



**A preparatory material for a workshop on IEA PVPS new Task 'PV for Transport'  
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# **Proposal of Subtasks for New Task: "PV for Transport"**

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# Subtasks and proposed works

## < Subtask 1 >

**Benefits and requirements for PV-powered vehicles**

## < Subtask 2 >

**PV-powered applications for electric systems and infrastructures**

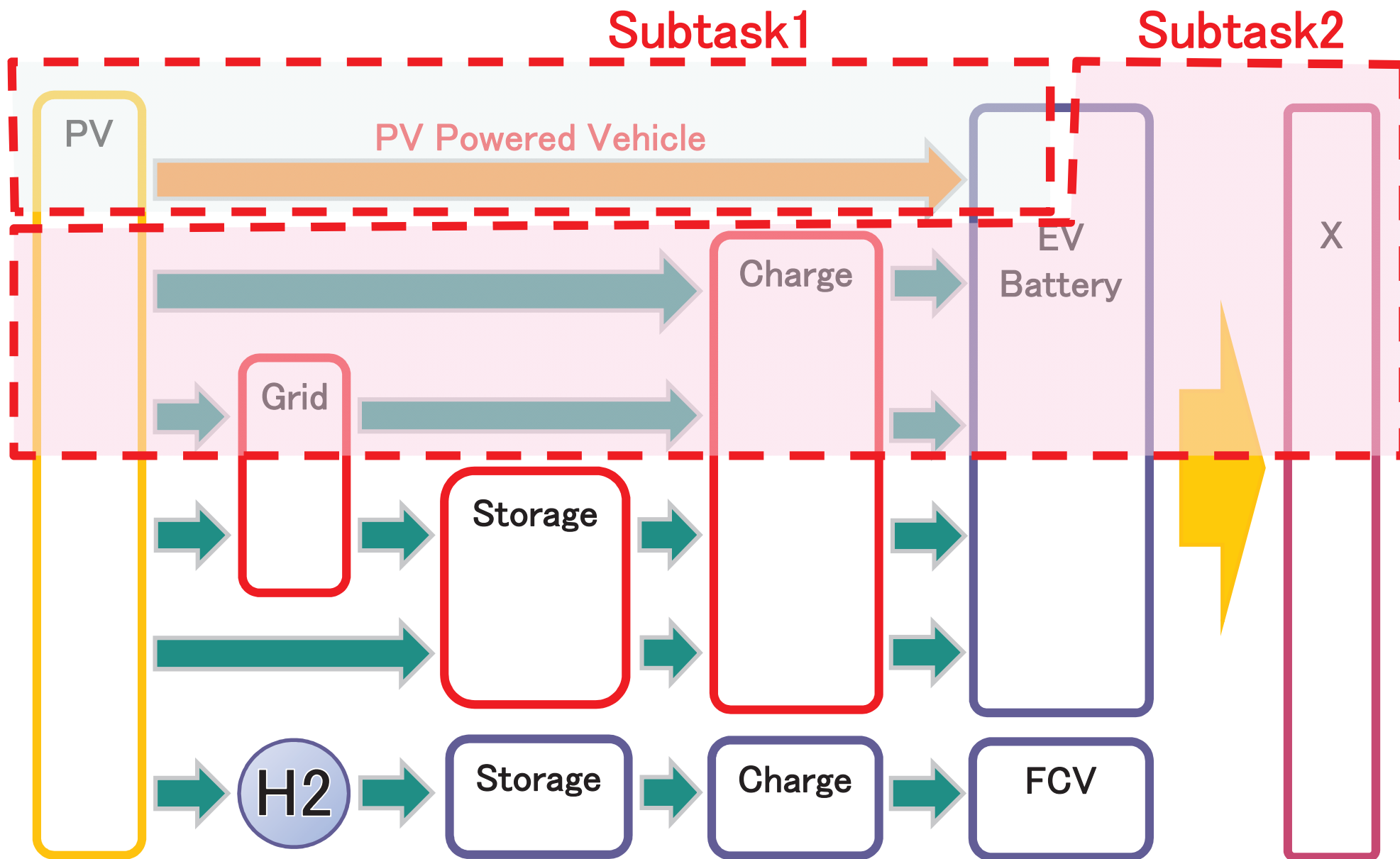
