

AutoRenew

Battery Technologies and Energy Storage Solutions 2015

28 - 30 September 2015 | EUREF - Campus Berlin, Germany

Workshop Intelligent Integration of Electric Vehicles into the Power Grid

Summary



Workshop Participants (f.l.t.r.): Dan Vogler/Utilicell, Shane Beattie/University of Warwick, Dr. Andreas Rückemann/Deutsche Accumotive, Florian Schaller/RLI, Paul Codani/PSA, Isobel Sheldon/Ricardo, Kibar Gür/Toyota, Dr. Andreas Pfrang/EU Commission, Alf Kuchenbuch/Linear Technology, Mike Kultgen/Linear Technology, Bin Cao/Neusoft Automotives, (missing: Fabian Moehrke/RLI)

Workshop: Intelligent Integration of Electric Vehicles into the Power Grid

Information and Communication Technology - Results

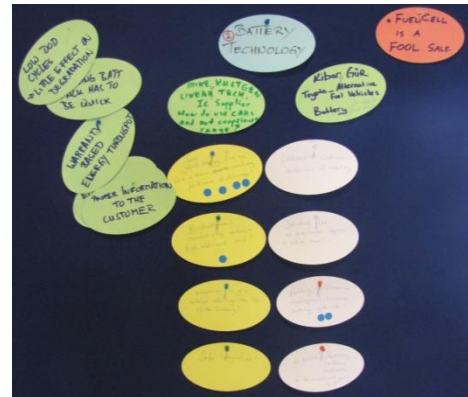
	Objectives	Challenges
Information and Communication Technology	AC/DC Plug Standard Big Tesla 120A	Full standardisation Short time steps of data transfer
	ESVE -> EV / Comlink A. ESVE Max Current B. EV Max Current C. State of Charge	1Plug4All
	Comlink/Safety/ESVE Disconnect	Digital communication standards
	Home/TDO/ISO Comlink ?WiFi / Dedicate Wire / PLC	#1 DC J1772, CHAdeMo, SAE AC, Tesla(AC/DC), CC(too many pins) U0AmpLimit
	Comlink Ancillary Service	#2Analog -> Digital
		#3 Safety Linked / Unlinked 1. charging 2. charged 3. supply off / supply on 4. Gear
		#4 A. Sub-Metering B. TOU - Time Of Use C. Variable Rate
		#5 Comlink 1. Maps Data 2. Station Data 3. Drivetrain Upgrades 4. Music 5. Emergency



Workshop: **Intelligent Integration of Electric Vehicles into the Power Grid**

Battery Technology - Results

	Objectives	Challenges
Battery Technology	Supply to store Energy from the Grid without scrifycing performance of EV Range	Proper Information to the Customer
	Bi-directional connectivity without high additional cost!	Economic Benefits
	Integration to grid without effecting the life of the battery	Business Model/Case
	Safe integration!	Warranty Based Energy Throughput
		Low DoD Cycles -> Little Effect Degradation
		Replacing Batt Pack has to be Quick
		Unknown customer behaviour of mobility
		Standard that all auto-maker agrees to reduce cost!
		Battery Performance development: increase battery cycle life!
	to guarantee chemistry, hardware, software to be compatible with grid	



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Business Models - Results

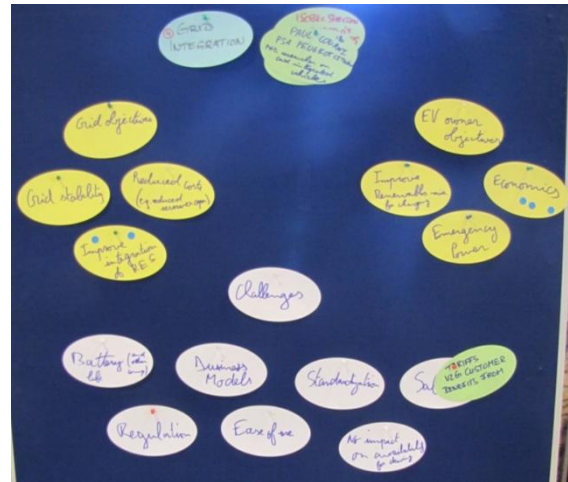
	Objectives	Challenges
Business Models	Market Pull	Financing
	Not triggered by shortness ROI, but by other trigger	Sustainability of programs
	Be a part of it (supporter = sexy)	Comfort factor
	Business Model needs to be "win for all"	Contrast of players interest
	Entire system must be thought through	Open markets -> less regulations
	Legislation	Lower prices due to competitive markets
	Pricing model for energy influences user behaviour Player	
	End Customer -be part of it -ROI	
	Energy Provider -less back-up power -no additional grid	
	Macro Economy (State) -CO2 reduction -affordable	



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Grid Integration - Results

	Objectives	Challenges
Grid Integration	Grid stability	Business Models Regulation
	Improve integration to RES	Battery life (and other)
	Reduced costs (e.g. Reduced reserve? Copper?)	Regulation
	EV owner objectives	Business Models
	Improve renewables mix for charging	Ease of use
	Emergency Power	Standardisation
	Economics	No impact on availability for charging
		Safety
		Tariffs V2G Customer benefits from



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Renewable Energies - Results

