

Is it really Greener in the Cloud?

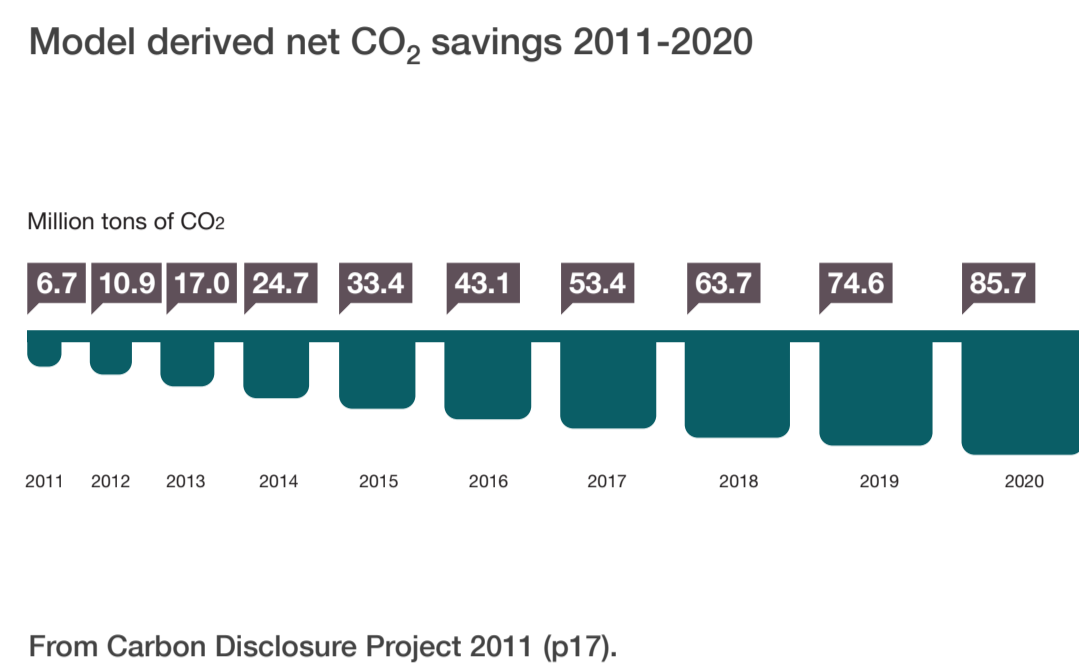
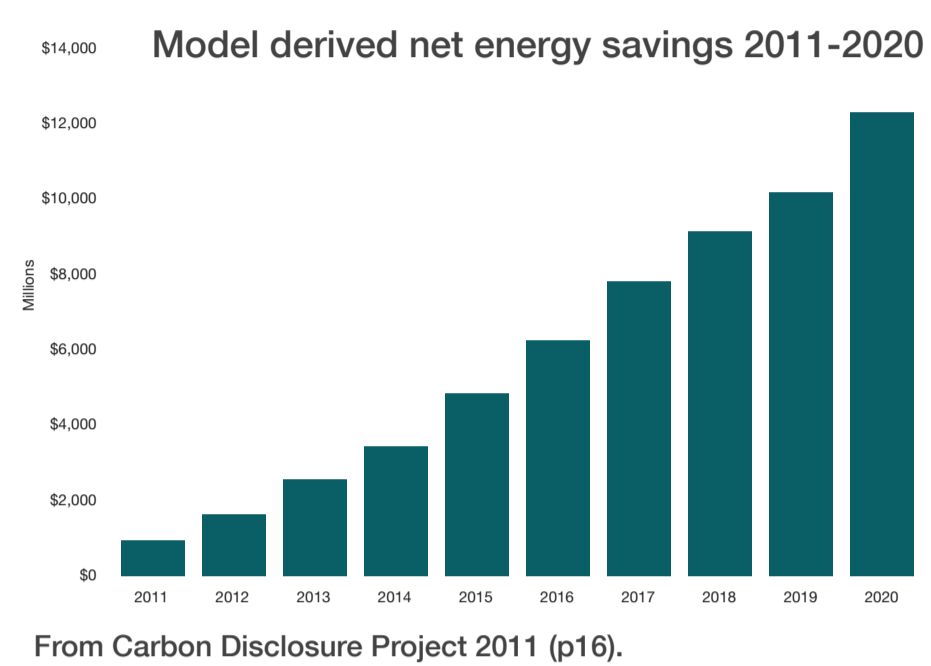
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Cloud computing has revolutionised modern communication.

