

# THE ICT SECTOR'S ENERGY (AND ENVIRONMENTAL) CHALLENGES



@SVENSK ELECTRONIK – ICT ENERGY

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# Presentation content

- › **“- Huston, we have a problem!”**

  - *We need to half CO<sub>2</sub> emissions by 2030 or else we will be toasted.*

- › **Challenge 1: Operational temperature**

  - Is the ICT network including supporting infrastructure designed for drastically increased peak temperatures?

- › **Challenge 2: Electricity consumption volatility due to 4G and 5G roll out!**

- › **Challenge 3: “Myths”** Such as...

  - “- *The ICT sector generates the same amount of CO<sub>2</sub> as the aviation industry...*” or

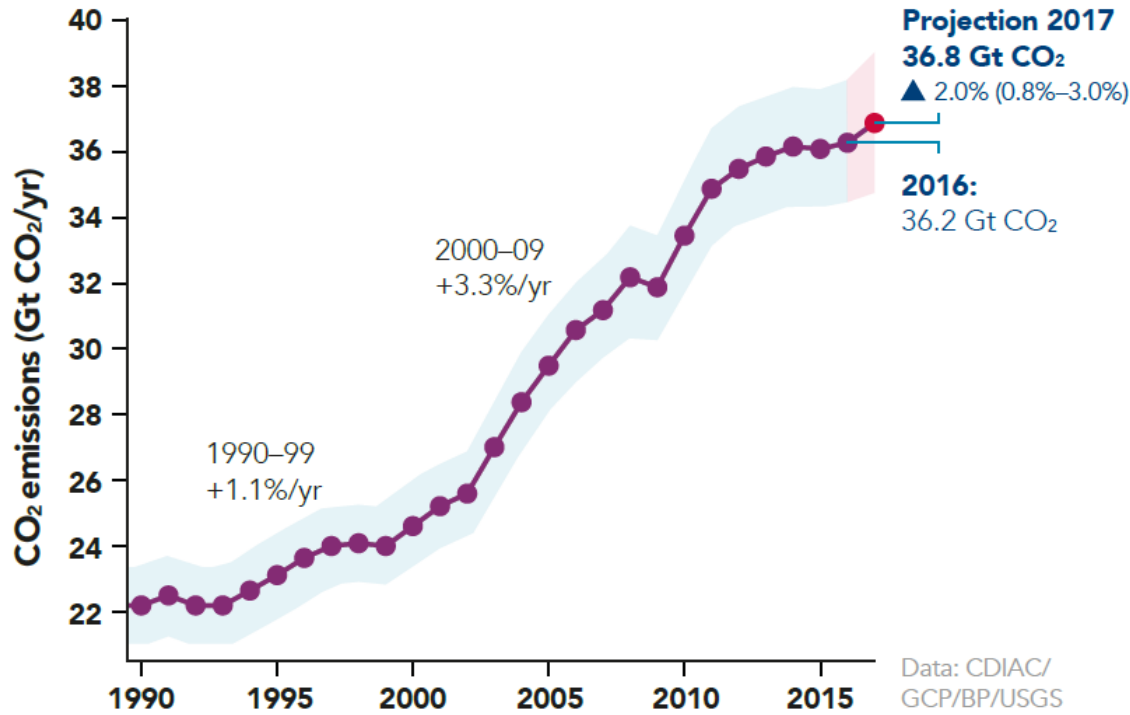
  - “- *The emissions generated by watching 30 minutes of Netflix [1.6 kg of CO<sub>2</sub>] is the same as driving almost 4 miles*”.

- › **“ICT is the enabler of a carbon free society”**

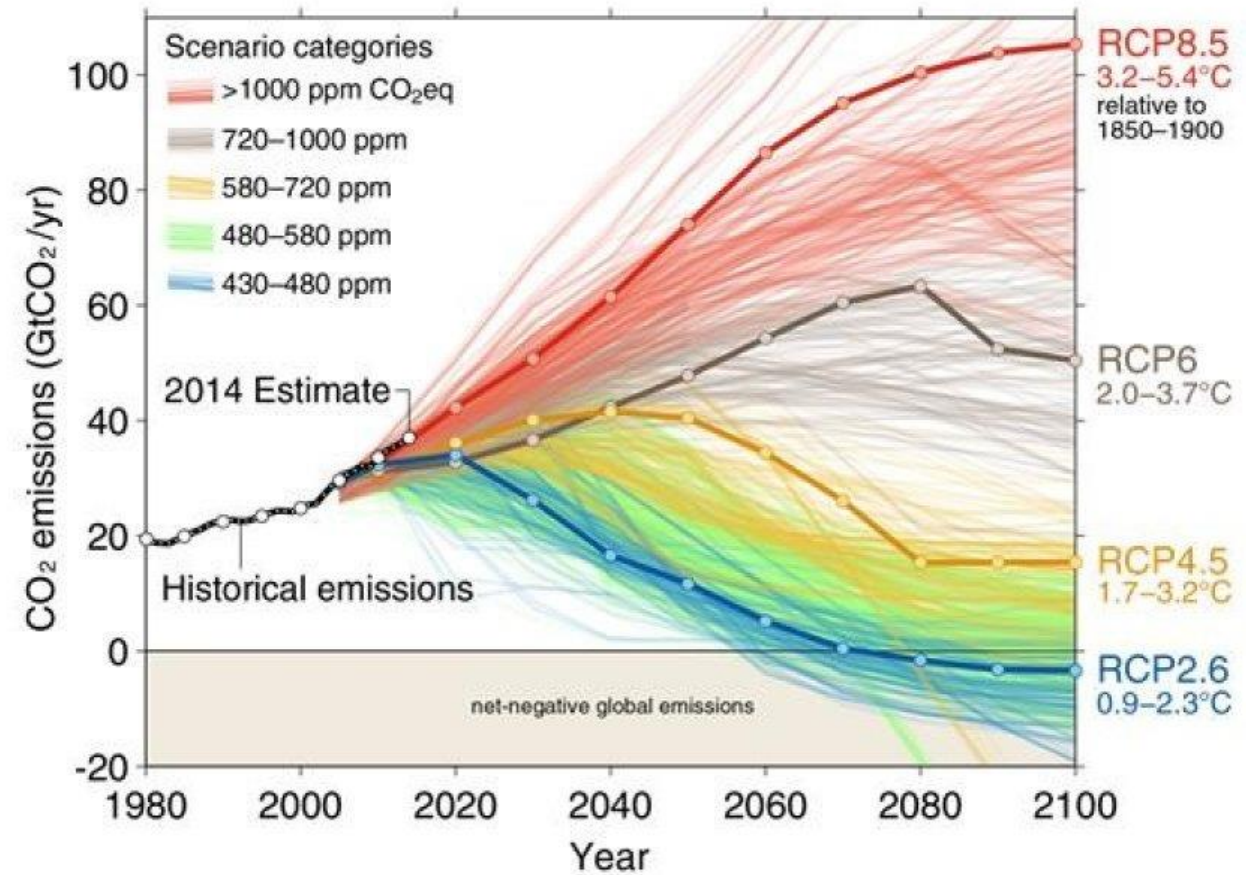
  - (EU Commission 2008)



# Higher temperatures due to increasing Greenhouse gas emissions



Global carbon dioxide emissions from fossil fuel use and industry. After three years of low or no growth, 2017 experienced renewed growth. Note, total global emissions of all greenhouse gases is equivalent to about 53 Gt CO<sub>2</sub>/yr. Data: Future Earth's Global Carbon Project's 2017 global carbon budget.

