出國報告（出國類別：會議）

出席「第 28 屆國際電動車輛研討及展覽會」

28th International Electric Vehicle Symposium and Exhibition (EVS 28)

服務機關：行政院環境保護署

姓名職稱：連杉利技正

派赴國家：韓國（高陽市）

出國期間：104 年 5 月 2 日至 5 月 7 日

報告日期：104 年 8 月 7 日

目錄

表目錄及圖目錄

壹、表目錄

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壹、目的

第 28 屆國際電動車輛研討及展覽會(28th International Electric Vehicle Symposium and Exhibition, EVS 28)於本(104)年 5 月 4～6 日在韓國高陽市國際展覽中心(Kintex)2 館的第 6 廳及第 7 廳辦理。本次大會主題為：「電動車輛，人人分享(e-Mobility for Humans)」。來自世界各國之專業人士聚集，共同探討電動車輛現況及未來的發展。

本次大會共有涵蓋 44 項技術領域的 161 篇論文和 167 篇海報於會場發表，來自全球約 140 家廠商（單位）於現場展示電動車輛相關技術或產品，大會亦提供試乘體驗區讓參觀者可以親身體驗電動車輛，試乘體驗區分為戶外區和室內區，其中戶外區主要提供參觀者試乘各類電動汽車；室內區提供參觀者實際騎乘參展的電動二輪車。

大會除國外知名車廠展示各款電動車輛(Electric Vehicle, EV)或油電混合動力車(Hybrid Electric Vehicle, HEV)，如賓士(Benz)的插電式油電混合動力車(Plug-in Hybrid Electric Vehicle, PHEV) S500、BMW 的電動車輛 i3 和 i8、日產(Nissan)的電動車輛 Leaf 和 e-NV200、雷諾(Renault)的電動車輛 Zoe 和 Twizy 外，韓國本土兩大車廠現代(Hyundai)和起亞(Kia)亦展示 Sonata PHEV 和 Soul EV；此外，展場中亦有各式零組件的展示，第 29 屆電動車輛研討及展覽會(EVS 29)將於西元（以下同）2016 年 8 月 18～22 日，在加拿大蒙特婁舉行。

本次參加 EVS 28 主要目的係為瞭解電動車輛的國際趨勢及各國政府政策，同時參與「西螺果菜市場電動蔬果運輸車推動情形(Promotion Strategy of Low-Speed Electric Trucks for Wholesale Market in Taiwan)」論文發表，介紹臺灣推動電動蔬果運輸車政策、執行方法和現況，俾讓國際人士瞭解臺灣推展利基型電動車成果，同時瞭解各國電動車輛推廣政策，做為國內推廣使用電動車輛之參考。

貳、行程與議程

一、行程

日期	地點	行程說明
5/2	臺北→韓國首爾→韓國高陽市	搭機前往韓國首爾，再搭乘客運至研討會舉辦地點高陽市
5/3	高陽國際展覽中心(KINTEX)	報到及展覽會場參觀
5/4-5/6	高陽國際展覽中心(KINTEX)	參加 ESV 28 國際電動車輛研討及展覽會、論文海報展示及展覽，並於 5 月 3 日參加西螺果菜市場電動蔬果運輸車推動情形 “Promotion Strategy of Low-Speed Electric Trucks for Wholesale Market in Taiwan”論文發表。 研討會每日上午 9 時至下午 6 時於 6 個會議室進行論文發表，提供與會者自行依需求選擇參加場次，本次與會以參加公共政策與推廣(Public Policy and Promotion)性質之議題為主，並利用會議空檔時間參觀海報展示及展覽。 除 EVS 28 展場外，同時大會於 5 月 6 日下午安排技術參觀(Technical Visit)行程，參訪 LG Electronics VC Company，瞭解 LG 在車輛技術的研發現況和成果。
5/7	首爾→臺北	搭機返回臺灣

二、議程

本次大會共有涵蓋 44 項技術領域的 161 篇論文和 167 篇海報於會場發表研討會於 6 個會議室進行論文發表，議程如表 1。

表 1　EVS 28 議程表

第 1 天：104 年 5 月 4 日（星期一）

	A (Rm.301)	B (Rm.302)	C (Rm.303)	D (Rm.304)	E (Rm.305)	F (Rm.306)
10:40-11:10	Opening Ceremony (Hall 6C)					
11:10-12:30	Plenary Session 1 (Hall 6C)					
12:30-14:00	Luncheon (Hall 6B)					
14:00-15:00	Dialogue Session I (Hall 7)					
15:00-15:10	Break					
15:10-16:30 Technical Session 1	A1 Batteries & Energy Storage	B1 Electric Motors & Generators	C1 Urban Electric Mobility	D1 Propulsion Systems & Subsystems	E1 Embedded Control Systems	
16:30-16:40	Break					
16:40-18:00 Technical Session 2	A2 Batteries & Energy Storage	B2 Electric Motors & Generators	C2 Urban Electric Mobility	D2 Heating & Cooling Systems	E2 Public Policy & Promotion	F2 IEA_HEV

第 2 天：104 年 5 月 5 日（星期二）

	A (Rm.301)	B (Rm.302)	C (Rm.303)	D (Rm.304)	E (Rm.305)	F (Rm.306)
09:00-10:20 Technical Session 3	A3 Batteries & Energy Storage	B3 Electric Motors & Generators / Charging & Infrastructure	C3 Electric Vehicles, Urban Electric Mobility	D3 Hybrid Electric Vehicles	E3 Public Policy & Promotion	
10:20-10:40	Break					
10:40-12:00 Technical Session 4	A4 Batteries & Energy Storage	B4 Charging & Infrastructure	C4 Electric Vehicles	D4 Hybrid Electric Vehicles	E4 Public Policy & Promotion	
12:00-13:00	Luncheon (Hall 6B)					
13:00-14:00	Dialogue Session II (Hall 7)					
14:00-15:00	Plenary Session 2 (Hall 6C)					
15:00-15:10	Break					
15:10-16:30 Technical Session 5	A5 Batteries & Energy Storage	B5 Charging & Infrastructure	C5 Electric Vehicles	D5 Hybrid Electric Vehicles / Auxiliary Components	E5 Introduction, Demonstration & Marketing	F5 Germany Trade & Invest
16:30-16:40	Break					
16:40-18:00 Technical Session 6	A6 Batteries & Energy Storage	B6 Charging & Infrastructure	C6 Electric Vehicles	D6 Plug-In Hybrid Electric Vehicles	E6 Introduction, Demonstration & Marketing	
18:30-20:30	Gala Dinner (Hall 6C)					

第 3 天：104 年 5 月 6 日（星期三）

	A (Rm.301)	B (Rm.302)	C (Rm.303)	D (Rm.304)	E (Rm.305)	F (Rm.306)
09:00-10:20 Technical Session 7	A7 Batteries & Energy Storage	B7 Charging & Infrastructure/ Power Electronic Systems	C7 Electric Vehicles	D7 Plug-In Hybrid Electric Vehicles	E7 Fuel Cell Vehicles	
10:20-10:30	Break					
10:30-11:50 Technical Session 8	A8 Batteries & Energy Storage/ Fuel Cells & Fuel Cell Systems	B8 Power Electronic Systems	C8 Electric Vehicles	D8 Plug-In Hybrid Electric Vehicles	E8 Standardization & Regulation	F8 Introduction to EV Policies of the Korean Local Governments
11:50-12:10	Break					
12:10-12:50	Plenary Session 3 (Hall 6C)					
12:50-13:20	Closing Ceremony (Hall 6C)					
14:00-18:00	Technical Visit					

參、EVS 28 內容

一、EVS 介紹

電動車輛研討會自 1969 年開始辦理，是歷史最悠久的世界性電動車輛研討會，2015 年將邁入第 46 年（第 28 屆辦理），來自全球電動車輛相關的重要業者皆在此會議中展示其最新的研發、推廣成果及各國推動政策。

二、參與 EVS 28 情形

（一）研討會

本次 EVS 28 大會於本(104)年 5 月 4～6 日在韓國高陽市韓國國際展覽中心(Kintex)2 館的第 6 廳及第 7 廳辦理。本次大會主題為：「電動車輛，人人分享(e-Mobility for Humans)」。來自世界各國之專業人士聚集，共同探討電動車輛現況及未來的發展。本署由空氣品質保護及噪音管制處連杉利技正，會同工研院高天和工程師及朱高弘工程師等 3 人參加，並由朱高弘工程師針對本署西螺果菜市場電動蔬果運輸車推動情形於 5 月 3 日下午

4:40~6:00 時段在 E 會場發表（論文內容如附件 1）。

圖 1　參加 EVS 28 人員合影

圖 2　韓國高陽市國際展覽中心(KINTEX)

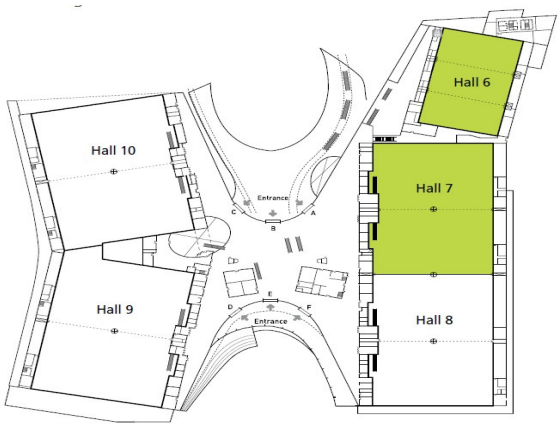


圖 3　韓國高陽市國際展覽中心配置圖

（二）試乘區

本次大會共有涵蓋 44 項技術領域的 161 篇論文和 167 篇海報於會場發表，來自全球約 140 家廠商（單位）於現場展示電動車輛相關技術或產品，大會亦提供試乘體驗區讓參觀者可以親身體驗電動車輛，試乘體驗區分為戶外區和室內區，其中戶外區主要提供參觀者試乘各類電動汽車；室內區提供參觀者實際騎乘參展的電動二輪車。

大會除國外知名車廠展示各款電動車輛(Electric Vehicle, EV)或油電混合動力車(Hybrid Electric Vehicle, HEV)，如賓士(Benz)的插電式油電混合動力車(Plug-in Hybrid Electric Vehicle, PHEV) S500、BMW 的電動車輛 i3 和 i8、日產(Nissan)的電動車輛 Leaf 和 e-NV200、雷諾(Renault)的電動車輛 Zoe 和 Twizy 外，韓國本土兩大車廠現代(Hyundai)和起亞(Kia)亦展示 Sonata PHEV 和 Soul EV；此外，展場中亦有各式零組件的展示。

大會亦讓參觀者親身體驗電動車輛，試乘體驗區分為戶外區（圖 4）和室內區（圖 5），其中戶外區主要提供參觀者試乘各式電動汽車（圖 6）；室內區提供參觀者實際騎乘參展的電動二輪車（圖 7）。

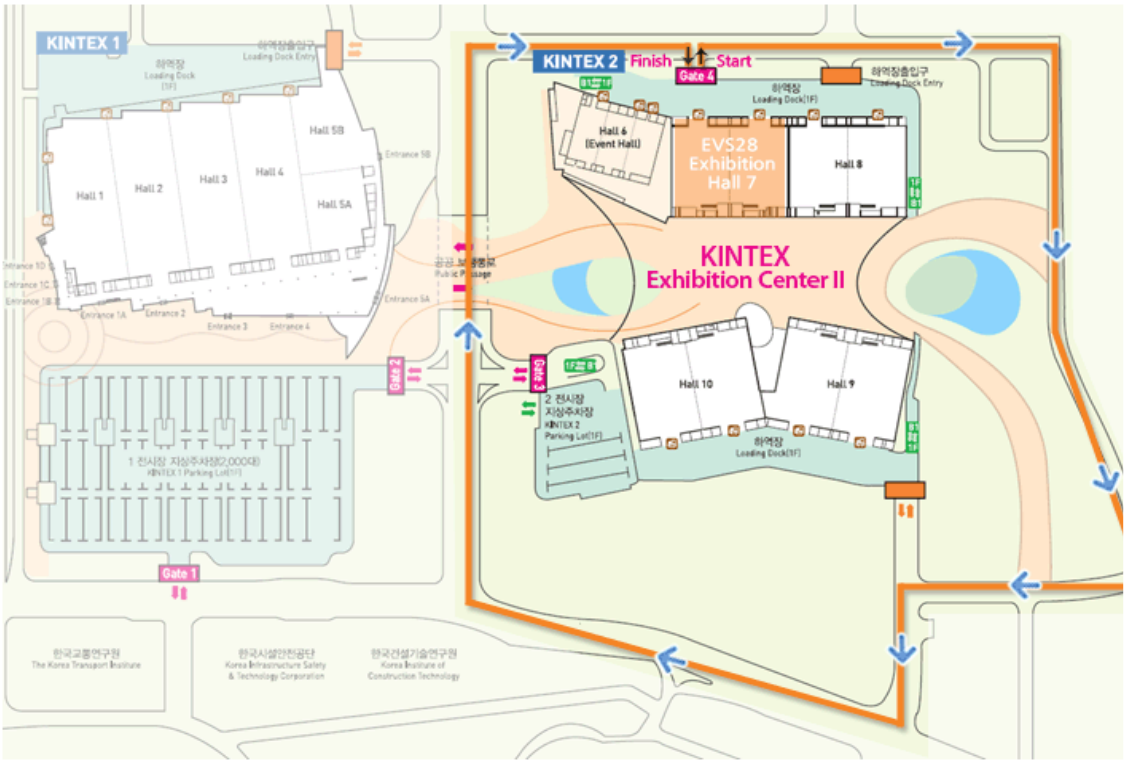


圖 4　戶外試乘電動車輛行駛路線

GM Spark EV

KIA Soul EV

Renault Twizy

Nissan Leaf

BMW i3

圖 5　戶外試乘車

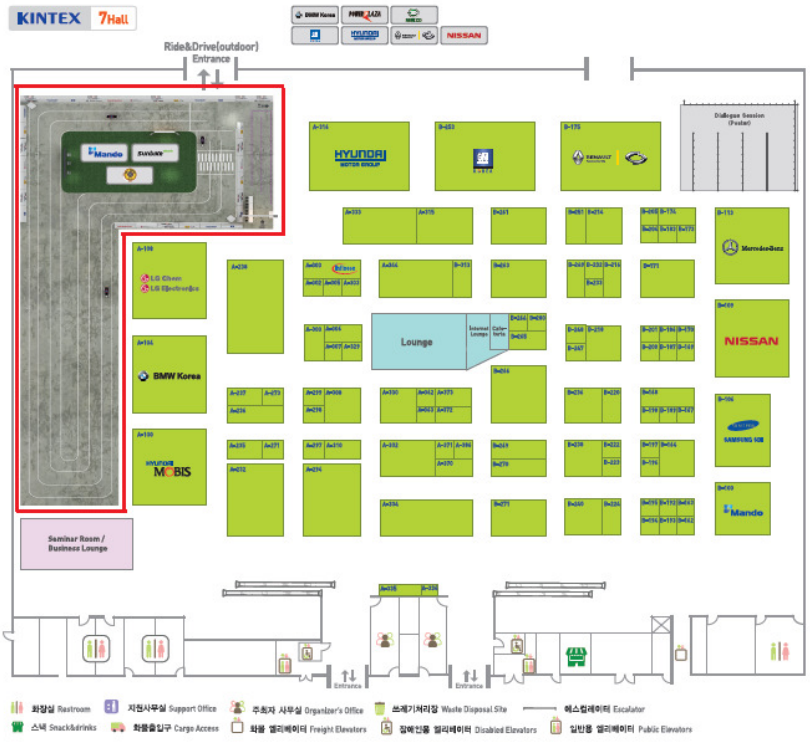


圖 6　室內電動二輪車體驗區

圖 7　室內試駕電動二輪車

（三）展覽會場

展場展示主要可區分為：(1)電動汽車、電動巴士和油電混合動力車車；(2)電動二輪車；(3)電動貨車；(4)電動車輛關鍵零組件（馬達&驅控器&電池）；(5)電動車輛充電設備；(6)各式連接器；(7)各國政策宣傳和執行。

