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Explore Data Center Carbon Protocol

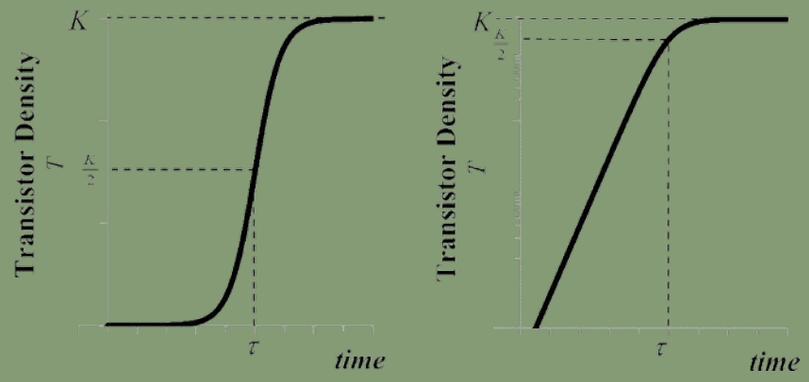
Digital Ecomomy And Carbon Emissions & The Limits of Moore's Law and the Economic Growth

How Important Is The Data Center In The Digital Economy?

The data center can be considered the “brain” of the Internet. Their role is to process, store, and communicate the data behind the countless information services we rely on every day, whether it’s streaming video, email, social media, online collaboration, or scientific computing. Digital services are the main reason for the increase in energy use. The demand for digital services has been steadily increasing, followed by the development of its infrastructure. As infrastructure increases, so makes the energy demand.

More Energy Consumed By Data Center Due To Moore's Law

As the digital economy advances, data centers have become necessities, the core infrastructure that makes modern day living possible. **Per Moore's Law**, large data centers are known to consume more energy as data transmission increases. However, at the same time, the world is threatened by climate change and data centers are accelerating the deterioration of our environment.



What Drives The Increasing Energy Use of Data Centers?

5G

- PEAK DATA RATES UP TO 20GBPS

In addition to the demand from cloud, colocation, and enterprise data center, 5G is another rising sector that requires large scale infrastructure.
While it will take a few years for 5G to mature and become widespread, it is widely expected that the rollout of 5G will substantially accelerate the data growth, with new types of digital services in domains such as smart cities, IoT, and transportation.
The larger bandwidth compared with 4G will lead to a growing demand for higher resolution content and richer media formats (e.g., virtual reality) starting in 2021.

SOCIAL MEDIA

- AN IMAGE = 24 MEGAWATT

- A 2.5 HOUR (HD) MOVIE = 1 KILOWATT-HOUR (KWH) OF ENERGY

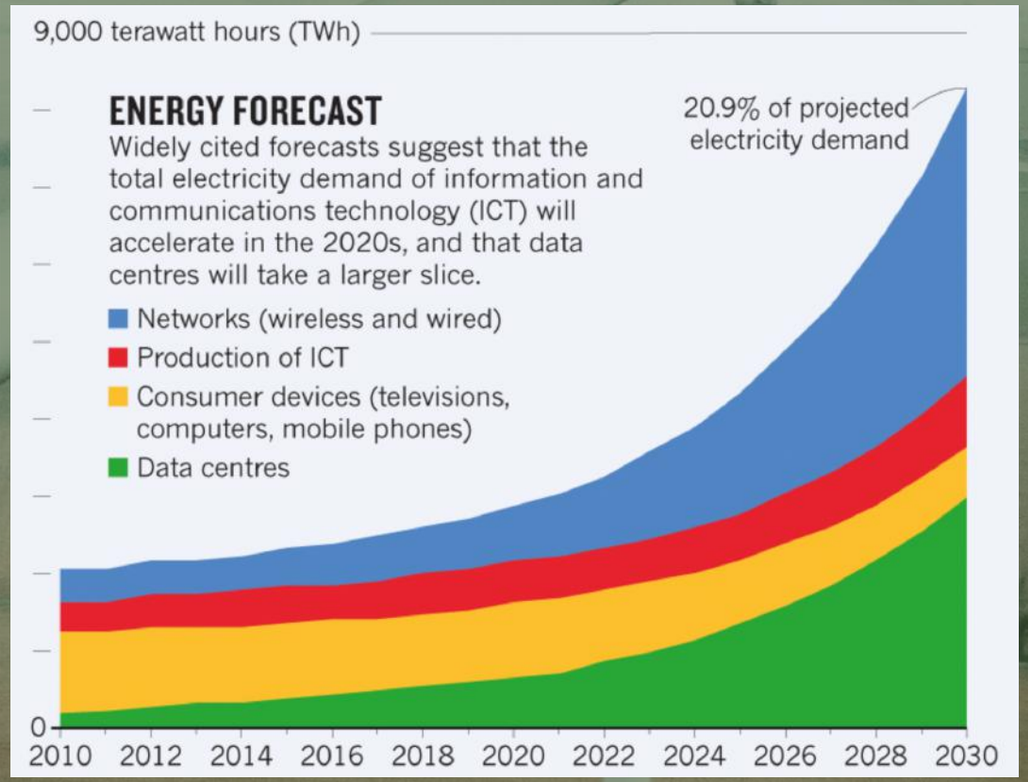
Social media also contributes to the explosive energy use. Research by Uptime Intelligence shows that every time an image is posted on Instagram by the Portuguese soccer star Cristiano Ronaldo (who at the time of writing had the most followers on the platform), his more than 188 million followers consume over 24 megawatt-hours (MWh) of energy to view it.