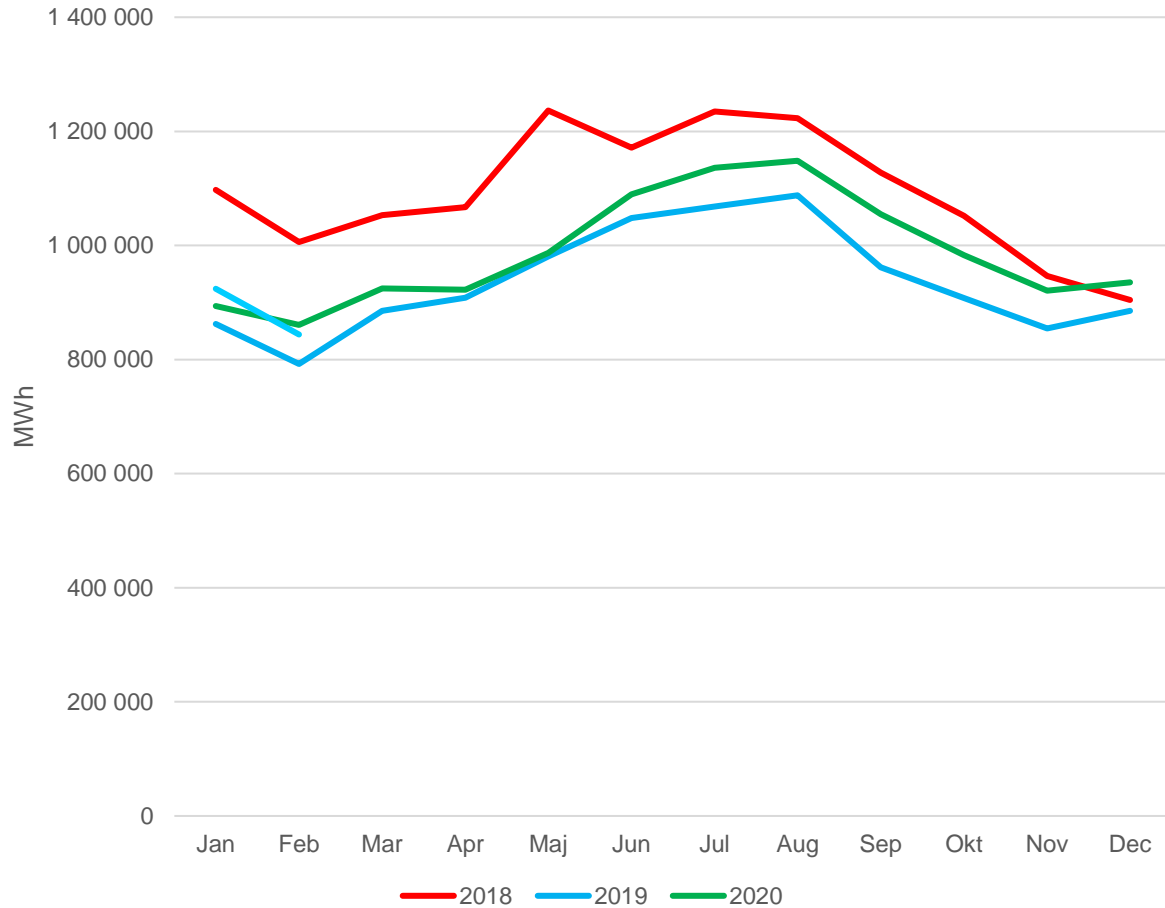


The IPCC's Fifth Assessment Report collated from the peer-reviewed literature almost 1200 scenarios of future emissions, each scenario having a different 'story' of how the future might unfold. The scenarios can be grouped according to which of the four Representative Concentration Pathways (RCPs) they are most similar to, based on peak concentration of greenhouse gases.