做為 EVS28 主辦國，韓國企業全力配合，租用攤位達 69 個，約佔總展出攤位半數，中國大陸廠商參與展出數列第二，共租用 20 個攤位，臺灣則僅有光陽工業公司於展場陳列。

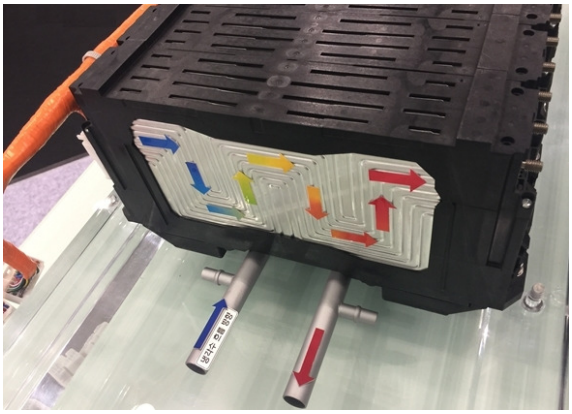
韓國廠商不僅參展攤位多，由參展品亦可看出韓國企業在電動車輛技術發展的企圖心和實力，以 Hyundai 和 LG 為例；說明如下：

1. Hyundai：做為韓國最大汽車製造集團，Hyundai 分別以 Hyundai Motor Group 和 Hyundai MOBIS 展示電動車輛和相關零組件研發成果；其中現代汽車集團(Hyundai Motor Group)於現場展示 1 輛 Sonata PHEV (圖 8)。本車配置一具 2.0 公升(L)汽油引擎和一具 50 仟瓦(Kw)電動馬達。在純電動模式下續航里程約達 40 公里(Km)。

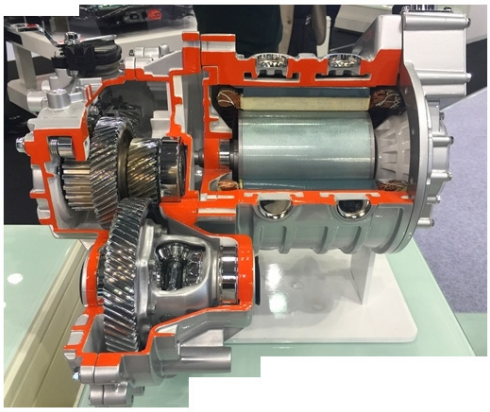
圖 8　插電式油電混合動力車 Sonata PHEV

Hyundai MOBIS（圖 9）則展示現代集團在電動車輛相關零組件研發成果，包括車載充電機，電池管理系統和各式動力馬達（圖 10）等。

圖 9　Hyundai MOBIS 展示攤位

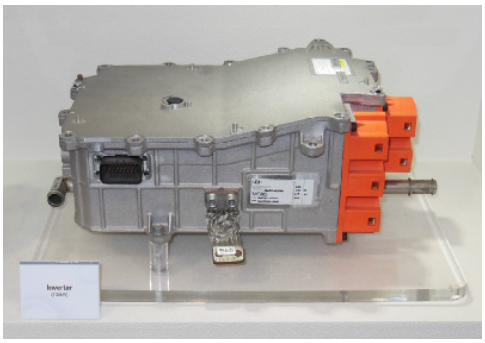


MOBIS 液冷電池系統



整合式永磁馬達

電池管理系統

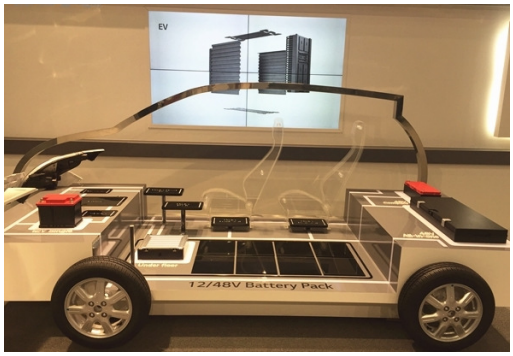


100 Kw 馬達控制器

圖 10　Hyundai MOBIS 部分展品

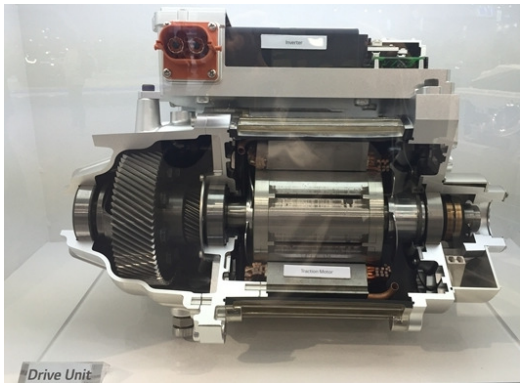
2. 樂金(LG)：LG 集團以 LG Chemistry 和 LG Electronics（圖 11）共同展示電動車輛相關零組件，包括輕量化底盤，風冷和液冷電池系統，馬達、控制器和電動附件（圖 12）。

圖 11　LG Chemistry 和 LG Electronics 展示攤位

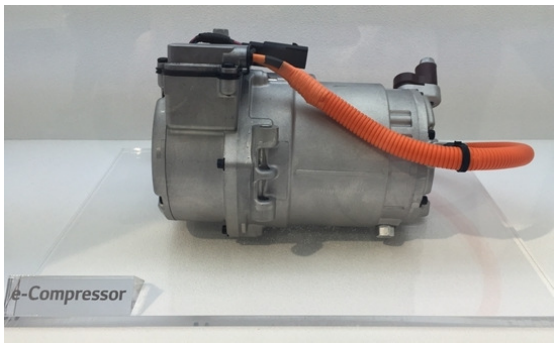


輕量化底盤

各式電池系統



整合式驅動裝置



一體式電動壓縮機

圖 12　LG Chemistry 和 LG Electronics 部分展示品

由 Hyundai 和 LG 所展示的電動車輛相關零組件，初步結論如下：

1. 韓國廠商已經建立完整的自主電動車輛關鍵零組件技術，現代集團是全球知名的汽車製造大廠，因此在電動車輛相關技術和零組件研發，並不令人感到意外；但如三星(Samsung)或樂金(LG)等消費性電子產品大廠，在電動車輛相關技術和零組件產品，所展現的研發成果，則令人驚訝，基本上，除尚未展出真正電動車輛外，其研發範圍已包含完成 1 輛電動車輛所應具備的技術。
2. 結合電動馬達、控制器和減速箱的整合式驅動裝置，無論是現代或樂金皆有展示相似產品，可推論此種整合式驅動裝置設計將可能是未來韓國電動車輛動力系統主流。

（四）研討會主議題

本次大會主要議題包括：(1)電池與能源儲存(Batteries & Energy Storage)；(2)電動馬達與發電機(Electric Motors & Generators)；(3)充電與公共設施(Charging & Infrastructure)；(4)都會電動載具(Urban Electric Mobility)；(5)電動車輛(Electric Vehicles)；(6)動力系統與子系統(Propulsion Systems & Subsystems)；(7)加熱與冷卻系統(Heating & Cooling Systems)；(8)油電混合動力車輛(Hybrid Electric Vehicles)；(9)嵌入式控制系統(Embedded Control Systems)；(10)公共政策與推廣(Public Policy & Promotion)等（詳細議程如附件 2）。

肆、心得與建議

本次大會主要參與討論公共政策與推廣(Public Policy and Promotion)性質的議題，並於 5 月 3 日參加西螺果菜市場電動蔬果運輸車推動情形論文發表，參加心得及建議如下：

一、4 輪電動汽車市占率最高業者-日產(Nissan)之觀點

Nissan Leaf 是目前市占率最高的電動汽車，Nissan 認為使用成本及稅金優惠是目前支撐電動車輛買氣的重要因素，全球 2014 年電動車輛銷售比 2013 年成長 54%，歐洲初期每月純電動車輛銷售成長 25 倍於當初油電混合動力(Hybrid)車輛，美國初期每月純電動車輛銷售成長 4 倍於當初 Hybrid 車輛。

Nissan 持續主導電動車輛市場，累積至今全球已經銷售超過 40 萬輛電動車輛，其電動車輛量占全球電動車輛銷售比重約 50%，其中 Nissan Leaf 車型約佔 42%。

依據 Nissan 進行 2010 年（導入期）及 2013 年（LEAF 車型銷售 10 萬輛）顧客需求調查結果顯示，買家越來越在意使用成本及稅金優惠，也就是第一波導入對象是重視車輛性能及環保之金字塔頂端的顧客，後續若要讓銷量持續成長，以自由市場經濟而言，民眾在意的還是支出的問題。

以使用成本而言，花費 100 日圓（24.6 元新臺幣），汽油車可行駛 10 公里(Km)，油電混合動力車車可行駛 14Km，電動車輛可行駛超過 50Km。Nissan 電動車輛目前尚未發生因電池導致的嚴重事故，未來 5 年該公司將致力於續航里程、性能及充電方法的發展，希望藉由技術突破，促使全球電動車輛銷售持續成長。

二、挪威電動汽車市場占有率為全球之冠

2013 年挪威純電動車輛市場占有率為 5.6%，2014 年上升為 12.5%，2015 第 1 季(Q1)電動車輛銷售占其汽車銷售市場的 17%，預估 2015 年將持續上升至 20.4%。2015 年 4 月挪威電動車輛登記數量已經突破 5 萬輛（占挪威 250 萬輛汽車之 2%），較該國原訂目標提前 3 年達標。

挪威政府對電動車輛祭出種種優惠，包括稅賦減免（一般汽車稅賦負擔很高）、公家停車場可免費充電及免停車費與免收過路費……等。但最大的誘因，則是可行駛大眾運輸專用車道。

每年電動車輛比燃油車款可節省近新臺幣 25 萬元的開銷，雖然 2015 年 5 月挪威針對上述目標的達成表示將持續補助，但其補助與否的爭議重點如下：

（一）補助電動車輛減少挪威政府的稅收。

（二）充電柱增加速度遠低於銷售量之增長，導致部分地區公共充電柱供應不足。

（三）允許電動車輛使用大眾運輸專用車道造成交通擁塞，在交通高峰期，專用車道上有 85%是電動車輛。

三、韓國濟州島被南韓環境部選定為電動車輛試驗區

目前濟州島已禁止新購內燃機車輛，韓國規劃 2030 年將濟州島所有內燃機車輛汰換成電動車輛，其「零碳島」推動方式包括推動智慧電網、電動車輛及再生能源，按照該國的規劃，將分 3 個階段將濟州島打造成零碳島。

（一）2017 年將濟州島內公部門內燃機車輛（占 10%約 2 萬 9,000 輛）汰

換成電動車輛。

（二）2020 年將濟州島內大眾運輸車輛（占 30%約 9 萬 4,000 輛）汰換成電動車輛。

（三）2030 年將濟州島內所內燃機車輛（約 371,000 輛）汰換成電動車輛。

濟州島電動車輛推動政策規劃如下：

（一）2015 年起濟州島成為電動車輛研究特區。

（二）2015～2017 年推動電池租賃營運計畫。

（三）2015～2017 年推動私人收費充電服務產業。

（四）透過展示、研討會、電動車輛試乘、電動車輛設計比賽協助韓國與國際企業交換資訊。

（五）2015～2017 年成立基金會建置電動車輛安全檢測中心。

（六）2015～2017 年成立電池回收研究中心，將技術產業化。

四、韓國政府補助經費投入電池交換電動公車

韓國 Begins 公司電池交換電動公車正試驗中，今(2015)年開始於濟州島建置，預計 2017 年將建置 190 輛電池交換之電動公車。.

