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Hydrogen – Green and zero emission fuel for the transport sector

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The future transport solutions will be dominated by zero-emission technology to reduce local environment and global climate impact. Green and zero-emission solutions will increasingly also become the most cost-effective sustainable solution.

The dominating energy source for transportation fuels have been based on fossil fuels the last 100 years. The massive penetration of diesel and gasoline vehicles have significant impact on environment and climate. In addition security of supply is threatened on longer term.

The UN and national strategies lead to complete transition by 2050 to renewables in all sectors. In the power sector good progress has been achieved and some countries now get more than 50% of electricity from renewable sources. This has been achived through deployment of massive solar and wind power plants. This trend is now the dominating trend and more than 50% of investments in the power sector is in renewables. The cost have come down and is now able to compete with fossil sources and the penetration will continue. The development leads to significant emission reduction from the sector, but also a significant change in the price structure of the power market.

Spot market prices are lower than in the last 3 decades and the variable production leads to longer periods with overproduction of power. This new source of cheap power can be utilized for green fuel in the transport sector.

Hydrogen is an ideal energy carrier for renewable energy. By coordinating the hydrogen production through water electrolysis with the wind and solar production the power green power is converted and can be used in the transport sector. Energy density of hydrogen is 2-3 times higher than diesel and 100 times higher than batteries.

Storing hydrogen in large quantities can be done in caverns similar to natural gas and offer seasonal storage capacities at very low cost.

Hydrogen production through water electrolysis is a mature technology, which is still advancing through higher current density and improved stack design and materials leading to higher conversion efficiency and lower cost. Also fueling equipment is now being produced in series production with a high level of functional safety. This sector is still in early market, so much advancement is still to come, establishing Hydrogen as a competitive fuel for the transport sector.

I will present the current state within green hydrogen production and fueling technology and come with our recommendations.