We question claims that cloud computing saves energy in this changing landscape.

Problem Origin

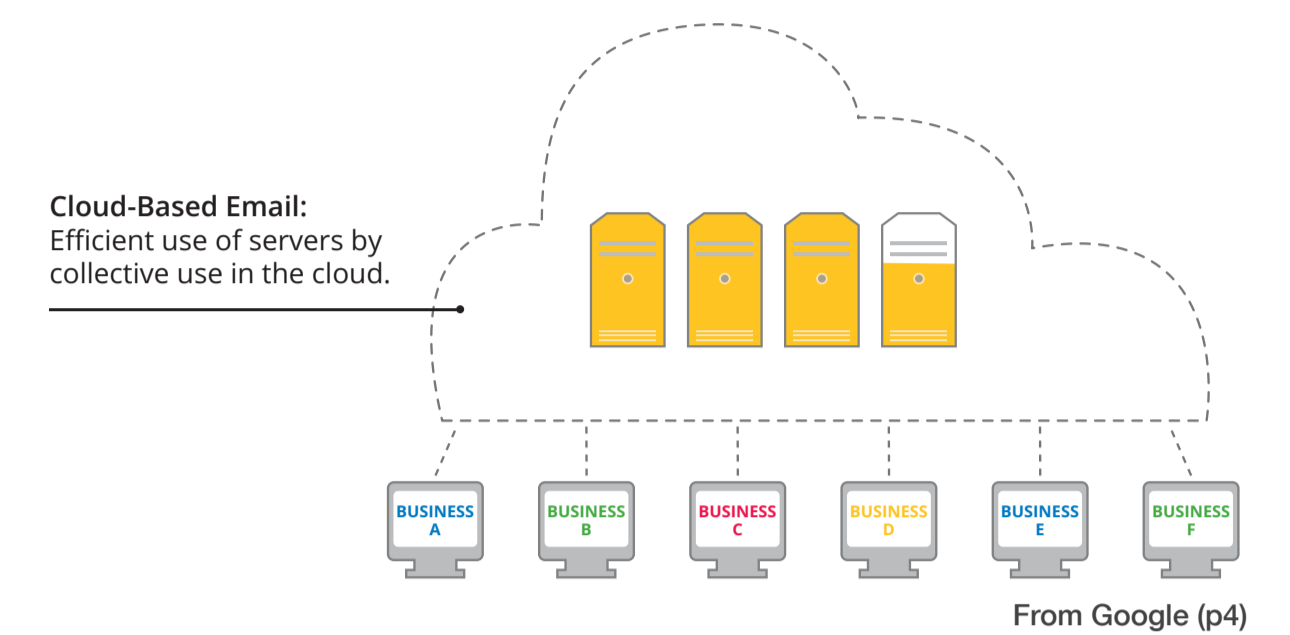
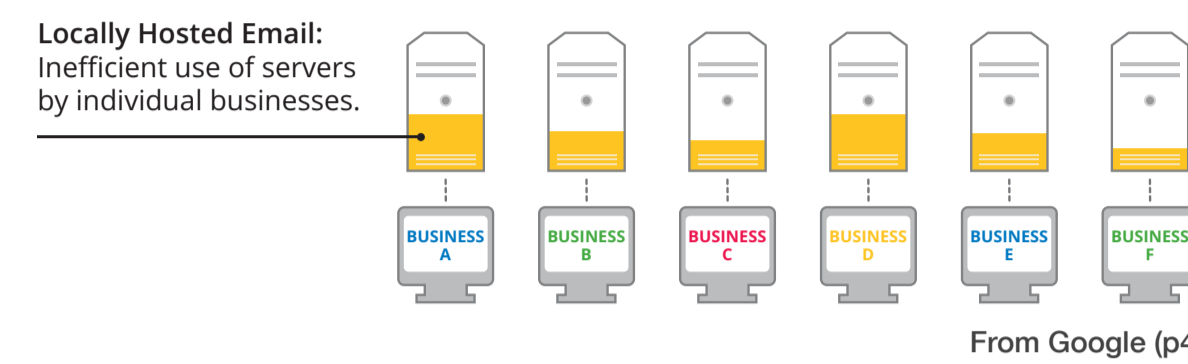
Proponents of cloud computing argue that switching to Cloud-based services provides significant energy savings.