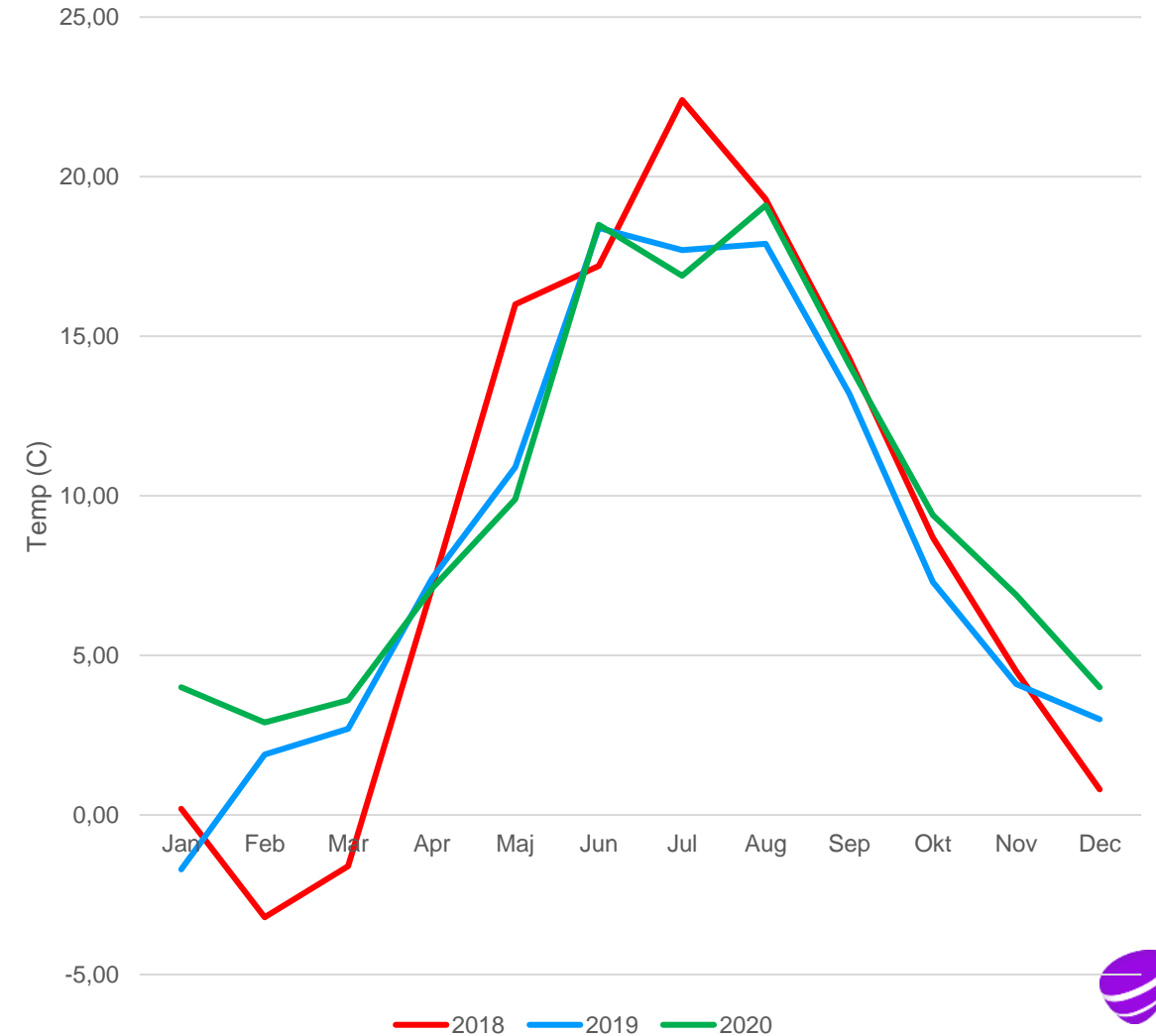


# Challenge 1: Data center Electricity consumption vs average temperature per month

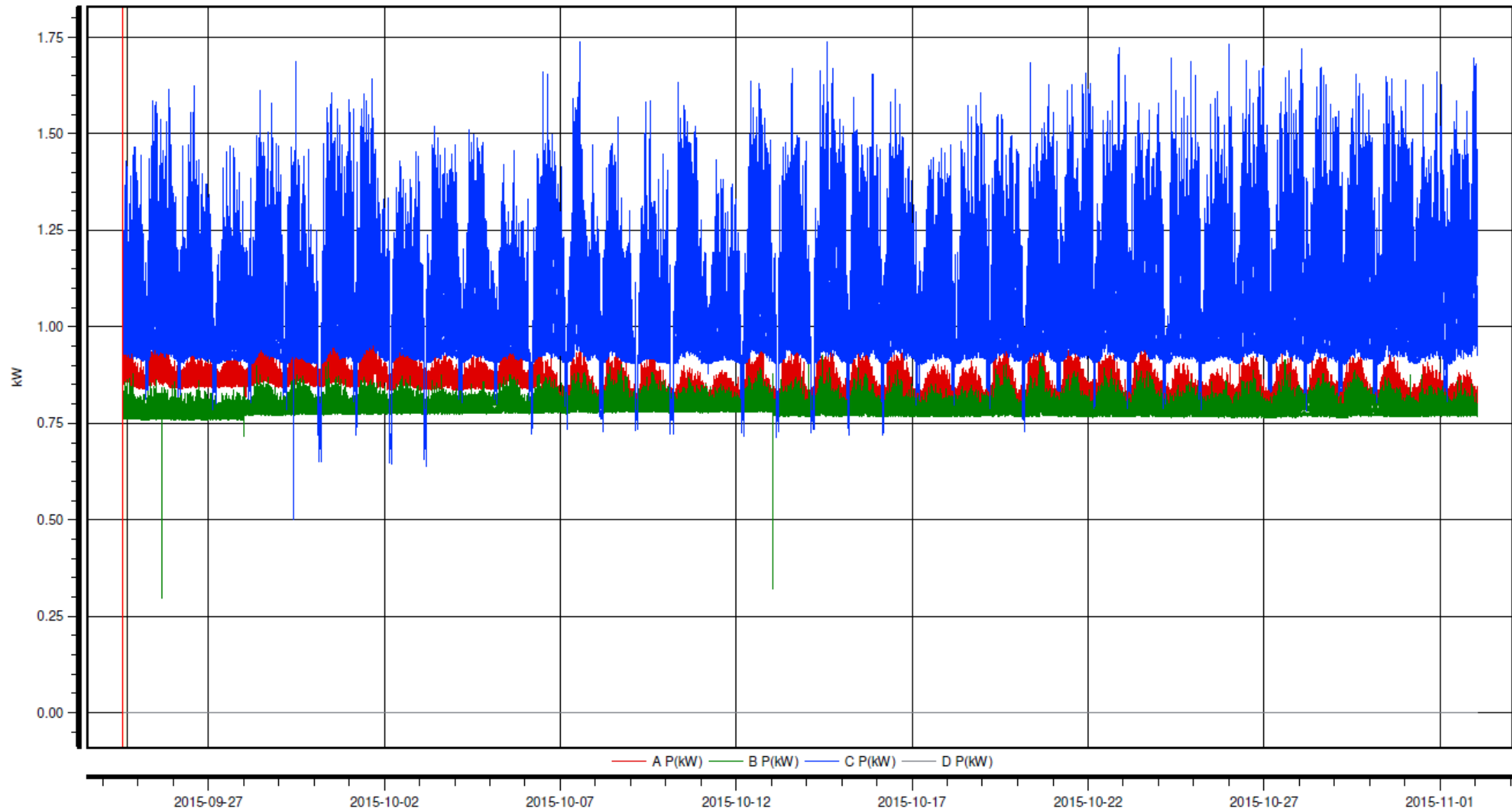
Electricity consumption per month



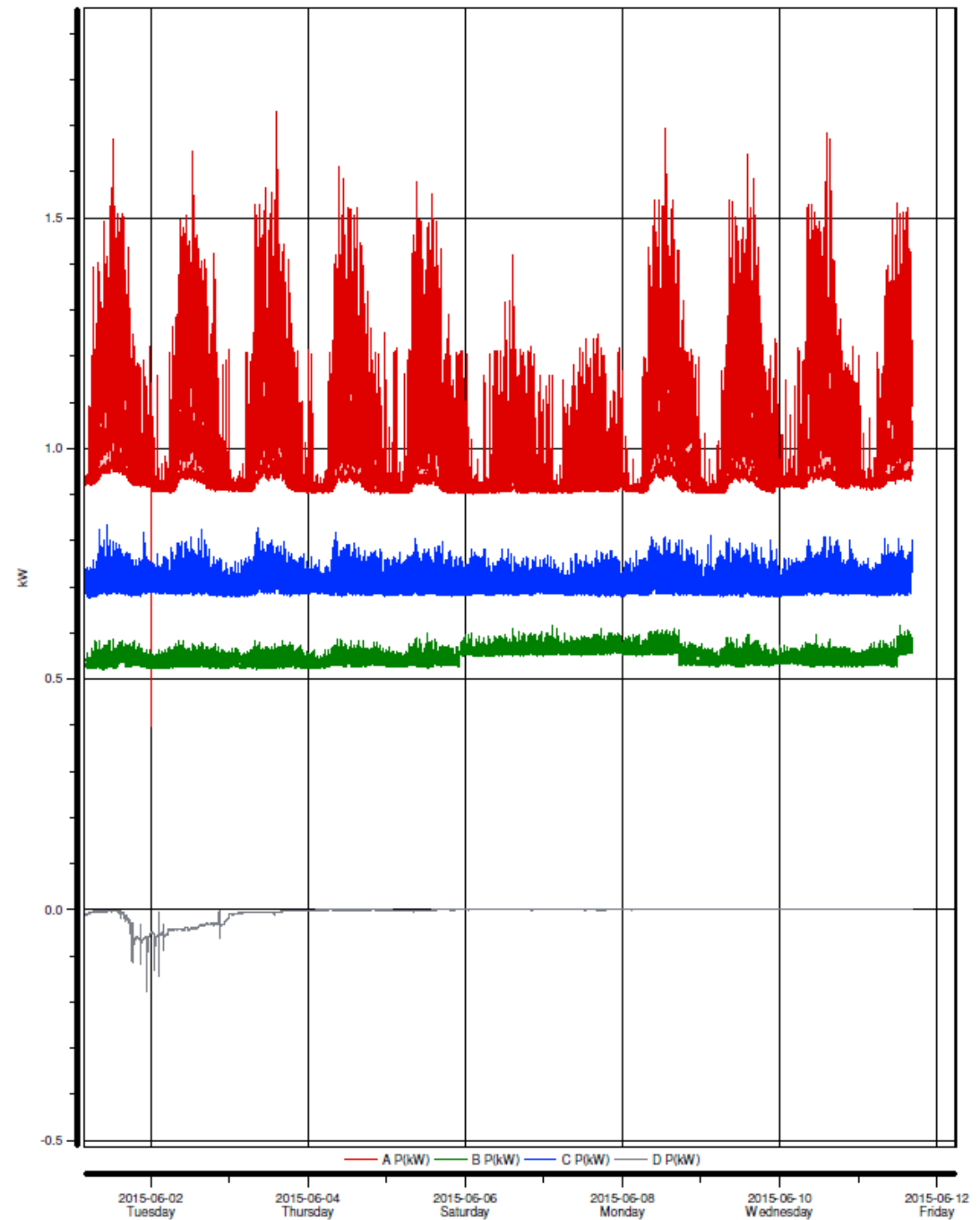
Monthly average temperature (SMHI - Stockholm)

