

Vehicle Innovations Bring Regional Community into the New Age Fuel Cell Vehicle and Hydrogen Move to the 2015 Introduction

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ABSTRACT

Hydrogen fuel cell is the long-awaited technology to improve the environment and to alternate the energy to non oil energy source. It takes more than expected but finally commercialization is announced and infrastructure preparation is in progress all over the world. Potential of hydrogen is not only fuel for the automobile but also considered to be an important long time storage media for fluctuated renewable energy. This technology may change the local community to be able to produce and consume and to control by them self rather than import and controlled by the central capital.

1. Introduction

Mobility is the one of the most basic desire of a human being. And since the invention of automotive the human being obtained the real freedom of moving. Last one and half century automotive itself changed from coal fueled steam to current gasoline fired hybrid vehicle. If you carefully check the fuel and technologies of vehicles, evolution of technologies are also carried out by the environmental restrain. This is very similar to the evolution of life.

Coal is replaced by the liquid fuel because of the limitation of range. Manual transmission is replaced by the automatic transmission because of the comfort and convenience. Next evolution was the introduction of electric drive this was due to the high oil price and brings the hybrid electric vehicle such as TOYOTA Prius to the market.

Next evolution is expected by the sustainability of the earth and brings the new technology "Fuel cell and hydrogen" to the market.

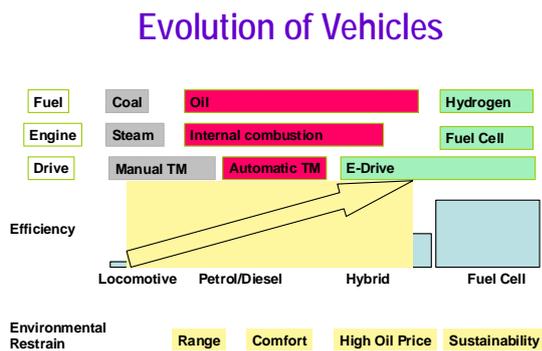


Fig. 1 Material innovation and Society

2. Progress and potential of Fuel Cell Vehicle

Hydrogen fuel cell was once a very expected technology to replace the oil burning vehicles. However engineers faced multiple difficulties to bring into the real road conditions. Day by day efforts of engineers and scientists solve the most of the problems such as

durability, volume and range. then finally announced to bring the technology in to the market soon.

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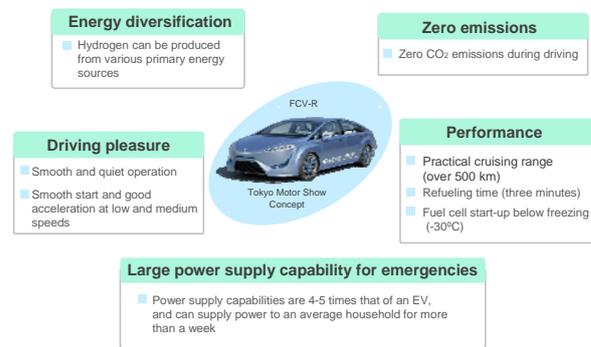


Fig. 2 Advantages of Fuel Cell Vehicle

Advantages of fuel cell vehicle are shown on figure2. In addition to the environmental performance such as zero emission, energy diversification the vehicle performance such as good drivability and slenderness are expected to realize. For the popularization of vehicle continence is very important fuel cell vehicle is now refueled within 3minutes and is able to travel more than 500km. In addition to the normal performance it is now recognized to be an emergency power source since vehicle has a capability of generating electricity 10kw lever more than few days with stored hydrogen.

There are other zero emission vehicle and environmental friendly vehicle such as Battery Electric Vehicle (BEV) Plug-in Hybrid Vehicle (PHV). We expect those technologies will be segregated by the size and purpose of the mobility shown in figure 3.

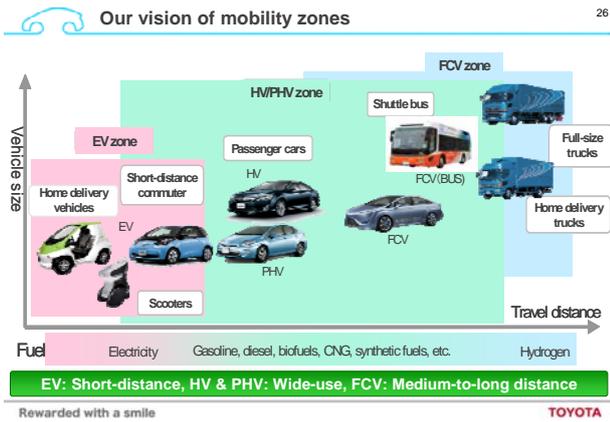


Fig. 3 Vision of Mobility Zone

3. Potential of Hydrogen

Hydrogen is already produced largely in the industry such as petroleum, chemical, fertilizer industries. Potential of those industries to provide hydrogen for early market is more than sufficient.

However recent increase of renewable energy power generation re-recognizes the potential of hydrogen as an energy vector to store the energy of this fluctuating energy source. In northern Europe hydrogen is spot light as a media to transfer the electricity to the south because of the lack of enough grid connection...

Efficiency of hydrogen just for store the electricity is lower than battery or pump-up hydro. However the hydrogen has a big advantage of long time storage and potential of replacing more expensive/valuable fuel such as gasoline. It is now getting expected to co-grow the renewable electricity and hydrogen to accelerate carbon free world.

Smart Energy Grid to Use Hydrogen as Storage

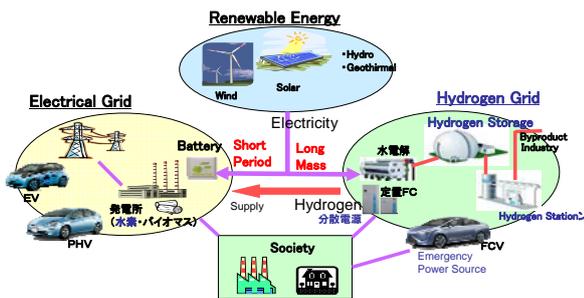


Fig. 4 Smart Grids to Use Hydrogen as Storage

4. Conclusion

Increased hydrogen usage in the society may increase the potential of regional area than ever since use of renewable enhance the regional economic balance to improve. Because of renewable energy is richer in dis centralized area either close to the sea or high mountain area rather than big city. This may lead the preferable economic condition to the local area and bring the area into self sustainable for both energy and fuel for

mobility. Cheaper energy and good living condition may attract more industries and people.

5. Concluding remarks

Several car manufacture already announce introduction of fuel cell vehicle into the market, it may be the beginning of new era for the human being to enjoy the mobility of freedom without any deterioration of environment and the regional society going to the center of living life.

References

[1] K. Hirose, Phil. Trans. R. Soc. A 368 (2010) 3365.