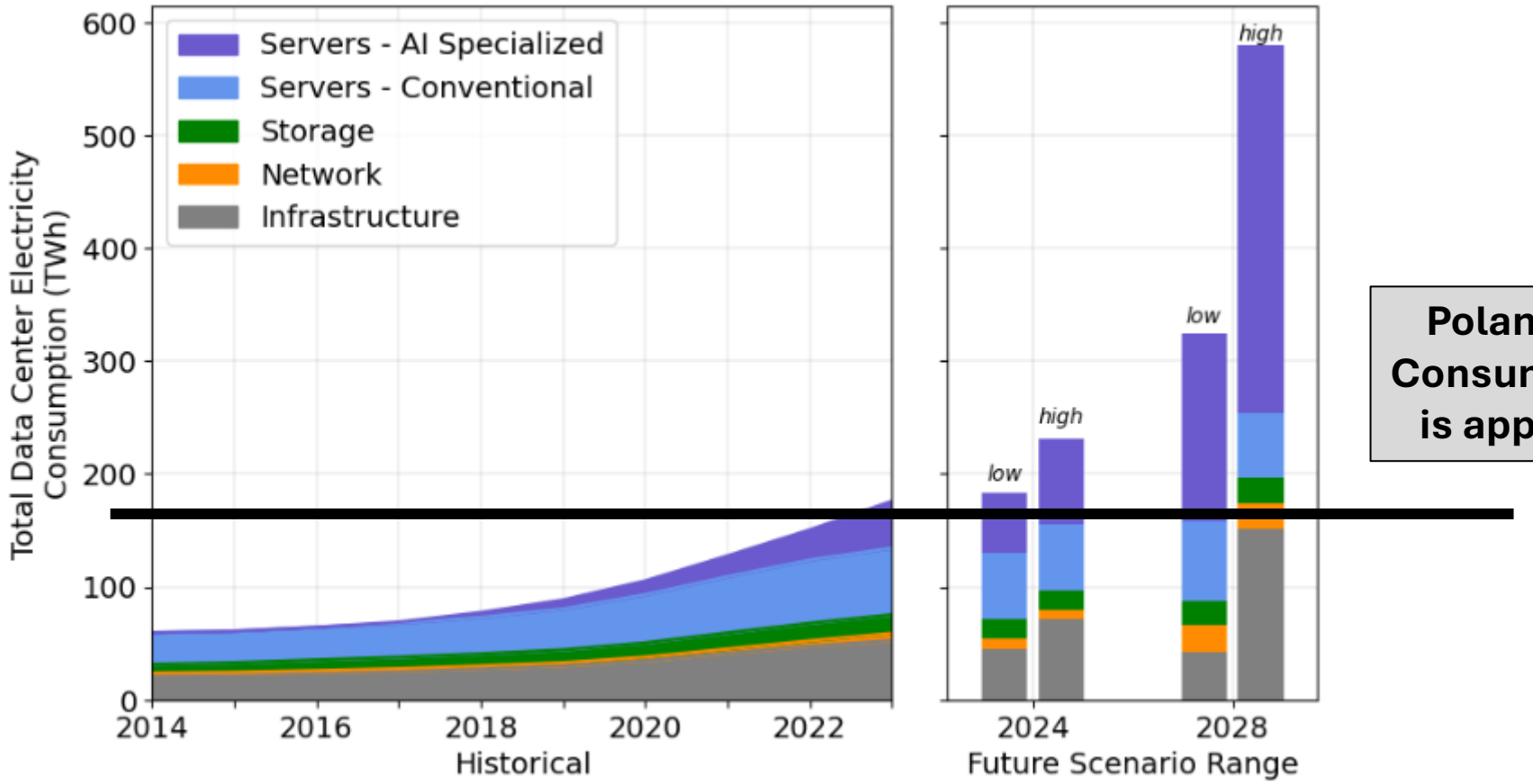



© Chen, 2025

# Cost comparison with countries



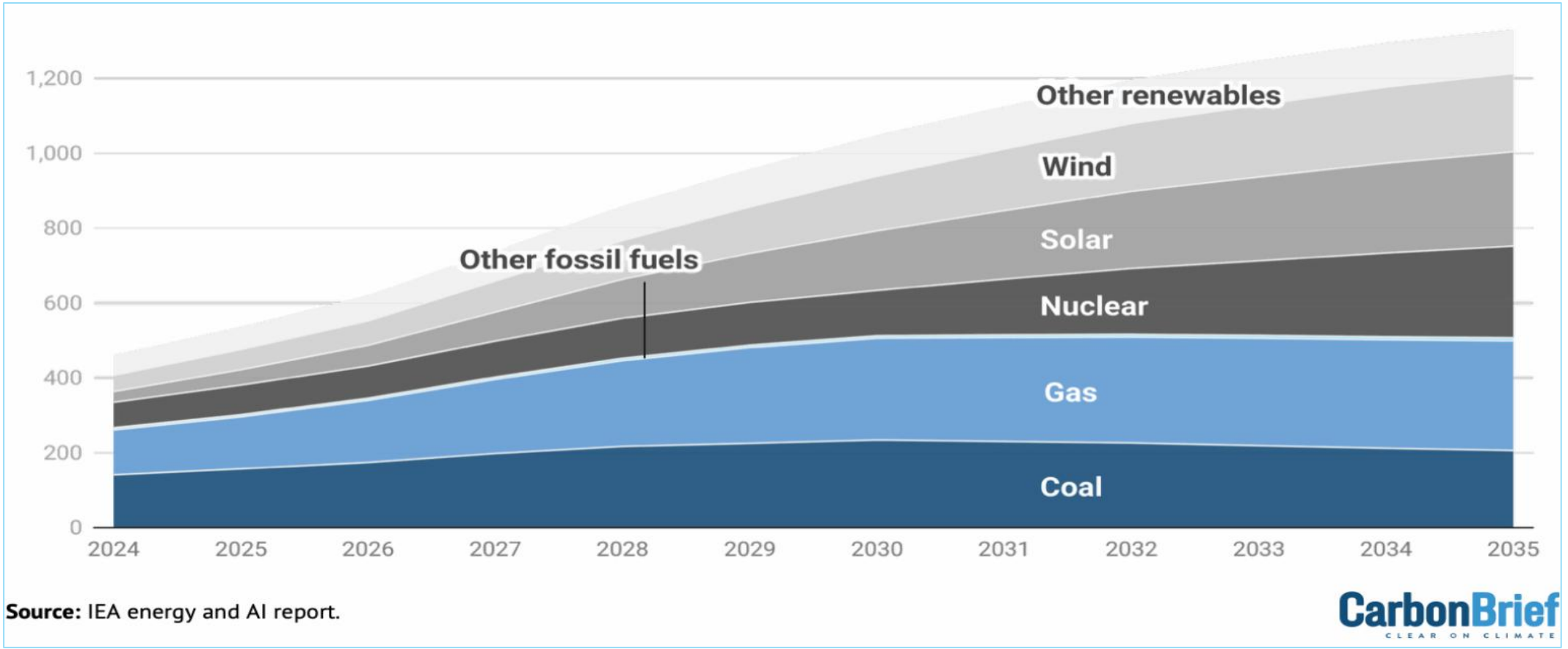
# Data center electricity usage and AI



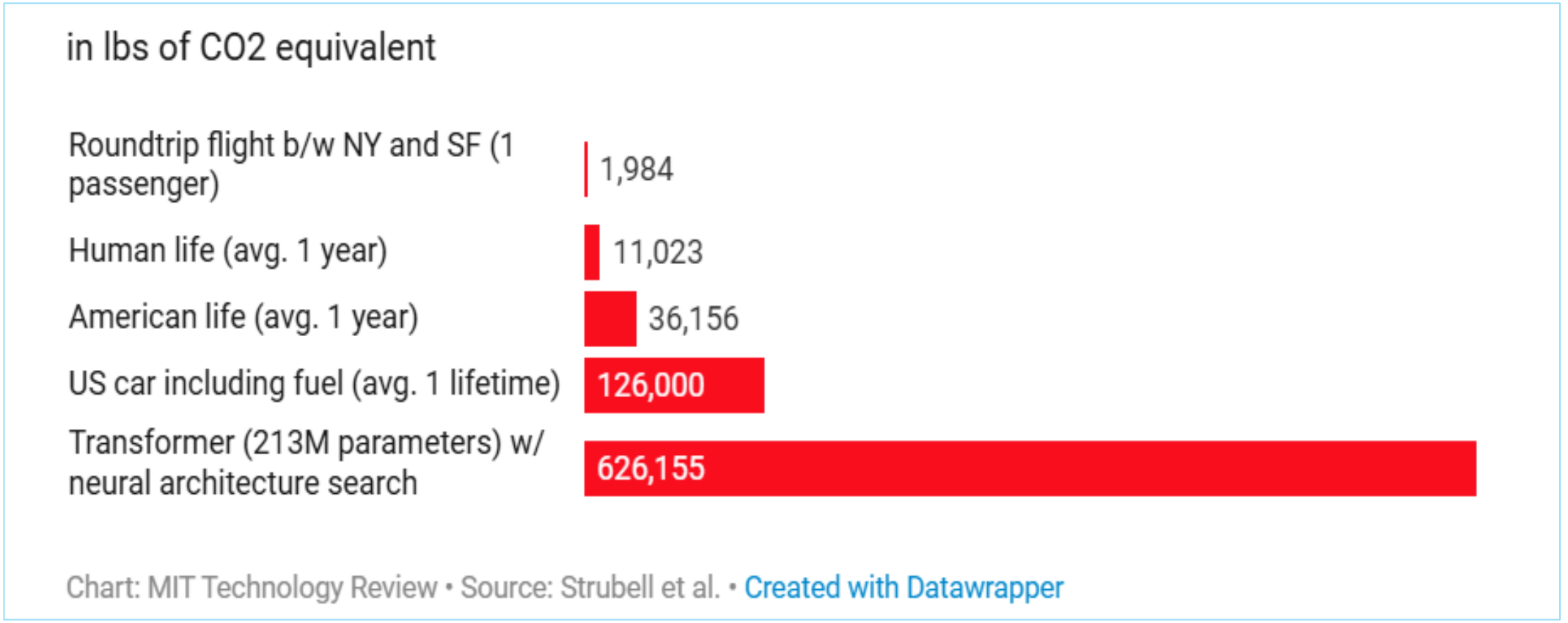

**Poland electricity Consumption in 2025 is approx. 167TWh**

**Figure 5.6. Total data center electricity use from 2014 through 2028 by equipment type.**

# Data centers and fossil fuels



# Carbon footprint comparisons




1 lb ≈ 0.45 kg → 1,984 lbs ≈ 900 kg

# Processing the AI data

- Human tasks in AI
  - Before training: data generation, collection, filtering, annotation
  - During training: assessing model responses (true/false)
  - After training: Impersonation: replacing AI in some contexts
    - Yes, they do ask humans to pretend and reply like a machine.
- Those tasks remains human-based
  - They are outsourced in platforms, using underpaid workers
