Mini Report (Task 2.2)

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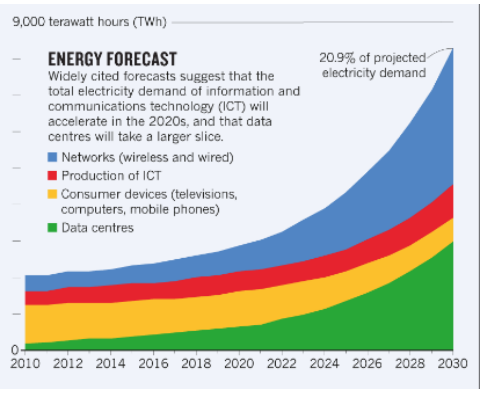

Figure 1 Energy forecast of different technology from **Garcia (2020)**

When talking about sustainability the main concern is applying an "approach that takes into consideration environmental concerns along with economic development" **(United Nations)**. It is a perspective which considers the environmental future to ensure it is not ruined by the present. In computing this is a particular concern as data centre's energy forecast is only on the rise, as seen in **figure 1**.

In the field of computing the relevant sustainable field is perhaps **goal 9** of 17, which is "Industry, Innovation and Infrastructure" **(Global Goals)**. Within my task 1.4 I have considered **targets 9.1 & 9.2** of this goal using accessible colours and a drop-down menu for those unable to accurately type, consequently abiding by an access for all ideal. Notably, however, the system can be considered computationally expensive as it computes the path each time the user requests it, perhaps a compromise could've been keeping a table of answers to the routes and simply calling upon the relevant solution to limit the use of power from the system. I could have also made the system accessible on multiple devices, these changes would arguably meet **targets 9.7 & 9.8**.

A real-world example from the same task could be the national railway services and their efforts to consider sustainability. Ways sustainability is considered within the national railway services includes the inclusion of "low emission technologies" such as electrification of the railway with battery and hydrogen power **(Department for Transport, 2021)**, which also has an added benefit of reducing railway related noise pollution which can cause "serious damage to wildlife" **(Iberdrola)**. There are also set future goals for their strides towards sustainability, using the 25 Year Environment Plan and Environment Bill as a key reference point towards the minimal amount they wish to achieve within that timeframe **(Department for Transport, 2021)**. Showcasing consideration for the long-term sustainability of the railway and a thorough plan in place to prove considerable efforts are being made.

A further task in which sustainability has been considered is task 1.1 as careful efforts were made to utilise a small amount of memory and keep both the power and time complexity low. Also used was a built-in python library (Collections) which was more sustainable in completing what I required for the task. Perhaps the code could be made more sustainable by using just one file to store both the unprocessed numbers and overwriting the final solution.

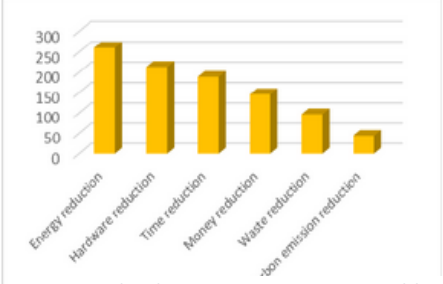

Figure 2 Cloud computing most noticeable environmental effects

The sustainability of all tasks could be improved using cloud computing, as these services have very efficient hardware, they can allocate the required computational power as needed. Some cloud computing services even pride themselves on being carbon-neutral, such as Google Cloud **(Google)**. Proof of the environmental effect from cloud computing can be seen in **figure**

2, showing around 250 companies saw energy reduction as the most noticeable environmental benefit.

References:

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