## Plug-In Vehicle to Utility Use Cases Instructions & status (scorecard)

This is the instructions for the set of Use cases that describe the steps that customers would use for transferring energy between Plug-In Vehicles and the Utility to optimize the grid.

1) The sequence starts with Use Case E. This is the General Registration/Enrollment Steps Initial Setup for PHEV-Utility Communication & Authentication

2) The Use Cases then proceeds to U1 thru U5 for the next set of criteria. One or more of these may apply to the customer and utility at a given site (territory).
These describe the Utility Programs (Awareness, Specific Enrollment) and include:
U1: Time of Use (TOU)
U2: Direct Load/Price Control
U3: Real Time Pricing
U4: Critical Peak Pricing
U5: Active Management

3) The next set of Use Cases are S1, 2 & 3 for the various connection architectures. Only one of these would be used by the customer at a time.
These include the steps for Binding/Rebinding
(Startup, VIN Authentication, Basic Charging per enrolled program, Shutdown) and include:
S1: Cordset EVSE (120V AC to vehicle charger)
S2: Premise EVSE (240V AC to vehicle charger)
S3: Premise EVSE w/Charger (DC to vehicle)

4) The next set of Use Cases are L1 thru L4. Only one of the4se apply at a time.They describe the Connection Location (VIN Authentication, Basic Charging per enrolled program) and include:L1: Home: Connects at premise

- L2: Another's Home: Inside the utility's service territory & A or B below:
  - A: premise pays tariff
  - B: customer pays tariff

L3: Another's Home: Outside the utility's service territory

L4: Public: Curbside, workplace, business, multi family dwelling

Additional Use Cases are planned that include:

## PR1: Charging Full Charge

Balancing Charge

PR2: Discharging

Vehicle to Grid (V2G) Vehicle to Home (V2H) Vehicle to Load (V2L) Vehicle to Vehicle (V2V)

PR3: Diagnostics

Communication failures/exceptional cases related to failures Manage PHEV charge for the health of the grid (mainly distribution)

PR4: Vehicle Manufacturer Specific criteria Security requirements This sequence of Use Cases are depicted in Figure 1.



**Figure 1 – Use Case Summary** 

A particular set of Use Cases applying to a customer and Utility territory may include the following set as shown in Figure 2. This example includes Use Case E, U2 & 4, Connection is from S2 and the customer can Charge and/or Discharge, have access to vehicle (&/or EVSE) diagnostics and use VM Specific programs.



Figure 2 – Use Case Set (example)

Chart 1 shows the summary of contents within the Use Cases.

Check indicates the category is required/desired

I = Initial information has been included

F = Feedback has been received from the team

C = Complete and ready to offer to SE2

The goal of this team is to have a "C" in all categories by the end of January, 2009.

