SOLAR INDUSTRY FORUM SOLAR MOBILITY FORUM 25-26 September 2018 SQUARE - Brussels Meeting Centre Brussels, Belgium

35th EU PVSEC 2018

Solar Mobility Forum @ EU-PVSEC

Realizing PV-Powered Mobility
'PVPS Task17: PV and Transport'

Brussels, Belgium, 25 September 2018

Keiichi Komoto

Mizuho Information & Research Institute, Inc. (MHIR), Japan

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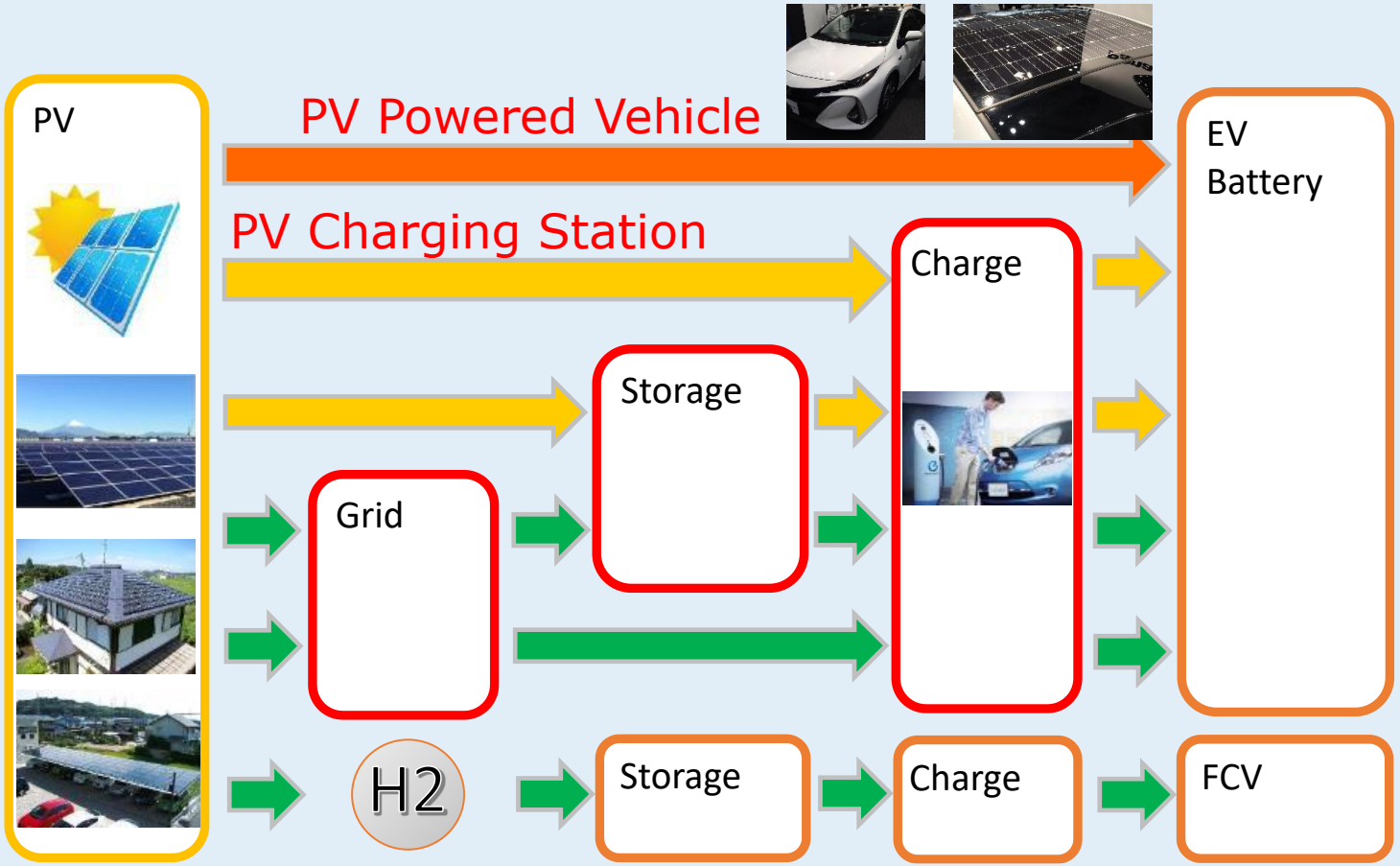
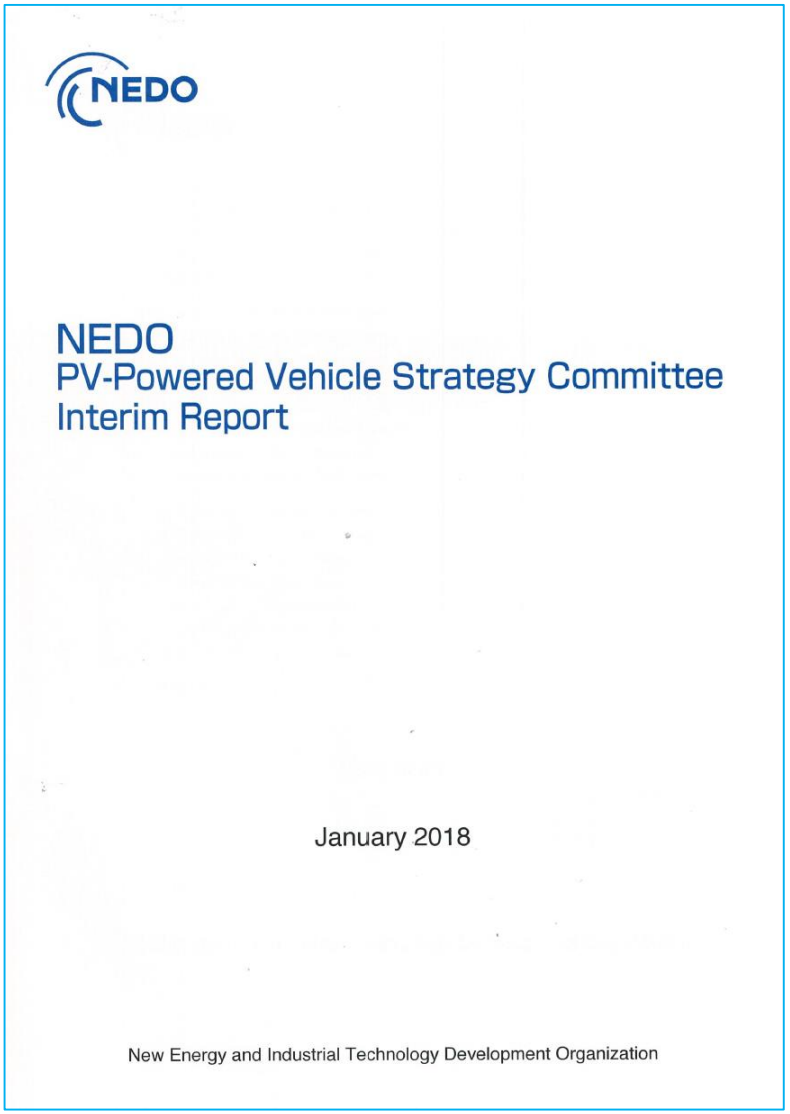
PV-powered mobility