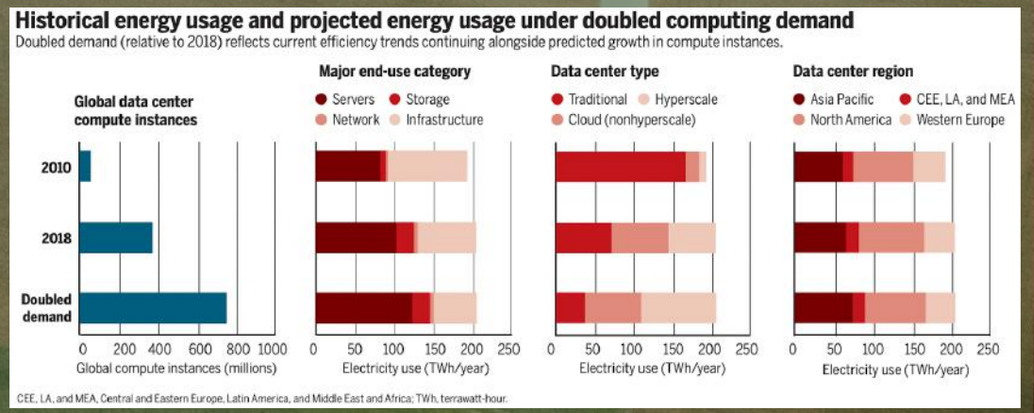
Media streaming, which represents the biggest proportion of global traffic has become the energy guzzler of the internet. Streaming a 2.5 hour high definition (HD) movie consumes 1 kilowatt-hour (kWh) of energy.

How Much Energy Do Data Centers Really Use?

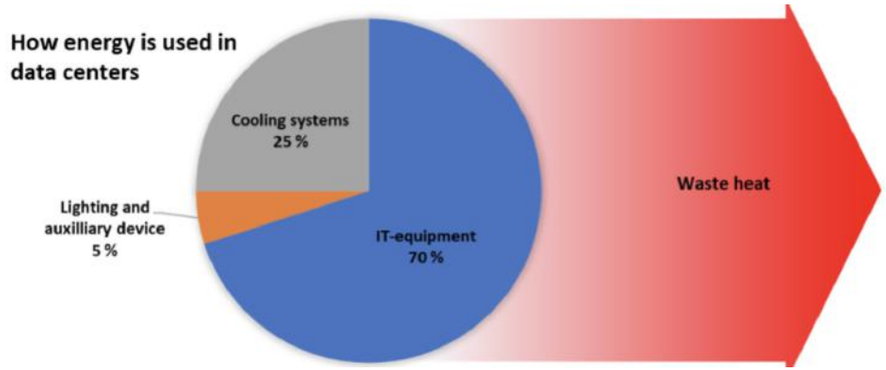
Data centers use an estimated 200 terawatt hours (TWh) each year. That is more than the national energy consumption of some countries, such as Iran, half of the electricity used for transport worldwide, and 1% of global electricity demand. All in all, data centers contribute around 0.3% to overall carbon emissions.

ICT's carbon footprint on a par with the aviation industry's emissions from fuel. One of the most worrying models predicts that electricity use by ICT could exceed 20% of the global total electricity consumption by the time a child born today reaches her teens, with data centers using more than one-third of that.





