Jens Malmodin
Ericsson Research

Internet consume less energy and emit less carbon than what many think

- Unfortunately, you can find other false info about Internet…on the Internet…

Environment ▶ Climate change Wildlife Energy Pollution

Guardian Environment Network
Environment

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'Tsunami of data' could consume one fifth of global electricity by 2025

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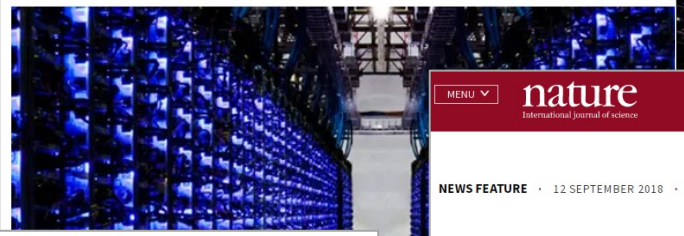

Climate Home News, part of the Guardian Environment Network

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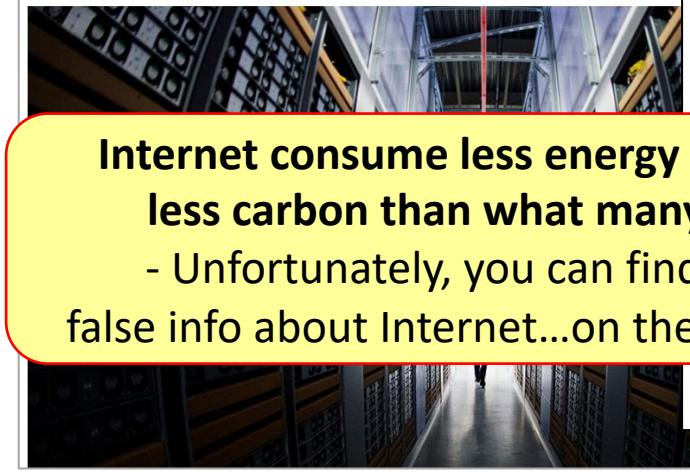
How to stop data centres from gobbling up the world's electricity

The energy-efficiency drive at the information factories that serve us Facebook, Google and Bitcoin.

Nicola Jones



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Climate change: Is your Netflix habit bad for the environment?

By Reality Check team
BBC News

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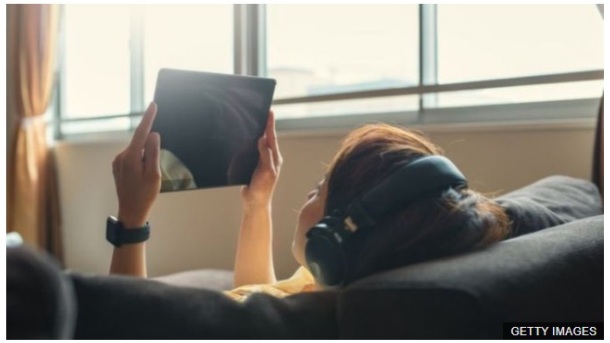
Reality Check



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Our video streaming habits impact the planet. Here's how

Watching Netflix, Amazon Prime and YouTube have exploded during the pandemic. But streaming video has a growing and significant environmental impact that goes far beyond your tv or phone. Source: CNN