Various ways to supply PV electricity to EV.



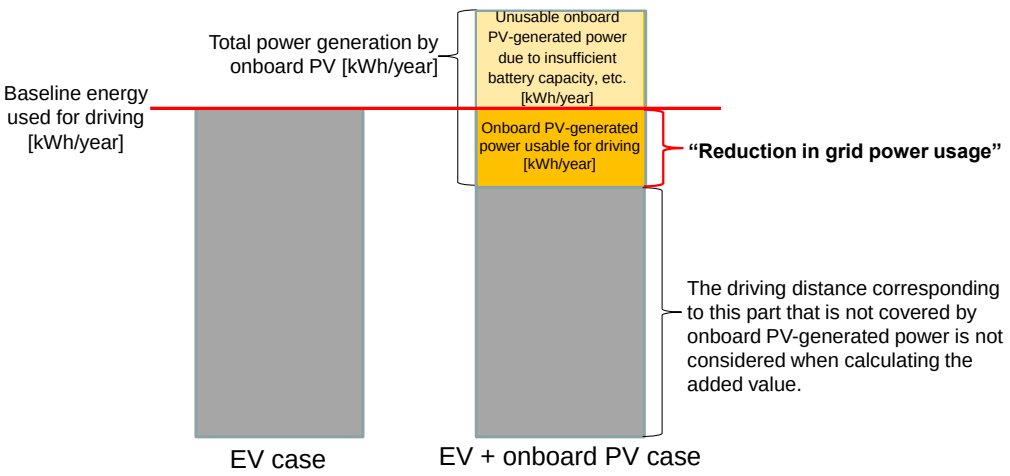
A preliminary study on PV-powered vehicles

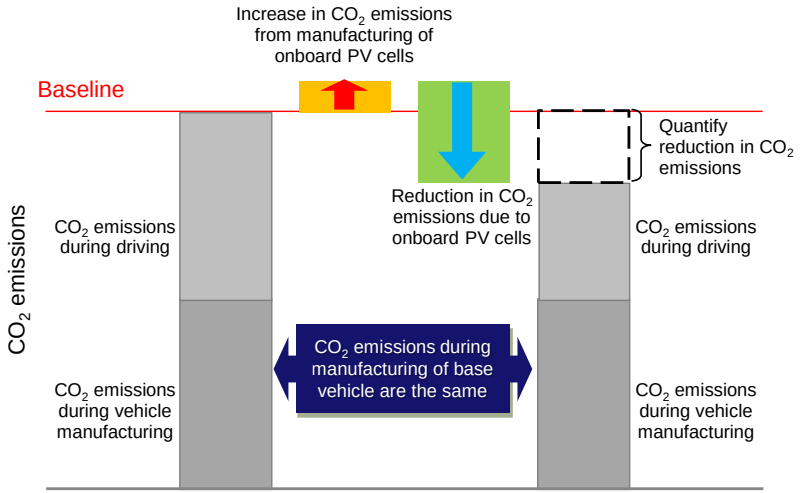
- **NEDO:**
  PV-Powered Vehicle Strategy Committee Interim Report, January 2018



A preliminary study on PV-powered vehicles

- **Evaluating expected values**
  - **CO2 reduction**
  - **Saving cost for charging electricity**
  - **Saving charging opportunity**



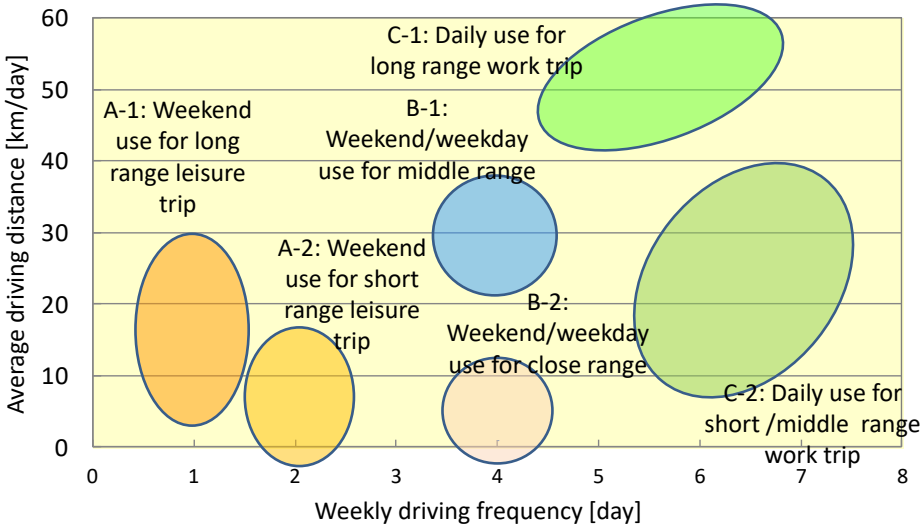


(Ref. NEDO, PV-Powered Vehicle Strategy Committee Interim Report, January 2018)