## < Subtask 3 >

**Roadmap of 'PV for Transport'**

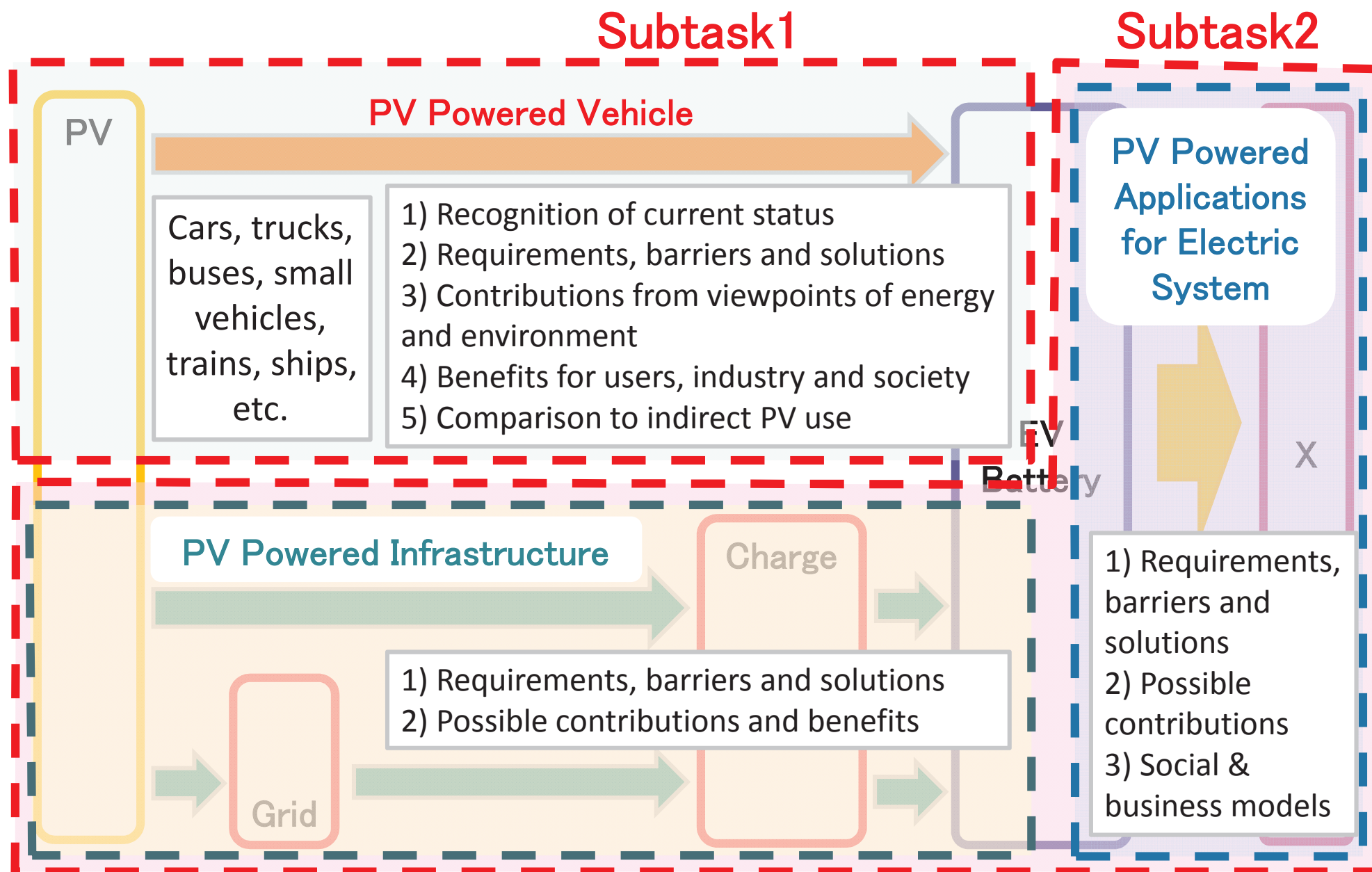
## < Subtask 4 >

**Dissemination**

# Scope of Subtask1 & 2



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# Subtask 1(1)

## ●ST1: Benefits and requirements for PV-powered vehicles

In order to deploy the PV-powered vehicles, Subtask 1 will clarify expected/possible benefits and requirements for utilizing PV on board. In addition, barriers and solutions to satisfy the requirements are identified.

