

Supply Chain Management under Emission Trading Scheme

Driven by environmental regulations, customers' preferences or social awareness, supply chain has been placed into a situation that requires urgent green management - green supply chain management (GSCM). So far two types of "greenness" are considered by researchers: green supply chain design and green supply chain operations. Studies in both areas have shed light into the practical world by facilitating green development of supply chain and increasing the environmental awareness within all partners in supply chain in every industry.

Emissions Trading Scheme (ETS) or "cap and trade" is a market-based approach used to achieve emission reduction by providing economic incentives. Motivated by differing Marginal Abatement Cost Curves (MACs) - the cost of eliminating an additional unit of emission, companies are sharing the common output environmental resource - emission permits by market trading. Compared to other Command-Control approaches such as regulations, direct and indirect taxes, it allows companies to achieve emission reduction flexibly in a most cost-efficient way.

By putting a price on carbon and thereby giving a financial value to each tone of emissions, ETS has placed climate change on the agenda of company boards and their financial departments. Such initiative may change the way that companies manage their supply chain. Main initiatives adopted so far by companies focus on technological improvements but a potential source where emissions could be reduced with less cost is neglected, that is the business practice among firms along the supply chain from the origin of materials to the end of customers. It is urgent to find ways that reduce emissions from a supply chain perspective. Herewith, ETS could be exploited to provide a proper economic stimulus within the supply chain towards its sustainable business development. Based on different MACs of different partners in the supply chain, a collaborative management of sharing the common environmental output resources – emission permits

could result in a cost-efficient way to reduce emission in the scale of a supply chain.

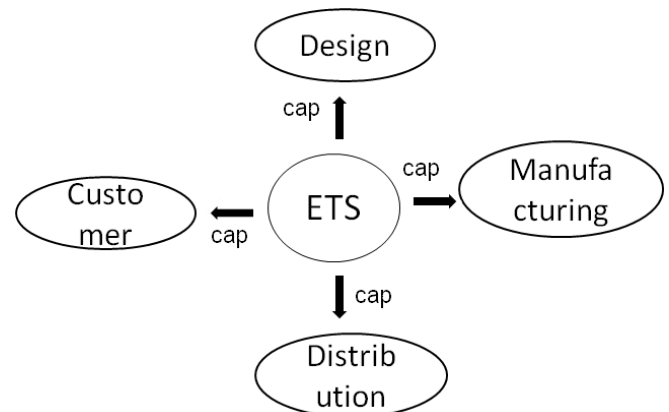


Figure: ETS implementation on supply chain

My research approach proposes that at least one node in a supply chain is included into ETS, no matter required by governmental regulations or volunteer willingness (explained in Figure 1). Impacts of such initiatives on the whole supply chain are analyzed and will be shown via two indicators: total emission amount of the supply chain and the operational cost of the supply chain. Specific scenarios will be given in which particular supply chain nodes joining ETS. Expected results of the research are:

- Impacts of ETS on supply chain
- Strategies for supply chain companies to join ETS
- Decision-making support for governments and supply chain managers



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