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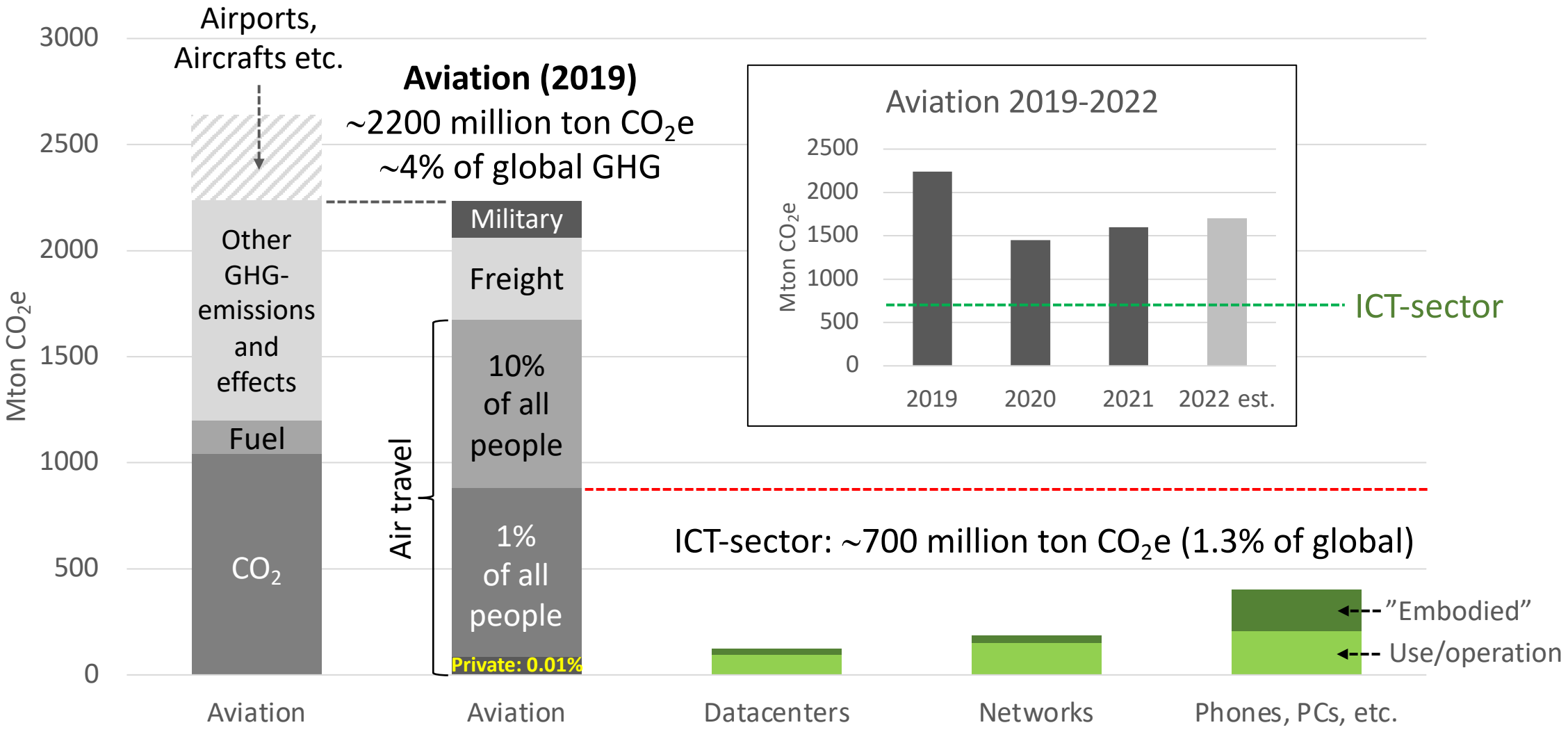
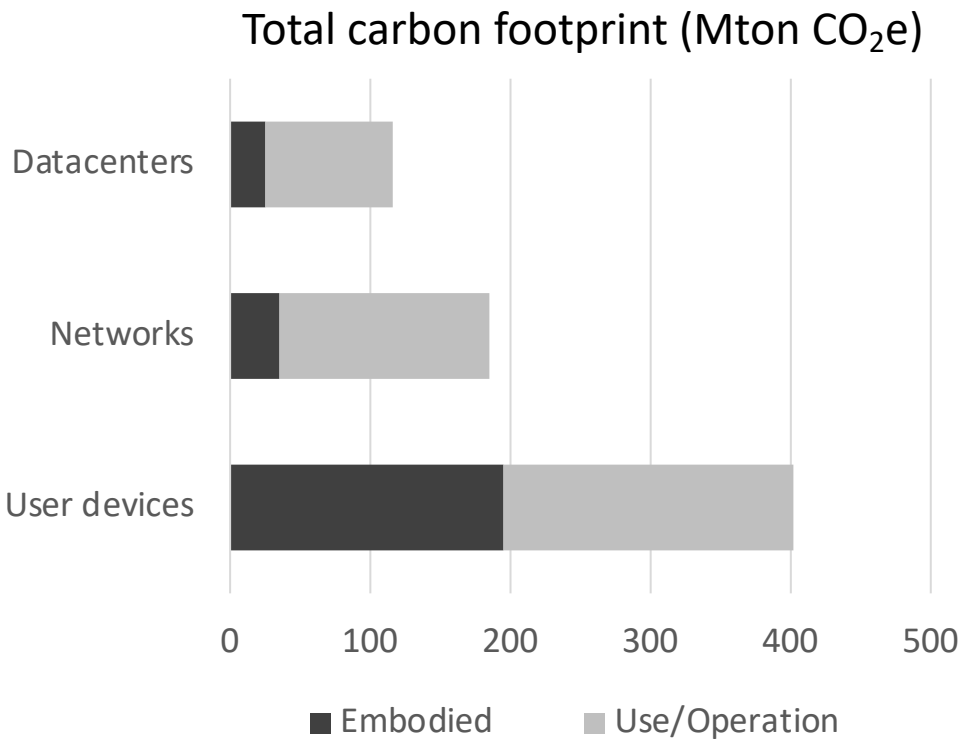
Aviation vs the ICT-sector ("Internet")



[Gössling & Humpe 2020]

"60% (5 billion) people daily for hours"

ICT sector 2020 data - Ongoing research



Datacenters: 46 large companies, 60% of operation (>90% of data)

Networks: 67 large operators, 80% of subs (70% incl. “Enterprise”)

Embodied: 59 large manufacturers, ~75% of key parts (revenue, energy/CO_2e)
(Integrated Circuits / Semiconductors, Displays, EMS, Vendors – 20% of PCB, 55% of OSAT)

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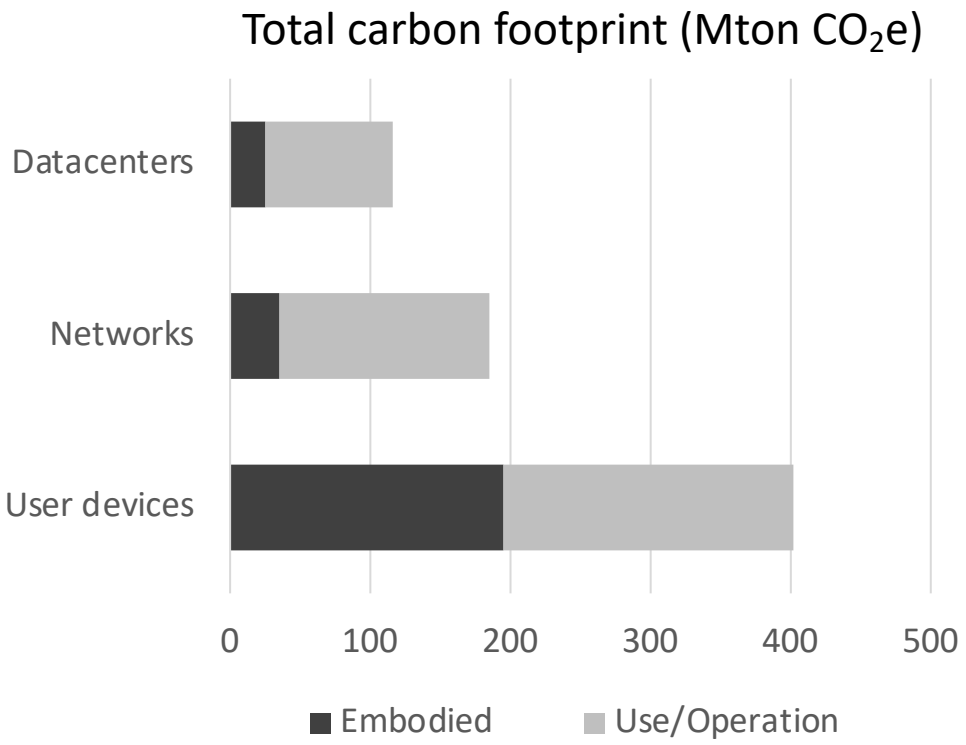