·	Key:       V       Initial information is included         F       Feedback from team has been received         C       Section is complete																																			
			Е									_	<b>S</b>					1 2											2 <b>R</b>				1			
1.1	Use Case Title	V	С		L C	1	C	$\sqrt{1}$	. √	1 C		, C	√İc	: v	Í c	1	С	$\sqrt{c}$	V	Í c	1	C	νī	V	1 c	ا	2 C	1	c	$\sqrt{1}$			1			-
1.2	Use Case Summary	, V	ī	Ż	Ť	Ż	Ť	V	J V	Ť	Ń	-	<del>v</del>	, , ,	Ť	Ń	ī	1	V	Ť	Ń	Ť	V I	, V	Ť	Ń	ī	Ń	ī	V I	-		1		1.1	Use Case Title
1.3	Use Case Detailed Narrative	, V	Ť	Ń	fi	Ż	i i	Ż	, V	ti	Ń		<del>v</del>	Ń	ti	Ż	i l	√.	Ń	L.	Ń		v.	Ń	1	Ń	-	Ż	· ·	v.	-		1		1.2	Use Case Summary
1.4	Business Rules and Assumptions	V	I				-	-	-	-			-	<u> </u>		-	-						<u> </u>					·		-	-		11		1.3	Use Case Detailed Narra
2	Actors	Ń	Ì																													1	1		1.4	Business Rules and Assu
3	Step by Step Analysis of Each Scenario	V	1		I				√	T			√ 1	V			T	√		1		T	√ 1	V	1		I		T	√ 1		- 1			2	Actors
3.1	Scenario Description		1		1		1		I √	1			√ 1	V	1		1			1		1	√ 1	V			T		1	√ 1		1			3	Step by Step Analysis of
3.1.1	Steps for this scenario		I		T		Т		I√	1			√ 1		1		1	√ 1		I		Т	√ 1		I		Т		T	√ 1		- 1			3.1	Scenario Description
3.2	Alternative Scenario Description				T				I√	I										1			√ 1		I		Ι			√		1			3.1.1	Steps for this scenario
3.2.1	Steps for this scenario			$\checkmark$	1				I√	I										Ι			√ 1		I		Ι			√ 1					3.2	Alternative Scenario Des
3.3	Alternative Scenario Description																						√ 1		1		Т			√		i.			3.2.1	Steps for this scenario
3.3.1	Steps for this scenario																						√		1		Ι			√ 1					3.3	Alternative Scenario Des
3.4	Alternative Scenario Description																						√ 1		I		Ι			√ 1		- i -			3.3.1	Steps for this scenario
3.4.1	Steps for this scenario																						√		Ι		Ι			√					3.4	Alternative Scenario Des
4	Requirements	$\checkmark$	Ι		I	$\checkmark$	Т	$\checkmark$	I√	1			√ I		T		Ι	√ 1		Ι		Ι	√ I		I		Ι		1	√ 1		- i -			3.4.1	Steps for this scenario
4.1	Functional Requirements	$\checkmark$				$\checkmark$			$\checkmark$		$\checkmark$								$\checkmark$							$\checkmark$						1			4	Requirements
4.2	Non-Functional Requirements	$\checkmark$		$\checkmark$					$\checkmark$										$\checkmark$													-i-			4.1	Functional Requirements
4.3	Business Requirements	$\checkmark$		$\checkmark$		$\checkmark$		$\checkmark$																				$\checkmark$				1			4.2	Non-Functional Requirer
5	Use Case Models		1	$\checkmark$		$\checkmark$		$\checkmark$																								1			4.3	Business Requirements
	Customer Information	$\checkmark$	I																													1			5	Use Case Models
5.1	Sequence diagram for Primary scenario			$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$																Ι		Ι		Ι			1			2	Customer Information
5.1	Equipment Diagram												√ I		Ι		T.															i.				Sequence diagram for Pr
	Sequence Diagram using EVSE Cordset																	√		1		Ι										1		5.1	5.1	Equipment Diagram
	Vehicle Information	$\checkmark$	Ι																													i –				Sequence Diagram using
5.2	Sequence diagram for Alternative scenario				1				√	1			_											_								1				Vehicle Information
0.2	Communication Path Diagram												٧	V	1		1		,				_			_					_	i –				Sequence diagram for Al
	Sequence diagram using premise EVSE	,																V				1	V	_	1	-		$ \rightarrow $			- 1				5.2	Communication Path Dis
5.3	Usage Information	N	1										1		I . I								$\rightarrow$	_	_			_			- 1					Sequence diagram using
	Activity Diagram	,						_		_			γ	N		V	1		_					_	_											Usage Information
5.4	System Diagram - Using EVSE Cordset	V	1					_	_	_			_						_				_	_	_	_		_			- 1				5.3	Activity Diagram
	Sequence Diagram		+ .	_									N	N	1	V	1						-	_	-	1					1					System Diagram - Using
5.5	System Diagram - Using Premise Mounted EVSE	٧	1															_	_				-	_	+						-				5.4	Sequence Diagram
5.6	Mattinta Dart Samania Diaman		-										V	N		N	1		_				_	_	-					_	- i					System Diagram - Using
5.0	EVSE Information Entry Saraan Diagram		+	-	-								-	N				_					_	_	+	-					-				5.5	Massage Diagram
5.7			<u> </u>	_	<u> </u>				_				_	V						<u> </u>			_	<u> </u>	<u></u>	<u> </u>					<u> </u>				5.6	Multiple Port Scenario D
																																	_		5.0	EVSE Information Entry
						(	Դհո	rt 1	<b>I</b> L	- C	1000	See	root	ard																				Deleted:	5.1	E v SE Information Entry

Chart 1 – Use Case Scorecard