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Optimising the Usage of Energy with COMPUTER SCIENCE



Energy usage in Computer Science?

Energy within computer science is used in many different ways such as:

- Switching between binary digits (0 and 1), electrical power is needed to switch transistors (switches) on and off.
- Data centres contain servers which use energy.
- When running software/programs makes the CPU perform tasks which requires power.

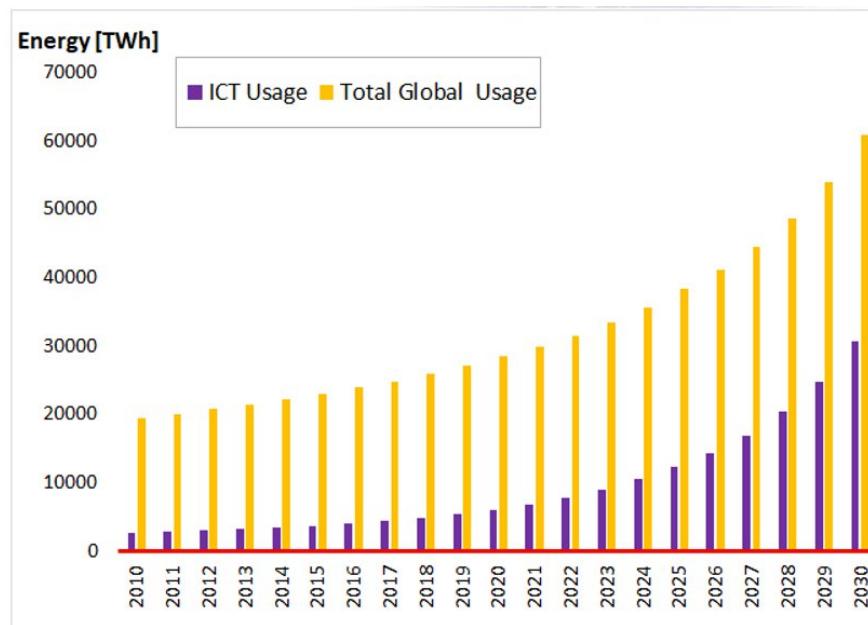


Figure 1: Worst-case forecast for ICT Energy Consumption [1]

Information and communication technologies (ICT) systems and devices are consuming lots of energy and, if the trend continues, it is predicted that by the year 2030, ICT will consume up to 50% of the global usage of energy with a contribution to greenhouse gas emissions of 23% making it also an environmental concern.



Optimising the usage of energy

We can use multiple methods to optimise energy usage with computer science:

- Code optimisation - Removing unnecessary loops and redundant operations.
- Reducing monitor brightness and putting the systems on sleep when not in use.
- Using machine learning and AI to predict energy usage patterns within power plants and other locations.
- Make algorithms that can manage cooling systems within data centres and power plants.



How is industry optimising energy usage? [2]

- Microsoft use AI algorithms to improve energy efficiency through predictive analytics, putting servers in low power mode.
- Google, Amazon use AI to reduce cooling costs in data centres.
- Smart thermostats can adjust heating/cooling when needed.
- Factories use predictive maintenance algorithms to avoid energy waste.



Key takeaways

- Computer science makes technology faster, cheaper, and greener by reducing wasted energy through multiple methods.
- Efficient computing leads to a greener planet.



The Future

Aims for the future:

- Always look for ways to optimise programs
- Use AI in predictive systems
- Use smart thermostats

DID YOU KNOW? [3]

As of 2017, around 2 billion computer systems are in used around the world!

Sources:

<https://arsalanshahid.info/energy-consumption-of-computing-setting-the-bounds-to-preventing-natural-disorders/> - [1]

<https://www.digitalrealty.co.uk/resources/articles/sustainable-data-centre-ai> - [2]

<https://www.bbc.co.uk/bitesize/guides/zsgymsg/revision/1> - [3]