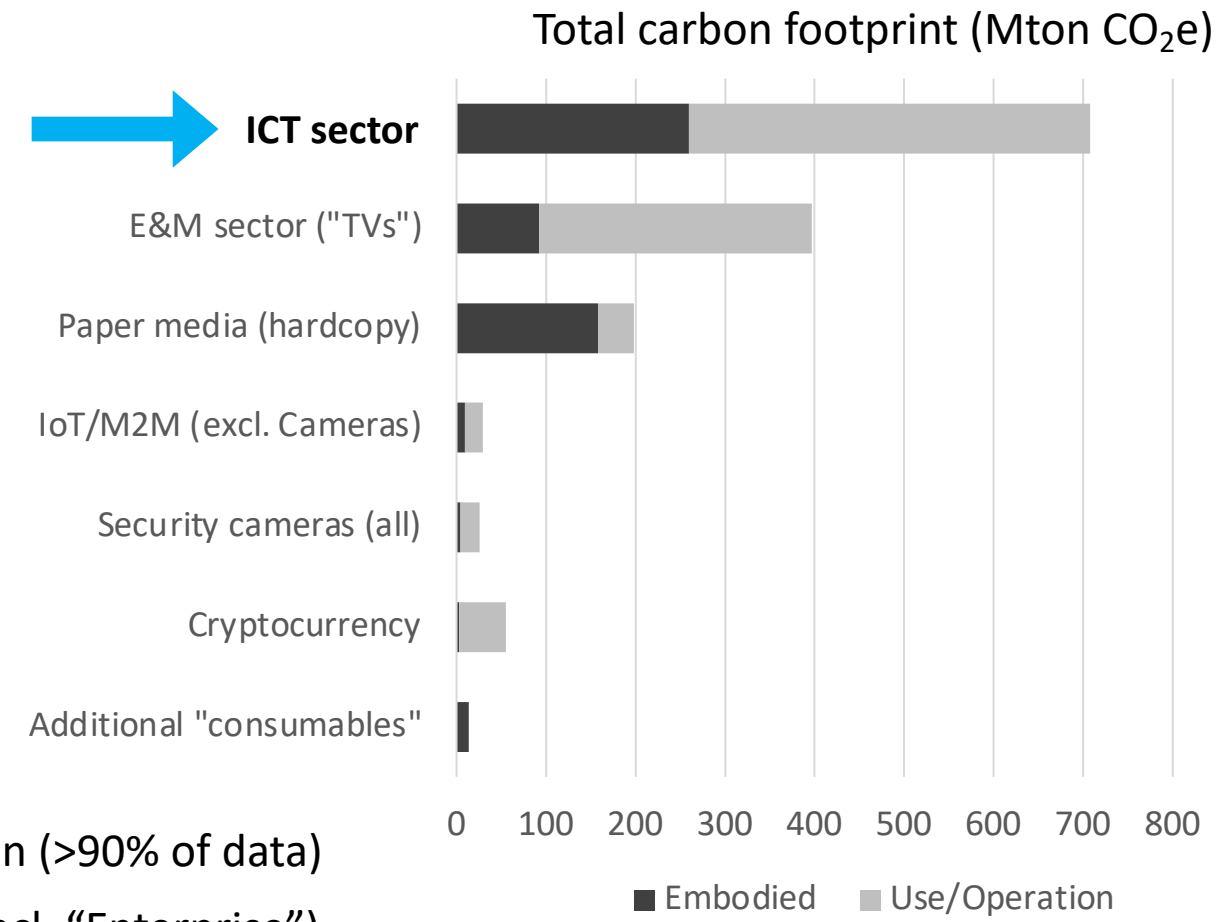

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Devices: 40 markets,
Leading industry analysts

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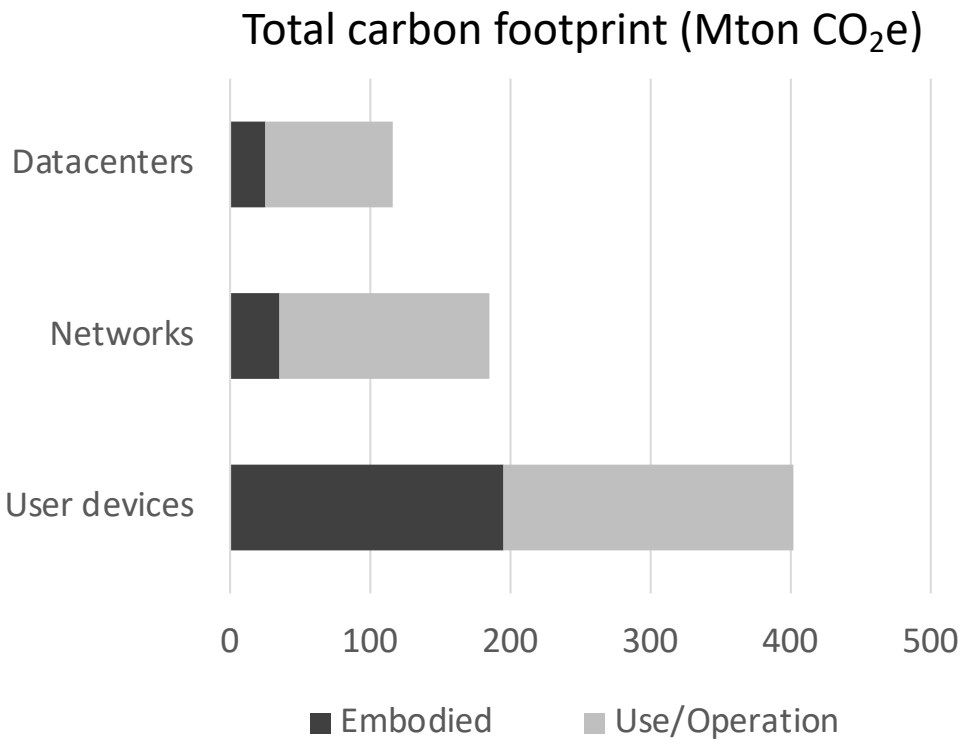