### <Target PV-powered vehicles>

- Passenger cars
- Freight trucks and buses
- Small vehicles such as e-scooters and e-bikes
- Trains, ships, etc.
  - > based on proposal from potential participants

## ●Activity structure (tbd: work could be as vehicle by vehicle)

# Subtask 1(2)

## ● Proposed works

### **1) Overview: recognition of current status**

- Showcase relevant activities of PV-powered vehicles
- Existing scenarios and targets for green-transport around the world

### **2) Requirements, barriers and solutions for PV-powered vehicles**

- How to use the PV electricity (driving, refrigeration, air-conditioning, etc.), capacity of battery, possible area for PV module integration, expected PV capacity on-board
- Requirements for components and energy management
- Required items for PV cells/modules: weight, efficiency, flexibility, structure, performance and lifetime
- Barriers to realize high performance PV-powered vehicles
- Possible solutions to overcome the barriers

# Subtask 1(3)

## ● Proposed works (cont.)

### **3) Possible contributions from viewpoints of energy and environment**

- Possible contributions to saving fossil-fuel consumption and reducing CO2 emissions of the transport sector, e.g. well-to-wheel
- Issues on recycling
- Required electricity of the vehicles: expected PV electricity, driving-mode of various vehicles, expected solar irradiation

### **4) Possible benefits for users, industry and society**

- Possible benefits: less-charging, industrial vitalization, comfortable transportation systems, etc.

### **5) Comparison to indirect PV use**

- Comparing contributions and benefits of PV-powered vehicles to cases of using PV electricity not produced in the vehicle

# Subtask 2(1)

## ●ST2: PV-powered applications for electric systems and infrastructures

Subtask 2 will discuss electric systems using PV-powered vehicles and infrastructures, and propose viable business models including VPP.

### <Possible PV-powered applications>

- PV-powered application for electric systems
  - Electric system (network) using PV-powered vehicles
  - VPP (Virtual Power Plant) including PV-powered vehicles and infrastructures
- PV equipped infrastructure
  - Electric charging station
  - Hydrogen production on site
  - Other infrastructures: road, etc.

## ●Activity structure (tbd)



# Subtask 2(2)

## ● Proposed works

### 1) PV equipped (PV-powered) infrastructure

#### 1-1) Technical requirements, barriers and solutions

- Requirements for PV-powered infrastructure
- Design of PV equipped infrastructure, including issues on control and management
- Barriers to realize PV-powered applications
- Directions to overcome the barriers

#### 1-2) Possible contributions and benefits

- Possible contributions to saving fossil-fuel consumption and reducing CO2 emissions of the transport sector
- Comparing contributions and benefits to indirect PV use (using PV electricity not produced at the site)

# Subtask 2(3)

## ● Proposed works (cont.)

### 2) PV-powered application for electric systems

#### 2-1) Technical requirements, barriers and solutions

- Requirements for integrating PV-powered vehicles: HEMS, CEMS and electric systems (PV-powered V2X and VPP)
  - Issues on control and management
  - How to use information networks and big data

#### 2-2) Possible contributions to electric system

- Possible contribution of PV-powered applications to electric system
  - How PV-powered vehicles can simplify the integration in the electric system
  - Improvement of efficiency and autonomy of HEMS and CEMS, and improvement of grid stability
- Comparing contributions to simple 'PV + Storage + EVs'

# Subtask 2(4)

## ● Proposed works (cont.)

### **3) Possible/innovative social models and business models**

- Interplay to expect from different types of actors, e.g. possible stakeholders
- New social models expected by innovational 'PV for Transport'
  - Ex. feasibility studies in some areas/regions
- Possible/innovative business models

# Approach: Subtask 3(1)

## ●ST3: Roadmap of 'PV for Transport'

In parallel with Subtask 1 and Subtask 2, Subtask 3 will develop a roadmap for deployment of PV-powered applications.

The roadmap will include:

- R&D scenario of PV-powered vehicles and applications
  - Approaches to meet the requirements
- Deployment scenario of PV-powered applications
  - PV-powered vehicles (including truck, train etc.)
  - Combination with electric systems and infrastructures
- Possible contribution to energy and environmental issues
  - Contribution to saving fossil-energy consumption and reducing CO2 emissions
- Suggestions/recommendations to policy-makers

## ●Activity structure (tbd: unnecessary?)

# Approach: Subtask 4

## ●ST4: Dissemination

In order to deploy 'PV for Transport', as well as to deliver results of Task XX, the deliverables should be disseminated via workshops, conferences and so on.

Subtask 4 will be in charge of communication with stakeholders, such as PV industry, transport industry such as automobile industry, battery industry, and energy service provider.

As well, communication/collaboration with the IEA HEV will actively be implemented.

Expected deliverables from Subtasks 1-3 will be proposed in the Task XX work plan.

# Discussions

Scope of works

Structure of Subtasks

Possible works/items under the Subtasks

Possible leadership

# Thank you for your attention

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