TNO innovation for life

GREENING MEDIA:

REDUCING ENERGY USE IN MEDIA NETWORKS

AGENDA & INTRO

DRAFT

- Introduction
- Networks & Media energy consumption
- Research, Standardization & Industry
- What can you do?

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Working at TNO for the past 4 years

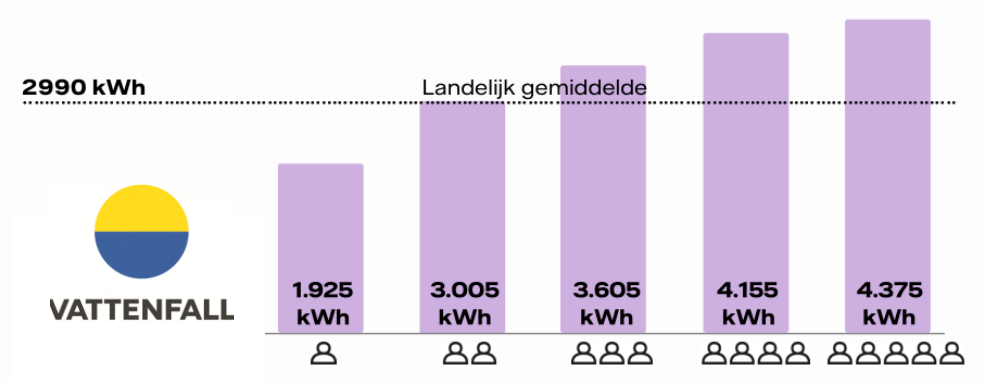
Focussing mainly on video compression & streaming

Working on everything from TV, VR to AR

More recently turning towards sustainability in networks

HOW MUCH ENERGY DO NETWORKS USE IN NL?

NS used 1,346 GWh in 2019



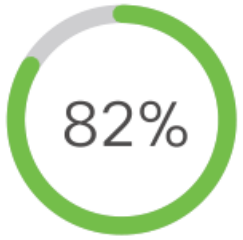
KPN Networks used 580 GWh in 2019

VDF Ziggo Networks used 295 GWh in 2019

~290.000 Dutch houses use in a year

≈ Equivalent to 5th largest Dutch city between Utrecht and Eindhoven

OVERALL MEDIA IS A HUGE CONTRIBUTOR



By 2022, Internet video will represent 82% of all business Internet traffic, VR/AR traffic will increase twelvefold, and Internet video surveillance traffic will increase sevenfold.[13]

cisco

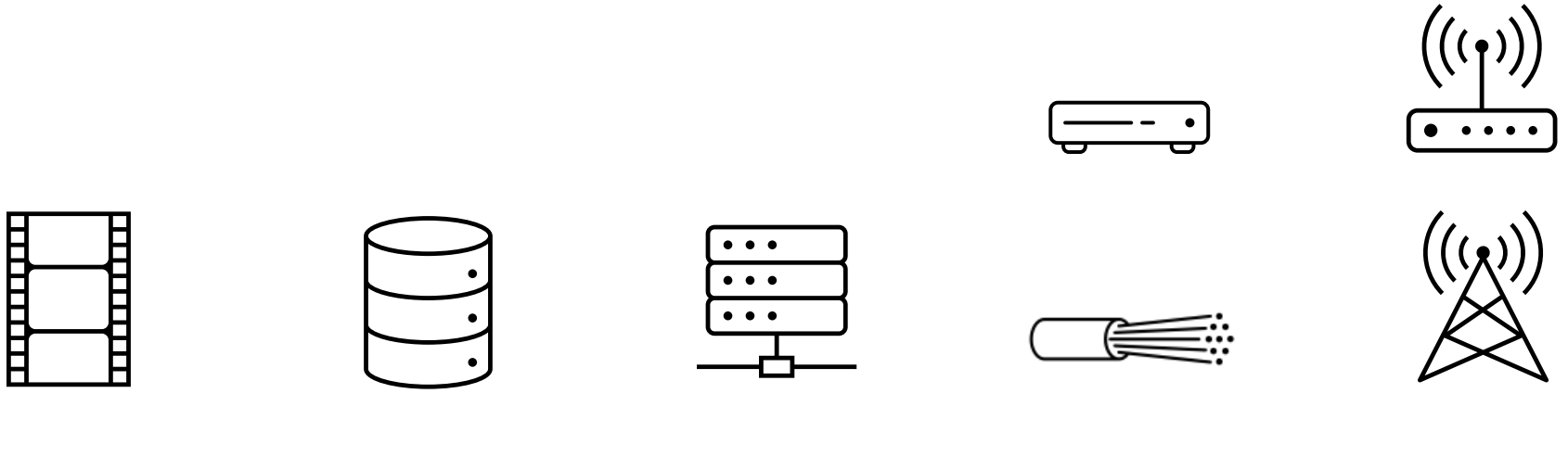
AR

VR

8K+

New media formats are expected to be in the market soon and will have higher bitrates than before