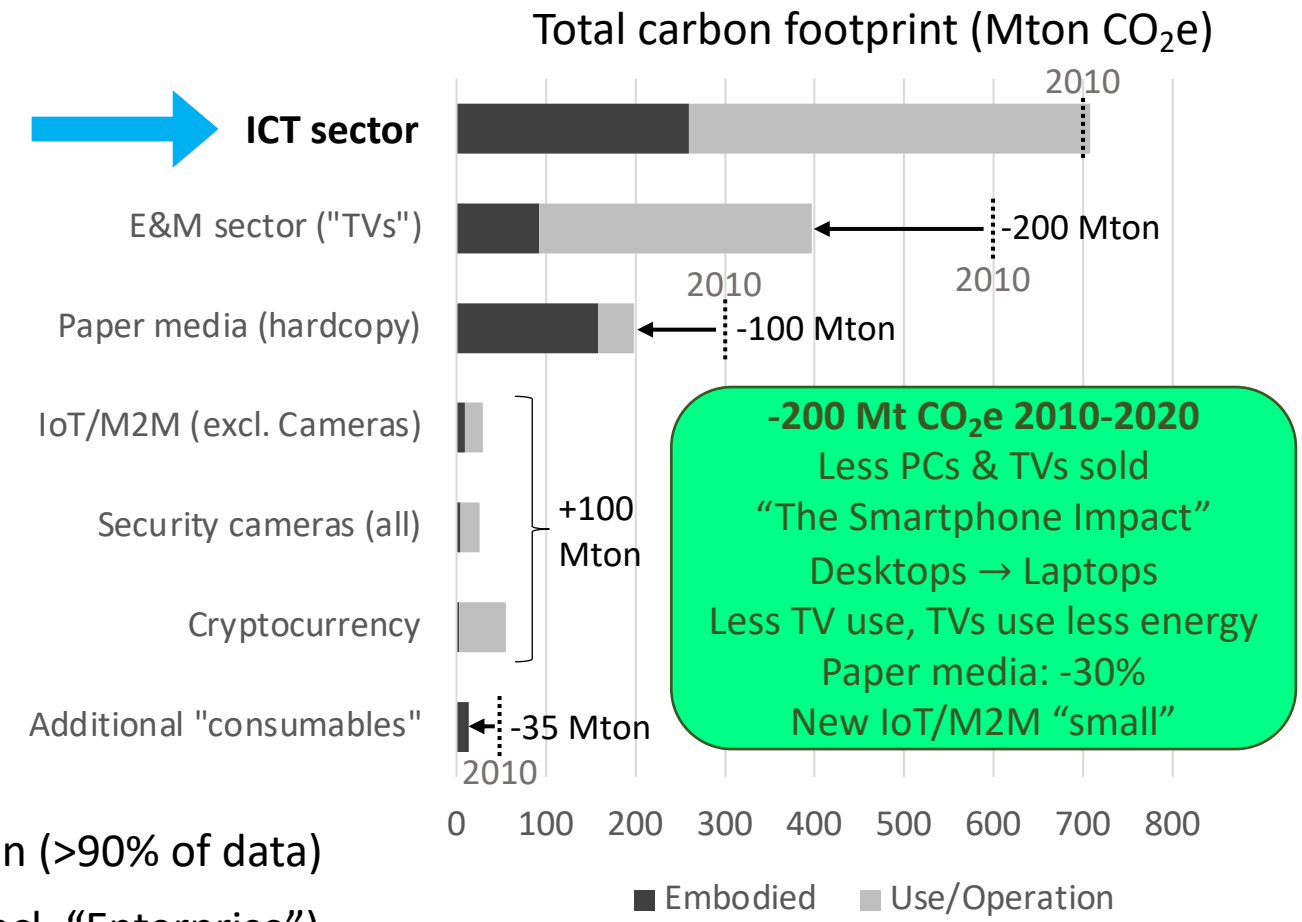

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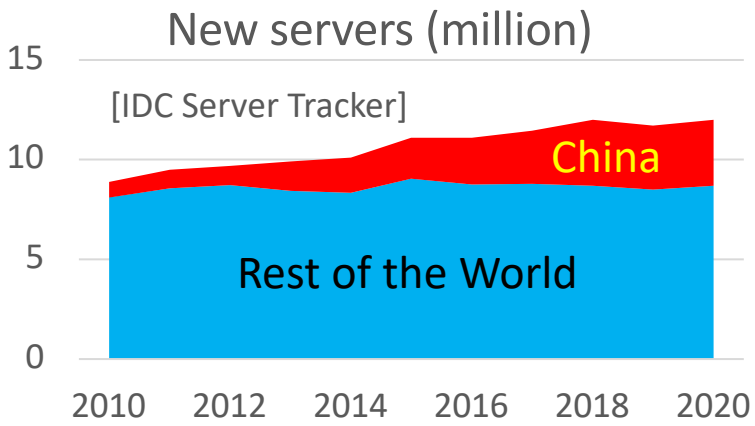
Measure IT!

* Renewables / Total electricity

Datacenters 2020

Companies (146+)	**Electricity***
Google, MS, FB/Meta	29/31 TWh
Amazon (AWS)	~10/~16 TWh
"DR-E-L-CO"	10/23 TWh
"Next 27 big ones"	10/19 TWh
USA/EU/Japan (35)	**59/89 TWh**
China (11)	1.4/~27.5 TWh
Others (100+)	~5/~20 TWh
Remaining (est.)	***~90 TWh***

196-205 TWh 2020 [Masanet et al 2022]



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Networks 2020

Operators (67)	**Electricity***
USA (5)	4.5/34.5 TWh
"EU-30" (25)	19/27 TWh
Japan & Korea (5)	0.6/15.5 TWh
India (5)	12 TWh
USA/EU/"JKI" (40)	**24/89 TWh**
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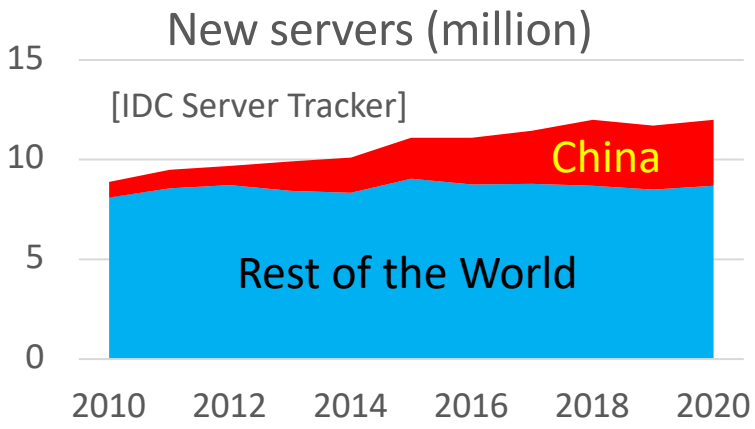

