Making

happen

Greening of Streaming

www.greeningofstreaming.org

Members of Greening of Streaming

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videon
DAZN
iSIZE

LUMEN
cognizant
Coherent Logix
Microsoft

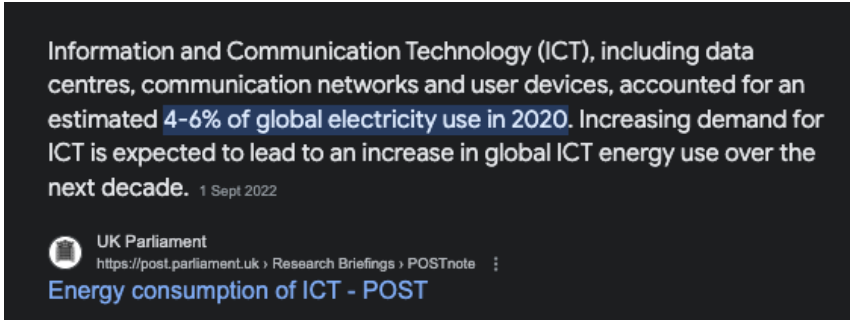
Agama
DTG THE CENTRE OF UK DIGITAL TV

Problem space

IEA (most conservative) figures:

- ~1% of Global Final Electricity supply is used by Data Centres
- ~1.5% of Global Final Electricity supply is used by Telecoms
- ~6% (including the above) is ICT as a whole

CISCO: 70-80% of network traffic is video



Global data centre electricity use in 2021 was 220-320 TWh [2], or around 0.9-1.3% of global final electricity demand. This excludes energy used for cryptocurrency mining, which was 100-140 TWh in 2021. [3]

Globally, data transmission networks consumed 260-340 TWh in 2021 [4], or 1.1-1.4% of global electricity use. The energy efficiency of data transmission has improved rapidly over the past decade: fixed-line network energy intensity has halved every two years in developed countries, and mobile-access network energy efficiency has improved by 10-30% annually in recent years.

‘Order of magnitude’: Streaming is probably driving demand for infrastructure that consumes **2% to 3%** of Global Final Electricity supply.

Whatever the actual value is it is clearly ‘significant’ enough to ensure the industry is being efficient - both for sustainability and for economic reasons

Principles

No GreenWashing

Member Led / Not for Profit - UG not SDO.

REAL change through education and engineering

Focus on Operational Energy (Watts / kWh)

Think systemically.

You can’t ‘win’ sustainability; you can only win if we all win together.

Activities

8 Working groups

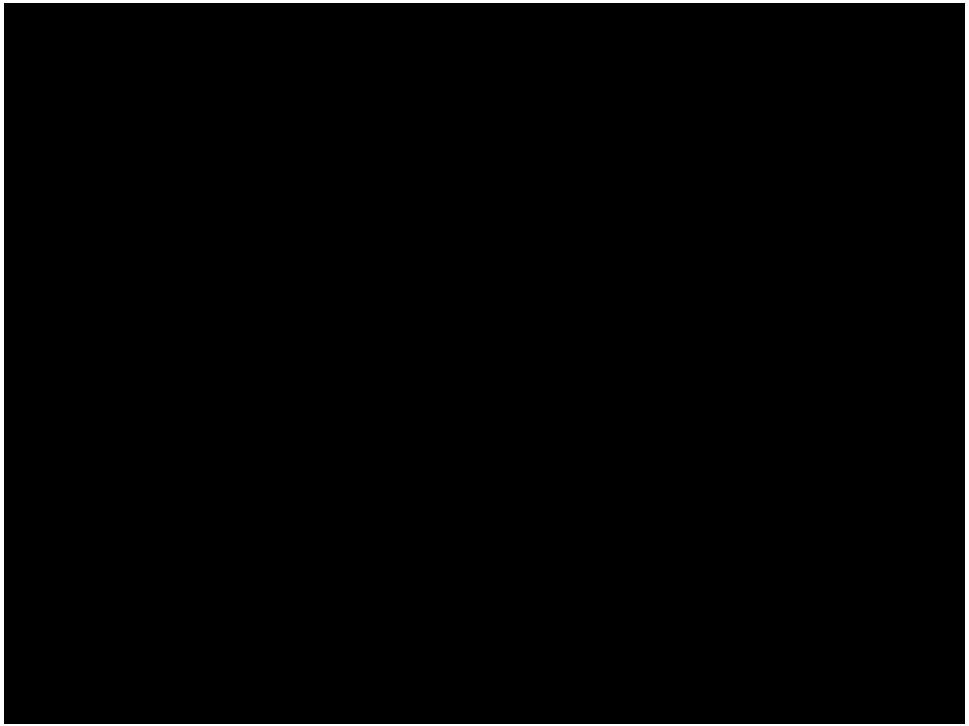
Language, Awareness, Best Practice, Traffic / Energy Measurement, Audio, Compression/Decompression, Driving Energy as a KPI for SDOs and Academic Liaison

Plus the LESS Accord as the overarching narrative.