五、多數電動車輛買主考量重點是為了省錢

依據挪威電動車輛協會(Norwegian EV Association)調查指出，54%的車主表示買電動車輛是為了省錢，只有 27%的車主表示是為了環保，16%則表示是為了省時，如果無稅金等補貼，僅 16%的電動車輛車主仍會購買電動車輛，顯示現階段政府補助優惠等措施對於民眾是否會購買電動車輛具有相當高之影響力。

六、一次性補助成效不佳，需有完整之配套措施及誘因

2010 年韓國之電動車輛推動計畫，原規劃於 2020 年全國推動 100 萬輛電動車輛，後下修為 20 萬輛，目前推動現況僅約 2,500 輛。

由多數國家電動車輛推動經驗可以發現，一次性補助將會在公部門採購達到尖峰後，因私人採購誘因不足而下降，若是補助持續增加，將增加政府財政負擔。因此增加電動車輛充電等使用設施，如可行駛公車專用車道、降低計程車(Taxi)稅金及免停車費等配套措施必須搭配設計，才能持續推廣使用電動車輛。

七、政策推動應考量經濟和環境因素

挪威目前在國內市場電動車輛市占率領先全球，但依據國際貨幣基金組織(International Monetary Fund, IMF)之統計，2014 年挪威人均國內生產毛額(Gross Domestic Product, GDP)為 9 萬 7,013 美元（以購買力換算人均 GDP 為 6 萬 6,937 美元），我國 2014 年人均 GDP 為 2 萬 2,597 美元（以購買力換算人均 GDP 為 4 萬 5,853 美元），其國民收入較我國國民高出甚多，擁有較高之電動車輛購買能力；此外，挪威家庭多配有私家車庫可方便充電，相較我國較容易推廣使用電動機車，其為該國推動電動車輛基本優勢。

八、電動車輛推動須整合政府資源

電動車輛推動涉及政府各部會業務和資源，建議可以設置專責單位和計畫負責統合管理，可參考歐洲推動電動車輛較有成效之國家，如德國於聯邦政府層級下，設置 Nation Platform for Electro Mobility，並制定 National Development Plan for Electric Mobility，用以訂定涵蓋經濟部、交通部、環境部和教育部的電動車輛推動政策；另目前韓國執行電動車輛政策，亦仿效類以作法，設置 Presidential Committee on Green Growth，負責協調及整合政府各部會資源。

附件 1　西螺果菜市場電動蔬果運輸車推動情形論文簡報

EVS28

KINTEX, Korea, May 3-6, 2015

Promotion Strategy of Low-Speed Electric Trucks for Wholesale Market in Taiwan

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Outline

I. Introduction

II. Establishment of Electric Trucks
   1. Requirements and Specification
   2. Electric-power Conversions

III. Formulation of Subsidies
   1. Subsidy for Electric Trucks
   2. Subsidy for Battery Rental

IV. Implementation and Future Development

V. Conclusion

2

Introduction

Xiluo produce market

- The **largest** fruit and vegetable wholesale market in Taiwan
- Supplies over **one-third** of Taiwan's daily consumption.
- Different vehicles run in market over **3000 trips** everyday.

Motorcycle + trailer

Tricycle

Small truck

Medium or large truck

3

Introduction

Tricycle

- The major transport vehicle in Xiluo produce market.
- Kit vehicles or Self-assembled vehicles.
- Diesel engine

Adverse effects

- Severe air and noise pollution in market
- Harm the health of workers in market

Solution

- Replace Diesel-Powered Tricycles with Electric Trucks

Keys

- Applicable electric trucks accommodate to dealers' requirements
- Acteptable costs to dealers
- Vehicle and battery maintenance.

4

Establishment of Electric Trucks

Requirements

- Purpose: Transport produce between the market and the warehouse
- Pay load: 500~2000 kg.
- Speed: 25~50 kph
- Range (round trip): 2~4 km
- Daily mileage：<= 50 km

Specifications of electric trucks

- Max. Pay load：2000 kg
- Speed: >= 40 kph (gross weight)
- Speed: >=25 kph (when pay load 1000kg)
- Cruising range：>= 50km (under 30 kph)
- Climbing ability: 8° @ 10 kph

5

Electric power conversions of the diesel-powered tricycles

Problem of four-wheels electric trucks

- Less maneuverable compare to tricycle
- Smaller loading platform
- Higher cost for new electric trucks

Resolve resistance for the policy implementation

- Vehicle maintenance and repair
- Business decline of local tricycle manufacturers.

Electric power conversions

- The same maneuverable as tricycle
- The same loading platform as tricycle
- Lower cost for conversion.
- Worked with local tricycle manufacturers.
- Local manufacturer are responsible to maintenance and repair

6

Engineering problems and solutions

Diesel powered tricycle → **Electric power conversion** → **Three-wheel electric truck**

Strategies

- Compatibility design and structure modification for electric vehicle system
- Operational safety control design of electric trucks

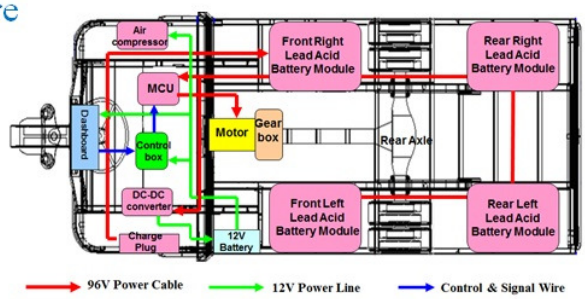
issues

- Vehicle performance (verification specification)
- Operational safety (verification specification)
- Electric safety (verification specification)

7

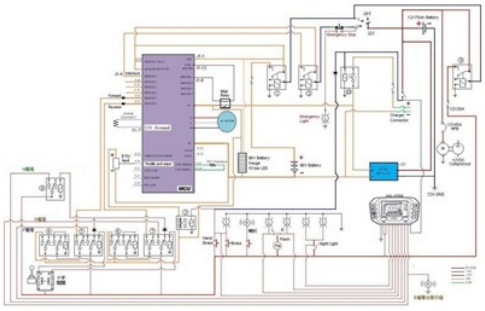
Compatibility design and structure modifications

- The drive-train compatibility analysis to ensure vehicle's performance.
- System architecture design



Operational safety control design

- Pass testing in accordance with "Verification Specification for transportation of electric truck suited to the fruit and vegetables market of Xiluo"
- Vehicle production and maintenance".



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Three-Wheel electric tricycles






Specifications	
Vehicle dimension (mm)	5000 (L) / 1550 (W) / 1960 (H)
Dock dimension (mm)	3270 (L) / 1550(W)
Gross Weight (kg)	1822
Max. payload (kg)	2500
Gear box	High gear/Low gear
Performances	
Speed	≧55 kph [gross weight /high gear] ≧40 kph [(gross weight + 1000kg payload) /low gear]
Climbing capacity	14° @ 17.3 kph
Mileage	54.1 km [(gross weight + 1000kg payload) /low gear] 81.6 km [gross weight /high gear]

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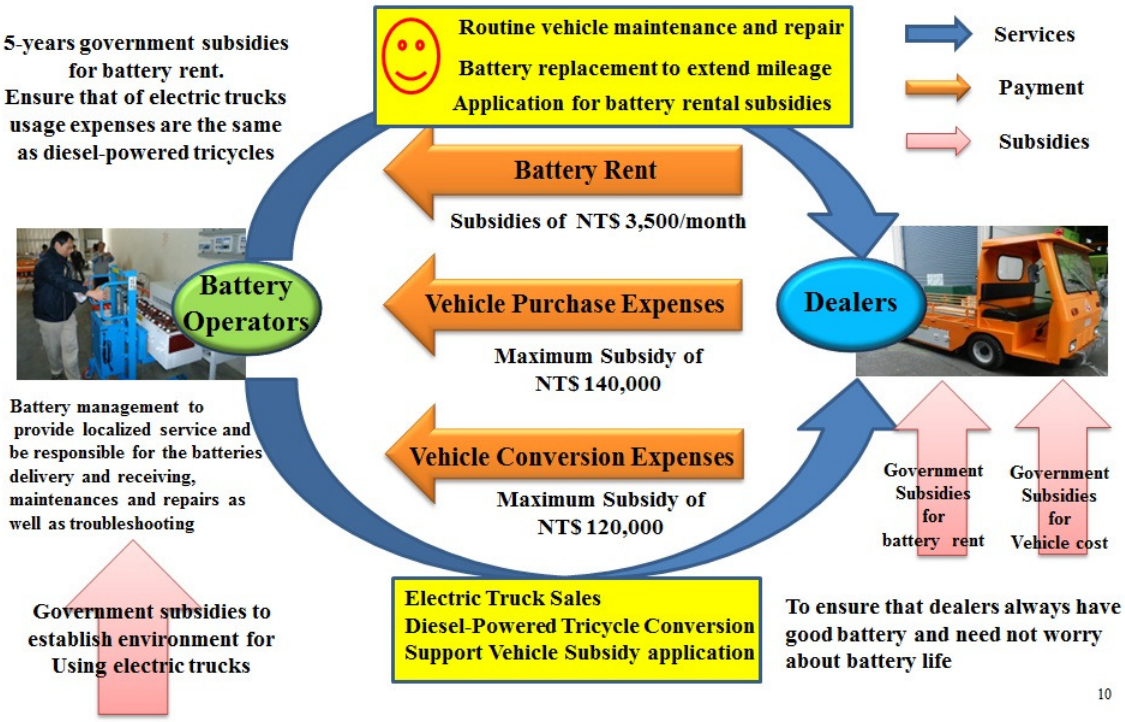
Subsidies



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Implementation and Future Development

1. Zero emission, low noise, improve effectiveness
2. Develop universal power modules, establish verification specification and certification procedures to ensure the quality of the electric trucks (performance and safety)
3. Over 50 electric trucks have been used in Xiluo market.

Item	Electric trucks	Diesel-powered tricycle
Power consumption (1)	3.5~4.5 km / kWh	7.0~10.0 km /L
Energy cost (2)	NT$ 2.1~4.4/kWh	NT$ 30~35 / L
Operational costs per km	NT$ 0.5~1.2 / km	NT$ 3.0~5.0 / km
Usage costs (3)	NT$ 500~1200 / month	NT$ 3000~5000 / month
Battery rent	NT$ 5000 / month	NT$ 0 / month
Total usage costs	NT$ 5500~6200 / month	NT$ 3000~5000 / month
Monthly usage costs (4)	NT$ 2000~2700 / month	NT$ 3000~5000 / month

(1) Considerations made for differences in vehicle load and vehicle status.
(2) Piecewise pricing for electricity; fluctuating gas prices.
(3) Based upon monthly usage of 1000 km.
(4) Including the EPA battery subsidy of NTD 3500/month.

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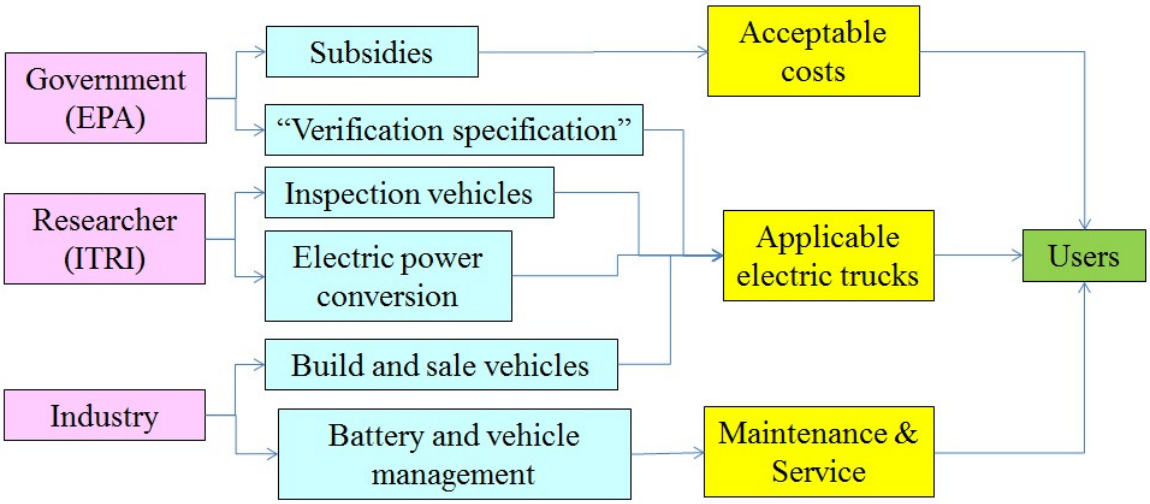
Conclusion

1. Government/Industry/Researcher cooperate to promote strategy.



2. Replace all diesel-powered tricycles before 2018.

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Q & A

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附件 2　EVS 28 詳細議程

EVS28 Daily Program

(As of April 22, 2015)

EVS 28 e-Motional Technology for Humans

Daily Program

May 4 (Monday), 2015

Opening Ceremony

10:00 – 10:40 **Exhibition Opening Ceremony** — **Hall 6C**

10:40 – 11:10 **Symposium Opening Ceremony** — **Hall 6C**

Plenary Session 1

11:10 – 12:30 — **Hall 6C**

Chairperson: TBD

11:10 **Hyundai-Kia Clean Mobility**
Moon-sik KWON, *Hyundai Motor Group*, KR

11:30 **E-MOTION AT GENERAL MOTORS**
Larry T NITZ, *General Motors Company*, US

11:50 **ELECTROMOBILITY IS ALREADY A REALITY : UPDATE OF THE EV WORLD SITUATION BY RENAULT GROUP, REFERENCE IN EV**
Gilles NORMAND, *Renault*, FR

12:10 **U.S. DOE ELECTRIC DRIVE VEHICLE BATTERY R&D PROGRESS AND PLANS**
Tien DUONG, *US Department of Energy*, US

14:00 – 15:00 Dialogue Session 1 — Hall 7

Technical Session 1

15:10 – 16:30 **A1: Batteries & Energy Storage** — **301**

Chairpersons: Paul CODANI, PSA Peugeot Citroën, FR
Jonghoon KIM, Chosun University, KR

15:10 **INVESTIGATIONS ON THE CYCLIC AGING BEHAVIOR OF LI-ION CELLS: REASONS FOR AN ABRUPT DROP OF CAPACITY**
Simon F. SCHUSTER, *Technische Universität München,* DE

15:30 **A LUMPED ELECTRO-THERMAL MODEL FOR LI-ION CELLS IN ELECTRIC VEHICLE APPLICATION**
Kamyar MAKINEJAD, *TUM CREATE,* SG