The Impact of The Data Center On Global Carbon Emissions



Data centers generate carbon emissions throughout their lifecycle. During the construction process, data centers consume raw materials (such as steel, cement, etc.), staffing, and the destruction of the natural resources of the local land and vegetation, which can be abstracted into the carbon emissions of building construction and comply with the standards of various countries.

The data center consumes energy in several aspects during operation, ranging from IT equipment, cooling systems, lighting, and other ancillary parts.

The operation of the server needs to be kept within a certain temperature limit due to the constant heat generated from computing. The cooling system is essential because it discharges the heat and ensures the safety of the entire operation. For data center energy efficiency indicators, there is a unified parameter called PUE:

DCCC

Data Center Carbon Credits as a medium for data center carbon trading

MESON

The first platform to support the application of the credits.
Meson can utilize the stock of idle resources through token incentives, and coordinate bandwidth resources across borders, regions, and projects.

It also encourages the construction of mega data centers. Meson is an effective platform that empowers global data centers to meet both the development of modern technology, and the needs of energy conservation and emission reduction.

Data Center Carbon Credits

DCCC A rule based incentive system for carbon emission control for data centers.

Low PUE

Low Utilization data center can contribute idle resources and sell DCCC for profit

High PUE

Low Utilization data center can contribute idle resources to get DCCC deductions

High Utilization data center need to buy DCCC from the market to offset carbon emissions

For data centers that do not meet the PUE index, a certain amount of DCCC needs to be purchased to offset their carbon footprint. The nodes with better PUE can sell their DCCC to the market. The second parameter is the utilization rate. The utilization rates of data centers built around the world vary greatly. For data centers with good PUE and low utilization rate, idle resources can be connected to some resource-sharing markets (such as MESON) to obtain DCCC, and additional benefits by selling DCCC. The data centers with poor PUE need to purchase DCCC from the market, or share idle resources to offset the difference in DCCC.

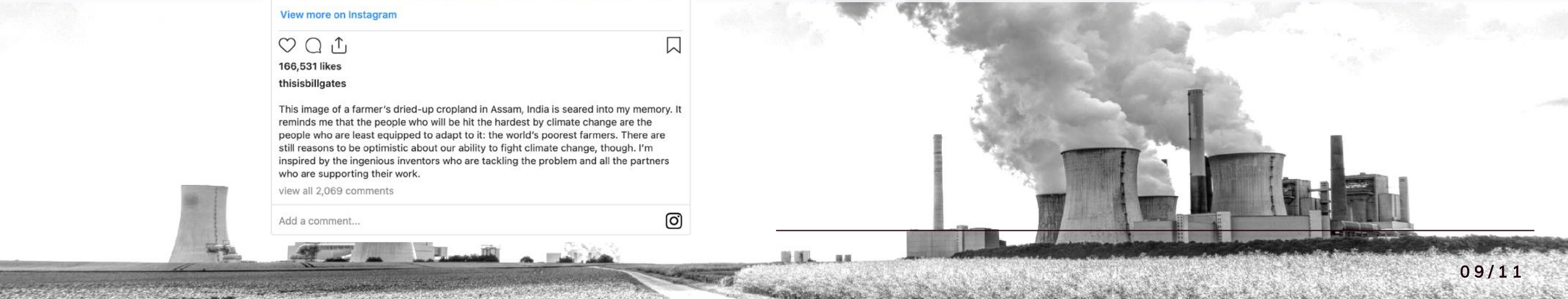
In addition to the two parameters mentioned above, another important parameter is the energy structure supplied to the data center. In the future development of DCCC, the energy structure of the power supply could also become a key parameter.

DCCC Use Case

MESON will become the first market to support the use of DCCC. MESON attempts to solve the problem of idle bandwidth resources by building a bandwidth aggregation and transaction market from the bottom up. Nodes that meet the PUE standard can contribute resources to the MESON network to obtain a certain amount of DCCC, and nodes that do not meet the PUE standard can contribute resources to the MESON network to obtain the DCCC balance.

DCCC will become an essential parameter of trading resources in MESON. Nodes that fulfill the DCCC standard get priority in the market of resource replacement. Nodes that do not fulfill DCCC standard have limited income and ranking of transactions.

We hope to create a platform for the world and hope that this platform can contribute to the sustainability of mankind.