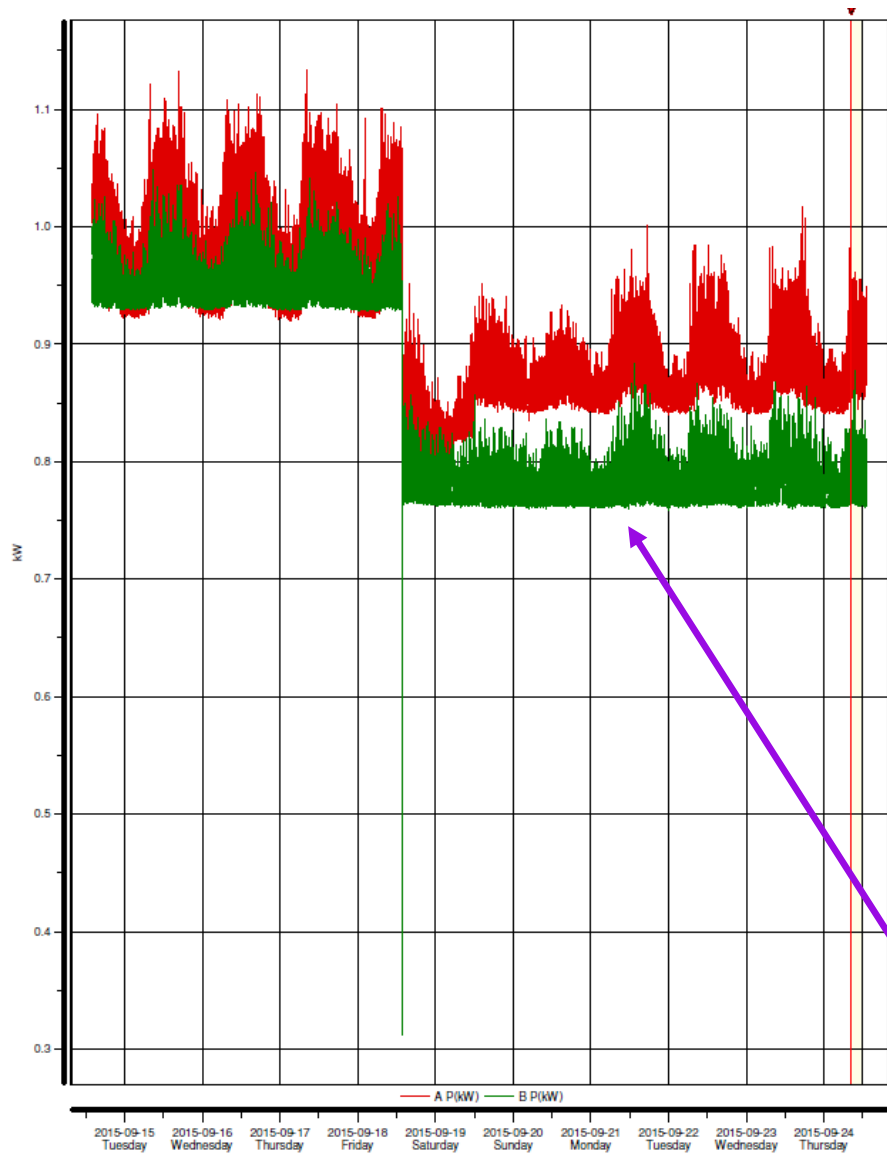


## Challenge 2: Electricity consumption volatility due to 4-5G roll out

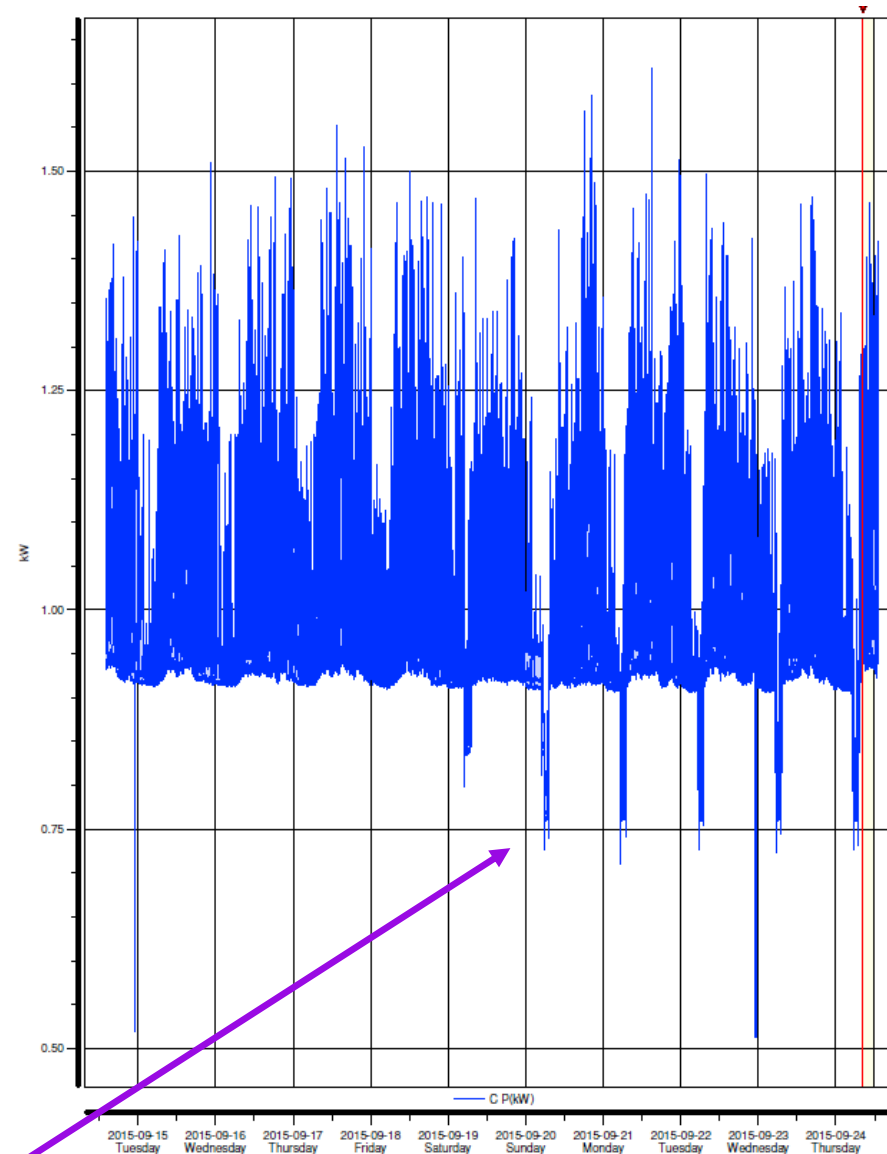


# *Site electricity consumption variations 2 - 4G*





2G



4G

Activated electricity saving features





# *Challenge 3: Myths about the ICT sectors footprint or...*

## *The importance of knowledge*

*"When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the stage of science."*

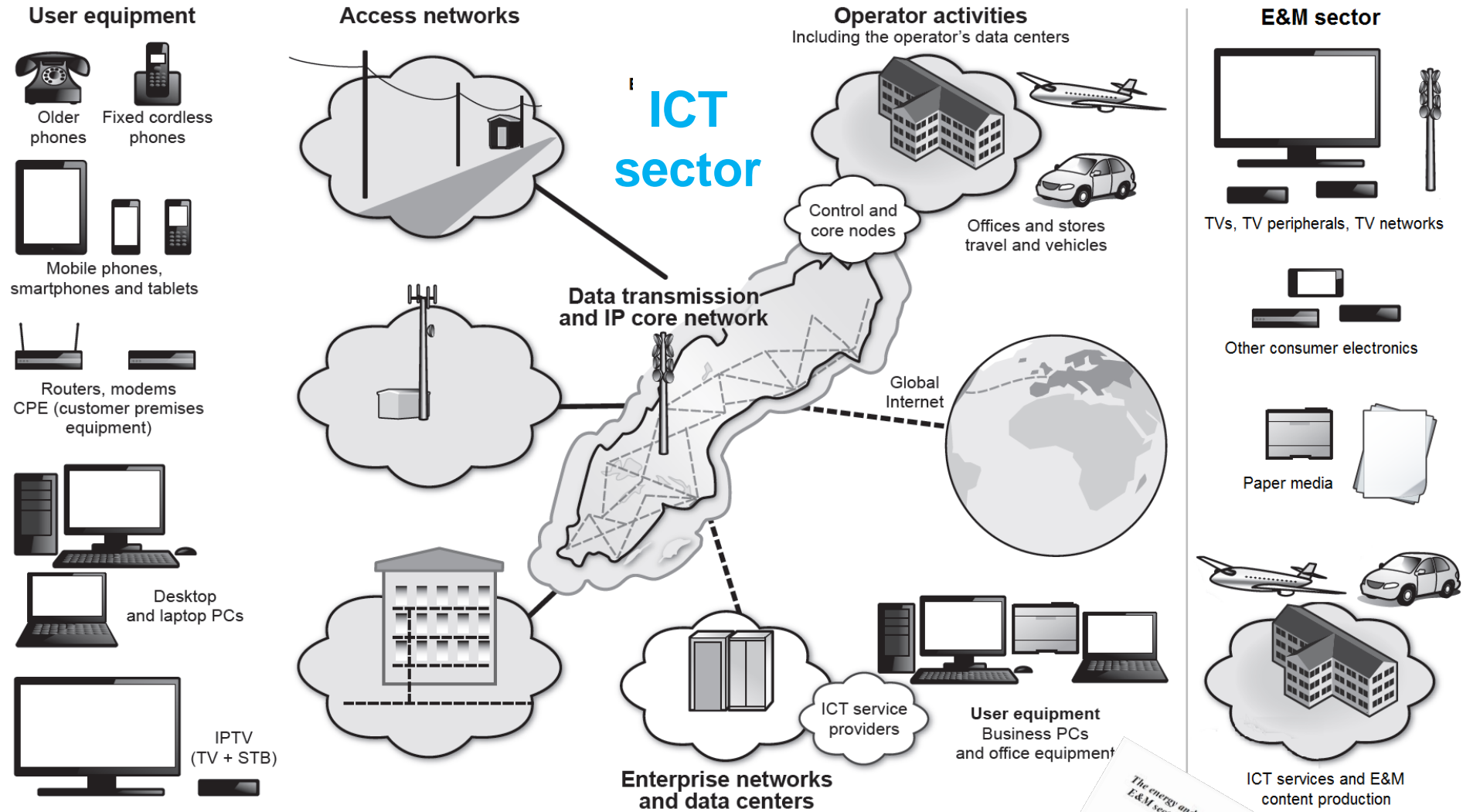
*(William Thomson, Lord Kelvin, 1824-1927)*

In short: What get's measured gets done"