15:50 **ON-BOARD AGING ESTIMATION USING HALF-CELL VOLTAGE CURVES FOR LIFEPO4 CATHODE-BASED LITHIUM-ION BATTERY FOR ELECTRIC VEHICLE APPLICATION**
Andrea MARONGIU, *RWTH Aachen University,* DE

16:10 **DEGRADATION PREDICTIONS OF LITHIUM IRON PHOSPHATE BATTERY**
Yuya HATO, *Waseda University,* JP

15:10 – 16:30 **B1: Electric Motors & Generators** — **302**

Chairpersons: Zaimin ZHONG, Tongji University, CN
Kwang Hee NAM, Tongji POSTECH, KR

15:10 **MOTOR PERFORMANCE IMPROVEMENT VIA ARCELORMITTAL'S ICARETM ELECTRICAL STEEL RANGE FOR AUTOMOTIVE APPLICATIONS**
Sigrid JACOBS, *ArcelorMittal,* BE

15:30 **MULTI-DOMAIN SIMULATION METHODOLOGY TO DESIGN THE AIR COOLED IN-WHEEL MOTOR FOR EV/HEV**
Martin Dendaluce JAHNKE, *Tecnalia Research & Innovation,* ES

15:10 – 16:30 C1: Urban Electric Mobility **303**

Chairperson: David BEETON, Urban Foresight Ltd., UK

15:10 **INNOVATIVE PRACTICE OF EV-CARSHARING IN CHINA URBAN E-MOBILITY**
Xiaoyuan WU, *Tongji University,* CN

15:25 **LARGE SCALE EVS' CHARGING SCHEDULING ENSURING SECURE AND EFFICIENT OPERATION OF TRAFFIC AND DISTRIBUTION**
Shuang WAN, *Tsinghua University,* CN

15:40 **DEVELOPMENT OF A NEW CONCEPT ELECTRIC VEHICLE FOR LAST MILE TRANSPORTATIONS**
Salvatore MICARI, *National Council of Research - Institute of Advance Technologies for Energy,* IT

15:55 **ELECTRIC FREIGHT VEHICLES IN CITY LOGISTICS: CHALLENGES, BARRIERS AND SUCCESS FACTORS.**
Tariq Van ROOIJEN, *TNO,* NL

16:10 **DEVELOPMENT OF SMART STRATEGIES TO EVALUATE THE RANGE ESTIMATOR IN ELECTRIC VEHICLES**
Christophe MOURE, *Applus IDIADA,* ES

15:10 – 16:30 D1: Propulsion Systems & Subsystems **304**

Chairperson: Zhichao HOU, Tsinghua University, CN

15:10 **ENERGY EFFICIENCY SIMULATION FOR IN-WHEEL ELECTRIC VEHICLE BETWEEN CPSPMSM AND PMSM**
Jongmoo KIM, *KERI(Korea Electro-technology Research Institute),* KR

15:30 **ADVANCED SHIFTING CONTROL OF A TWO SPEED GEARBOX FOR AN ELECTRIC VEHICLE**
Pablo PRIETO, *Tecnalia Research & Innovation,* ES

15:50 **A HIGHLY EFFICIENT TWO SPEED TRANSMISSION FOR ELECTRIC VEHICLES**
Saphir FAID, *Punch Powertrain,* US

15:10 – 16:30 E1: Embedded Control Systems **305**

Chairperson: TBD

15:10 **N-BMS, A NOVEL ISO26262 COMPLIANT BATTERY MANAGEMENT SYSTEM**
Karl VESTIN, *Lithium Balance A/S,* SE

15:30 **SYSTEM-ON-CHIP-BASED HIGHLY INTEGRATED POWERTRAIN CONTROL UNIT FOR NEXT-GENERATION ELECTRIC VEHICLES: HARNESSING THE POTENTIAL OF HYBRID EMBEDDED PLATFORMS FOR ADVANCED MODEL-BASED CONTROL ALGORITHMS.**
Martin Dendaluce JAHNKE, *Tecnalia Research & Innovation,* ES

Technical Session 2

16:40 – 18:00 A2: Batteries & Energy Storage **301**

Chairperson: Shiho KIM, Yonsei University, KR

16:40 **WHAT ARE THE OPTIONS FOR LI-ION BATTERIES AFTER AUTOMOTIVE USE**
Hakim IDJIS, *Ecole Centrale Pari,* FR

17:00 **AN OVERVIEW OF CURRENT U.S. DOE HYBRID ELECTRIC SYSTEMS R&D ACTIVITIES**
David HOWELL, *U.S. Department of Energy,* US

17:20 **COST REDUCTION THROUGH CELL DESIGN OPTIMIZATION FOR VEHICLE REQUIREMENTS - FROM ACTIVE MATERIAL TO VEHICLE PRODUCT PORTFOLIO**
Matthias TSCHECH, *TU Braunschweig,* DE

16:40 – 18:00 B2: Electric Motors & Generators **302**

Chairperson: Juhani LAURIKKO, VTT, FI

16:40 **NOISE EMISSIONS ON SWITCHED RELUCTANCE MOTORS: EVALUATION OF DIFFERENT STRUCTURAL MODELS**
Cassio FARIA, *Siemens Industry software NV,* BE

17:00 **ASSESSMENT OF AXIAL FLUX MOTOR TECHNOLOGY FOR HYBRID POWERTRAIN INTEGRATION**
Michael LAMPERTH, *GKN EVO eDrive Systems Ltd,* CH

17:20 **ABNORMAL ELECTROMAGNETIC NOISE OF MOTORS DEPENDING ON FIXING METHODS OF PERMANENT MAGNETS**
Myunggyu KIM, *Hyundai Motor Group,* KR

16:40 – 18:00 C2: Urban Electric Mobility **303**

Chairperson: Xiaoyuan WU, Tongji University, CN

16:40 **THE FUTURE OF ELECTRIC MOBILITY: 50 BIG IDEAS FROM AROUND THE WORLD**
David BEETON, *Urban Foresight Ltd.,* UK

17:00 **EVS AND CHARGING INFRASTRUCTURE : RETURN OF EXPERIENCE**
Franck VITTE, *Blue Solutions, Bollore Group,* SG

17:20 **A COMPARATIVE STUDY OF DIFFERENT ELECTRIC DRIVE SYSTEMS AND THEIR EFFECTS ON DRIVE CYCLE PERFORMANCE OF AN ELECTRIC CITY BUS**
Ahu Ece Hartavi KARCI, *Istanbul Medeniyet University,* TR

17:40 **PRELIMINARY MODULAR DESIGN FOR ELECTRIC PERSONAL MOBILITY WITH EMBODIMENT OF DESIGN-ENGINEERING COLLABORATION**
Hyunjune (Hj) YIM, *Hongik University,* KR

16:40 – 18:00 D2: Heating & Cooling Systems **304**

Chairperson: Nam Il KIM, Korea Automotive Technology Institute, KR

16:40 **OPTIMIZATION OF THERMAL MANAGEMENT IN PHEV CELL MODULE USING HEAT PIPES**
Hyunkyu CHOI, *Hyundai Mobis,* KR

17:00 **ECONOMIC ASSESSMENT OF DIFFERENT AIR-CONDITIONING AND HEATING SYSTEMS FOR ELECTRIC CITY BUSES BASED ON COMPREHENSIVE ENERGETIC SIMULATIONS**

Technical Session 2

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Technical Session 3

09:00 – 10:20 A3: Batteries & Energy Storage **301**

Chairperson: Jelle SMEKENS, VUB, BE

09:00 **AGING OF LI-ION BATTERIES IN ELECTRIC VEHICLES: IMPACT OF REGENERATIVE BRAKING**
Peter KEIL, *Technische Universität München,* DE

09:20 **HEAT PIPE APPLIED INDIRECT COOLING SYSTEM FOR HIGH VOLTAGE BATTERY PACKS IN PHEVS**
Tae Kwon KIM, *Hyundai Mobis,* KR

09:40 **EFFECTS OF VIBRATIONS AND SHOCKS IN ELECTRIC VEHICLES ON LI-ION BATTERIES**
Martin BRAND, *Research assistant,* DE

10:00 **ASSESSMENT OF ECONOMIC POTENTIAL OF VEHICLE-TO-HOME(V2H) IN JAPAN WITH CUSTOMER DRIVING HABITS TAKEN INTO ACCOUNT**
Tomoya NAKADA, *Nissan Motor Co., Ltd.,* JP

09:00 – 10:20 B3: Electric Motors & Generators / Charging & Infrastructure **302**

Chairperson: Arrate Alonso GOMEZ, VUB, BE

09:00 **VIBRATION REDUCTION DESIGN OF PERMANENT MAGNET MOTOR USING LEVEL SET BASED SHAPE OPTIMIZATION METHOD**
Sunghoon LIM, *Hanyang University,* KR

09:20 **ANALYSIS OF DIFFERENT TYPES OF STARTER AND GENERATOR FOR 48V MILD HEV SYSTEM**
Jeongki KWON, *Hyundai Mobis,* KR

09:40 **DC QUICK CHARGING OPERATION ASSISTANT DEVELOPMENT AND EXPERIMENT IN TAIWAN**
Hung Hsi LIN, *Ship and Ocean Industries R&D Center,* TW

10:00 **WORKPLACE CHARGING: GOOD FOR YOUR BUSINESS / GOOD FOR YOUR EMPLOYEES**
Zach HENKIN, *Drive Oregon,* US

09:00 – 10:20 C3: Electric Vehicles **303**

Chairpersons: Jakub BERNATT, Institute of Electrical Drives & Machines KOMEL, PL
Chunhua ZHENG, Shenzhen Institutes of Advanced Technology, CN

09:00 **URBAN ELECTRIC-MOBILITY : THE BENEFITS OF MICRO-MOBILITY**
Nathalie CARUCCI, *Renault S.A.S,* FR

09:15 **CHARGING INFRASTRUCTURE OVERVIEW ROLES AND PLAYERS IN EUROPE**
Sébastien Albertus, *Renault S.A.S,* FR

09:30 **TESTING METHODOLOGY OF VEHICLE PEDESTRIAN NOTIFICATION SYSTEMS**
Ian WHITTAL, *Government of Canada,* CA

09:45 **ROBUST CONTROL METHOD OF INDUCTION MACHINE AGAINST TEMPERATURE VARIATION**
Sang Min KIM, *Hyundai Mobis,* KR

10:00 **DEVELOPMENT AND PERFORMANCE EVALUATION OF ADVANCED ELECTRIC BUS TRANSPORTATION SYSTEM**

Kenichiro EDA, *Waseda University,* JP

09:00 – 10:20 D3: Hybrid Electric Vehicles **304**

Chairpersons: Joerg Dieter WEIGL, National University of Singapore , SG
Hyunsu KIM, Hyundai Motor Company, KR

09:00 **POWER SEMICONDUCTOR AND PACKAGING TRENDS IN VEHICLE ELECTRIFICATION**
Achim STRASS, *Infineon Technologies Korea Co Ltd,* KR

09:20 **THERMAL MODEL DEVELOPMENTS FOR ELECTRIFIED VEHICLES**
Namwook KIM, *Argonne National Laboratory,* US

09:40 **USING MULTIOBJECTIVE OPTIMIZATION FOR AUTOMOTIVE COMPONENT SIZING**
Aymeric Rousseau, *Argonne National Laboratory,* US

10:00 **DEVELOPMENT OF PERFORMANCE SIMULATOR FOR A HEV WITH CVT AND VALIDATION WITH DYNAMOMETER TEST DATA**
Hanho SON, *Sungkyunkwan University ,* KR

09:00 – 10:20 E3: Public Policy & Promotion **305**

Chairpersons: Stefan PETTERSSON, Viktoria Swedish ICT, SE
Seung-Ho HAN, Korea Electric Power Research Institute, KR

09:00 **DRIVING THE FUTURE TODAY: DELIVERING A STRATEGY FOR ULTRA LOW EMISSION VEHICLES IN THE UK**
Richard BRUCE, *UK Department for Transport,* UK

09:20 **GAMIFYING THE EV DRIVING EXPERIENCE: A VIRTUAL ELECTRIC VEHICLE TO CHANGE PUBLIC ATTITUDES**
Mark APPERLEY, *University of Waikato,* NZ

09:40 **LOCAL MEASURES TO ENCOURAGE THE WIDESPREAD UPTAKE OF LOW EMISSION VEHICLES: LEARNING FROM THE UK AND GLOBAL GOOD PRACTICE**
David BEETON, *Urban Foresight Ltd.,* UK

10:00 **REDUCING CO2 EMISSIONS IN THE CITY OF KAMPALA USING BATTERY ELECTRIC BUSES**
Fred MATOVU, *Engineering,* UG

Technical Session 4

10:40 – 12:00 **A4: Batteries & Energy Storage** **301**

Chairperson: Chengliang YIN, Shanghai Jiao Tong University, CN

10:40 **COUPLING LOCAL RENEWABLE ENERGY PRODUCTION WITH ELECTRIC VEHICLE CHARGING: A SURVEY OF THE FRENCH CASE**
Paul CODANI, *PSA Peugeot Citroën,* FR

11:00 **DEVELOPMENT OF IN SITU GAS MEASUREMENTS FOR LITHIUM ION BATTERY R&D**
Dee STRAND, *Wildcat Discovery Technologies,* US

11:20 **SOC ESTIMATION OF LIFEPO4 LI-ION BATTERY USING BP NEURAL NETWORK**
Lihong QIU, *Hefei University of Technology,* CN

11:40 **48V RECUPERATION STORAGE BASED ON SUPERCAPS FOR AUTOMITIVE APPLICAITONS**
Andreas BAUMGARDT, *University of Federal Defense Munich,* DE

10:40 – 12:00 **B4: Charging & Infrastructure** **302**

Chairpersons: Don MACKENZIE, University of Washington, US
In-Soo SUH, KAIST, KR

10:40 **EARLY HYDROGEN STATION ECONOMICS ANALYSIS**
Changzheng LIU, *Oak Ridge National Laboratory,* US

11:00 **EV INTEGRATION IN SMART GRIDS THROUGH INTEROPERABLE SYSTEMS**
Raul RODRIGUEZ, *Fundacion Tecnalia,* ES