A preliminary study on PV-powered vehicles

Expected values of PV-powered vehicles

- PV capacity: 1kW
- Battery cap.: 40kWh
- Efficiency: 12.5km/kWh

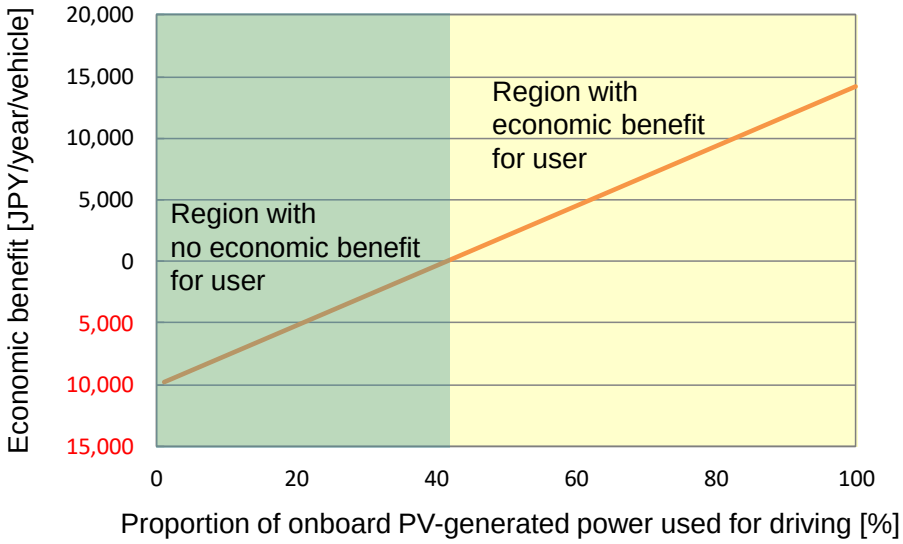


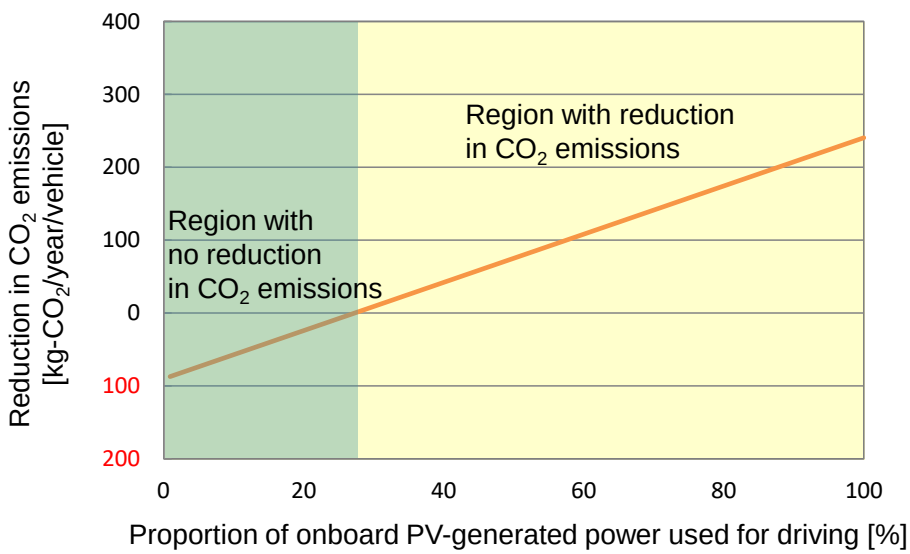
Driving pattern	Range [km/d]	Frequency [days/week]	Effective use of PV electricity	Expected values of PV-Powered vehicle		
				CO_2 reduction [kg-CO_2/y]	Saving charging cost [JPY/y]	Charging opportunity
A-1 Weekend use for long range leisure trip	150	2 (Weekend)	100 %	-240	-14,200	decrease
A-2 Weekend use for short range leisure trip	50		44 %	-54	-650	unnecessary
B-1 Weekend/weekday use for middle range	50	4 (Mon., Wed., Fri. and Sun.)	88 %	-200	-11,300	unnecessary
B-2 Weekend/weekday use for close range	5		9 %	23	7,820	unnecessary
C-1 Daily use for ling range work trip	50	5 (From Mon. to Fri.)	100 %	-240	-14,200	decrease
C-2 Daily use for short/middle range work trip	15		33 %	18	2,010	unnecessary

