

Prospect for power needs for digital applications (and a bit more)

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Extracts from



Working Group 2024-2026

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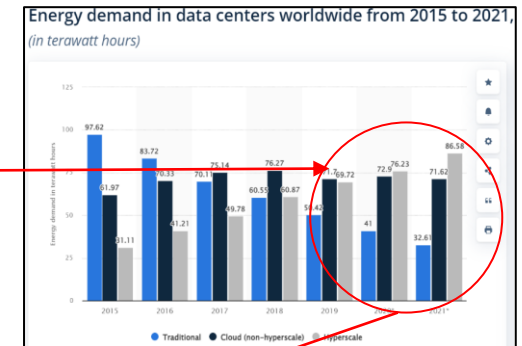
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Global scale

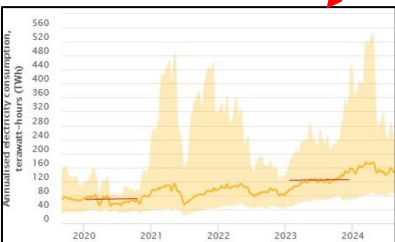
Starting point 2023

Estimation from the last published and comprehensive data (2020)

	2020 (Base)			
	TWh	CO ₂ Op.	CO ₂ Man	CO ₂ Total
Data Centers	220 [250]	95	30	125
Blockchains	70	30	9	39
Networks	250	155	31	186
Devices (ICT+E&M)	910	565	313	878
Total	1450	845	383	1228



	2023 (Estimate)			
	TWh	CO ₂ Op.	CO ₂ Man	CO ₂ Total
Data Centers	270 [320]	65	40	105
Blockchains	[95] 125 [155]	50	18	69
Networks	260	156	33	189
Devices (ICT+E&M)	945	595	292	878
Total	1600	866	383	1241



From 2023 to 2030, a few facts (1)

Chips

Stability (industrial roadmaps already known): 3-4 years and 20 G\$ to construct a new factory => Upper limit on the increase of production (at least up to 2030 !)

Data centers and AI

AI ? Domain-tayloried (Deep-Learning on "private" data) or **Generic** ?

"Macroscopic Rule of thumb": 50 G\$ => 10^6 H100 => 10 TWh

(Jan 26 – Colossus: 38+ G\$ => $5,5 \cdot 10^5$ GPU => 2 GW => 12+ TWh)

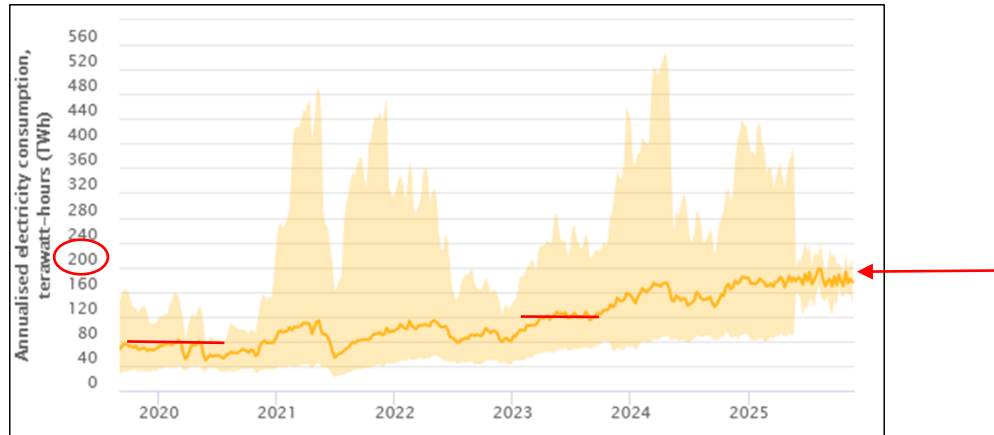
Investments announced for AI: Stargate for 500 G\$, *i.e.* 100 TWh

More likely (including "international race to AI" and China): at least 1,000 G\$, *i.e.* 200+ TWh

From 2023 to 2030, a few facts (2)

Blockchain

Networks



Actual 5G technology stable, but ramp-up with large rebound effects
(6G in use only at the turn of the decade)

Devices

ICT: Sales of smartphones, PC's, screens, CPE's stable since early 20's

E&M: Declining sales of TV's and STB's

Overall stability

Prospect for 2030

	2023 (Estimate)			
	TWh	CO ₂ Op.	CO ₂ Man	CO ₂ Total
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* IEA (2025): 945 TWh (3,500 G\$!)
(Later revised to ~750 TWh)
* Shift Project (2025): 1,100 TWh

	2030 (Prospect)			
	TWh	CO ₂ Op.	CO ₂ Man	CO ₂ Total
Data centers	500 [700]	70	40	110
Blockchains	[?]200[?]	80	16	96
Networks	270]360[590]	120	40	160
Devlces (ITC+E&M)	1000	619	301	918
Total	2060	889	397	1284

After 2030 ?