11:20 **IMPACT OF PENETRATION OF ELECTRIC VEHICLES ON INDIAN POWER GRID**
Makarand LOKHANDE, *Sardar Vallabhai National Institute of Technolgy,* IN

10:40 – 12:00 **C4: Electric Vehicles** **303**

Chairperson: Jiuyu DU, Tsinghua University, CN

10:40 **IMPACT OF SMART CHARGING ON THE EV BATTERY AGEING - DISCUSSION FROM A 3 YEARS REAL LIFE EXPERIENCE**
Laurent De VROEY, *GDF SUEZ,* BE

11:00 **ELECTRIC VEHICLE USE AND ENERGY CONSUMPTION BASED ON REAL WORLD ELECTRIC VEHICLE FLEET TRIP AND CHARGE DATA AND ITS IMPACT ON EXISTING EV RESEARCH MODELS**
Cedric De CAUWER, *Vrije Universiteit Brussel,* BE

11:20 **FEASIBILITY OF ELECTRIC BUSSES IN PUBLIC TRANSPORT**
Joni MARKKULA, *Tampere University of Technology,* FI

11:40 **ELECTRIC VEHICLE ENERGY CONSUMPTION MODELLING AND PREDICTION BASED ON ROAD INFORMATION**
I.J.M. (Igo) BESSELINK, *Eindhoven University of Technology,* NL

10:40 – 12:00 **D4: Hybrid Electric Vehicles** **304**

Chairpersons: Thomas FRANKE, Technische Universitaet Chemnitz, DE
Achim STRASS, Infineon Technologies Korea Co Ltd, KR

10:40 **INVESTIGATION OF CO2 EMISSIONS IN PRODUCTION AND USAGE PHASES FOR A HYBRID VEHICLE SYSTEM COMPONENT**

Tetsuya NIIKUNI, *National Traffic Safety and Environment Laboratory,* JP

11:00 **48V HYBRID SYSTEMS FROM SEMICONDUCTOR PERSPECTIVE**
Achim STRASS, *Infineon Technologies Korea Co Ltd,* KR

11:20 **STUDY OF REGENERATIVE BREAKING CONTROL FOR HEV WITH MULTISPEED TRANSMISSION**
Jeewook HUH, *Hyundai Motor Group,* KR

11:40 **"MEASUREMENT AND ANALYSIS OF INDIAN ROAD DRIVE CYCLES FOR EFFICIENT AND ECONOMIC DESIGN OF HEV COMPONENT"**
Vishal PAREKH, *Aspero Research,* IN

10:40 – 12:00 E4: Public Policy & Promotion **305**

Chairpersons: Mark APPERLEY, University of Waikato, NZ
Dongseok CHOI, KATRI, KR

10:40 **POLICY STRATEGIES FOR AN EMERGENT TECHNOLOGY; LESSONS FROM THE ANALYSIS OF EV-POLICY IN 8 NORTH-EUROPEAN COUNTRIES**
Martijn Van Der STEEN, *Netherlands School of Governance,* NL

11:00 **THE NORWEGIAN EV-SUCCESS, AND WHAT HAPPENS WHEN SALES GET HIGH**
Christina BU, *The Norwegian EV Association,* NO

11:20 **BENEFITS TO PLUG-IN ELECTRIC VEHICLES (PEVS) AND UTILITIES FROM CALIFORNIA'S EVOLVING LOW CARBON FUEL STANDARD (LCFS) REGULATION**
Dean TAYLOR, *Southern California Edison,* US

11:40 **UK GOVERNMENT SUPPORT FOR ULEV TECHNOLOGY R&D**
Bob MORAN, *Office for Low Emission Vehicles,* UK

13:00 – 14:00 Dialogue Session 2 **Hall 7**

Plenary Session 2

14:00 – 15:00 **Hall 6C**

Chairperson: TBD

14:00 **LONG RANGE EV BATTERY PACK**
Woongpil YANG, *LGE Vehicle Components Company*, KR

14:20 **EVOLVING ELECTRIC VEHICLE**
Kazuo YAJIMA, ***Nissan Motor, Co. Ltd,*** JP

14:40 **MERCEDES-BENZ CARS HYBRID STRATEGY**
Oliver BRITZ, *Mercedes-Benz Korea Ltd.*, DE

Technical Session 5

15:10 – 16:30 A5: Batteries & Energy Storage **301**

Chairpersons: James MILLER, Argonne National Laboratory, US
Jin-Dong MOON, Mando Corporation, KR

15:10 **MODULE AGEING OF LI-ION CELLS WITH ACTIVE BALANCING COMPAREDTO THE AGEING BEHAVIOURON CELL LEVEL**
Christian CAMPESTRINI, *Research associate,* DE

15:25 **OPTIMIZATIONI OF LI-ION BATTERIES THROUGH MODELLING TECHNIQUES**
Jelle SMEKENS, *Vrije Universiteit Brussel,* BE

15:40 **BATTERY DEVELOPMENT PROCESS WITH SAFETY**
Andrew KWON, *GM Korea,* KR

15:55 **VOLTEC BATTERY DESIGN AND MANUFACTURING**
Milind GANDHI, *GM Korea,* KR

16:10 **EXPLORING THE OPTIONS TO REDUCE THE COST OF XEV BATTERIES VIA CHEMISTRY STANDARDIZATION.**
Tom Van BELLINGHEN, Umicore, BE

15:10 – 16:30 B5: Charging & Infrastructure **302**

Chairperson: Yoshinori KONDO, National Institute for Environmental Studies, JP

15:10 **DC-ELECTRIC VEHICLE SUPPLY EQUIPMENT OPERATION STRATEGIES FOR ENHANCED UTILITY GRID VOLTAGE STABILITY**
Peter KRASSELT, *Karlsruhe Institute of Technology,* DE

15:30 **PROPOSED DYNAMIC CONTACTLESS POWER TRANSFER SYSTEM**
Toshiyuki FUJITA, *Technova Inc.,* JP

15:50 **THE PROVISION OF PUBLIC RECHARGING INFRASTRUCTURE FOR ELECTRIC VEHICLES IN THE UK – IS THERE A BUSINESS CASE?**
Josey WARDLE, *Newcastle University,* UK

16:10 **NORWEGIAN ELECTRIC CAR USER EXPERIENCES 2014**
Espen HAUGE, *Norwegian Electric Vehicle Association,* NO

15:10 – 16:30 C5: Electric Vehicles **303**

Chairpersons: Laurent De VROEY, GDF SUEZ, BE
Cassio FARIA, Siemens Industry software NV, BE

15:10 **SIZING TOOL FOR RAPID OPTIMISATION OF PACK CONFIGURATION AT EARLY-STAGE AUTOMOTIVE PRODUCT DEVELOPMENT**
Kotub UDDIN, *University of Warwick,* UK

15:30 **INCREASING THE ENVIRONMENTAL POTENTIAL OF ELECTRICAL VEHICLES AND RENEWABLE ENERGIES WITH GRID ATTACHED ENERGY STORAGE**
Surendraprabu RANGARAJU, *Vrije Universiteit Brussel,* BE

15:50 **EV MOTOR CONTROLLER TARGET COOLING BY USING MICRO THERMOELECTRIC COOLER**
Po-Hua CHANG, *Industrial Technology Research Institute,* TW

16:10 **INVESTIGATING FACTORS AFFECTING ELECTRIC VEHICLES ADOPTION: AN AGGREGATED PANEL DATA ANALYSIS OVER U.S. STATES**
Donghyung YOOK, *Korea research institute for human settlements,* KR

15:10 – 16:30 D5: Hybrid Electric Vehicles / Auxiliary Components 304

Chairpersons: Namwook KIM, Argonne National Laboratory, US
SungHo HWANG, Sungkyunkwan University, KR

15:10 **ANALYSIS OF REGENERATIVE BRAKING EFFECT TO IMPROVE FUEL ECONOMY FOR E-REV BUS BASED ON SIMULATION**
Jongdai CHOI, *Seoul National University,* KR

15:30 **COOPERATIVE CONTROL ALGORITHM FOR FRICTION AND REGENERATIVE BRAKING SYSTEMS CONSIDERING TEMPERATURE CHARACTERISTICS**
Minho KWON, *Sungkyunkwan University,* KR

15:50 **MODELING AND SIMULATION STUDY ON A SERIES-PARALLEL HYBRID ELECTRIC VEHICLE**
Yaohua LI, *Chang'an University,* CN

16:10 **FAULT-TOLERANT CONTROL SYSTEM FOR EMB EQUIPPED IN-WHEEL MOTOR VEHICLE**
Seungki KIM, *Hanyang University,* KR

15:10 – 16:30 E5: Introduction, Demonstration & Marketing 305

Chairpersons: Philippe LEBEAU, Vrije Universiteit Brussel, BE
Woongchul CHOI, Kookmin University, KR

15:10 **DERIVING VEHICLE-TO-GRID BUSINESS MODELS FROM CONSUMER PREFERENCES**
Rene BOHNSACK, *Amsterdam University of Applied Sciences,* NL

15:30 **EARLY ADOPTERS OF ELECTRIC VEHICLES IN GERMANY UNVEILED**
Stefan TROMMER, *German Aerospace Center (DLR),* DE

15:10 – 16:30 F5: Germany Trade & Invest 306

Chairperson: Stefan Di BITONTO, Germany Trade & Invest, DE

ALTERNATIVE DRIVES IN GERMANY: HANDS-ON E-MOBILITY! THE FOUR NATIONAL SHOWCASE REGIONS FOR ELECTRIC MOBILITY
Stefan DI BITONTO, *Germany Trade and Invest,* DE

E-MOBILITY IN PRACTICE: THE NATIONAL SHOWCASE REGIONS FOR ELECTROMOBILITY (PART I)
Cathleen KLÖTZING, *Energy Agency of Saxony,* DE
Gernot LOBENBERG, *Berlin Agency for Electromobility,* DE

E-MOBILITY IN GERMANY - EXPERIENCES OF GERMAN OEM AND THE COMBINED CHARGING SYSTEM
Albrecht PFEIFFER, *BMW China,* DE
Cornel PAMPU, *Carmeq GmbH,* DE

E-MOBILITY IN PRACTICE: THE NATIONAL SHOWCASE REGIONS FOR ELECTROMOBILITY (PART II)
Wolfgang FISCHER, *State Agency for Electromobility Baden-Wuerttemberg,* DE
Juliane BIELINSKI, *Metropolregion Hannover,* DE

Technical Session 6

16:40 – 18:00 A6: Batteries & Energy Storage **301**

Chairpersons: Wootaik LEE, Changwon National University, KR
Ahmed PESARAN, National Renewable Energy Laboratory (NREL), US

16:40 **OPTIMAL CHARGING STRATEGY DEVELOPMENT BASED ON SOLID ELECTROLYTE INTERFACE (SEI) FILM GROWTH MODEL AND DYNAMIC PROGRAMMING**
Chengliang YIN, *Shanghai Jiao Tong University,* CN

17:00 **EXPERIMENTAL BEHAVIOUR OF LI-ION AND SUPERCAPACITORS CELLS FOR HEVS UNDER STANDARDIZED AND TAILORED-LIFE CYCLE TESTING**
Mario CONTE, *Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA),* IT

17:20 **ADVANCED LITHIUM-ION BATTERY MANUFACTURING R&D**
James MILLER, *Argonne National Laboratory,* US

17:40 **COUPLED MECHANICAL-ELECTROCHEMICAL-THERMAL MODELING FOR ACCELERATED DESIGN OF EV BATTERIES**
Ahmad PESARAN, *National Renewable Energy Laboratory,* US

16:40 – 18:00 B6: Charging & Infrastructure **302**

Chairperson: Chantal GUIMONT, EMC, CA

16:40 **DYNAMIC WIRELESS POWER TRANSFER SYSTEM FOR ELECTRIC VEHICLE TO SIMPLIFY GROUND FACILITIES - POWER CONTROL BASED ON VEHICLE-SIDE INFORMATION -**
Katsuhiro HATA, *The University of Tokyo,* JP

17:00 **MODELING CHARGING CHOICES OF BEV OWNERS USING STATED PREFERENCE DATA**
Don MACKENZIE, *University of Washington,* US

17:20 **ECONOMIC ASSESSMENT OF STRATEGIES TO DEPLOY PUBLICLY ACCESIBLE CHARGING INFRASTRUCTURE**
Raul RODRIGUEZ, *Tecnalia,* ES

17:40 **COMBINED CHARGING SYSTEM - ONE SYSTEM FOR ALL**
Cornel PAMPU, *Carmeq,* DE
Albrecht PFEIFFER, *BMW China Services Ltd.,* DE

16:40 – 18:00 C6: Electric Vehicles **303**

Chairperson: Sang Won YOON, Hanyang University, KR
Kirill KARPUKHIN, Federal State Unitary Enterprise NAMI, RU

16:40 **DESIGN AND REALIZATION OF A ONE-PEDAL-DRIVING ALGORITHM FOR THE TU/E LUPO EL.**
I.J.M. (Igo) BESSELINK, *Eindhoven University of Technology,* NL

17:00 **AN ACCESSIBLE PRE-DESIGN CALCULATION TOOL TO SUPPORT THE DEFINITION OF EV COMPONENTS**
Christophe MOURE, *Applus IDIADA, ES*

17:20 **MODEL BASED ADAPTIVE CONTROLLER DESIGN AND OPTIMIZATION FOR (L7) ELECTRIC VEHICLE**
Kuang-Shine YANG, *Metal Industries Research & Development Center,* TW

17:40 **LATERAL HANDLING IMPROVEMENT WITH DYNAMIC CURVATURE CONTROL FOR AND INDEPENDENT REAR WHEEL DRIVE EV**
In-Soo SUH, *KAIST,* KR

16:40 – 18:00 D6: Plug-In Hybrid Electric Vehicles **304**

Chairpersons: Rene BOHNSACK, Amsterdam University of Applied Sciences, NE
Kyungseok CHO, Halla Visteon Climate Control Corp., KR