  - With NDAs, surveillance, isolation, less support (healthcare, pension)
  - Vulnerable populations are targeted: refugees, prisoners, children
  - (Miceli, 2024)

# AI usage: the psychological cost

- The AI bias
  - Conveys the a certain bias that the data it builds on has
  - Online data producers do ***not*** reflect the world population
- Dimensions of the bias
  - Imperialist worldview, white supremacist views, gender-biased views, (you-name-it)-phobic views…
  - Are more present in the generated knowledge model (Katz, 2020)
- Many examples in the news
  - Such as the Dutch authority scandal
  - An AI-assisted program wrongly accused 26000 families of fraud for child support declaration, asked for unfair reimbursements

# AI usage: the psychological cost

- Psychological dependency and attachment formation
  - Users often anthropomorphize AI systems
- Parasocial attachment
  - Leads to delusional thinking, emotional dysregulation, and social withdrawal
- Crisis incidents and harmful outcomes
  - Cognitive impairment and addictive behaviors linked to prolonged AI use
- Heightened vulnerability among specific populations
  - Adolescents, elderly adults, and individuals with mental illness
- Need for validated diagnostic criteria, clinician training, ethical oversight, and regulatory protection

# Conclusion

- The decision to use AI belongs to the user
  - The costs and consequence of AI must be known
- The objective of this set of slides
  - Is to inform about what is often silenced
  - To contribute to better clarity about this tool
  - To raise awareness about its impact
- Feel free to improve these slides
  - Just send me back your improved version, I might update this one

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