MEDIA USES ENERGY IN THE WHOLE CHAIN



Encoders | Data Centres/Cloud | CDNs | Network infrastructure | Radio | End devices

Preparation | Storage & Distribution | Decoding & Consumption

NEXT GEN COMMUNICATIONS & MEDIA

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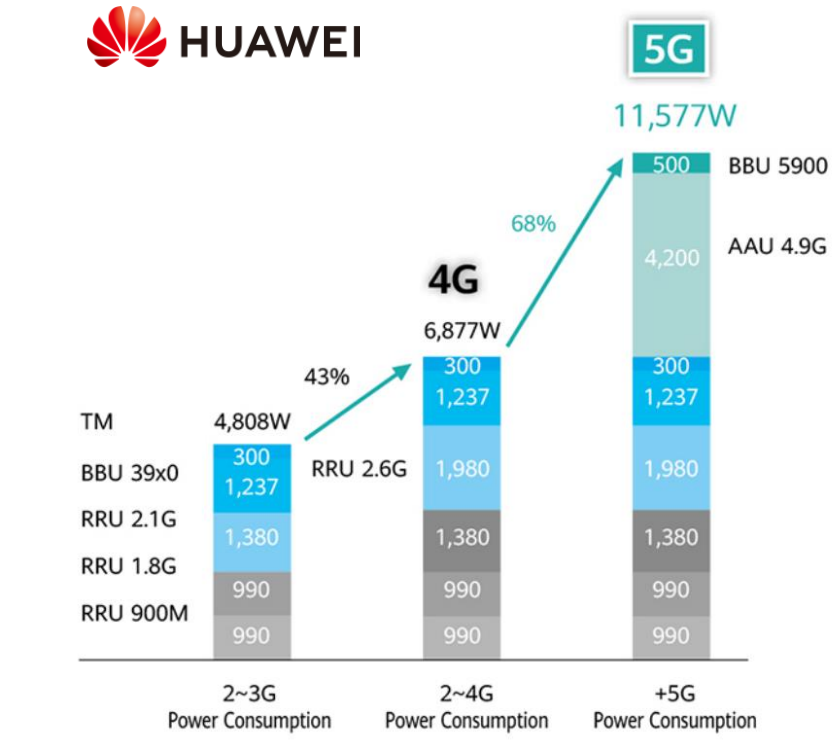
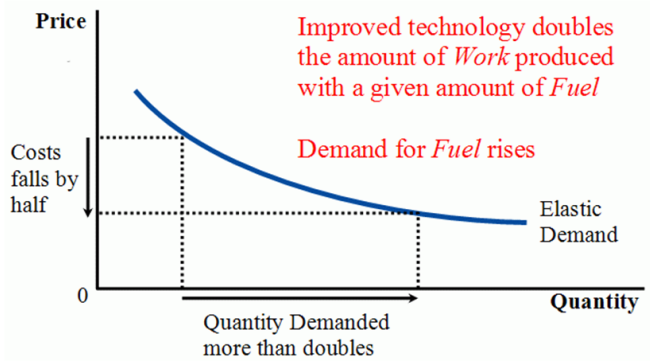


Typical maximum power consumption of a single 5G base station

Base stations will provide considerable bandwidth gains

- Jevons Paradox: the observation that improved efficiency can increase overall consumption by making an activity cheaper and thus more scalable or accessible



Energy per bit goes down, but number of bits explodes

GREEN ENERGY IS SILVER, REDUCING IS GOLD

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- Green is great!
  - It really is!
  - Investment from large tech companies drives the price of renewables down and makes it more accessible
- But by using green today, it means others must source their energy from non-renewables
- Therefore reducing energy consumption is still key, along with other benefits:
  - Useful for marketing
  - Reduce OPEX costs
  - Complying with (future) regulations

KPN blijft in de Dow Jones Sustainablity Index

VodafoneZiggo introduceert nieuwe CSR-strategie voor 2025: People Planet Progress

Datacenters verbruiken drie keer zoveel stroom als de NS

Datacenters Het stroomnet kan de explosieve groei van het dataverkeer niet aan. Niemand lijkt goed zicht te hebben op het stroomverbruik van de datasector, noch op de gevolgen voor de energietransitie.