16:40 **CHEVROLET VOLT ON-ROAD TEST PROGRAMS IN CANADA. PART 1: EFFECTS OF DRIVE CYCLE, AMBIENT TEMPERATURE AND ACCESSORY USAGE ON ENERGY CONSUMPTION AND ELECTRIC RANGE**
Hajo RIBBERINK, *Natural Resources Canada,* CA

17:00 **CHEVROLET VOLT ON-ROAD TEST PROGRAMS IN CANADA. PART 2: EVALUATION OF GASOLINE DISPLACEMENT AND EXTREME WEATHER PERFORMANCE IN COMPARISON WITH OTHER VEHICLES TYPES**
Hajo RIBBERINK, *Natural Resources Canada,* CA

17:20 **DEVELOPMENT OF A PLUG-IN HEV BASED ON THE NOVEL COMPOUND POWER-SPLIT TRANSMISSION**
Chen WANG, *Corun CHS Technology Co., Ltd,* CN

17:40 **CROSS-DOMAIN SYSTEMS ENGINEERING AND VEHICLE SIMULATION FOR ELECTRIFICATION**
Christian LINGENFELSER, *Bosch Engineering GmbH,* DE

16:40 – 18:00 E6: Introduction, Demonstration & Marketing **305**

Chairpersons: Shigeyuki MINAMI, Osaka City University, JP
In-Soung JUNG, Korea Electronics Technology Institute, KR

16:40 **LIGHTWEIGHT INFRASTRUCTURE FOR ELECTRIC VEHICLE CHARGING**
Stefan PETTERSSON, *Viktoria Swedish ICT,* SE

17:00 **BUSTING MYTHS AND DRIVING EV UPTAKE: GO ULTRA LOW**
Jonathan MITCHELL, *Office for Low Emission Vehicles,* UK

17:20 **GLOBAL OPPORTUNITIES FOR SMALL/MEDIUM ENTERPRISES IN E-MOBILITY (GO4SEM)**
Arrate Alonso GOMEZ, *Vrije Universiteit Brussel,* BE

17:40 **HOW ACTIVISM MATTERS FOR CREATING THE ELECTROMOBILITY 2.0 INDUSTRY?**
Carole DONADA, *Essec Business School,* FR

Technical Session 7

09:00 – 10:20 A7: Batteries & Energy Storage **301**

Chairpersons: Kotub UDDIN, University of Warwick, UK
Kunsoo HUH, Hanyang University, KR

09:00 **BATTERIES 2020 – A JOINT EUROPEAN EFFORT TOWARDS EUROPEAN COMPETITIVE AUTOMOTIVE BATTERIES**
Jean-Marc TIMMERMANS, *Vrije Universiteit Brussel,* BE

09:20 **DESIGN OPTIMIZATION OF LITHIUM-ION BATTERY USING HYBRID ELECTRIC VEHICLES SIMULATION MODEL.**
Jihoon KIM, *Hanyang University,* KR

09:40 **A STATE-OF-CHARGE AND CAPACITY ESTIMATION ALGORITHM FOR LITHIUM-ION BATTERY PACK UTILIZING FILTERED TERMINAL VOLTAGE**
Chang Yoon CHUN, *Seoul National University,* KR

09:00 – 10:20 B7: Charging & Infrastructure / Power Electronic Systems **302**

Chairperson: TBD

09:00 **ON THE ENERGY EFFICIENCY OF QUICK DC VEHICLE BATTERY CHARGING**
Carlo VILLANTE, *University of L'Aquila,* IT

09:20 **IMPACT OF ENERGY MANAGEMENT OF ELECTRIC VEHICLES ON TRANSIENT VOLTAGE STABILITY OF MICROGRID**
Muhammad Shoaib KHALID, *Huazhong University of Science and Technology,* CN

09:40 **UNRAVELING USER TYPE CHARACTERISTICS: TOWARDS A TAXONOMY FOR CHARGE INFRASTRUCTURE**
Jurjen HELMUS, *University of Applied Sciences Amsterdam,* NL

10:00 **48V INTEGRATED MOTOR-INVERTER DESIGN FOR MILD HEV**
Jinseok HONG, *Hyundai Mobis,* KR

09:00 – 10:20 C7: Electric Vehicles **303**

Chairpersons: I.J.M. (Igo) BESSELINK, Eindhoven University of Technology, NE
Kwangki JEON, Korea Automotive Technology Institute, KR

09:00 **ELECTRIFICATION OF A TRUCK FOR CITY DELIVERY SERVICES**
Geunhie RIM, *KERI(Korea Electro-technology Research Institute),* KR

09:20 **IMPROVEMENT ON DRIVING COMFORT AND ENERGY CONSUMPTION OF ELECTRIC VEHICLE THROUGH THROTTLE SIGNAL CONTROL**
Joerg Dieter WEIGL, *National University of Singapore,* DE

09:40 **ELECTRIC VEHICLES 2015-2025**
Peter HARROP, *IDTechEx,* UK

10:00 **THE INFLUENCE OF ELECTRICITY ALLOCATION RULES IN ENVIRONMENTAL ASSESSMENTS OF ELECTRIC VEHICLES.**
Maarten MESSAGIE, *Vrije Universiteit Brussel,* BE

09:00 – 10:20 D7: Plug-In Hybrid Electric Vehicles **304**

Chairperson: Carole DONADA, Essec Business School, FR

09:00 **PLUG-IN HYBRID VEHICLE IMPROVEMENTS ACHIEVED BY ADDING AN ELECTROCHEMICAL CAPACITOR**
Toshihiko FURUKAWA, *United Chemi-Con,Inc,* JP

09:20 **DRIVING CONTROL ALGORITHM BASED ON ROUTE INFORMATION FOR A RANGE EXTENDED ELECTRIC VEHICLE**
Jaemyoung PI, *Sungkyunkwan University,* KR

09:40 **A STOCHASTIC MODEL PREDICTIVE CONTROL STRATEGY FOR ENERGY MANAGEMENT OF SERIES PHEV**
Haiming XIE, *Tsinghua University,* CN

09:00 – 10:20 E7: Fuel Cell Vehicles **305**

Chairpersons: Gerfried JUNGMEIER, JOANNEUM RESEARCH, AU
Sungho LEE, Hyundai Motor Company, KR

09:00 **ANALYSIS OF FIELD-STRESSED MODULES FROM A FUEL-CELL VEHICLE'S MAIN INVERTER**
Hye Seong HEO, *InfineonTechnologies Korea Co Ltd,* KR

09:20 **AN INNOVATIVE BUSINESS MODEL FOR FUEL CELL PLUG-IN ELECTRIC VEHICLES**
Zhenhong LIN, *Oak Ridge National Laboratory,* US

09:40 **SENSITIVITY ANALYSIS FOR ASSESSING ROBUSTNESS OF POSITION-BASED PREDICTIVE ENERGY MANAGEMENT STRATEGY FOR FUEL CELL HYBRID ELECTRIC VEHICLE**
Jihun HAN, *KAIST,* KR

Technical Session 8

10:30 – 11:50 A8: Batteries & Energy Storage / Fuel Cells & Fuel Cell Systems **301**

Chairperson: Jean-Marc TIMMERMANS, Vrije Universiteit Brussel, BE

10:30 **CHARACTERISING LI-ION BATTERY DEGRADATION THROUGH THE IDENTIFICATION OF PERTURBATIONS IN ELECTROCHEMICAL BATTERY MODELS**
Kotub UDDIN, *University of Warwick,* UK

10:50 **EFFECTS OF IMBALANCE IN LARGE FORMAT LITHIUM ION CELLS ON CYCLE LIFE**
Hong-Keun KIM, *Seoul National University,* KR

11:10 **COLD START STUDIES IN A PEMFC STACK FOR AUTOMOTIVE FUEL CELLS**
Sungho LEE, *Hyundai Motor Group,* KR

11:30 **TOYOTA FUEL CELL SYSTEM (TFCS)**
Hiroyuki YUMIYA, *Toyota Motor Corporation,* JP

10:30 – 11:50 B8: Power Electronic Systems **302**

Chairpersons: Michael LAMPERTH, GKN EVO eDrive Systems Ltd, CH
Geunhie RIM, Korea Electrotechnology Research Institute, KR

10:30 **A NOVEL RECTIFICATION METHOD FOR A HIGH LEVEL AC VOLTAGE CONVERTING TO A LOW LEVEL DC VOLTAGE: EXAMPLE OF SCOOTERS IDLING STOP SYSTEM**
Pin Yung CHEN, *Industrial Technology Research Institute,* TW

10:50 **DESIGN OF A NOVEL SIC MOSFET STRUCTURE FOR EV INVERTER EFFICIENCY IMPROVEMENT**
Young Kyun JUNG, *Hyundai Motor Group,* KR

11:10 **CONTROL STRATEGIES AND FUNCTIONAL SAFETY FOR THE INTELLIGENT STATOR CAGE DRIVE (ISCAD)**
Florian BACHHEIBL, *Universitat der Bundeswehr Munchen,* DE

11:30 **THERMAL SIMULATION OF A POWER ELECTRONICS COLD PLATE WITH A PARAMETRIC DESIGN STUDY**
Boris MAROVIC, *Mentor Graphics,* DE

10:30 – 11:50 C8: Electric Vehicles **303**

Chairpersons: Maarten Messagie, Vrije Universiteit Brussel, BE
Bongsob SONG, Ajou University, KR

10:30 **RETROSPECTIVE OF EV TESTING BY CONSUMER REPORTS**
Gabriel SHENHAR, *Consumer Reports,* US

10:50 **UQM TECHNOLOGIES - INNOVATIVE SOLUTIONS FOR ELECTRIFYING VEHICLES**
Josh LEY, *UQM Technologies,* US

11:10 **POWERPLAZA EV TECHNOLOGY & EV PRODUCTS**
Lauren KWON, *Powerplaza.Co., Ltd.,* KR

10:30 – 11:50 D8: Plug-In Hybrid Electric Vehicles **304**

Chairperson: Haiming XiE, Tsinghua University, CN

10:30 **DESIGN, MODELING, SIMULATION AND ANALYSIS FOR CONVERSION OF CONVENTIONAL TATA INDICA CAR INTO PLUG IN HYBRID ELECTRIC VEHICLE**

Varsha SHAH, *Sardar Vallabhai National Institute of Technolgy,* IN

10:50 **ENERGY EFFICIENCY EVALUATION OF A PLUG-IN HYBRID VEHICLE UNDER EUROPEAN PROCEDURE, WORLDWIDE HARMONIZED PROCEDURE AND ACTUAL USE**
Francois BADIN, *IFPEN,* FR

11:10 **ROUTE-BASED ENERGY MANAGEMENT FOR PHEVS: A SIMULATION FRAMEWORK FOR LARGE-SCALE EVALUATION**
Namdoo KIM, *Argonne National Laboratory,* US

10:30 – 11:50 E8: Standardization & Regulation / Public Policy & Promotion **305**

Chairperson: Sang Kyu HWANG, KOTI (Korea Transport Institute), KR

10:30 **GUIDING INFRASTRUCTURE DEPLOYMENT: THE INVOLVEMENT OF INTERNATIONAL STANDARDIZATION**
Peter Van Den BOSSCHE, *Vrije Universiteit Brussel,* BE

10:50 **NOVEL LARGE SCALE SIMULATION PROCESS TO SUPPORT DOT'S CAFE MODELING SYSTEM**
Aymeric ROUSSEAU, *Argonne National Laboratory,* US

11:10 **LABORATORY ALIGNMENT PROCEDURE FOR IMPROVING REPRODUCIBILITY OF TYRE WET GRIP MEASUREMENT**
Kwangki JEON, *Korea Automotive Technology Institute,* KR

10:30 – 11:50 F8: Special Session of Local Government **306**

Chairperson: TBD

10:30 **SEOUL CITY'S EV POLICY**
Hee-Eun KANG, *Air Quality Management Division, Seoul City,* KR

10:50 **GLOBAL MECCA FOR EV POWERED BY WIND, JEJU SPECIAL SELF-GOVERNING PROVINCIAL GOVERNMENT EV POLICY**
Jung Ho JANG, *Energy Industry Division, Jeju Special Self-Governing Province,* KR

Plenary Session 3

12:10 – 12:50 **Hall 6C**

Chairperson: TBD

12:10 **THE FUTURE OF URBAN MOBILITY IS ELECTRIC AND WIRELESS**
Anthony THOMSON, *Qualcomm Europe Inc.*, UK

12:30 **POWER SEMICONDUCTOR TECHNOLOGIES FOR THE ELECTRIFIED POWERTRAIN OF THE FUTURE**
Mark MUENZER, *Infineon Technologies AG*, DE

Closing Ceremony

12:50 – 13:40 **Hall 6C**

Dialogue Session 1 — May 4 (Monday), 2015

Batteries & Energy Storage

DS1-01 **NECESSITY AND METHODS TO IMPROVE BATTERY LIFETIME ON SYSTEM LEVEL**
Susanne ROTHGANG, *RWTH Aachen University*, DE

DS1-02 **AN ANALYTICAL OPTIMAL SIZING METHOD FOR BATTERY–SUPERCAPACITOR POWERTRAIN INTERFACED WITH A BUCK-BOOST CONVERTER**
Li SUN, *University of Technology, Sydney*, AU

DS1-03 **THE EFFECT OF AN ADDITION OF CATALYST ON THE ELECTROCHEMICAL PERFORMANCE OF CATHODE MATERIALS FOR LITHIUM SECONDARY BATTERIES**
Jungbae LEE, *Hyundai Mobis*, KR

DS1-04 **BATTERY LIFE IMPACT OF VEHICLE-TO-GRID APPLICATION OF ELECTRIC VEHICLES**
Hajo RIBBERINK, *Natural Resources Canada*, CA

DS1-05 **DEVELOPMENT OF HYDROGEN STORAGE TANK USED FOR FUEL CELL ELECTRIC VECHICLE(FCEV) BY NUMERICAL ANALYSIS**
Dongsun LEE, *Hyundai Motor Group*, KR