Very many uncertainties

BaU: Heavy increase of data centers (AI) and network traffic

But: SW (and HW) improvements ? Up to ?

Data centers opposition: electricity, water, waste heat

(Data Center Watch: 26-Q1+Q2: 200 G\$ blocked/delayed)

(UE2027: QR code for DC - PUE, WUE, Carbon footprint)

AI regulations ?

Business model for GenAI ?

Slow-down of investments?

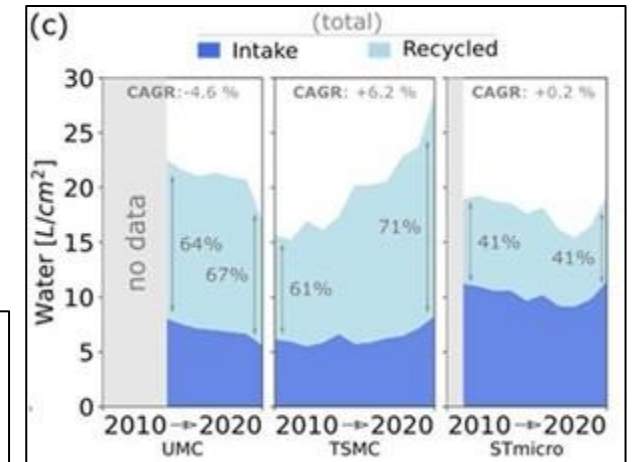
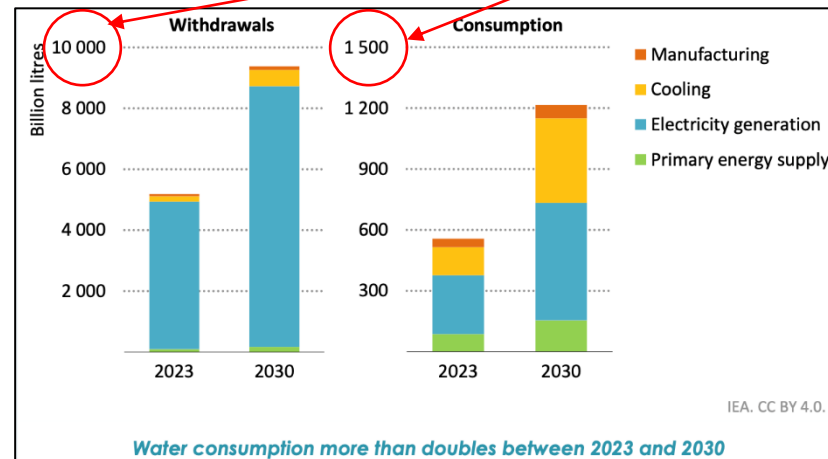
Decarbonated or fossil-generated electricity ?

Water issues

Water necessary for
Chips fabrication
large withdrawal and large recycling

Data centers cooling

No mandatory
reporting ... figures
could be biased ?



In France:
annual withdrawal = 30,000 GL
annual consumption = 4,000 GL

To end up with something not really new ...

Digital industries and services

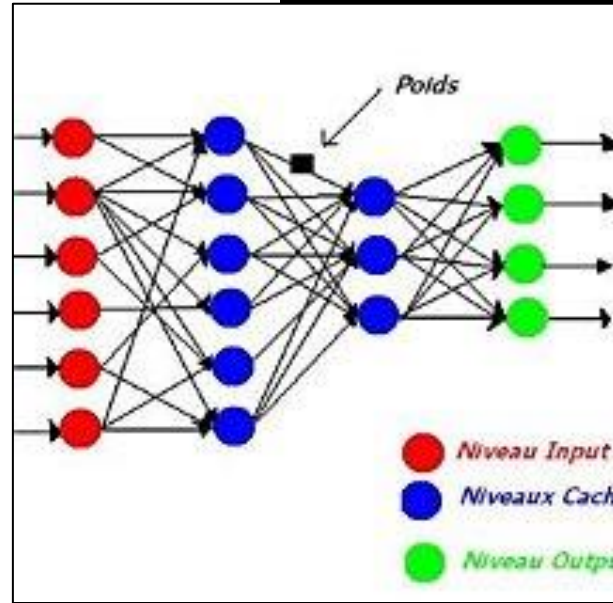
- need water and electrical power (not to mention a variety of rare materials)
- produce heat
- support economic development

Climate

- does not need additional heat
- will lead to water restrictions in many places on earth
- endangers planet habitability

Societal vs. economic issues

- very difficult but urgent and crucial choices



Thanks

