Cost Analysis of Hydrogen Infrastructure in Europe

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The European Union initiated the project “Clean Urban Transport for Europe (CUTE)”: In ten European cities fuel cell driven busses are used in public transport. The necessary hydrogen production facilities had to be built.
This paper gives an outlook on the cost development of hydrogen as a fuel in Europe. The cost predictions are based on experiences and data gathered in the CUTE project and are calculated using a software model implemented within the GaBi 4 LCA software.
In the first part a brief overview on hydrogen production methods is given. Advantages and disadvantages of the different production methods are considered. The currently major methods of steam-reforming and electrolysis are regarded in detail.
The next section is dedicated to cost prediction methods used in the chemical industry. Different cost prediction methods are surveyed considering the necessary and available data, the level of detail and the accuracy.
The cost model which was applied in this study is described and the equations and assumptions it is based on are explained. The theoretic background of this model was derived from some of the cost prediction methods of the chemical industry mentioned above and other effects like the learning curve effect.
The determination of the scenarios and boundary conditions which are to be considered is vital to the obtained results and therefore they are regarded and discussed in detail. The assumptions and scenarios are based on information obtained during talks with experts from various fields such as local traffic companies, bus manufacturers, hydrogen production plant manufacturers and others.
At last the obtained results are illustrated and discussed and an short outlook on the future developments is given.

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