DS1-06 **A COMPARATIVE STUDY OF DIFFERENT FAST CHARGING METHODOLOGIES FOR LITHIUM-ION BATTERIES BASED ON AGING PROCESS**
Mohamed Abdel MONEM, *Vrije Universiteit Brussel*, BE

DS1-07 **A STUDY ON THE STATE OF CHARGE ESTIMATION BASED ON INTERNAL RESISTANCE AND POWER COUNTING FOR LITHIUM ION BATTERY**
Ho Young PARK, *Hyundai Mobis*, KR

DS1-08 **COMPARING THE PERFORMANCES OF DIFFERENT ENERGY STORAGE CELLS FOR HYBRID ELECTRIC VEHICLE**
Dongxiang YAN, *China Agriculture University*, CN

DS1-09 **A MERGED METHOD BETWEEN THE DATA MINING AND THE WT FOR CHARACTERISTIC ANALYSIS OF LITHIUM IRON PHOSPHATE BATTERY**
Jonghoon KIM, *Chosun University*, KR

DS1-10 **EXPERIMENT-BASED ANALYSIS BETWEEN THE WAVELET TRANSFORM AND THE DISCRETE WAVELET PACKET TRANSFORM**
Jonghoon KIM, *Chosun University*, KR

DS1-11 **SOC ESTIMATION PERFORMANCE COMPARISON BASED ON THE EQUIVALENT CIRCUIT MODEL USING AN EKF IN COMMERCIAL LICOO2 AND LIFEPO4 CELLS**
Hyunjun LEE, *Soongsil University*, KR

DS1-13 **PEO/NASICON BASED HYBRID SOLID ELECTROLYTE FOR ALL SOLID-STATE LITHIUM BATTERY**
Yun-Chae JUNG, *Hanyang University*, KR

DS1-14 **ELECTROCHEMICAL PERFORMANCES OF GRAPHITE AND LINI0.6CO0.2MN0.2O2 CELLS AT LOW TEMPERATURE**
Chil-Hoon DOH, *KERI(Korea Electro-technology Research Institute)*, KR

DS1-15 **A STUDY ON THE AMOUNT OF AVAILABLE ENERGY ACCORDING TO THE STATE OF INTERNAL IMPEDANCE OF A BATTERY FOR VEHICLES**
Byoung-Hoon KIM, *Korea Automotive Technology Institute*, KR

DS1-16 **SOC ESTIMATION ALGORITHM FOR THE MULTIPLE LITHIUM-ION BATTERIES**
Kim Hung NGUYEN, *Soongsil University*, KR

DS1-17 **HYBRID ELECTRIC VEHICLE CONTROL STRATEGY OPTIMIZATION BY INCORPORATING REDUCED ORDER BATTERY ELECTROCHEMICAL MODEL**

Chengliang YIN, *Shanghai Jiao Tong University*, CN

DS1-18 **TEMPERATURE MEASUREMENT OF LARGE FORMAT POUCH CELLS WITH IMPEDANCE SPECTROSCOPY**
Reinhold KOCH, *TUM CREATE*, SG

DS1-19 **BATTERY DIAGNOSTIC SYSTEM AND COMPLEX IMPEDANCE MEASUREMENT ALGORITHM**
Andre THUNOT, *Cambridge University*, UK

DS1-21 **DEVELOPEMENT OF ACCELERATED CYCLE LIFE TEST METHOD FOR (HYBRID) ELECTRIC VEHICLE BATTERY MODULE**
Jungeun HYUN, *Korea Automotive Technology Institute*, KR

DS1-22 **PREDICTION OF ELECTROCHEMICAL PROCESS INSIDE LITHIUM-ION BATTERY BASED ON SIMILARITY THEORY**
Cheng HONGZHENG, *Tongji University*, CN

DS1-23 **INCOBAT INNOVATIVE AND COST EFFICIENT MANAGEMENT SYSTEM FOR NEXT GENERATION HIGH VOLTAGE BATTERIES FOR AUTOMOTIVE APPLICATIONS**
Bartek KRAS, *Impact Clean Power Technology SA*, PL

DS1-24 **PERFORMANCE CHARACTERISTICS OF A HEAT PUMP FOR DEHUMIDIFYING OF A CABIN IN ELECTRIC VEHICLES**
Jae Hwan AHN , *Korea University*, KR

DS1-25 **EFFICIENT FAST-CHARGING STRATEGIES FOR LI-ION BATTERIES**
José Luis Antuña ALBUERNE, *University of Oviedo*, ES

DS1-92 **DESIGN AND SIMULATION OF LIQUID-COOLING PLATES FOR THERMAL MANAGEMENT OF EV BATTERIES**
Zechang SUN, *Clean Automotive Engineering Center, Tongji University*, CN

Charging & Infrastructure

DS1-26 **EV CHARGER MODELING BASED ON IEC 61850 STANDARDS**
Seongjoon LEE, *KERI(Korea Electro-technology Research Institute)*, KR

DS1-27 **TRANSITION TO SOFT INFRASTRUCTURE**
Sunggyoo GEO, *Geo-Line Co., Ltd.*, KR

DS1-28 **E-MOBILITY IN CAR PARKS – GUIDELINES FOR CHARGING INFRASTRUCTURE EXPANSION PLANNING AND OPERATION BASED ON STOCHASTIC SIMULATIONS**
Martin UHRIG, *Karlsruhe Institute of Technology*, DE

DS1-29 **HIGH POWER COMPACT CONTACTLESS CHARGING SYSTEM.**
Hiroyuki KISHI, *Technova Inc.*, JP

DS1-30 **CONTACTLESS ELECTRIC VEHICLE CHARGING – A COMPARATIVE COIL DESIGN ANALYSIS**
Benjamin KLAUS, *Karlsruhe Institute of Technology*, DE

DS1-31 **FAST CHARGING OF ELECTRIC VEHICLE, NEW SOLUTIONS AND CONCEPTS**
Karl VESTIN, *Lithium Balance A/S*, SE

DS1-32 **A STUDY OF 6.6KW ON BOARD CHARGER FOR ELECTRIC VEHICLE**
Youngsoo DOW, *Hyundai Mobis*, KR

DS1-33 **CONSIDERATION OF BATTERY DEGRADATION AND CHARGING INFRASTRUCTURE THROUGH LONG-TERM USE EXPERIENCE OF AN ELECTRIC VEHICLE**
Yoshinori KONDO, *National Institute for Environmental Studies, Ministry of the Environment of Japan*, JP

DS1-34 **ELECTRIC CITY BUS AND INFRASTRUCTURE DEMONSTRATION ENVIRONMENT IN ESPOO, FINLAND**
Juhani LAURIKKO, *VTT Technical Research Centre of Finland*, FI

DS1-35 **FAST IN CHARGE PROJECT: INNOVATIVE FAST INDUCTIVE CHARGING SOLUTION FOR ELECTRIC VEHICLES. MECHANICAL, ELECTRICAL AND CONTROL INTEGRATION**
José Luis CALVO, *Tecnalia*, ES

DS1-36 **CHARGING CHOICES OF SMALL-BATTERY PHEV DRIVERS USING INSTRUMENTED VEHICLE DATA**
Don MACKENZIE, *University of Washington*, US

DS1-37 **IMPACT OF FAST CHARGING ON LIFE OF EV BATTERIES**
Ahmad PESARAN, *National Renewable Energy Laboratory*, US

DS1-38 **A LINK CAPACITOR DESIGN FOR ON-BOARD CHARGER IN ELECTRIC VEHICLES**
Dongyoon NOH, *Mando Corporation*, KR

DS1-39 **TEST CASES FOR AC PORTABLE HOME CHARGER OF ELECTRICAL VEHICLE**
SungKi HWANG, *Kyungshin Corp.*, KR

DS1-40 **COEXISTENCE TEST BETWEEN HS-PLC AND HPGP IN KOREA AMI-EVSE**
Chagneun PARK, *KERI(Korea Electro-technology Research Institute)*, KR

DS1-41 **COMMUNICATION PROTOCOL BETWEEN EV CHARGER AND SMART CHARGER OPERATION SYSTEM**
Seung-Ho HAN, *KEPCO Research Institute*, KR

DS1-42 **FOREIGN METAL DETECTION BY COIL IMPEDANCE FOR EV WIRELESS CHARGING SYSTEM**
Ting-En LEE, *Automotive Research & Testing Center*, TW

DS1-43 **INRUSH CURRENT REDUCTION METHOD ANALYSIS IN ELECTRIC VEHICLE CHARGING**
Kyoungjin KIM, *RenaultSamsung Motors*, KR

Electric Motors & Generators

DS1-44 **COMPARISON OF THERMAL PERFORMANCE BETWEEN DIRECT COIL COOLING AND WATER JACKET COOLING FOR ELECTRIC TRACTION MOTOR BASED ON LUMPED PARAMETER THERMAL NETWORK AND EXPERIMENTATION**
Zhengyu LIU, *Robert Bosch GmbH*, DE

DS1-45 **IDENTIFYING DYNAMIC CHARACTERISTICS OF THE TRACTION MOTOR HOUSING FOR THE NOISE REDUCTION OF THE ELECTRIC VEHICLE**
Jongchan PARK, *Hyundai Mobis*, KR

DS1-46 **PATENT LANDSCAPE OF ELECTRIC MACHINE TECHNOLOGIES FOR ELECTRIC MOBILITY**
Enver Doruk ÖZDEMIR, *German Aerospace Center - Institute of Vehicle Concepts*, DE

DS1-47 **THE DESIGN METHOD OF TRACTION MOTOR INSULATION SYSTEM FOR ECO-FRIENDLY VEHICLES**
Yongho KIM, *Hyundai Mobis*, KR

DS1-48 **ANALYSIS ON THE HIGH-SPEED PERMANENT MAGNET SYNCHRONOUS MOTOR FOR FCEV AIR COMPRESSOR**
Ji-Hwan CHOI, *Hyundai Mobis*, KR

DS1-49 **DESIGN OF THE END-COIL STRUCTURE WITH SQUARE CONDUCTOR FOR THE AUTOMOBILE ISG**
Se Hyun RHYU, *Korea Electronics Technology Institute*, KR

DS1-50 **ELECTROMAGNETIC EQUIVALENT CIRCLE MODELING OF INTERIOR PERMANENT MAGNET SYNCHRONOUS MACHINE USING MODELICA**
Xueping CHEN, *Tongji University*, CN

DS1-51 **MAGNETIC EQUIVALENT CIRCUIT MODEL OF INTERIOR PERMANENT-MAGNET SYNCHRONOUS MACHINE CONSIDERING MAGNETIC SATURATION**
Zaimin ZHONG, *Tongji University*, CN

DS1-52 **STUDY ON PERMANENT MAGNET TEMPERATURE ESTIMATION OF PMSM FOR EV TRACTION**

Suyeon CHO, *Korea Automotive Technology Institute*, KR

DS1-53 **MAGNETIC SATURATION AND IRON LOSS INFLUENCE ON MAX TORQUE PER AMPERE CURRENT VECTOR VARIATION OF SYNCHRONOUS RELUCTANCE MACHINE**
Taechul JEONG, *Hanyang University*, KR

DS1-54 **TORQUE RIPPLE OPTIMIZATION OF IPM**
Seil YANG, *GM Korea*, KR

DS1-55 **IMPROVEMENT OF BACK-EMF WAVEFORM BY ADJUSTING POLE ANGLE IN SURFACE-MOUNTED PERMANENT MAGNET SYNCHRONOUS MACHINE TYPE GENERATOR FOR FLY-WHEEL**
Young-Jin SHIN, *Hanyang University*, KR

DS1-56 **A STUDY TO DETERMINE DESIGN PARAMETERS WITH STATISTICAL METHODS CONSIDERING COGGING TORQUE OF EPS MOTORS**
Soohwan PARK, *Hanyang University*, KR

DS1-57 **COGGING TORQUE REDUCTION IN SURFACE-MOUNTED PERMANENT MAGNET SYNCHRONOUS MOTOR BY AXIAL POLE PAIRING**
Jung Pyo HONG, *Hanyang University*, KR

DS1-58 **AN INTEGRATED PM MAGNETIC-GEARED MACHINE FOR HYBRID ELECTRIC VEHICLES**
K. T. CHAU, *The University of Hong Kong*, HK

DS1-59 **FABRICATION STUDY OF LAMINATED STATOR FOR AN E-BIKE AXIAL FLUX ELECTRIC MACHINE**
Chau-shin JANG, *Industrial Technology Research Institute*, TW

DS1-60 **DEVELOPMENT AND PERFORMANCE INVESTIGATION OF 60KW INDUCTION MOTOR WITH COPPER DIE-CASTING ROTOR FOR ELECTRIC VEHICLE PROPULSION APPLICATIONS**
Yondo CHUN, *KERI(Korea Electro-technology Research Institute)*, KR

DS1-61 **INTELLIGENT STATOR CAGE WINDING FOR AUTOMOTIVE TRACTION ELECTRIC MACHINES**
Dieter GERLING, *Universitat der Bundeswehr Munchen*, DE

DS1-62 **ROTATING TRANSFORMER FOR A WOUND ROTOR SYNCHRONOUS MOTOR**
Jiyoung LEE, *KERI(Korea Electro-technology Research Institute)*, KR

DS1-63 **MAGNETIC CORE STRUCTURE DESIGN CONSIDERING CONDUCTOR-OCCUPYING RATIO**
Eui Chun LEE, *Korea Institute of Industrial Technology*, KR

DS1-64 **CURRENT CONTROL STRATEGY OF WOUND ROTOR SYNCHRONOUS MACHINE WITH LOSSES CONSIDERATION**
Qi WANG, *Kookmin University*, KR

DS1-65 **COMPARISON OF IPM AND SPM MOTORS USING FERRITE MAGNETS FOR LOW-VOLTAGE TRACTION SYSTEMS**
Yonghoon KIM, *Korea Institute of Industrial Technology*, KR

DS1-66 **DESIGN AND THERMAL ANALYSIS OF WHEEL HUB MOTORS OF ELECTRIC VEHICLES USING ANALYTICAL AND CFD METHODS**
Jun Ho LEE, *Korea Automotive Technology Institute*, KR