# The Swedish ICT & E&M sector study (2016)



**E&M sector**

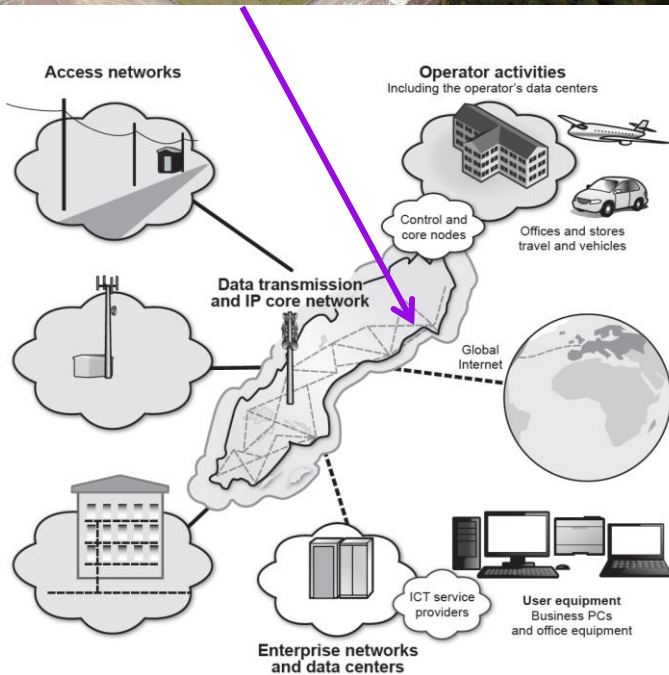
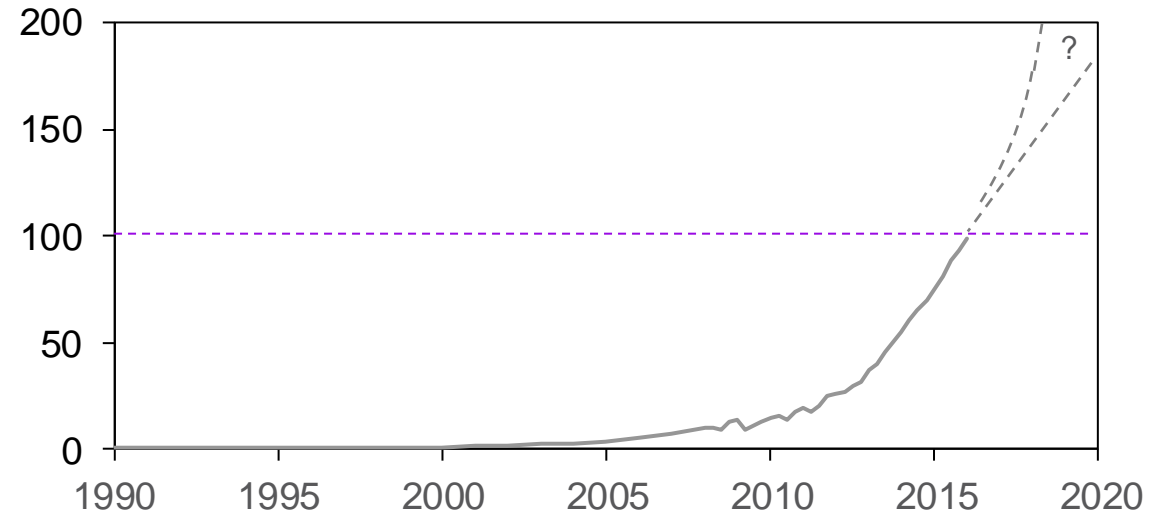


