

Background

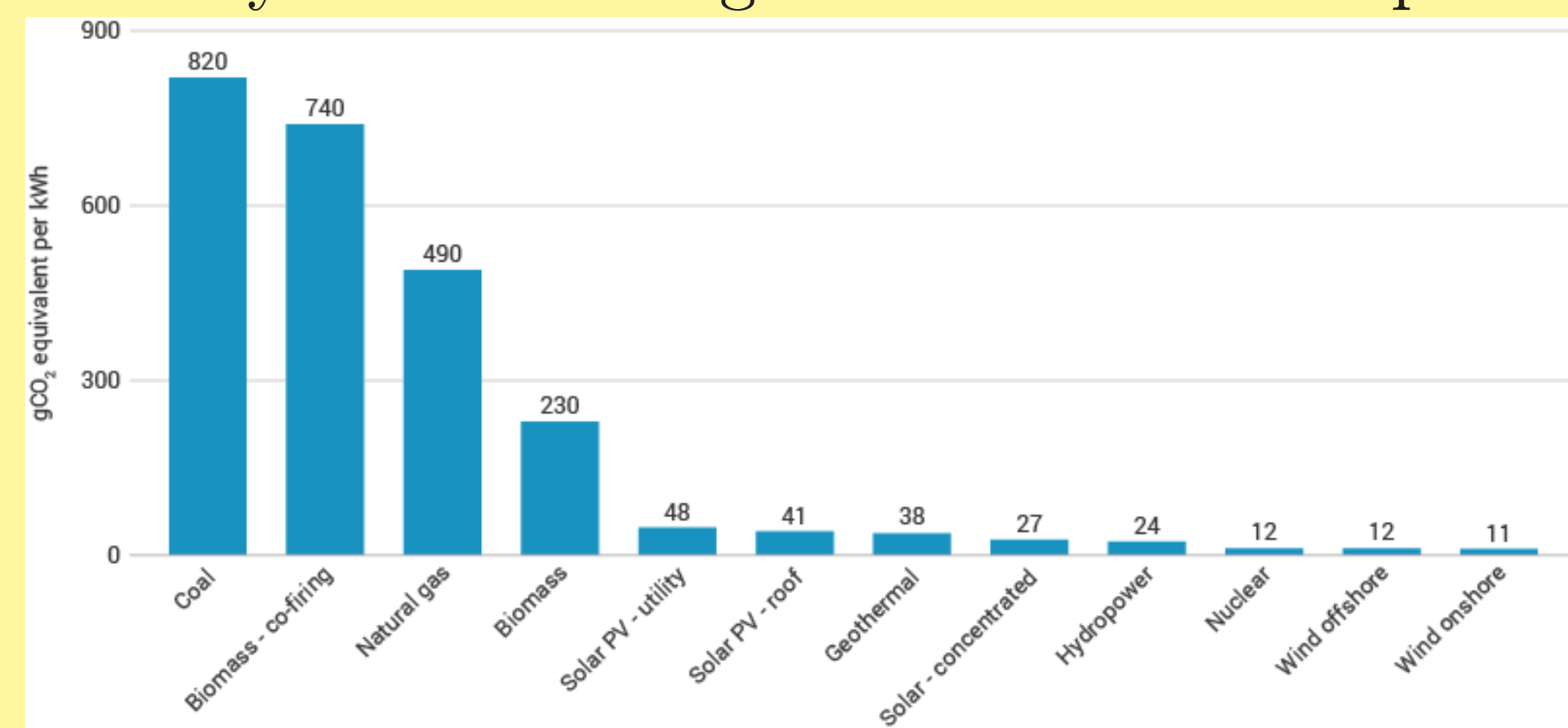
While photovoltaic (PV) energy production has one of the smallest carbon footprints of any energy production technology, the industry faces major problems in the form of social sustainability issues in the supply chain. The issues mainly manifests in the use of forced labour in the production of polysilicon, in the Xinjiang region of China.

Companies, such as Aneo, wish to ensure the PV modules they use are as environmentally and socially sustainable as possible. To enable companies to choose the right PV modules, and thereby pressuring the rest of the market towards more sustainable solutions, this bachelors thesis aims to map the PV supply chain, establish major issues and propose suitable solutions.

Ecological impact

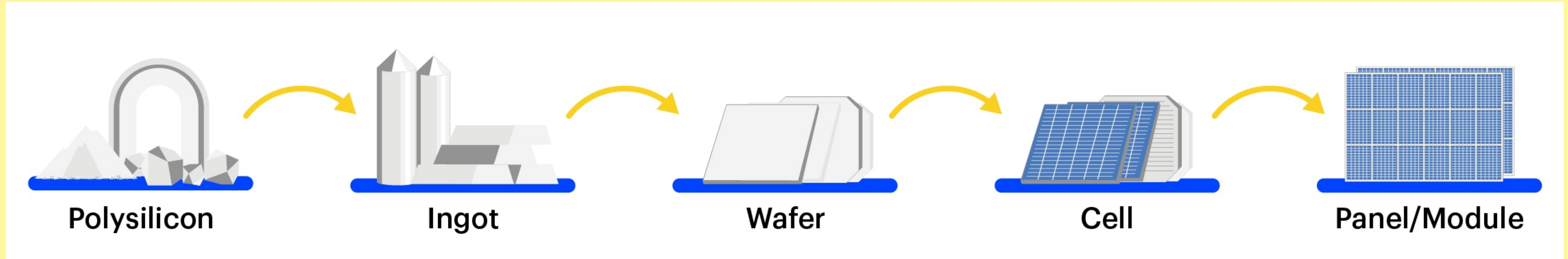
While PV technology is renewable, research suggests it has the highest greenhouse gas emissions of the green energy technologies.

Most of these emissions occur during the purification of quarts into polysilicon. As such, using green energy for these processes are key for reducing PVs carbon footprint.



Supply Chain

The supply chain of photovoltaic modules are currently dominated by China. Quartz, polysilicon, ingots and wafers production have more than 90% of global production in China. Cells and modules are slightly more diversified with 80% of production taking place in China[1].



Topics to explore:

- Is it possible to establish a US and EU based supply chain?
- What role can Norway play in a European supply chain?
- What can Aneo affect?

Social impact

China has for several years been accused of operating with government supported, forced labour. A report from 2021 made headlines when it proved government involvement in forced labour. The forced labour is mostly in the early staged of production, but is therefore integrated through the while chain of production

This begs the following questions which this reports will try to anwer.

- How much impact can be allocated to the modules used on the Norwegian market?
- Is there any way to reduce the social imprint from the modules imported into Norway?
- Is it possible to change the production chain to a more sustainable practice?

Future market and regulations

Both the US and EU are currently introducing or planning to introduce regulations on import, and subsidy programmes such as the inflation reduction act and RePower EU to improve the production chain in the US and EU. This is done to reduce the dependence on China and better the impacts from the solar industry [1].

The finished report will consider factors such as:

- Expected growth of the European and the US market.
- Ideal supply chain for solar modules
- Future technology in PV
- How to reduce dependency on Chinese sourced resources

Goals

- Complete a comparative LCA on modules on the market today.
- Showcase the difference made in impacts from modules when varying country of origin, energy mix used in production and legal frameworks.
- Aquire knowledge useful for the groups future work in the industry.
- Provide Aneo with a thorough work, useful in their future operations.

Sources

- [1] U. department of Energy, “Supply chain deep dive assessment,” en, 2022. [Online]. Available: <https://www.energy.gov/sites/default/files/2022-02/Solar%20Energy%20Supply%20Chain%20Report%20-%20Final.pdf> (visited on 02/16/2023).

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