INDUSTRY RESPONSE: STANDARDIZATION/FORA

3GPP A GLOBAL INITIATIVE

5G

MPEG

Green (2015)

ITU International Telecommunication Union

ngmn the engine of wireless innovation

Green Future Networks Project

GSMA

MEMBERS' CLIMATE DISCLOSURE

MOBILE INDUSTRY PATHWAY TO ZERO EMISSIONS

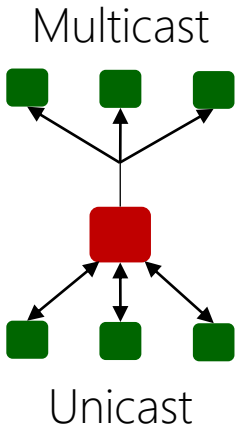
MEMBERS' EMISSIONS TARGET SETTING

Standardization

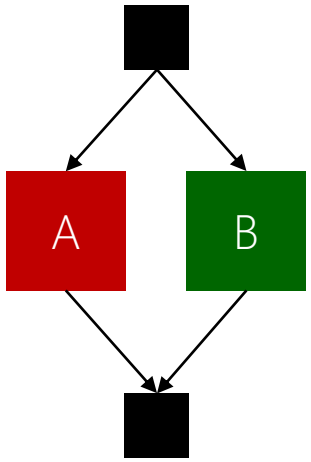
Industry Fora

WHAT ARE SOME OF THE QUESTIONS FOR MEDIA?

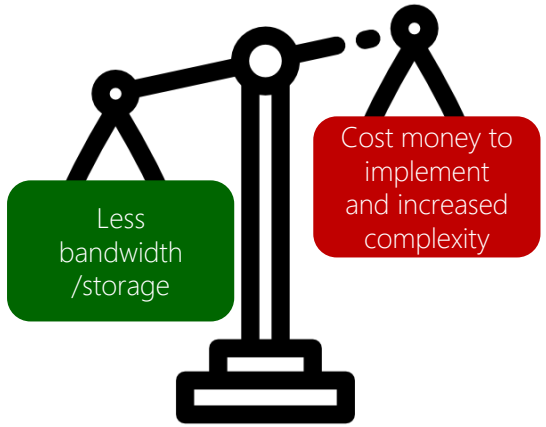
Will 5G mean more or less energy consumption as we have higher bandwidth and more use cases?



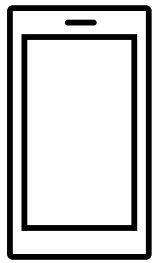
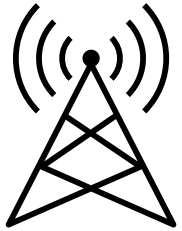
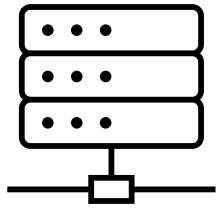
What protocols are energy efficient?
Ex. Unicast vs Multicast



Green SDN: how to route traffic in a greener way through "green nodes"



How does energy use change along the media delivery pipeline with better video compression?

OTHER INDUSTRIES ARE ALREADY ATTACKING THE PROBLEM

WHAT CAN YOU DO?

THE DUTCH MEDIA INDUSTRY CAN MAKE AN IMPACT!

Change of encoding/streaming parameters

- Better compression (new parameters & codecs)
- New signalling that can reduce decoder energy usage
- Change of buffer behaviour to avoid unnecessary streaming

Reduction of energy consumed on applications

- Reduce number of connections established
- Reduce number of unnecessary assets retrieved
- Avoiding unnecessary streaming (asking clients if still watching)

Redrawing of architectures

- Reduce number of servers (moving to virtualization)
- Reduction in data transfers
- Data transfers at specific times of the day

New business policies

- Change of availability of recordings (less time is less server space)
- Energy inefficient features are charged to customers
- Procurement to HW manufacturers that recycle their equipment

CONTACTS

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