"At one location, we took 400 development servers and consolidated them into 8-10 physical servers to achieve significant savings."

State Street, Madge Meyer

From Carbon Disclosure Project 2011 (p16).

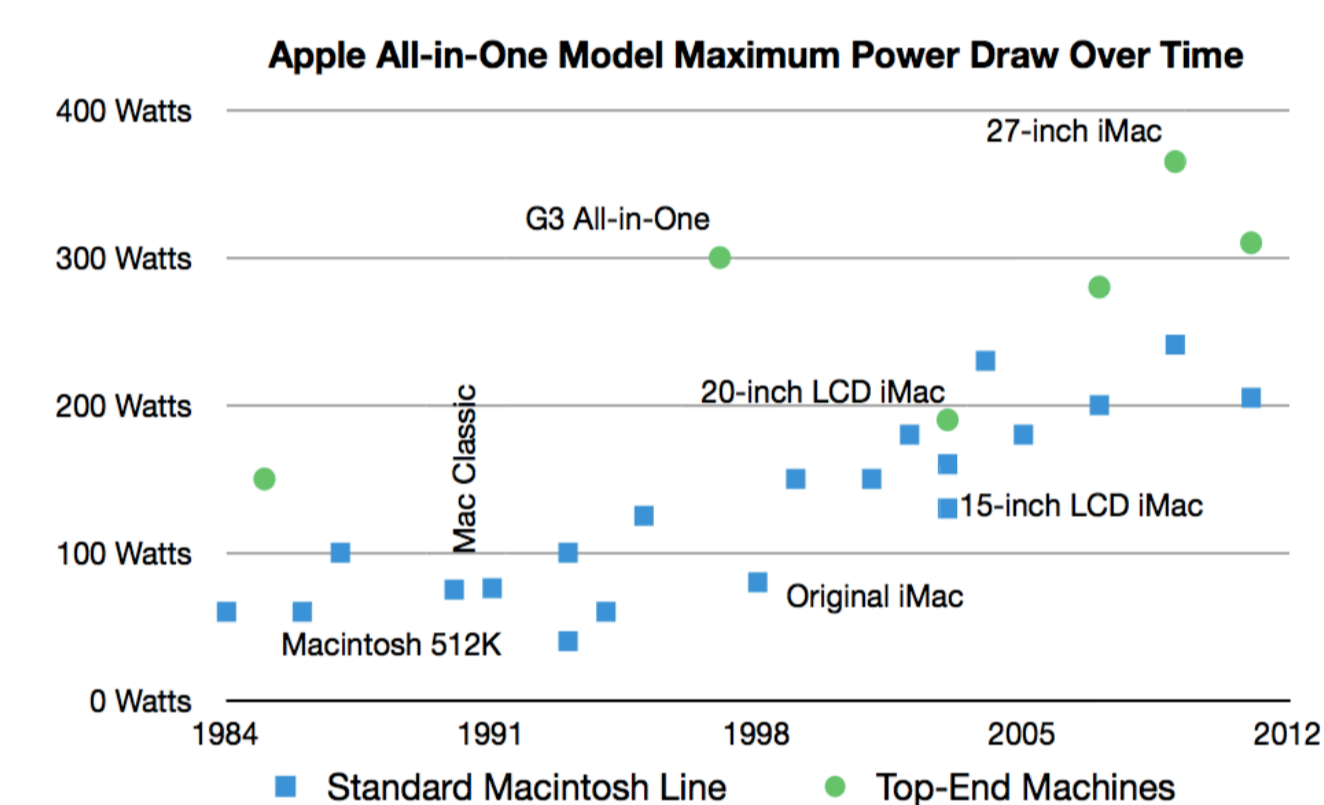


Problem Domains and Trends