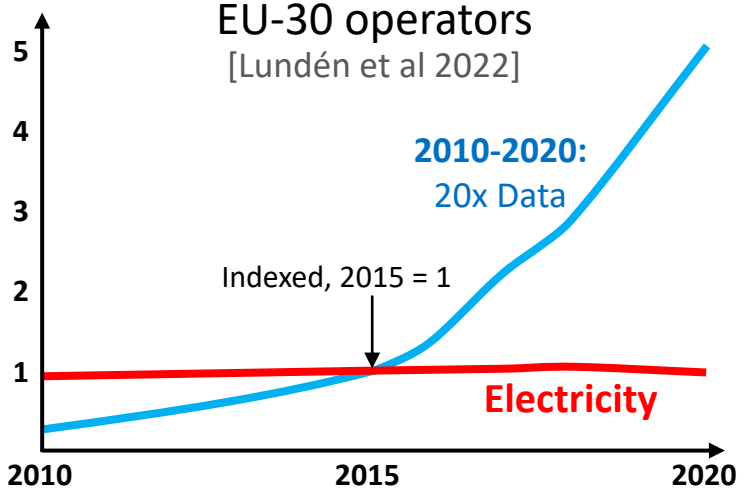

Measure IT!

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A = Assembly, D = Displays, EMS = Electronic Manufacturing Service, IC = Integrated Circuits, V = Vendor, Dc = Datacenters

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Manufacturers 2020

Comp. (52)	**Electricity***	**Parts**
Samsung	4/23 TWh	A,D,IC,V
TSMC	1.2/16 TWh	IC
SK Hynix	9.7 TWh	IC
Intel	7.2/8.8 TWh	IC
Foxconn	0.8/8.4 TWh	A,EMS,V
LG Display	8.3 TWh	D
Apple	2.6/2.6 TWh	V,Dc
Ericsson	0.4/0.6 TWh	A,V

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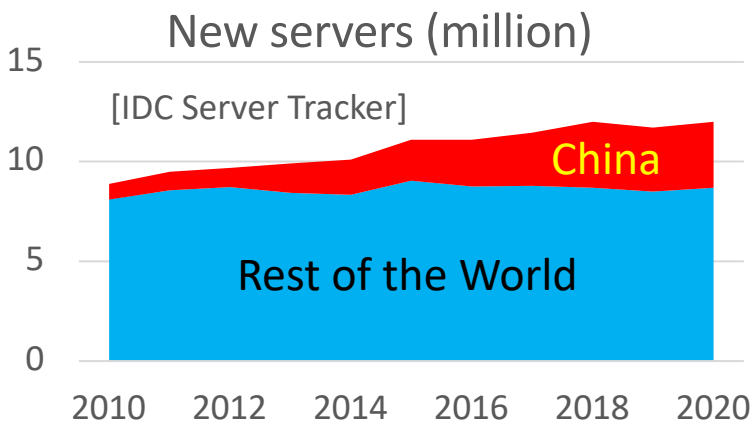
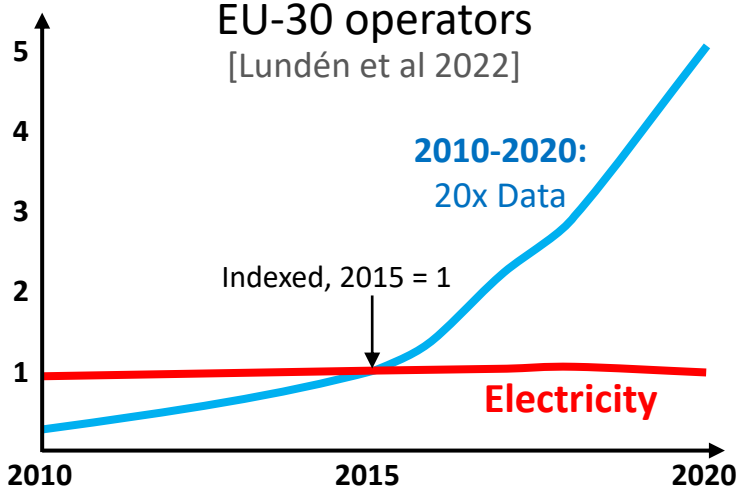
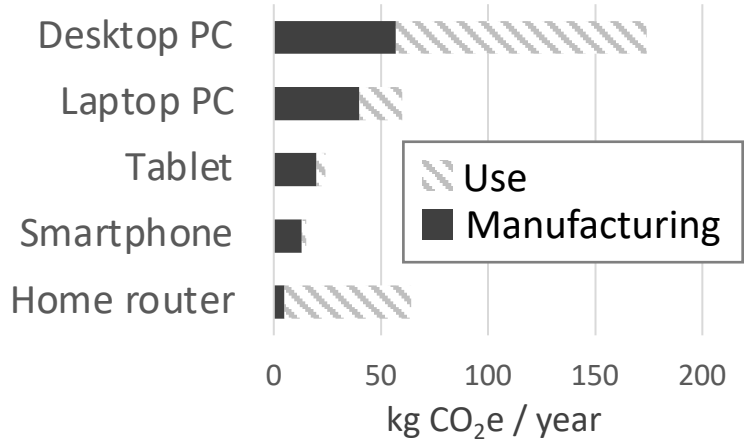