(Ref. NEDO, PV-Powered Vehicle Strategy Committee Interim Report, January 2018)

A preliminary study on PV-powered vehicles

- **Environmental benefit compared to use of non-PV electricity, e.g. contribution to reduction of CO_2 emission, will depend on effective use of PV electricity generated on-board , as well as economical benefit.**





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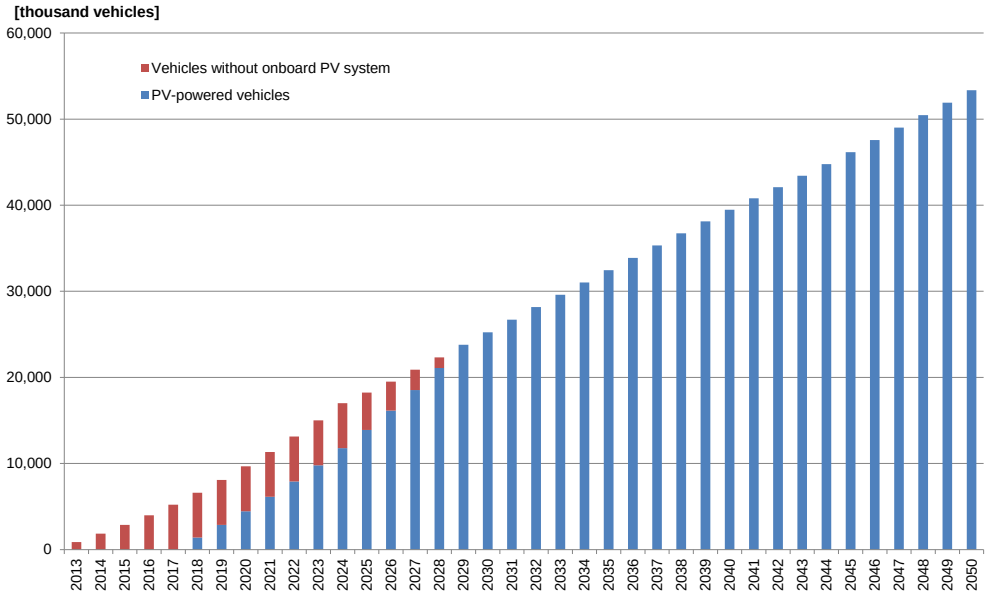
A preliminary study on PV-powered vehicles

Expected contribution to CO2 emission reduction due to PV-powered vehicles in Japan



Year	Reduction in CO_2 emissions due to PV-powered vehicles (A)	Reference for calculating possible contribution due to PV-powered vehicles (B)		Ratio (A/B)
2030	Up to 2.27 million t-CO_2	CO_2 reduction target for passenger cars in 2030 in Japan	20 million tons	11%
2050	Up to 5.91 million t-CO_2	CO_2 reduction target for passenger cars in 2050 in Japan	64 million tons	9%