Some interesting discoveries

Reducing your data consumption / production does **not** affect network energy.

Sending* less GB does NOT reduce the energy demand (CO2)



*not considering computation at the edges of the network such as encoding, transcoding or decoding

Galileo moment..

Science (largely from UK universities) has focussed on the energy consumption of the application and consumer device in trying to develop and ‘energy impact’ model for service / application operators working on the internet.

To give the app operators a feedback loop from their energy impact, they have reasoned ‘how much traffic you produce online must directly correlate to how much network service ‘share’ you have and therefore you can apportion energy and work to reduce that.

To cut a long story short, much of the internet application world (video / gaming / enterprise / cloud etc) now thinks that the network energy varies with traffic.

“1GB = 1Kg CO2”

..but if you ask an engineer this is simply not true.

Network Energy

Is NOT proportional to traffic.

NOT using a network to stream does NOT reduce the energy required.

So the digital companies now accounting their GB data reduction and announcing a ‘Net Zero’ value proposition, and in fact not achieving anything at all beyond reducing their own apportionment.

(Not all bad news:) Migration to newer

Indications are that networks are both getting MUCH bigger, faster, and the energy they require is actually REDUCING as they grow.

It seems that as with most technology, a migration to newer brings energy reduction.

Networks not building ‘more roads’ - they are building ‘better transport systems’ at each generation - Energy consumption is not linear with growth of network NOR with its usage (with a few elastic exceptions)

However, decommissioning old networks requires consideration:

- Embodied Emissions - at some point the ‘truck rolls’ outweigh the operational energy efficiency gains.
- Operational Energy / Capacity Strategy
- Cost of migration
- (Jevons Paradox is a risk)

The takeaway is that it seems that a migration to new generation brings about energy benefits in isolation, but the legacy must be factored in to really weigh the life-time energy and emissions benefits.

This leaves plenty to work on for GoS in Layer4

Streaming areas of computation that use energy.

- Production (IP increasingly being used)
- Distribution
  - Encoding / transcoding
  - Packaging
  - Caching
- Security (own class since appears in multiple areas)
- Asset Management and Storage
- Subscriber Access / Advertising
- Consumer LAN / Electronics
  - Routers
  - TV display and UI
  - Decoders

‘Overselling’ in the TV, broadcast, internet and streaming industry:

We may buy into ‘quality’, but the term takes on various meanings within the streaming and broadcast industry--from visual quality to latency and buffering.

For streaming consumers, differences in quality are often imperceptible. Yet each incremental quality increase may demand significantly more energy.

The Proposition:

“What if the ‘default’ streaming encoding profile was Energy Optimised with ‘acceptable’ quality for general viewing rather than, as it is today, Quality Optimised (and typically over provisioned) with no energy consideration?”

(Note that this does not remove the option for opting in to Quality Optimisation - but proposes that the consumer be given the choice to select a quality level above the generally acceptable (energy optimised) ‘default’ … read on…)

Asking the industry for theoretical ‘straw man’ models:

“What would ‘Low Energy Sustainable Streaming’ (LESS) look like?”

“It’s not the ‘codec’ - its the ‘codec implementation’”

Greening of Streaming’s ‘action’ - let’s measure it system wide:

“If implemented ‘globally’ what difference to the energy demands of streaming *could* an adoption of The LESS Accord make?”

The discussion with the industry and its stakeholders:

“How disruptive would adoption of The LESS Accord *really* be for the industry?”

Can we reach an ‘accord’ between us?

Action

Action

Let’s get the industry to ‘do’ something

A few months to ‘spitball’ and throw ideas at members.

Members meet in Eu Parliament (inviting regs / MEPs etc) to workshop 3 or 4 test models.

Over summer tests are prototyped, and presented at IBC.

Q4/Q1 tests are run at scale. Q2 data is provided to academia to analyse

Then end Q2 to Hollywood for a wrap up and announcement of the results.

The Low Energy Sustainable Streaming Accord

‘The LESS Accord’

LESS

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