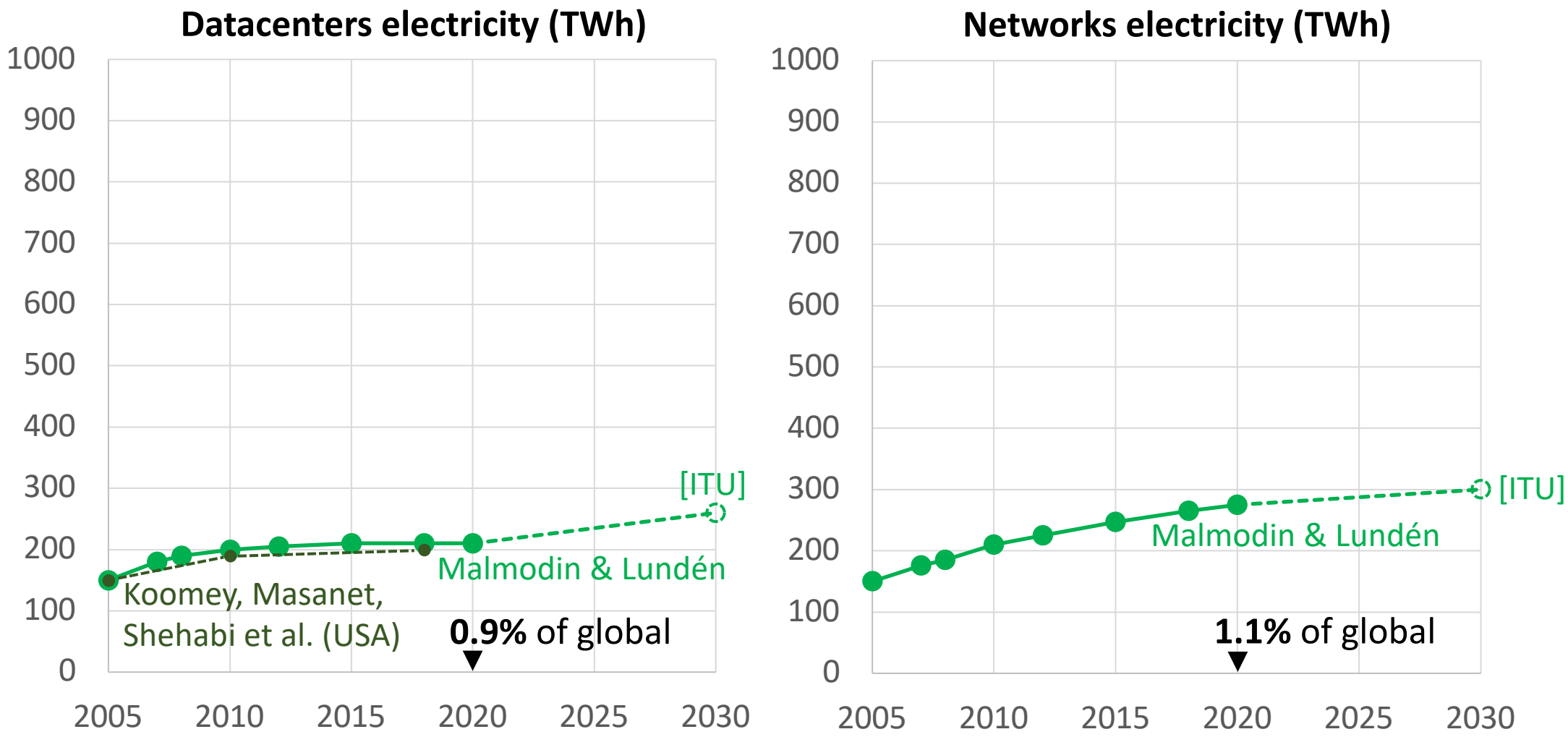
EU-30 operators
[Lundén et al 2022]



[Study submitted, under review]



Datacenters and networks over time



Based on ”real” measured data 2020: 60% of datacenters, 70% of networks

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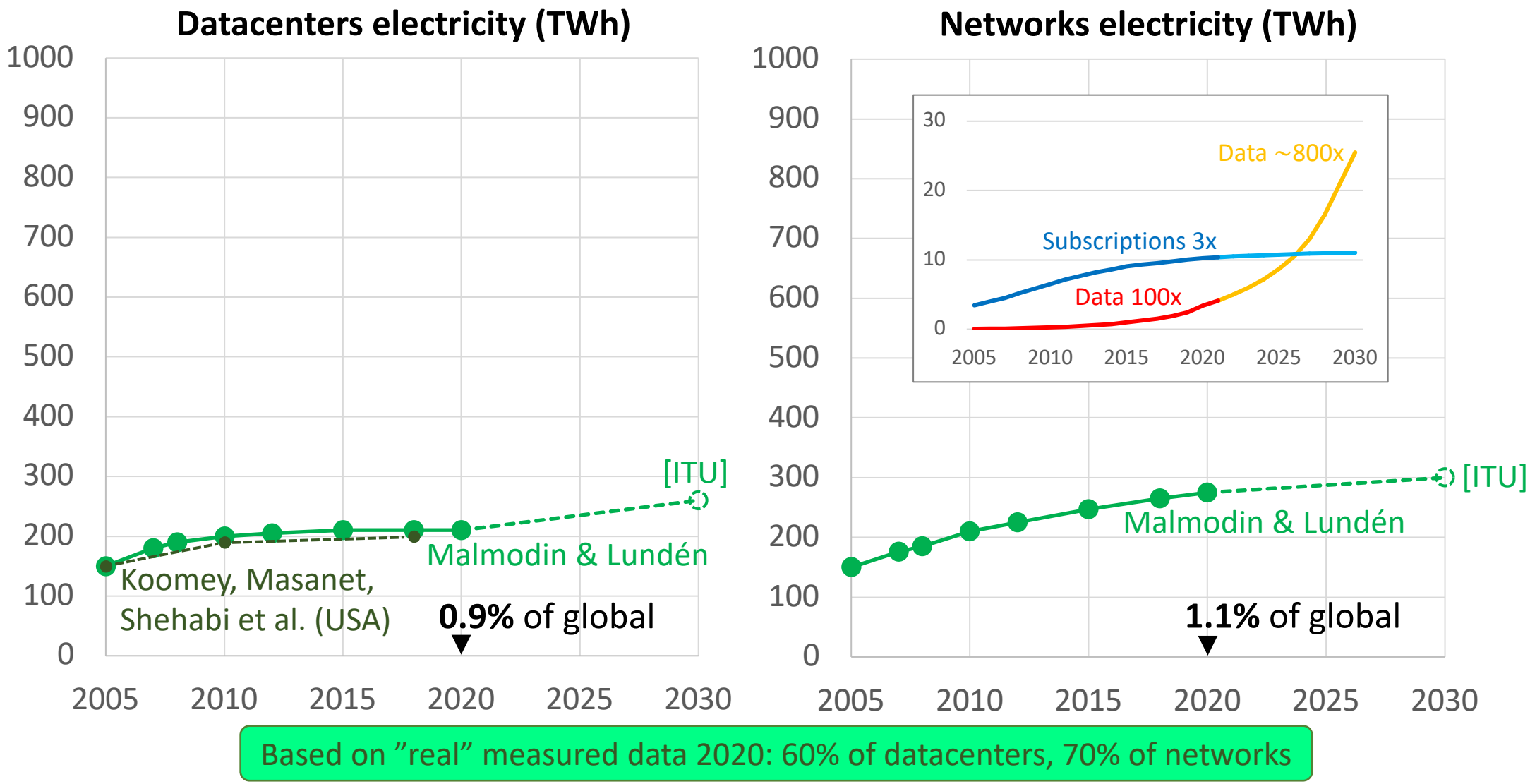