# The study on Sweden (2016): Energy vs Data

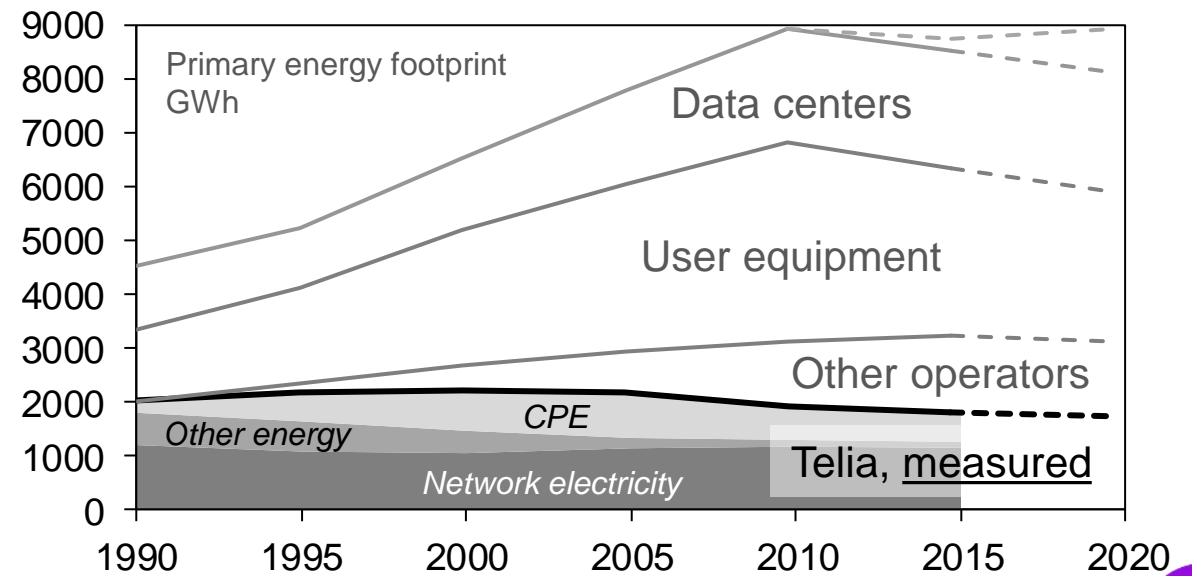
Facebook data center



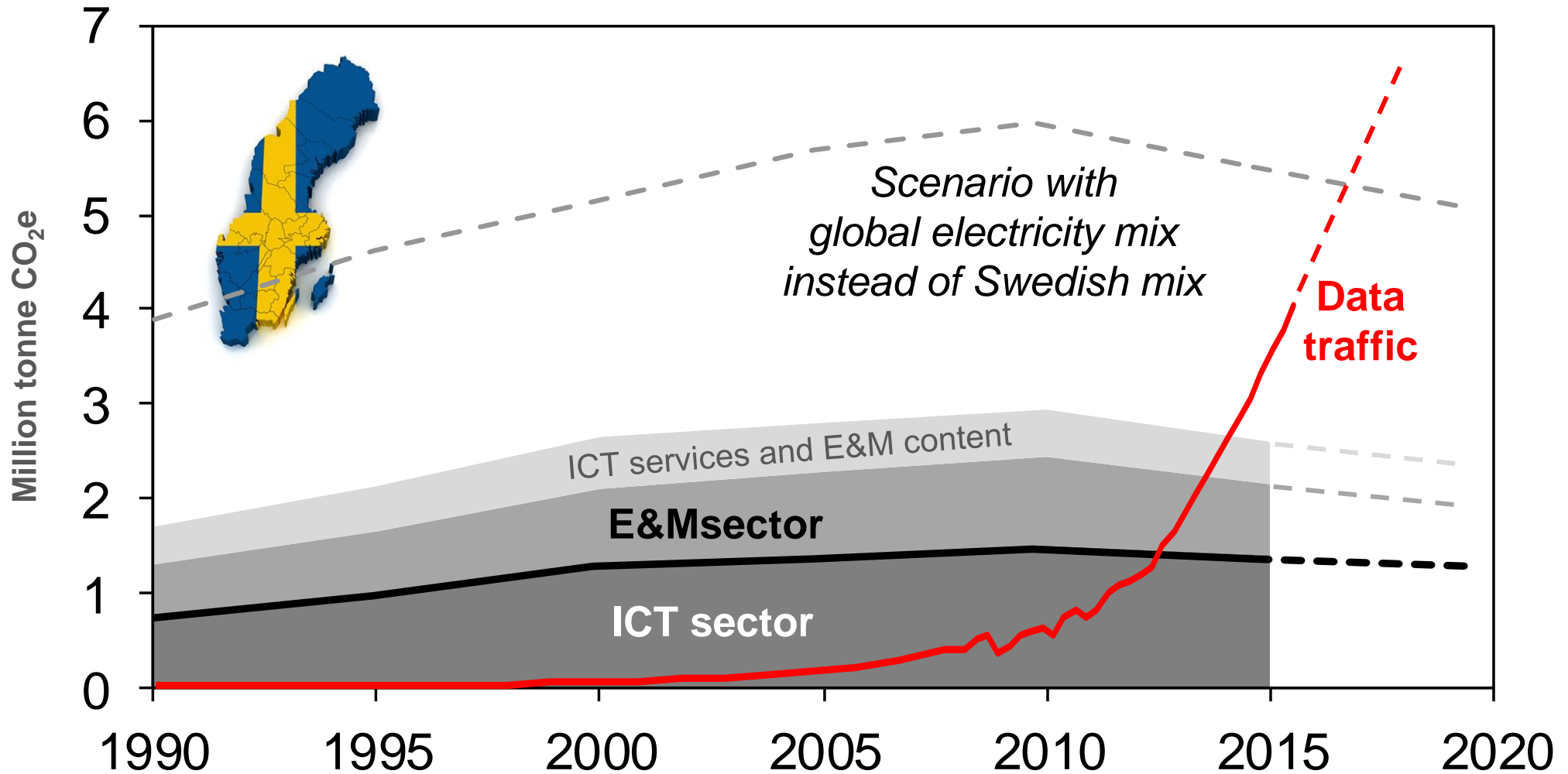
Data traffic



ICT sector use - energy consumption



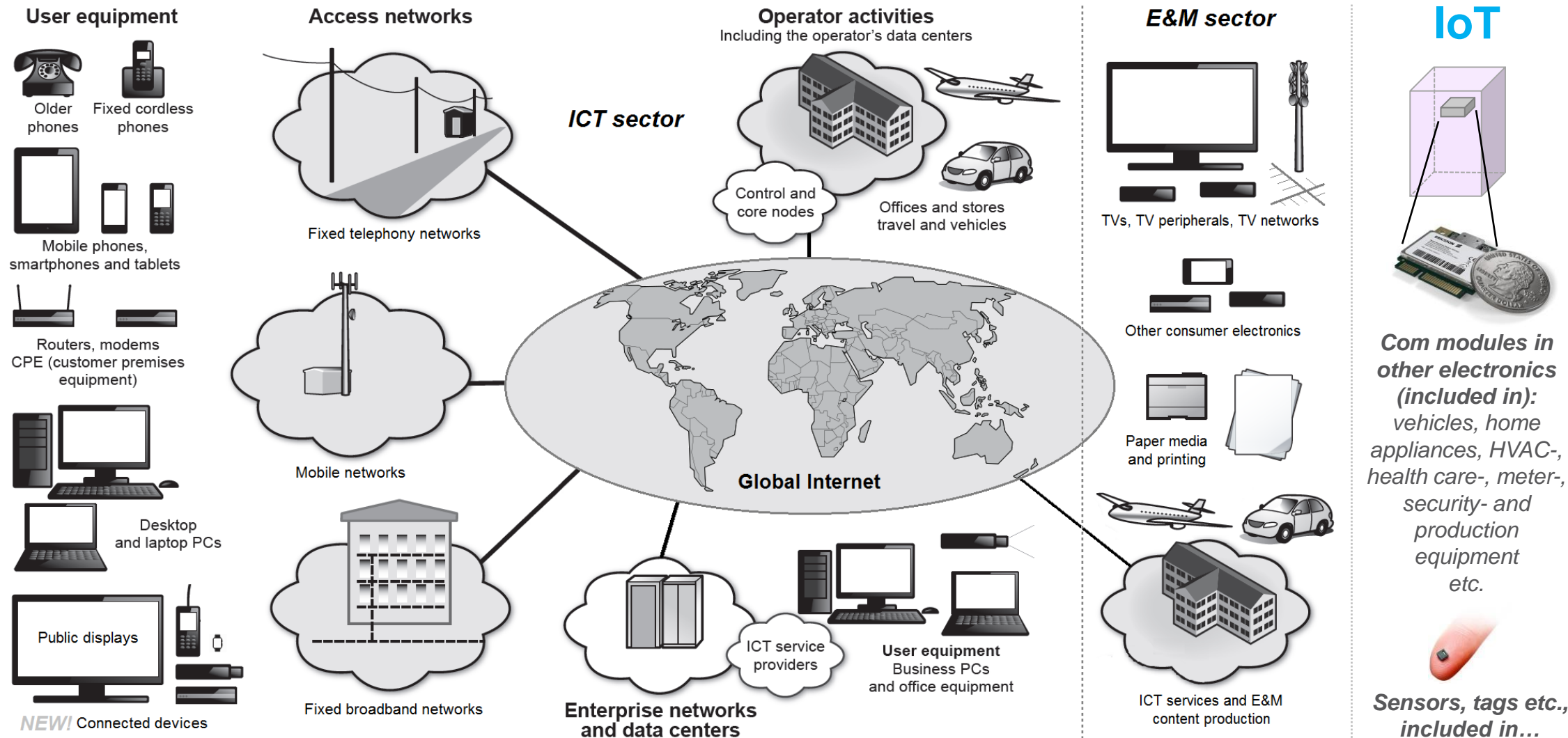
# The study on Sweden (2016): Carbon vs Data



Malmodin, J., Lundén, D. (2016). *The energy and carbon footprint of the ICT and E&M sector in Sweden 1990-2015 and beyond* Paper published and presented at: *ICT for Sustainability (ICT4S)*, Amsterdam, Netherlands, 30-31 August 2016.



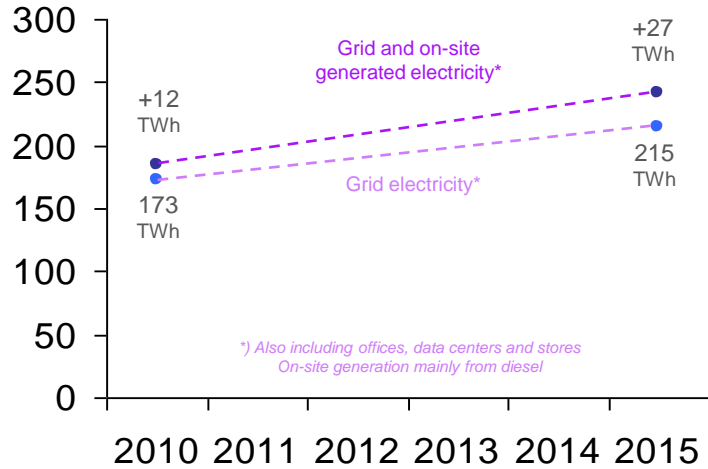
# The global ICT & E&M landscape



# The global telecom operator study (2018)

## Global Mobile and fixed network

### Energy footprint

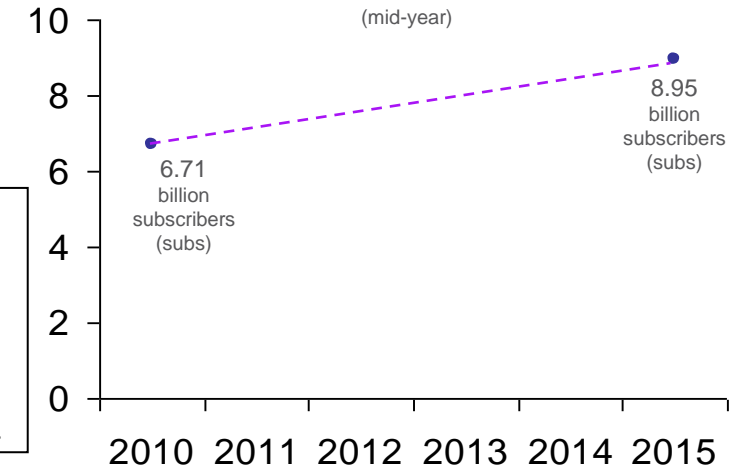


### Total results 2015:

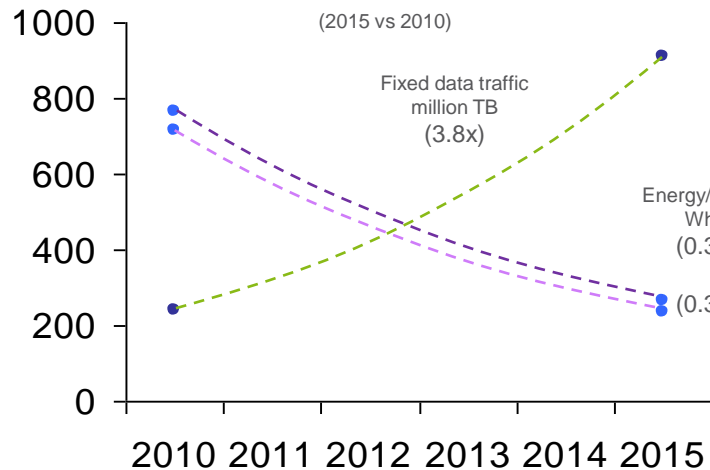
169 Mton CO<sub>2</sub>e  
0.34% of global CO<sub>2</sub>e  
0.5% of global energy related CO<sub>2</sub>  
1.03% of global grid electricity consumption