We considered trends in a broad range of domains to identify system feedback

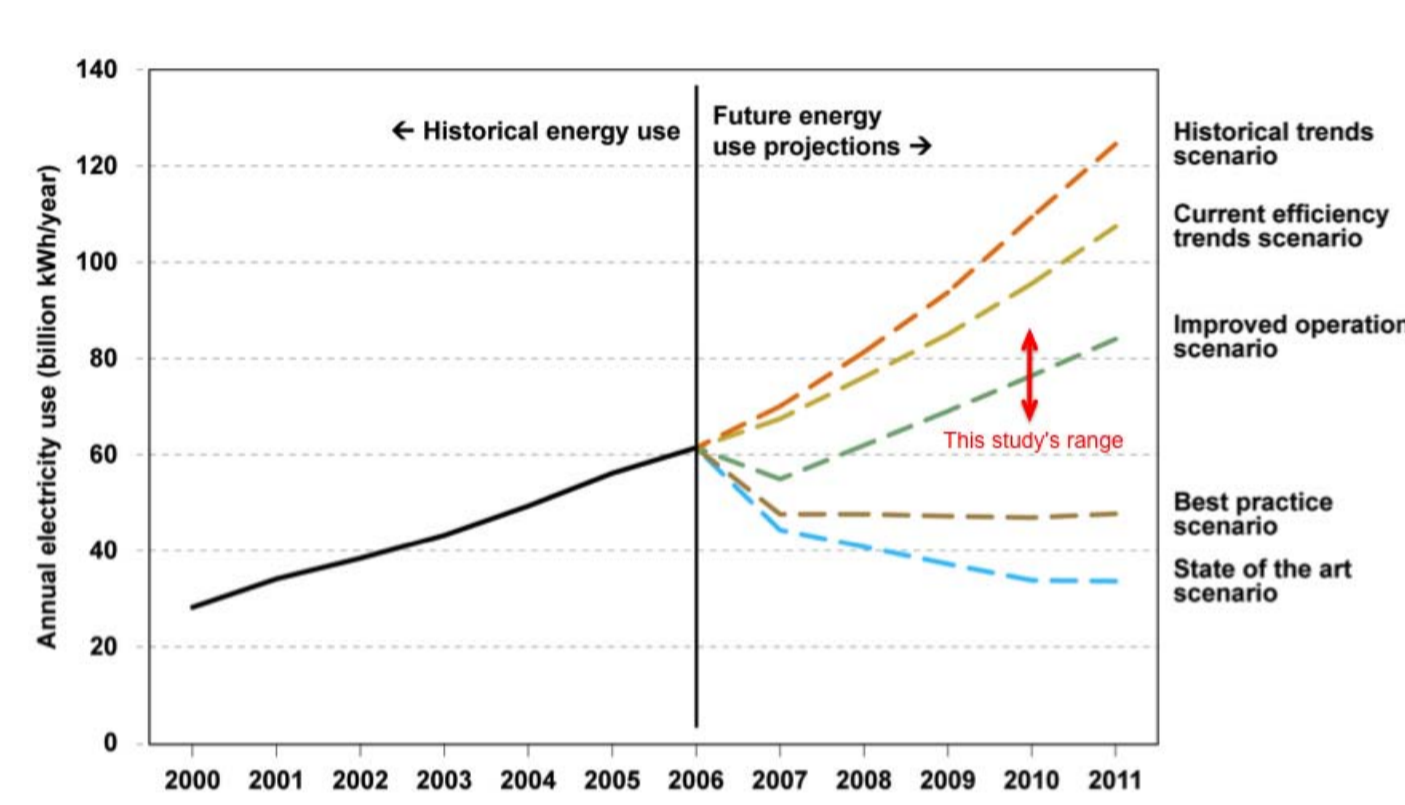
On-Site Computing Domain

Energy consumed by workstations



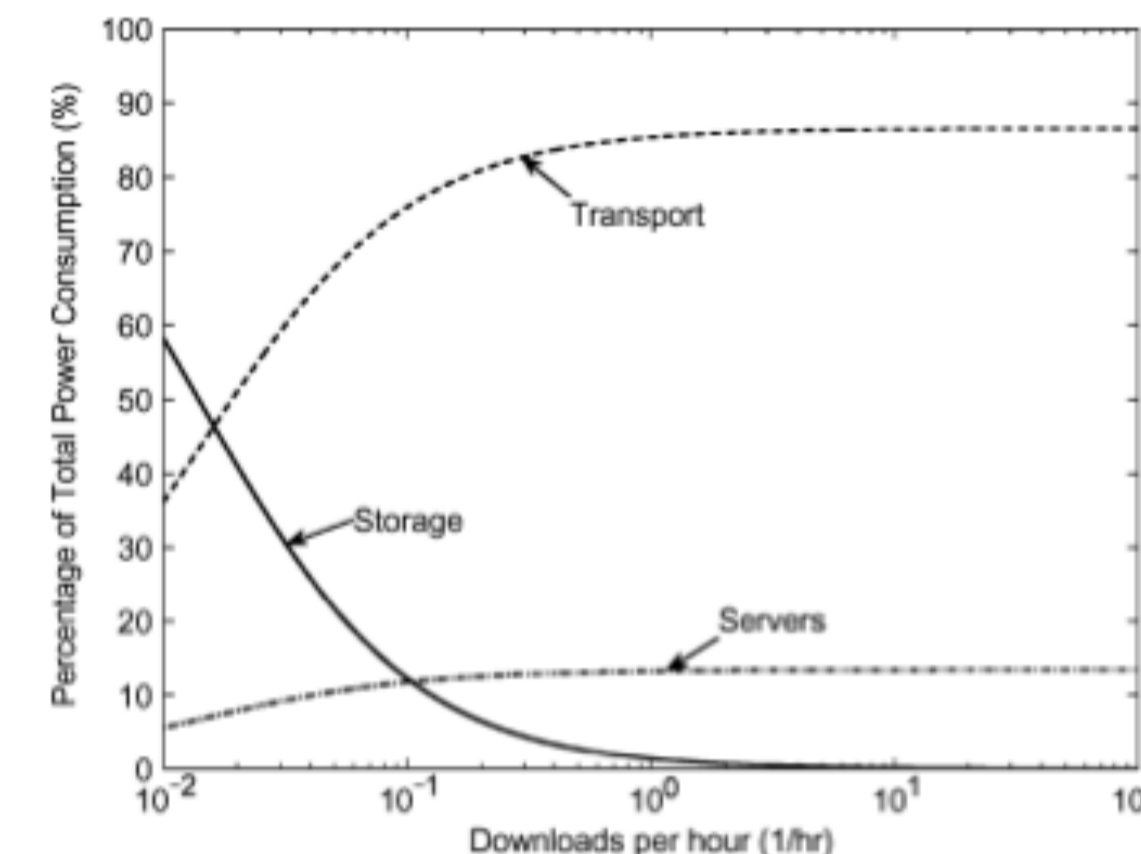
Cloud Infrastructure Domain

Energy consumed at data centres



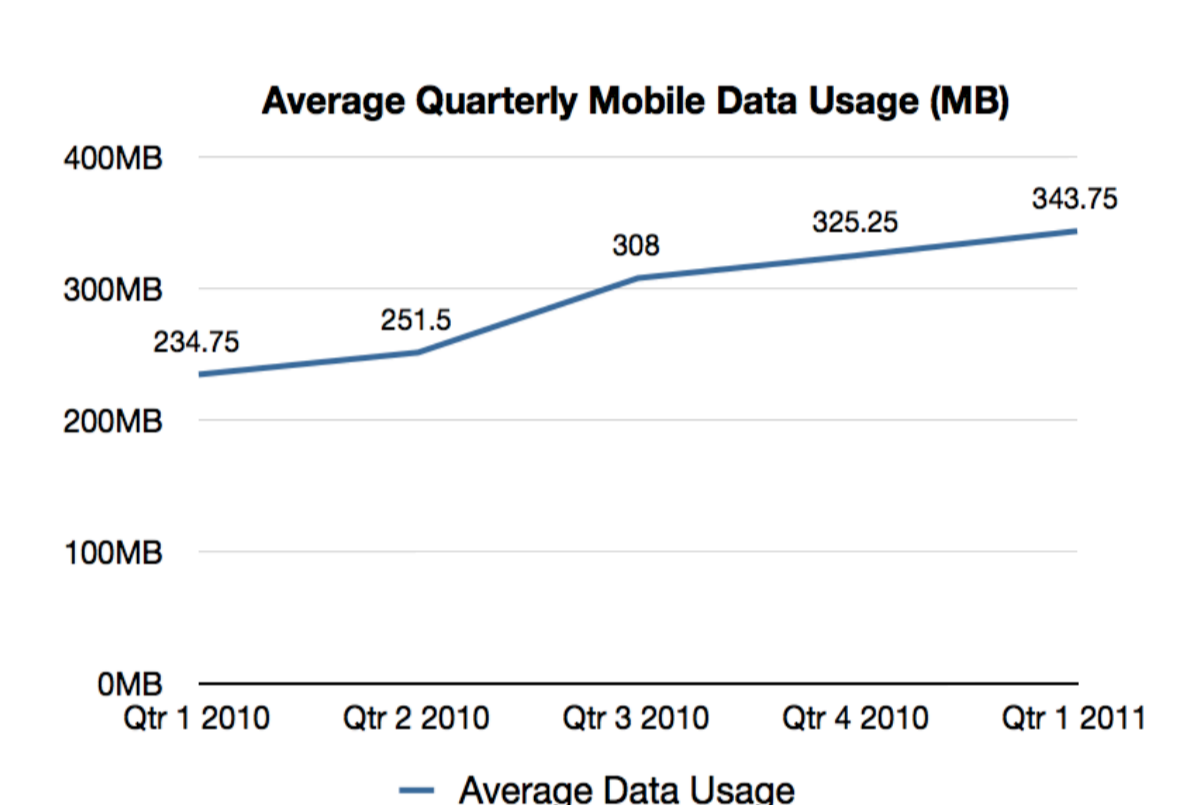
Data Transport Domain