	Objectives	Challenges
Renewable Energies	Increase renewables	Cost
	Predictable return of investment	Compatible integration with existing infrastructure
	Energy security	Intermittent Energy
	100% available	Regulations legal
		Support to regulations EV safety ??? & Standardisation Applications



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Main Objectives

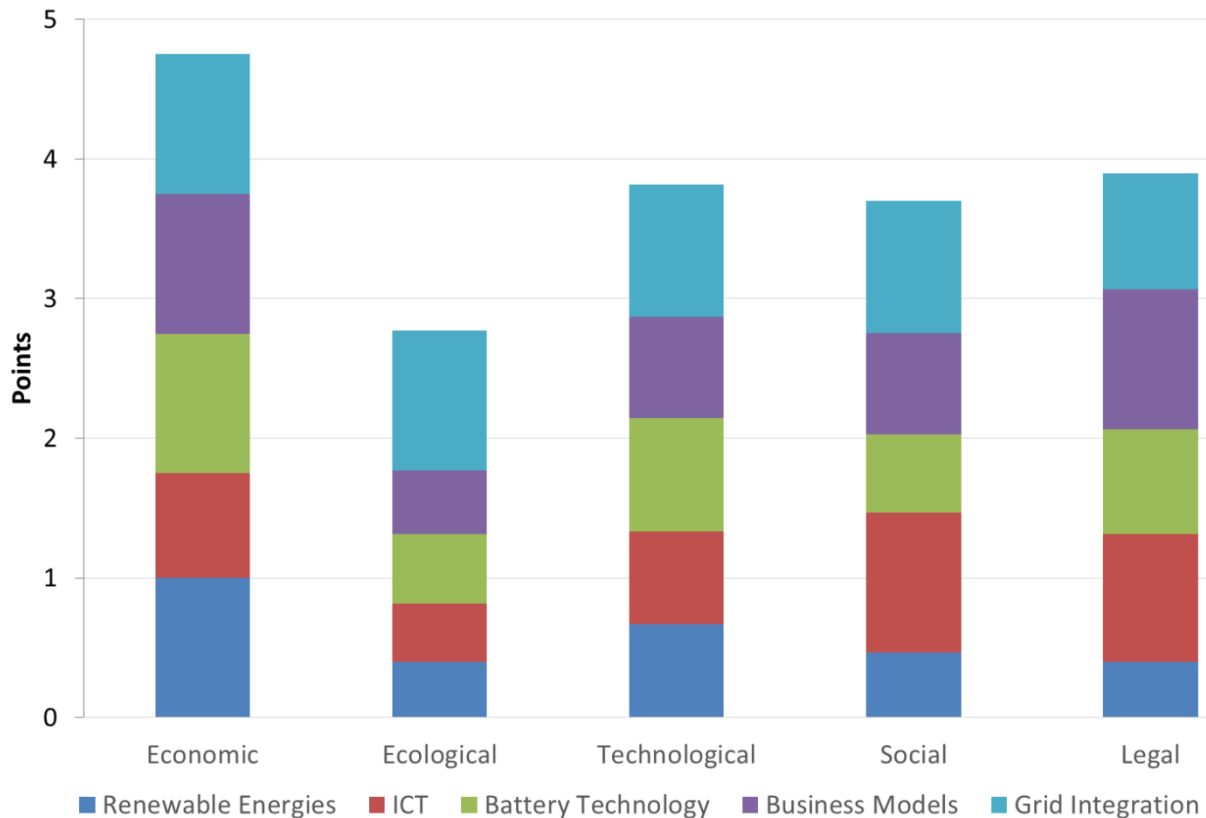
Group	Topic	Points
Business Models	Market Pull	5
Renewable Energies	Increase renewables	4
Battery Technology	Store/Supply energy to/from the grid without sacrificing performance of EV range	4
Grid Integration	Economics	3
Information and Communication Technology	AC/DC Plug Standard "Big Tesla" 120 A	2
Battery Technology	Battery performance development: increase battery cycle life	2
Grid Integration	Improve integration to RES	2
Renewable Energies	Energy Security	1
Renewable Energies	Cost	1
Renewable Energies	Predictable	1
Information and Communication Technology	Digital Communication Standards	1
Battery Technology	Bi-directional connectivity without high additional cost	1
Business Models	Legislation	1
Business Models	Business Model needs to be win for all	1

The most important five topics contain one topic of each of the five groups, showing the importance to consider multiple fields of interest for the intelligent integration of EVs into the power grid.

“Market Pull” and “Economics” are two main subjects within the first four topics, showing the impact of economics in this topic. However, “Increase Renewables” and “Store/Supply energy to/from the grid without sacrificing performance of EV range”, ranking 2nd and 3rd, show the awareness of renewable energy and V2G applications among the workshop participants.

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Categorization



Our workshop results indicate a balanced picture over all groups and categories. For the categorization, topics could be labeled as “economic”, “ecological”, “technological”, “social” and “legal”. The most prominent category among all groups is “Economic”, the least group is “Ecological”. However, all categories are mentioned in each group.

In conclusion, challenges in the field of intelligent integration of electric vehicles will most likely touch any of these categories. This emphasizes the need to think interdisciplinarily when it comes to the intelligent integration of EVs into the power grid.