* Reduction in CO2 emissions required to achieve 80% reduction target by 2050: 960 million tons (for Japan as a whole), of this 200 million tons in the transport sector, including 64 million tons for passenger cars (Contribution of standalone measures in the transport sector: 58.4 %, Percentage of total vehicle CO2 emissions from passenger cars: 55.2%).
* CO2 emission factor for grid-derived power in 2030 was based on "New Policies Scenario 2030" in "IEA World Energy Outlook 2015". As for CO2 emission factor for grid-derived power in 2050, that in 2040 in "New Policies Scenario 2040" in "IEA World Energy Outlook 2015" was used. CO2 emission factor of gasoline in Japan was used for calculations on HEV.

(Ref. NEDO, PV-Powered Vehicle Strategy Committee Interim Report, January 2018)

IEA PVPS Task17: PV and Transport

- **Objectives**
  - Clarify expected/possible benefits and requirements for PV-powered vehicles
  - Identify barriers and solutions to satisfy the requirements
  - Propose directions for deployment of PV equipped charging stations
  - Estimate the potential contribution of PV in transport
  - To realize above in the market, contribute to accelerating communication and activities going ahead within stakeholders such as PV industry and transport industry

Task17 Structure

＜Subtask 1＞
Benefits and requirements for PV-powered vehicles

＜Subtask 2＞
PV-powered applications for electric systems and infrastructures

＜Subtask 3＞
Potential contribution of PV in transport

＜Subtask 4＞
Dissemination

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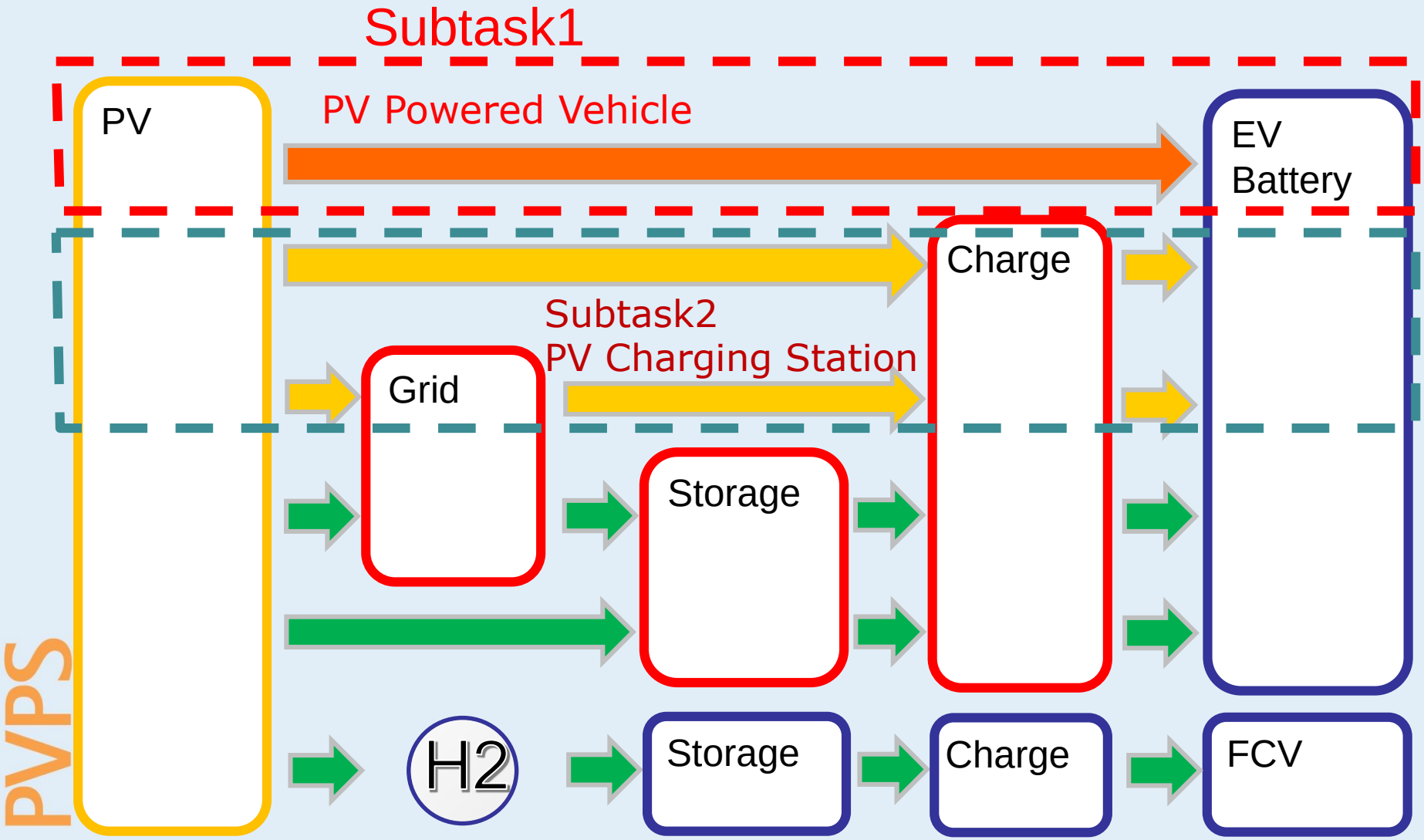
Scope of Subtask1 & 2