*Energy footprint is here defined as the grid and on-site generated electricity including network sites and buildings including offices, data centers and stores. Note that non-electric energy e.g. for buildings, travel and fleet vehicles is not included in this definition of the energy footprint. This due to the fact that it's not fair to compare a secondary energy source like electricity to primary energy (i.e. "fuels") without tracing all forms of energy back to their original primary energy sources. As most of the network operations energy is electric it's best to only include and compare electric energy. All forms of energy is however included in the carbon footprint.*

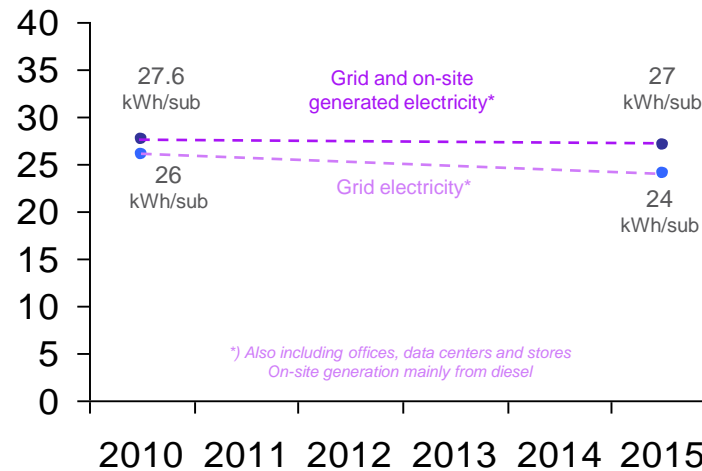
### Number of subscribers (subs)



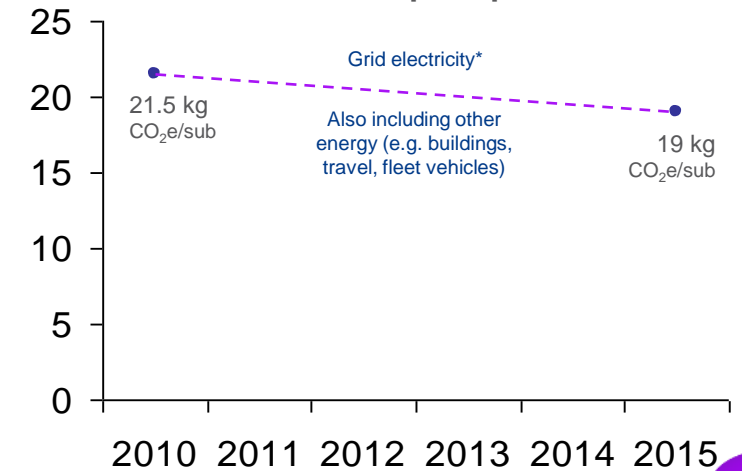
### Data traffic and energy/data



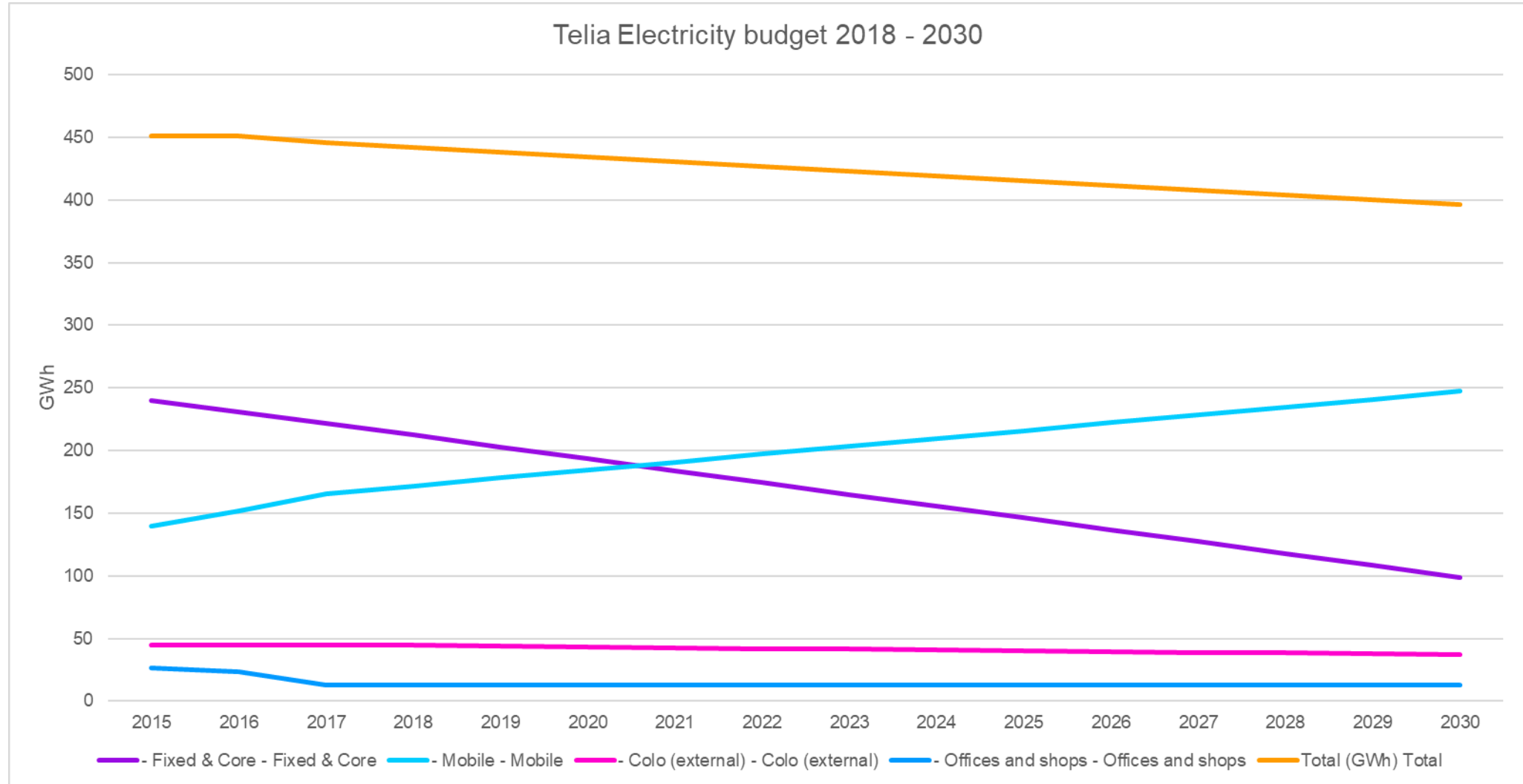
### Energy footprint per sub



### Carbon footprint per sub



# TELIA SWEDEN ELECTRICITY FOOTPRINT FORECAST 2018 - 2030







# Exponential climate action roadmap, Global summit and media

A large graphic with a blue and white background. The text "EXPONENTIAL CLIMATE ACTION ROADMAP" is written in large, bold, blue and white letters. The background is a collage of various news articles and website screenshots. At the top right, there's a screenshot of the "GLOBAL CLIMATE ACTION SUMMIT" website. Below it, there's a headline "Climate Action Roadmap Shows Sectors Can Halve Emissions by 2030 with Strong Policies". To the left, there's a headline "Klimatutsläppen kan halveras till 2030 enligt ny rapport". At the bottom, there's a headline "Rockström: Så halverar vi klimatutsläppen till 2030 - 'Digitala revolutionen är världsekonominns joker'".

**EXPONENTIAL  
CLIMATE ACTION  
ROADMAP**

**Rapport: Klimatutsläpp kan halveras till 2030**

Världens utsläpp av växthusgas kan halveras till år 2030. Det visar en ny global rapport från FN:s klimatpanel. Rapporten visar att om alla sektorer för större firms förtagningar som kan skälas upp, säger han.

