

Photovoltaics and electric vehicles (PV + EV)

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Prof. Urs Muntwyler, David Zurflüh (Bern University of Applied Sciences BFH)

Partner:



Shaping the FUTURE Swiss Electrical Infrastructure



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Charging electric vehicles (EV) with Photovoltaics (PV) is efficient, convenient and cheap. The PV-Laboratory at BFH in Burgdorf engages in application and research of PV and EV as a member of the IEA technical collaboration program TCP PVPS Task 17 “PV for Transport” research group. The PV-Laboratory is also member of the IEA TCP “Hybrid- and electric vehicles” Task 43 “EV and grid”. Professor Urs Muntwyler served as chair of the IEA TCP HEV from 1998 – 2018 (www.ieahev.org).

Introduction

Since the “Tour de Sol” - solar races, organized by Urs Muntwyler in the 90-ties, “PV and EVs” are a vision which now becomes reality. PV and EV’s, together with the heat pump (HP), are the perfect measure for the “decarbonization” of the society. The solar carport of the BFH with 2’700 Wp produces “fuel” for 30 years – 10-times cheaper than gasoline. When solar power is directly used where it is produced, infrastructures, like grid and charging stations, are much less used. This is a research topic of the PV laboratory of the BFH.



Figure 1: Solar charging station carport at BFH in Burgdorf – “fuel” for 30 years!

IEA Task 17 PV for Transport

The IEA TCP PVPS Task 17’s Workplan addresses issues on PV-powered applications such as PV-powered vehicles, PV equipped electricity supply equipment and integrated electrical systems consisting of PV-powered vehicles including cars, trucks, etc. It consists of technical viewpoints and issues on expected benefits from users’ and stakeholders’ viewpoints, in addition to energy and environmental aspects. As a cross-cutting issue, a roadmap for deployment of PV usage in transport and reducing CO2 emissions of the sector will be discussed.

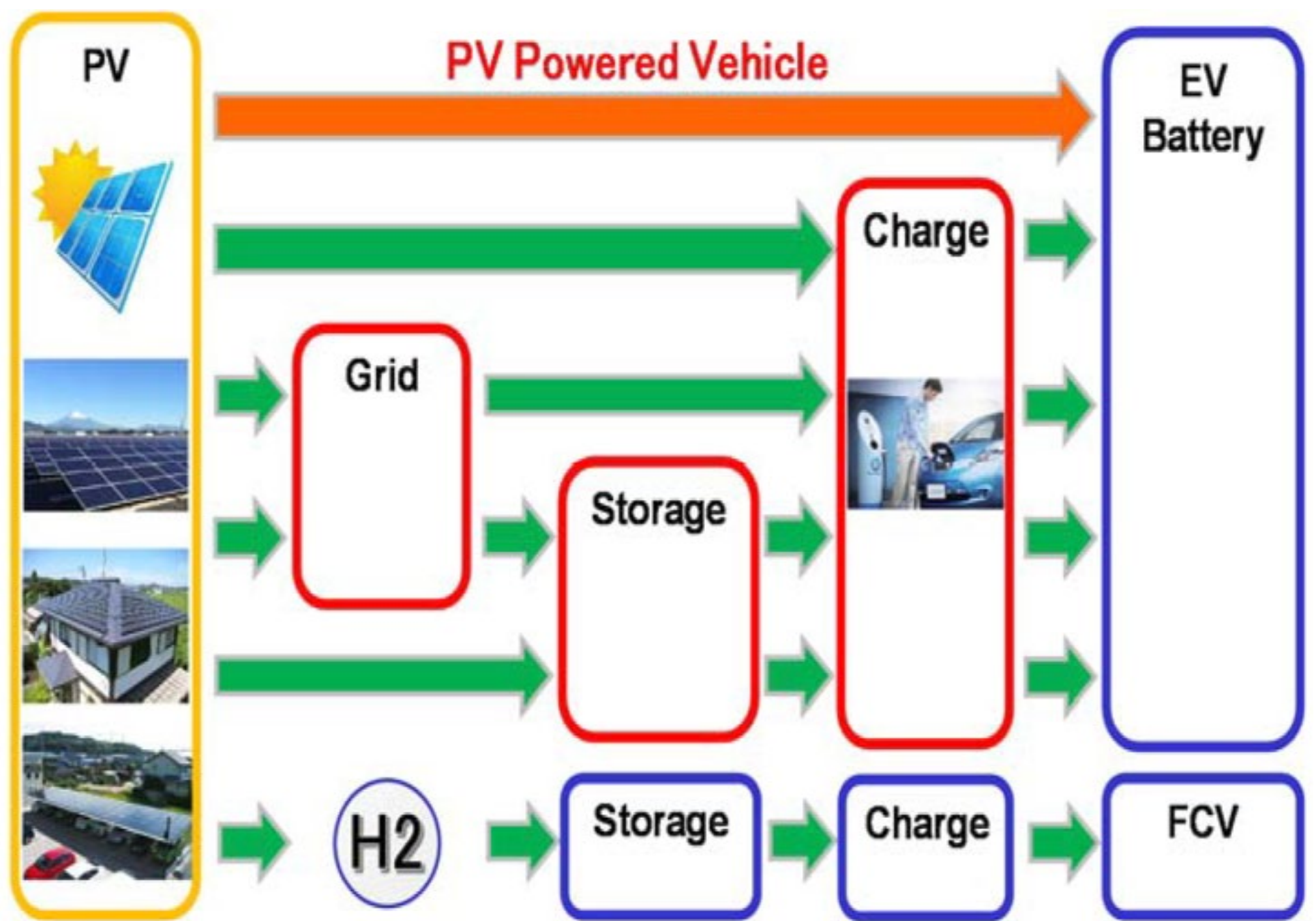


Figure 2: Schema of the different possibilities electric vehicles can be charged with power. Task 17 analyzes the direct charging of EVs trough PV.

Outlook

In contribution to the IEA TCP PVPS Task 17 the PV Lab started measuring the irradiation on roof, hood and side panels of a Nissan Leaf including GPS data in January this year. Measurements on the Sono Sion will be done as soon as the ordered car is delivered to the BFH.



Figure 3: The Nissan Leaf owned by the PV Lab showing one of the reference cells for the measurement of the irradiance.



Figure 4: The Sion (Sono Motors) with 1.2 kWp of solar cells integrated in the car body.

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