Subtask 1: Benefits and requirements for PV-powered vehicles

- Context

  In order to mitigate environmental impacts, promoting electrified vehicles is suggested. How to directly use PV electricity for vehicles, and how to integrate PV components on board will be important.

- Objectives

  - To recognize current status and future potential
  - To identify requirements, barriers and solutions
  - To clarify expected contributions to energy and environment
  - To clarify expected benefits for users, industry and society
  - To compare to indirect PV use
  - To discuss potential of other PV-powered vehicles

<Target PV-powered vehicles>

- Passenger cars
- Others: Small vehicles, freight trucks, buses, trains, ships, etc.

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Subtask 2: PV-powered applications for electric systems and infrastructures

- Context

  For promoting electrification of vehicles, not only charging electricity by itself on board, but also charging renewable electricity at the environmental friendly infrastructure, e.g. PV-powered charging stations, will be feasible.

- Objectives

  - To identify requirements, barriers and solutions for PV-powered infrastructure such as charging station.
  - To clarify contributions and benefits by PV-powered infrastructure, and to compare them to using PV electricity not produced at the site

Subtask 3: Potential contribution of PV in Transport

- Context

  A potential of PV market in the transport will be driving force for the further development of PV.
  New social models expected by innovational ‘PV and Transport’

- Objectives

  - R&D scenario of PV-powered vehicles and applications
  - Deployment scenario of PV-powered vehicles and applications
  - Contribution to saving fossil-energy and reducing CO2 emissions
  - Social and business models

Subtask 4: Dissemination

- Context

  Knowledge is disseminated to the general public and end users in a timely manner.

- Objectives

  Information dissemination procedures effectively release key findings to stakeholders such as PV industry, transport industry, battery industry, and energy service provider.

  < Expected deliverables >
  - Technical reports based on proposed activities
  - Task brochure
  - Webinars and conference presentations
  - Workshop with stakeholders

Participating/potential countries

- Australia
- Belgium
- China
- France
- Germany
- Italy
- Japan (Operating Agent)
- Korea
- Morocco
- The Netherlands
- Spain
- Switzerland

Please join us!

Contact:

Toshio HIROTA, Operating Agent of Task17
Waseda University, Japan
hirotat@aoni.waseda.jp

Keiichi KOMOTO
Mizuho Information & Research Institute, Japan
keiichi.komoto@mizuho-ir.co.jp

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