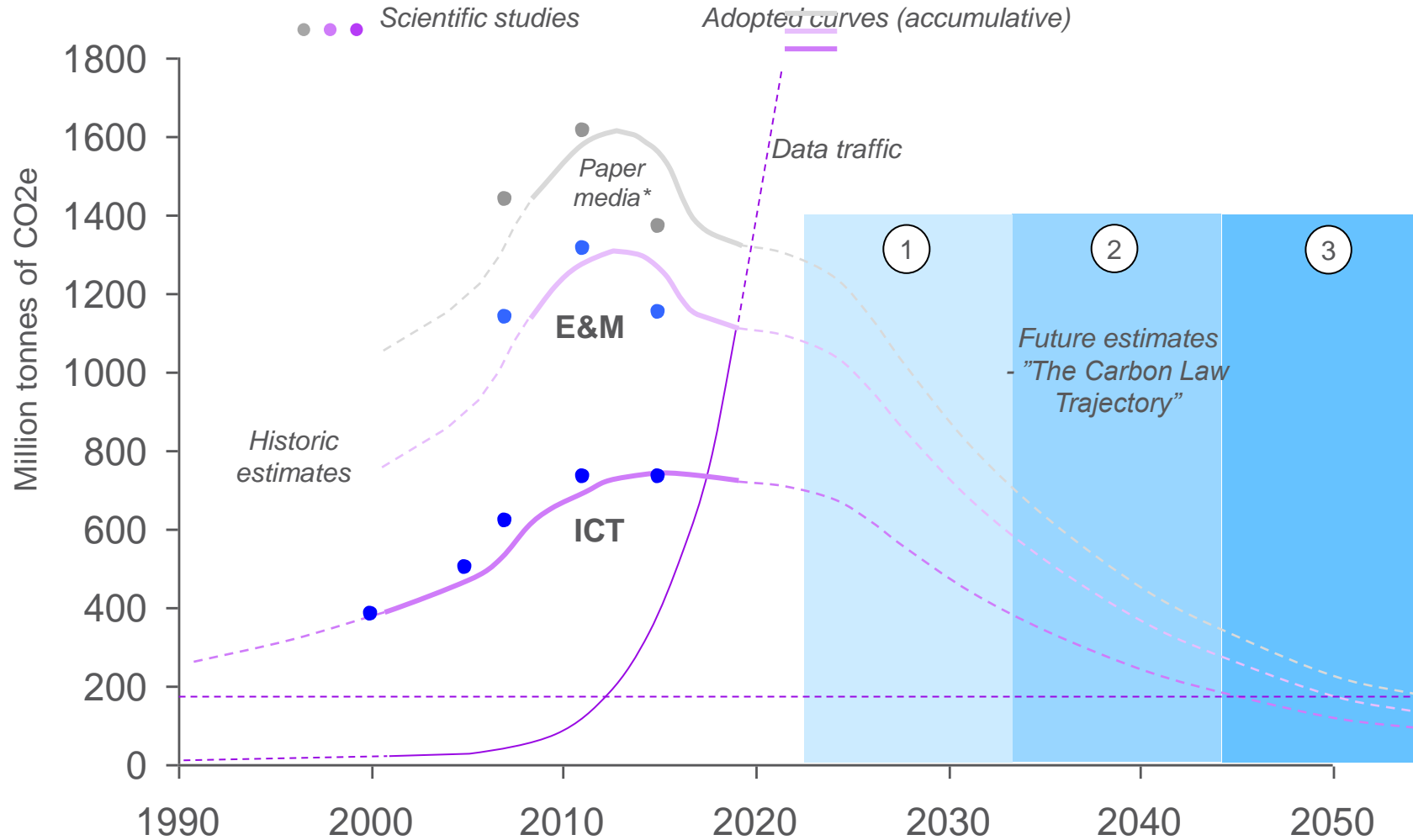
2021-05-17  
Dag.Lunden@TeliaCompany.com

**Rockström: Så halverar vi klimatutsläppen till 2030 - "Digitala revolutionen är världsekonominns joker"**

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# But will the ICT & E&M sector's positive CO2 trends be enough to save the planet?

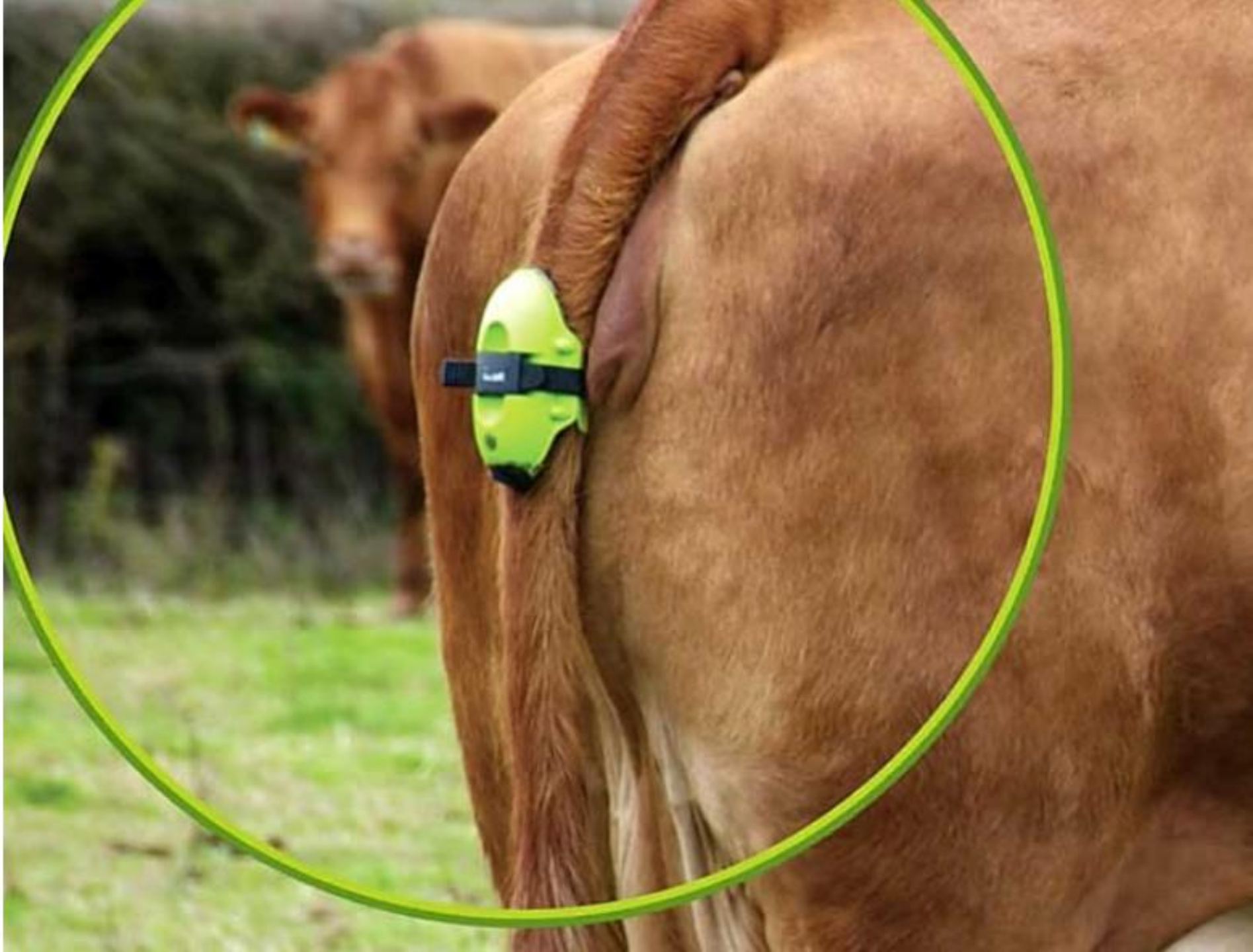


\*) Paper media = News, Print & Write (not including packaging and tissue)



***DON'T FORGET...***

***...ICT's enabling  
effects in other  
sectors...***



# Conclusion

- › “- **Huston, we have a problem!**”
  - *Yes, but there’s a solution, renewables...!*
- › **Challenge 1: Operational temperature**  
Increase temperature recillense, free air cooling, geo cooling and excess heat reuse!
- › **Challenge 2: Electricity consumption volatility due to 4G and 5G roll out!**  
Utilize existing backup solutions as energy storage, stabilize consumption over time
- › **Challenge 3: “Myths”**  
Meassure, report and publish!
- › **...and please don’t forget the cow!**





**THAT'S ALL FOLK'S!**