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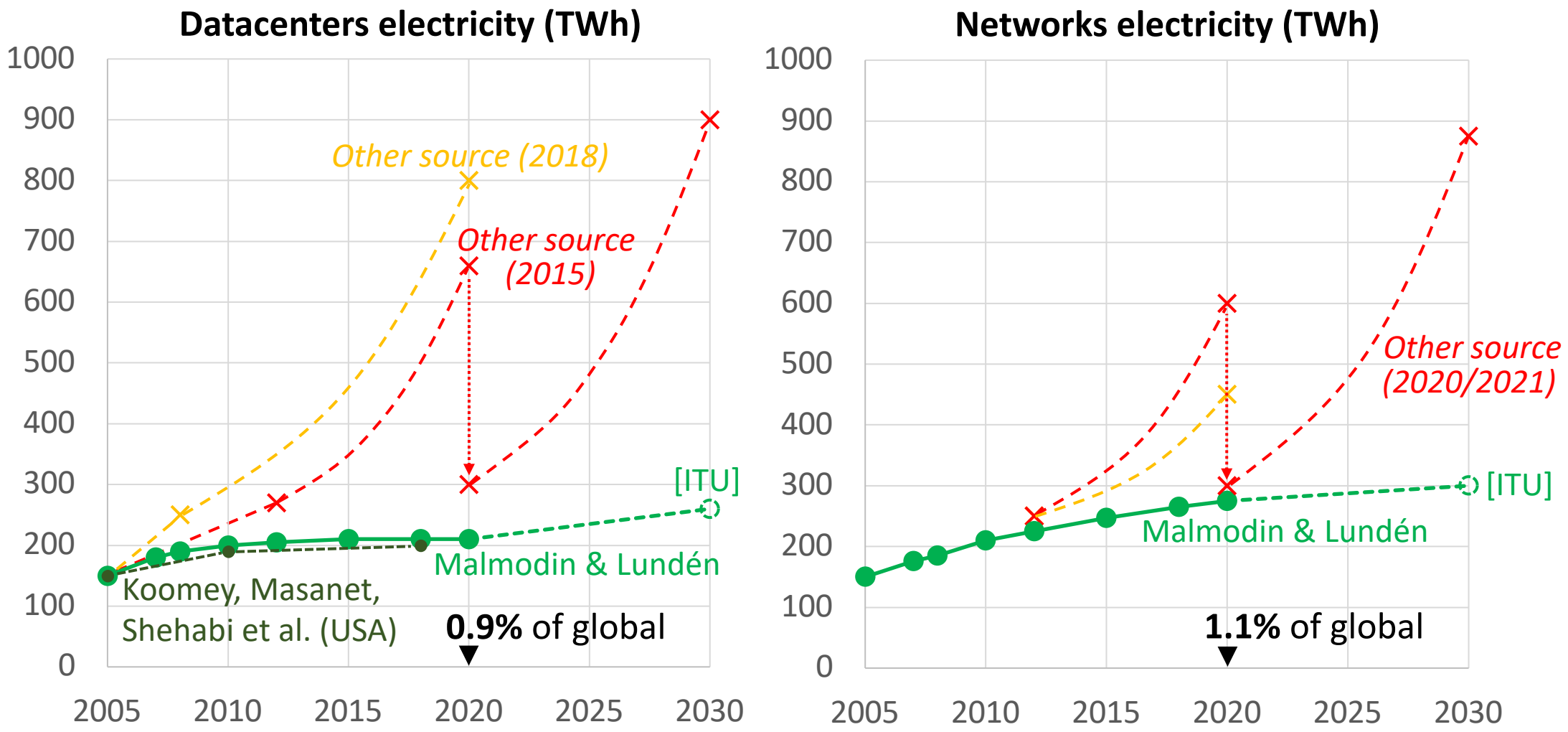

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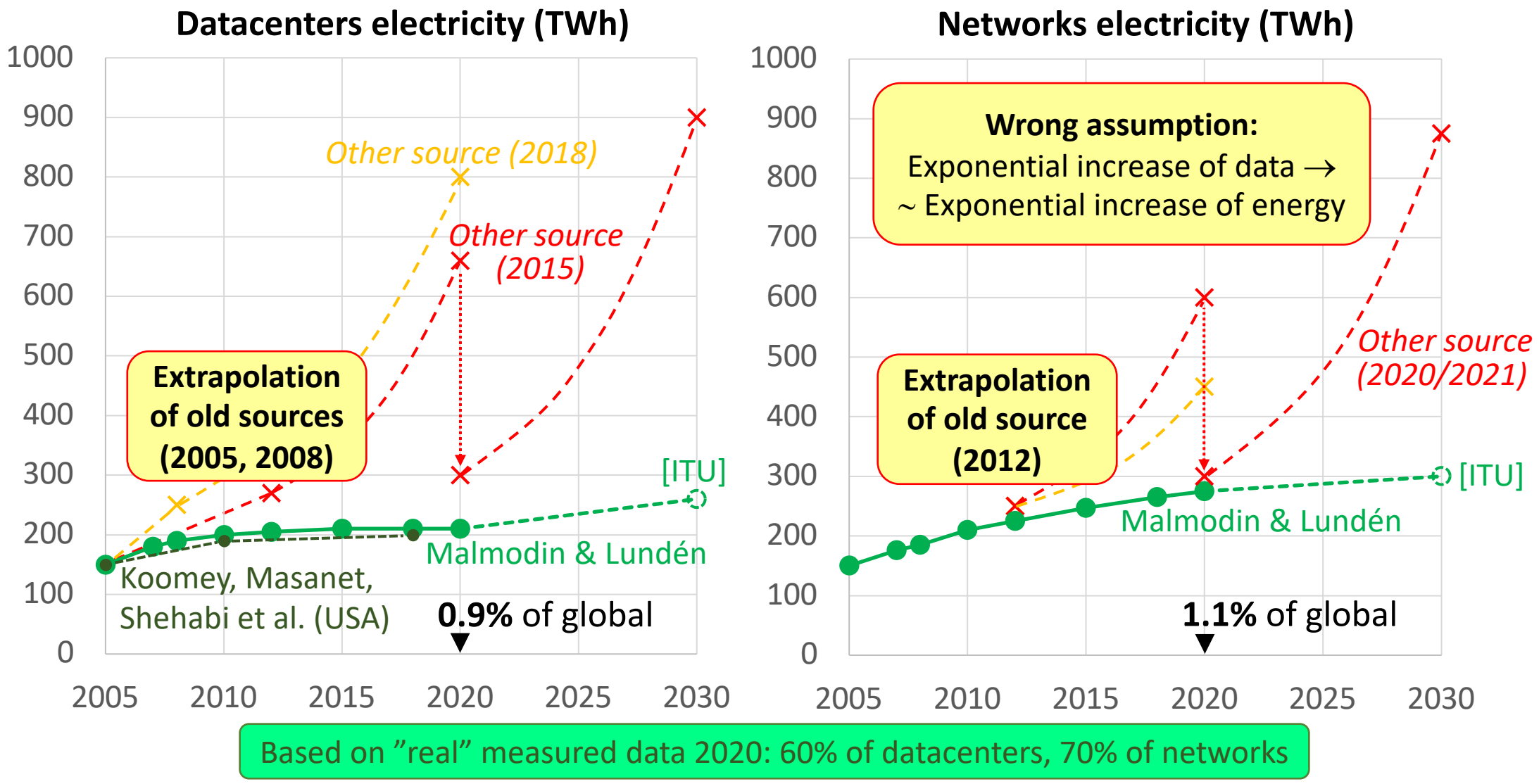

