

Technology Update

Electrical Vehicles vis-à-vis Solar Energy

Electromobility: The scientists think on how many photovoltaic (PV) on the vehicle can contribute to the energy supply of mobile systems. Electromobility with the input of battery appears most probable from wind and solar energy today as the succession technology of the internal combustion engine. This requires a completely new charging network and in the long run, rebuilt possibly in many houses which do not provide today the necessary controlling set up. Also the last rules of power network could be overloaded in unfavourable circumstances, when in the thickly populated cities all may like to load simultaneously. That should be preventive at present scenario before all through the intelligent regulation of the charging phenomenon.

However it gives still another potentially meaningful possibility in order to the network to protect the driver from the charging and discharging behavior with the direct production of energy through solar cells on the vehicle. The theme belongs to research cannon of the photovoltaic energy production programmes of international energy agent (IEA PVPS). There exists one objective of the working group to task 17, to which also the Fraunhofer Institute for Solar Energy System (FH ISE) co-work, in order to nurture in the possible advantages and requirements completely or partly of the PV driven vehicles. To that there is obstacles to name and to determine the potential share that PV electricity to the total energy demand of the traffic sectors could have to determine. To the possible applications side by side the vehicles which carry

solar cells, there are also public fuel stations directly operated with solar cells.

The Japanese New Energy and Industrial Technology Development Organisation (NEDO), a think tank to the theme Energy Change has in an extensive simulation study calculated the potential use of vehicle-integrated photovoltaic. Per vehicle with that PV area of 3.23m² with 31% efficiency was accepted. Simultaneously differing vehicle types were simulated from plug-in-hybrids to pure electrical vehicles. In addition to that man divided traffic participants according to travel frequencies and distances.

It happens that travels of maximum 50 Km in 4 days in a week are possible without it to be made to plug box at any time, whereby Japanese irradiation proportions would be taken for granted. In addition to that also 200 Kg CO₂ per year is cut down. One who travels daily 150 Km cuts down yearly 250 Kg CO₂, however, because of slower stretches, in spite of that occasionally to the fuel station. In that country highly calculated, Japan could, according to the study cut down yearly about 11% of its PKW related CO₂ emission. The performance of the vehicle – PV should, as per this study stand at 1270 KW, with that electricity generation and use fit in optimally with each other. In Europe to the same time it would be 1.9 million tons saved CO₂ yearly in China about 3.7 million tons and North America 3.8 million tons.

The Munich start up Sono Motors is already one step farther. It stands short before the market tyres of Sion of roundabout with solar cells covered up four persons – PKW. The automobile was so

far financed through Crowd funding. 10000 of the energy generating PKW are already ordered for a price 25500 € and paid, which covers up the costs of the firms. For Sion specially flexible but still robust solar module and a polymer casing method was developed with which the high-efficiency cells completely in the vehicle surfaces on the roof radiator bonnet, doors and rear flap integrated. These are specially light and the production method generates lesser wastes usually. For that Sono has applied for a patent. On an average German summer day the solar cells should at Sion produce sufficient electricity for 30 Km travel stretch. That is more than four PKW travellers daily to traverse. In cloudy sky it reaches, as the case may be of sun's availability, still always 4 to 11 Km according to the circumstances. The rest may be met up from out of switch box.

A similar concept follows up the firm of the Netherland concern Lightyear that presented the prototypes of its solar electrical vehicle. The all wheel driven automobile should thank solar energy can traverse also long stretches without additional charge. Alone the built up battery has according to Lightyear as per circumstances regarding use a span of 600 Km to 800Km and can be charged at normal switch box as also marketable charging stations. The first 100 vehicles are already ordered at a price each of about 120000 €.

(A Photograph of Electrical vehicle is printed in back cover)

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Greek Alphabet

α alpha	η eta	ν nu	τ tau
β beta	θ theta	ξ xi	υ upsilon
γ gamma	ι iota	\omicron omicron	ϕ phi
δ delta	κ kappa	π pi	χ chi
ϵ epsilon	λ lambda	ρ rho	ψ psi
ζ zeta	μ mu	σ sigma	ω omega