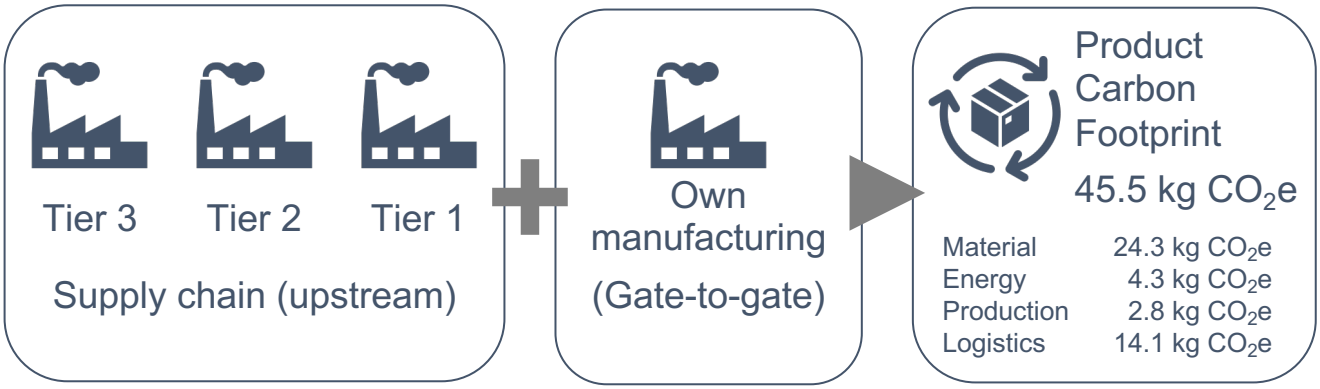
Tackling the challenge of Carbon Pricing by becoming net zero with Verifiable Credentials

In recent years, companies have been striving to optimize their production and to automate processes. However, one of the biggest challenges today is climate change and the associated topic around carbon pricing. This mechanism should shift the price society pays for global warming to those who cause it and who can actually change it.

Taking into consideration that companies need to pay for climate damage, it is essential to lower emissions in order to stay competitive. As, on average, 80% of a Product Carbon Footprint comes from the supply chain, becoming net zero is only possible through collaborating with suppliers and customers. When talking about Product Carbon Footprints, one needs to measure emissions on different levels: company-internal emissions and emissions from the supply chain – divided into upstream and downstream. Calculation methods are not standardized properly and therefore companies suffer from a lack of availability of these data. And what you cannot measure, you cannot reduce.

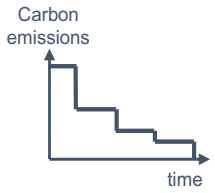


In order to break-down emissions on a product level, you need to average values from your processes. The question about how high the actual carbon footprint of a product is, can hardly be answered. Companies need to first calculate their own emissions and then get all emission data from their suppliers which is very complicated because supply chains are complex and can change often.

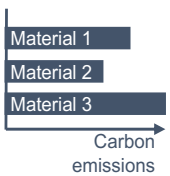
A company's competitive standing is dependent on its ability to manage carbon emissions, leading to immense pressure to report and reduce its carbon footprint, not only within its own organizational boundaries, but across the entire supply chain. Therefore, the biggest challenges are firstly getting data from your supply chain to minimize Product Carbon Footprints and secondly how to exchange these data in a trustful manner.

Confidentiality is involved in most of the determinants (logistics setup, components, suppliers of suppliers, …) which makes the process even harder. And even if there would be a trustful way to exchange these data, how will you be sure that the data are calculated correctly and consistently?

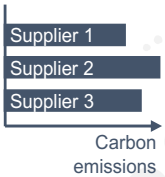
Decarbonization opportunities



Agreement with supplier on yearly reduction targets



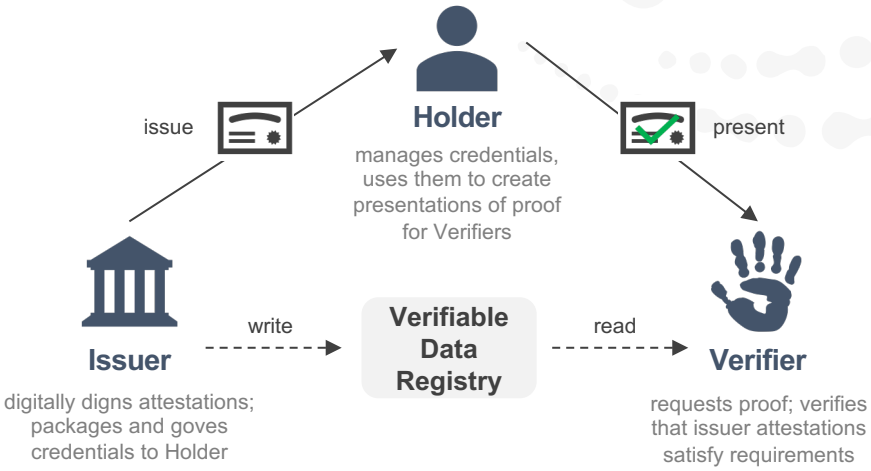
Sourcing of **material** with lowest emissions



Sourcing of **supplier** with lowest emissions

Both of these challenges can be solved by so-called Verifiable Credentials. Verifiable credentials are cryptographically verified credentials, which could generate the needed trust level while ensuring confidentiality. Primary data would replace average, outdated and static values from databases which is essential to reach decarbonization. Signatures and claims could be stored digitally so that they would need to be verified only once – making the system much safer and faster. All parties in the system would be verified so that they can trust each other.

Three roles are assigned in that system: issuer, holder and verifier. Holder is the company, which wants to calculate and minimize its Product Carbon Footprint. The issuer here is a technical inspection company such as TÜV which brings trust into the system as it cannot work by self-declaration.



The issuer knows about emissions and ways of measuring energy as well as the Bill of Materials used to produce the product. It can also reach out to the supplier or it can get the data that the holder would request from a supplier. Along the chain, there is a direct relationship between holder and supplier which exchange Product Carbon Footprint data based on their Bill of Materials or Bill of Processes.

Fulfilling data sovereignty

- Peer-to-peer exchange of sustainability data
- Confidentiality and trustworthiness through verifiable credentials
- Decentralized data storage

All three roles are being generated at every step of the supply chain. If requested data are already coming in with credentials in a verifiable way, the issuer at the next step can trust these data and can relate to the registered identities. The holder is not registered here as it should not be known. There is always a direct relationship between holder and verifier. Identities of some parties and components are anonymized and the system is based on 1-1 relationships to keep data secure. Claims would be about internal emissions plus component information coming from the supplier. Variations are possible, based on the trust assumptions of the parties. Requests would be sent back the supply chain from the OEM to Tier 1 supplier until Tier n.

The system will implicate different levels of quality, depending on how many suppliers have access to primary data. To make this concept successful, the network must be an open network. Companies would need to agree on standardization and on how to map values down to a product level. Furthermore, there must be connectors to the network so that it works for different industries all having different requirements.