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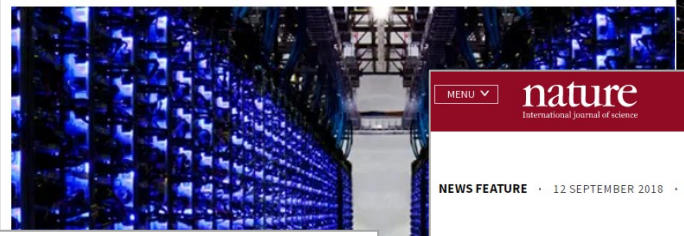

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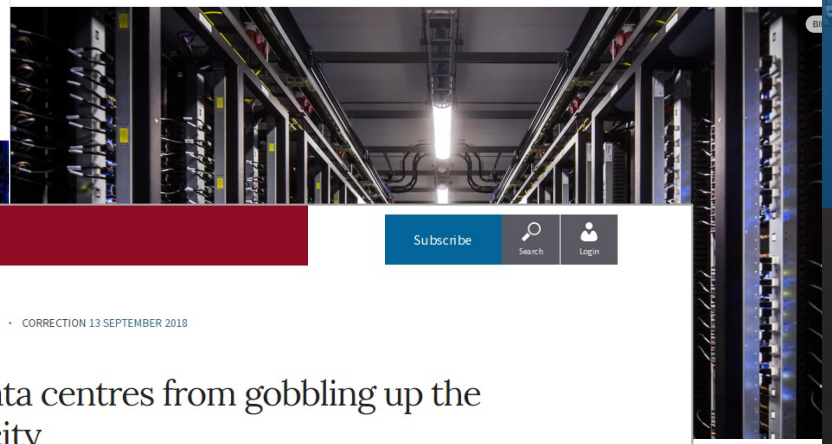

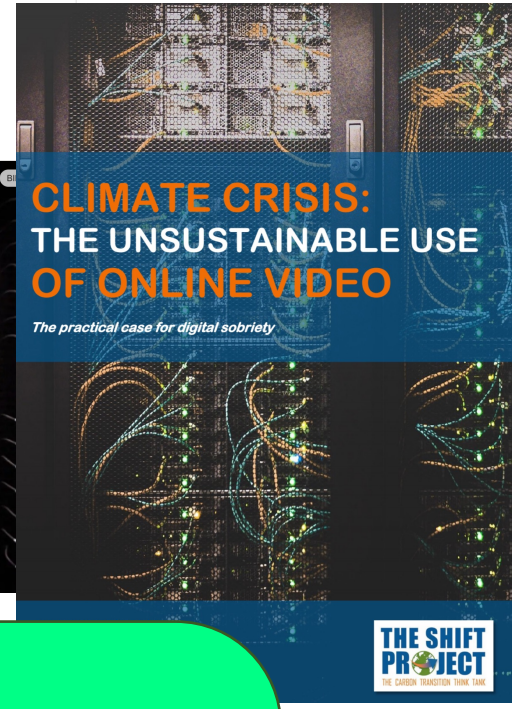

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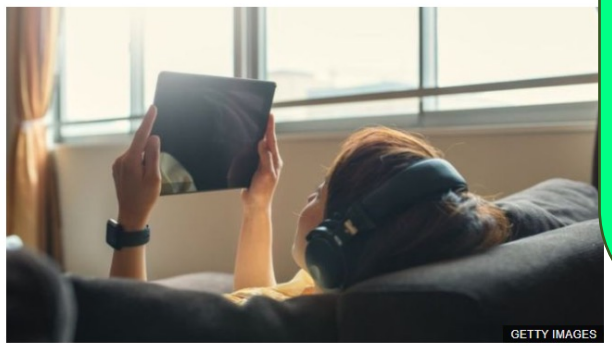

Summary (in contrast to media):

* ICT sector carbon footprint is stable, not growing!
* 1% of all people on Earth emit more when flying (60% of people use ICT daily for hours)
* E&M ("TVs") and paper media: 30% lower emissions
* ICT sector leads investments in renewables
* More data in the future do not mean more energy/CO_2

We can keep on surfing the web, streaming music & video and downloading games and play for fun!

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Our video streaming habits impact the planet. Here's how

Watching Netflix, Amazon Prime and YouTube have exploded during the pandemic. But streaming video has a growing and significant environmental impact that goes far beyond your tv or phone. Source: CNN

Thank you!

References

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