Energy consumed transporting data



Device Adoption Domain

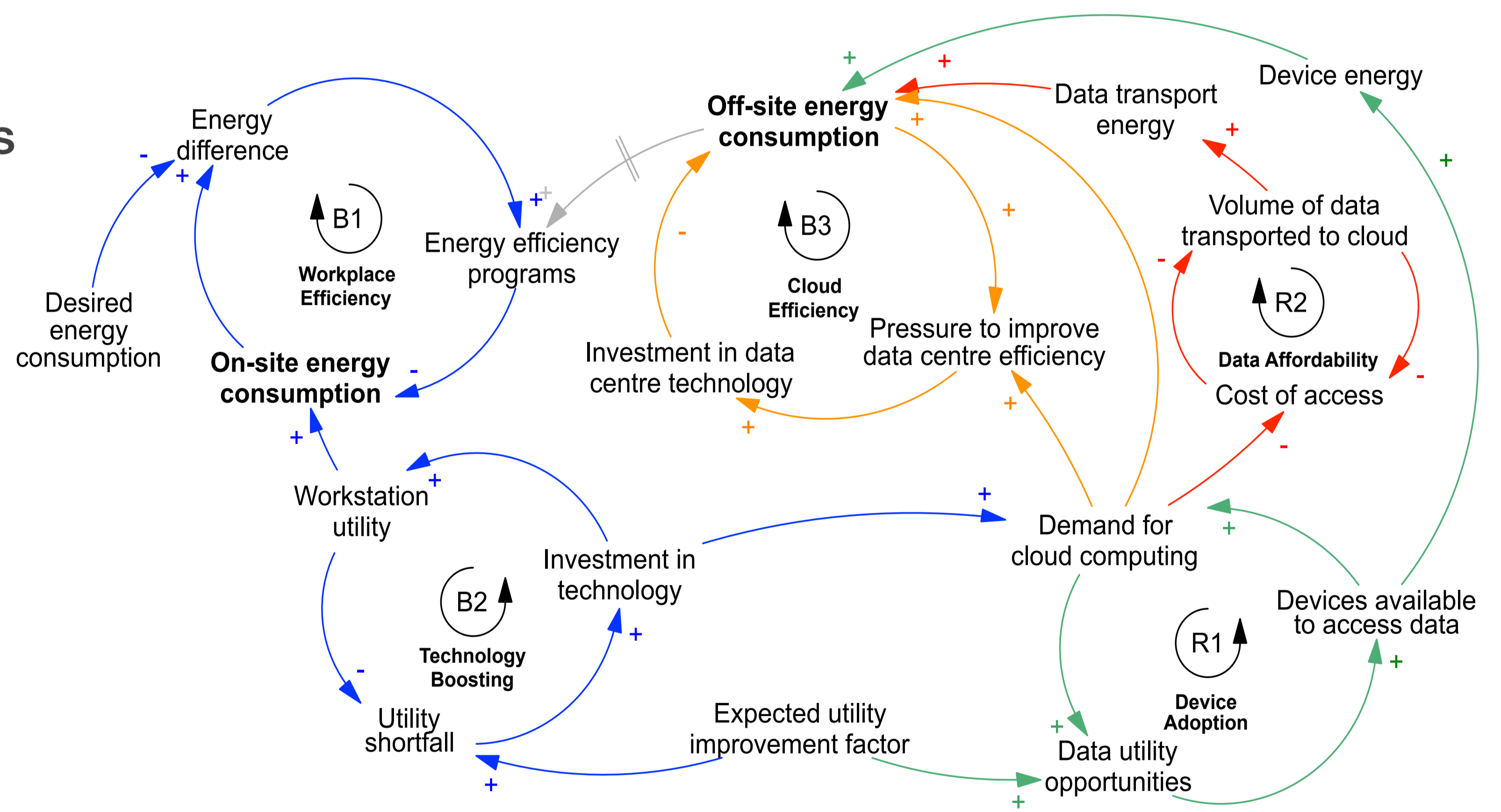
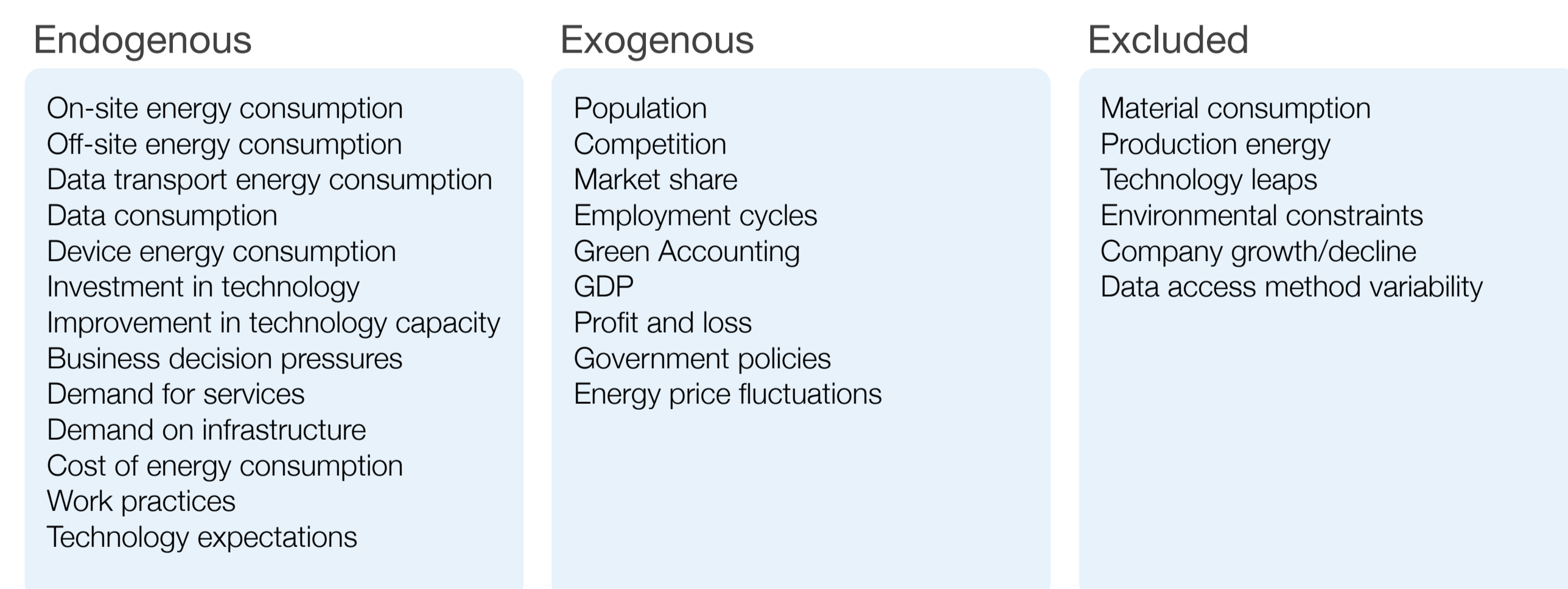
Energy consumed by devices



Initial Model Mapping

Based on these trends, we mapped these relationships in a Causal Loop Diagram

Model Boundary Chart



Discussion and Development

We intend to move towards a Stock-and-Flow model to investigate the system behaviour

At this stage our research is showing that it is likely total energy consumption will increase by switching to the cloud and a large portion of the energy consumption will be outsourced.

Likely What-if Scenarios...

- What will happen if new devices displace traditional methods of computing?
- Would workstations be replaced less often if processing shifted to the cloud?
- Can external energy consumption be disclosed to inform IT decision makers?

References

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