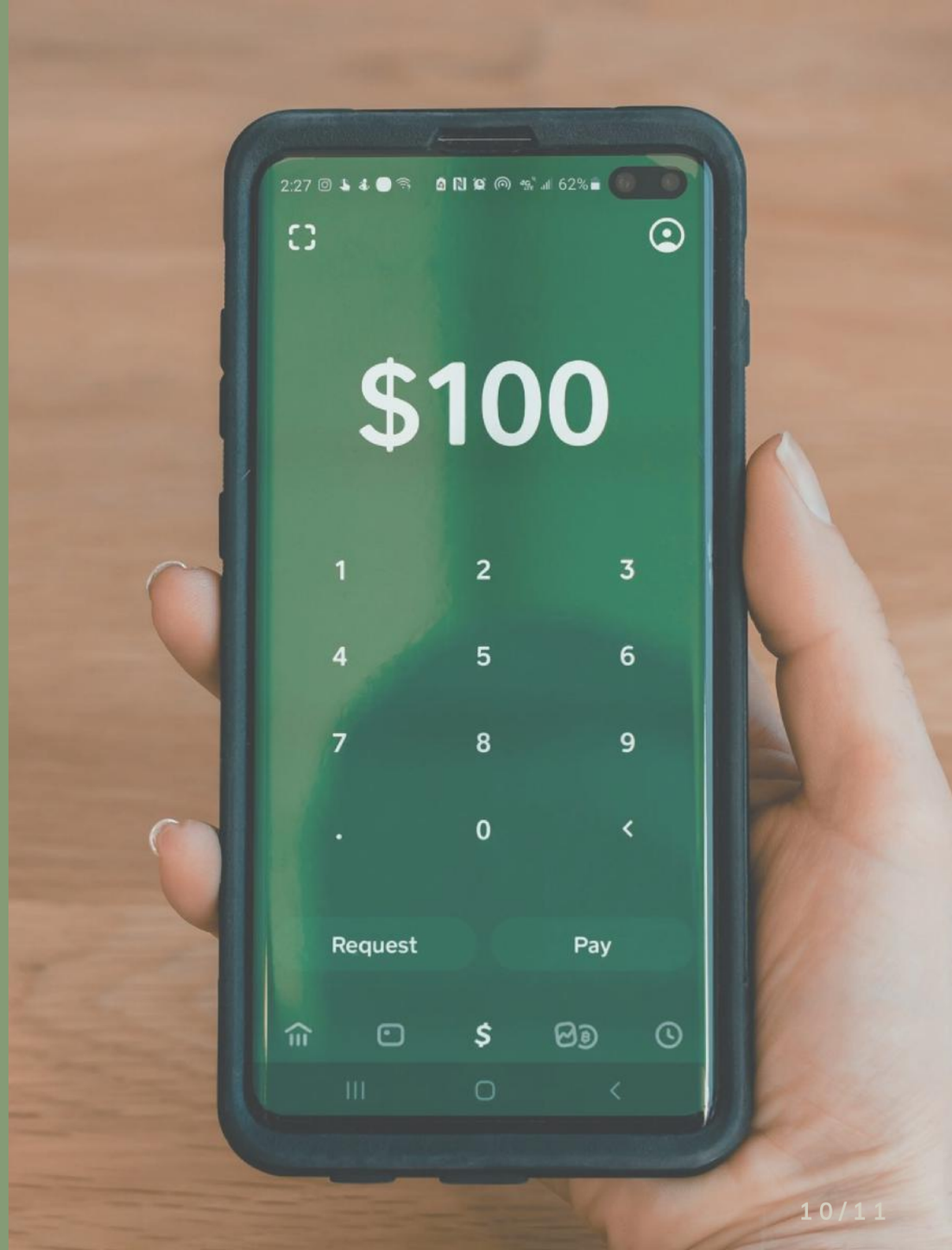


Pay by The Demand Side or the Supply Side?

The debate on whether the Supply-side or Demand-side should pay carbon emissions has been ongoing.

The question such as: should airline companies pay for carbon emissions or passengers? Should the power plant pay for carbon emissions or the electricity user; Should Bitcoin miners pay for the carbon emission or those who use the network? (Bitmex buys carbon credits).

We believe that both ends must be responsible. For the demand-side, voluntary encouragement is the main focus, and certain mandatory constraints are required for the supply side.



Conclusion

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We propose establishing an agreement on carbon emissions trading in the data center dimension, introducing indicators such as PUE, utilization rate, and power supply structure, and using DCCC to make specific measurements. The agreement itself is still in its early stages, and we hope to attract more people with lofty ideals to participate in the discussion and governance of the agreement.

Join the talk: https://github.com/daqnext/DCCC