Power Electronic Systems

DS1-67 **EXPERIMENTAL RESEARCH ON PERFORMANCE OF TRACTION MOTOR FOR ELECTRIC VEHICLE**
Jin-Hong KIM, *Korea Electronics Technology Institute*, KR

DS1-68 **SHIELDING PERFORMANCE AND MEASUREMENT METHOD OF HIGH-VOLTAGE WIRING HARNESSES**
Yoshio MIZUTANI, *AutoNetworks Technologies, Ltd. (SUMITOMO ELECTRIC Group)*, JP

DS1-69 **A DEVELOPMENT OF FORWARD DC-DC CONVERTER WITH ACTIVE-CLAMP FOR SMALL**

HYBRID ELECTRIC VEHICLE
Hyojin BANG, *Hyundai Mobis*, KR

DS1-70 **EVALUATION OF A 600V 450A HYBRID SIC POWER MODULE**
Xuhui WEN, *Institute of Electric Engineering, CAS*, CN

DS1-71 **NOVEL SIC JUNCTION BARRIER SCHOTTKY DIODE STRUCTURE FOR EFFICIENCY IMPROVEMENT OF EV INVERTER**
Dae Hwan CHUN, *Hyundai Motor Group*, KR

DS1-72 **EXPERIMENTAL MODELING AND DIRECT DIGITAL CONTROL OF PMSM**
Kiyong LEE, *Chungbuk National University*, KR

DS1-73 **DESIGN OPTIMIZATION OF BULK CAPACITOR**
Hyoungmin KIM, *GM Korea*, KR

DS1-74 **POWER FACTOR CORRECTION IN ON-BOARD CHARGER**
Suhan WOO, *GM Korea*, KR

DS1-75 **DEVELOPMENT OF HIGH EFFICIENCY BI-DIRECTIONAL DC/DC CONVERTER FOR 48V-12V DUAL VOLTAGE SYSTEM IN VEHICLE**
Hoonsung SUNG, *Kyungshin Corp.*, KR

DS1-76 **TECHNOLOGY OF LOAD MANAGEMENT FOR ENHANCEMENT OF POWER SAFETY IN VEHICLES**
Jong-Min PARK, *Taesung Electro-Circuit Systems*, KR

DS1-77 **ANALYSIS OF POWER MODULE RELIABILITY EXPOSED TO REAL OPERATION CONDITIONS OBSERVED IN ELECTRIFIED VEHICLES**
Minki KIM, *Hanyang University*, KR

Embedded Control Systems

DS1-78 **INTEGRATED CIRCUIT FOR BATTERY MANAGEMENT SYSTEMS IN ISO26262 COMPLIANT VEHICLES**
Karl VESTIN, *Lithium Balance A/S*, SE

DS1-79 **EARLY-STAGE RESOURCE EVALUATION METHOD FOR ECU INTEGRATION OF HYBRID ELECTRIC VEHICLES**
Jaesung CHUNG, *Hanyang University*, KR

DS1-80 **A STUDY ON CLAMPING FORCE ESTIMATION OF EMB FOR FUEL-CELL VEHICLE USING SLIDING MODE OBSERVER**
Kangseok LEE, *Changwon National Univ.*, KR

Propulsion Systems & Subsystems

DS1-81 **PRACTICAL AC MOTOR CONTROLLER DESIGN SOLUTIONS OF HIGH CURRENT CONTROL FOR 5~15KW PARTICULAR ELECTRIC VEHICLES**
Shin-Hung CHANG, *Industrial Technology Research Institute*, TW

DS1-82 **INVESTIGATION ON IGBT FAILURE EFFECTS OF EV/HEV INVERTER USING FAULT INSERTION HIL TESTING**
Ping-Lun LI, *Industrial Technology Research Institute*, TW

DS1-83 **A NOVEL DTC METHOD FOR SURFACE PMSM USED IN ELECTRIC VEHICLE**
Yaohua LI, *Chang'an University*, CN

DS1-84 **DYNAMIC ANALYSIS ON A BELT DRIVING STARTER AND GENERATOR SYSTEM**
Zhichao HOU, *Tsinghua University*, CN

DS1-85 **OPTIMAL TORQUE DISTRIBUTION STRATEGY FOR A FOUR MOTORIZED WHEELS ELECTRIC VEHICLE**
Xudong ZHANG, *Technical University of Berlin*, DE

DS1-86 **INTEGRATED ELECTRIC VEHICLE MONITORING SYSTEM**
Seongjoon LEE, *KERI(Korea Electro-technology Research Institute)*, KR

Heating & Cooling Systems

DS1-87 **AN ENERGY-SAVING THERMOSTAT CONTROLLER FOR ELECTRIC VEHICLE AIR-CONDITIONING SYSTEM**
Po-Hsu LIN, *Automotive Research & Testing Center*, TW

DS1-88 **THERMAL MANAGEMENT OF DENSELY-PACKED EV BATTERY SET**
Jin LIWEN, *Xi'an Jiaotong University*, CN

DS1-89 **STUDY OF HEATING SYSTEM ON THE BATTERY MODULE FOR PHEV**
Nam Il KIM, *Korea Automotive Technology Institute*, KR

DS1-90 **EXPERIMENTAL STUDY ON HEATING PERFORMANCE CHARACTERISTICS FOR AIR-SOURCED HEAT PUMP**
Hoseong LEE, *Korea Automotive Technology Institute*, KR

Auxiliary Components

DS1-91 **DEVELOPMENT OF EV MODEL MOUNTED HILS FOR THE EVALUATION OF THE DYNAMIC CHARACTERISTIC OF ELECTRIFIED COMPONENT MOTOR IN EV/HEVS**
Yongtae KIM, *Korea Automotive Technology Institute*, KR

Dialogue Session 2 — May 5 (Tuesday), 2015

Fuel Cells & Fuel Cell Systems

DS2-1 **A STUDY ON THE PREDICTION TECHNIQUE OF THE THERMAL MANAGEMENT SYSTEM PERFORMANCE AT VARIOUS STACK OPERATING CONDITIONS IN A FUEL CELL VEHICLE**
Youngbok LIM, *Hyundai Mobis*, KR

Fuel Cell Vehicles

DS2-2 **CENTRIFUGAL AIR COMPRESSOR FOR FUEL CELL ELECTRIC VEHICLE**
Kyungseok CHO, *Halla Visteon Climate Control Corp.*, KR

DS2-3 **A STUDY OF METHOD TO SOLVE COLD-START PROBLEM IN FUEL CELL ELECTRIC VEHICLE**
Yongshik CHONG, *Hyundai Mobis*, KR

Electric Vehicles

DS2-4 **EV (ELECTRIC VEHICLE) SHARING DEMAND ESTIMATION -A CASE STUDY OF BEIJING, CHINA-**
Taekwan YOON, *LG CNS*, KR

DS2-5 **EV (ELECTRIC VEHICLE) FLEET SIZE AND COMPOSITION OPTIMIZATION BASED ON DEMAND SATISFACTION AND TOTAL COSTS MINIMIZATION**
Taekwan YOON, *LG CNS*, KR

DS2-6 **ENERGY EFFICIENCY AND FUEL ECONOMY ANALYSIS OF A PARALLEL HYBRID ELECTRIC BUS IN DIFFERENT CHINESE URBAN DRIVING CYCLES**
Jiuyu DU, *State Key Laboratory of Automotive Safety and Energy, Tsinghua University*, CN

DS2-7 **NEW TEST BENCH FOR VEHICLE POWER NETWORK WITH OUTSTANDING ACCURACY, RESOLUTION AND DATA RATE**
Dmytro BILYI, *University of Federal Defense Munich*, DE

DS2-8 **A METHODOLOGY TO DERIVE MTPA CONTROL TRAJECTORY FOR XEV TRACTION IPMS=SM**
Weizhe QIAN, *Infineon Integrated Circuit (Beijing) Co Ltd*, CN

DS2-9 **WILL SUB-100 CONTINUE TO DOMINATE THE U.S. BATTERY ELECTRIC VEHICLES MARKET?**
Zhenhong LIN, *Oak Ridge National Laboratory*, US

DS2-10 **SOLVING THE RANGE CHALLENGE? RANGE NEEDS VERSUS RANGE PREFERENCES FOR BATTERY ELECTRIC VEHICLES WITH RANGE EXTENDER**
Thomas FRANKE, *Technische Universitaet Chemnitz*, DE

DS2-11 **AN ENERGY MANAGEMENT STRATEGY OF HYBRID ENERGY STORAGE SYSTEMS FOR ELECTRIC VEHICLES**
Chunhua ZHENG, *Shenzhen Institutes of Advanced Technology*, CN

DS2-12 **LIFE-CYCLE ENERGY AND CARBON FOOTPRINTS OF ELECTRIC CARS UNDER BEIJING REAL-WORLD DRIVING PATTERNS**
Hewu WANG, *Tsinghua University*, CN

DS2-13 **COMPARISON OF MCT AND SCT MODE BASED ON THE VEHICLE PARAMETERS IN INFLUENCING THE BEV DRIVING RANGE.**
Changkyu CHOI, *GM Korea*, KR

DS2-15 **ELECTRIC VEHICLES, ENVIRONMENT AND ELECTRIC ENERGY IN KOREA**
Geunhie RIM, *KERI(Korea Electro-technology Research Institute)*, KR

DS2-16 **A FULL ELECTRIC VEHICLE 4WD TYPE**
Danut Gabriel MARINESCU, *University of Pitesti*, RO

DS2-17 **DESIRED SLIP RATIO ESTIMATION AND TRACKING USING FUZZY OBSERVER FOR IN-WHEEL**

EV
Jongmoo KIM, *KERI(Korea Electro-technology Research Institute)*, KR

DS2-18 **COMPARISON OF ENERGY CONSUMPTION IN ELECTRIC VEHICLE EQUIPPED WITH SINGLE- OR MULTI-SPEED SYSTEM OF POWER TRANSMISSION**
Jakub BERNATT, *Institute of Electrical Drives & Machines KOMEL*, PL

DS2-19 **IMPLICATIONS OF CHANGES IN THE ELECTRICITY MIX FOR THE ENVIRONMENTAL PERFORMANCE OF BATTERY ELECTRIC VEHICLES IN BELGIUM**
Surendraprabu RANGARAJU, *Vrije Universiteit Brussel*, BE

DS2-20 **NOISE SOURCE ANALYSIS AND REDUCTION OF INDUCTION MOTOR FOR ELECTRIC VEHICLE**
Jung Pyo HONG, *Hanyang University*, KR

DS2-21 **TIRE-ROAD FRICTION ESTIMATION BASED ON FREQUENCY CHARACTERISTICS OF IN-WHEEL DRIVE SYSTEM**
Yu-Gong LUO, *Tsinghua University*, CN

DS2-22 **A STUDY OF ALLOWABLE BRAKING TORQUE OFFSET IN THE CASE OF SINGLE EMB ACTUATOR FAILURE**
Ji In PARK, *Korea Automotive Technology Institute*, KR

DS2-23 **COMPARISON OF HYBRID-EXCITATION FAULT-TOLERANT IN-WHEEL MOTOR DRIVES FOR ELECTRIC VEHICLES**
T. W CHING, *University of Macau* , MO

DS2-24 **INFLUENCE OF THE EXTRA WHEEL MASS OF ELECTRIC BIKES**
Zhichao HOU, *Tsinghua University*, CN

DS2-25 **REAL-TIME OPTIMAL ENERGY MANAGEMENT STRATEGY FOR RANGE-EXTENDED ELECTRIC BUS IN HARBIN URBAN BUS DRIVING CYCLE**
Jingfu CHEN, *Tsinghua University*, CN

DS2-26 **STATISTICAL CHARACTERIZATION OF MEDIUM-DUTY ELECTRIC VEHICLE DRIVE CYCLES**
Robert PROHASKA, *National Renewable Energy Laboratory*, US

DS2-27 **FEATURES OF OPERATION OF ELECTROMOBILE TRANSPORT IN THE CONDITIONS OF RUSSIA**
Kirill KARPUKHIN, *Federal State Unitary Enterprise NAMI*, RU

DS2-28 **CALCULATION OF INSTALLATION UNITS OF PUBLIC FAST CHARGING INFRA IN FUTURE AND ANALYSIS OF IMPACT ON THE POWER CONSUMPTION AMOUNT ACCORDING TO CHARGING BEHAVIOR OF ELECTRIC VEHICLES DURING THE INITIAL STAGE IN KOREA**
Hyungmok YOO, *KOTI (Korea Transport Institute)*, KR

DS2-29 **INDEPENDENT AND INTEGRATED TORQUE CONTROL OF 4-WHEEL DRIVE ELECTRIC VEHICLE FOR AUTOMATED DRIVING**
In-Soo SUH, *KAIST*, KR

DS2-30 **CONVERTING MOTORISED SAILING YACHTS TO CARBON-NEUTRAL VESSELS**
Evan Lowell / Eric Kin-Ming Yee, *National University of Singapore*, SG

DS2-31 **MULTIFUNCTIONAL SOLAR CHARGING STATION FOR ELECTRIC VEHICLES**
Joerg Dieter WEIGL, *National University of Singapore*, DE

DS2-32 **GENETIC ALGORITHMS BASED OPTIMAL ENERGY MANAGEMENT STRATEGY FOR FOUR-WHEEL INDEPENDENT DRIVE ELECTRIC VEHICLES**
Xiaoshuai XIN, *University of Electronic Science and Technology of China*, CN

DS2-33 **ANALYSIS OF ELECTRIC CITY BUS PERFORMANCE BASED ON TRANSIENT TEST OF ELECTRIC DRIVE SYSTEM CONSIDERING REAL-WORLD DRIVIING CYCLES**
Hochang JUNG, *KATECH, Korea Automotive Technology Institute*, KR

DS2-34 **ANALYSIS OF ENERGY CONSUMPTION PERFORMANCE FOR ELECTRIC VEHICLE CONSIDERING TRANSMISSION SHIFTING PATTERN**

Hochang JUNG, *KATECH, Korea Automotive Technology Institute*, KR

DS2-80 **REMAINING DRIVING RANGE ESTIMATION FOR ELECTRIC VEHICLES BASED ON AN ADVANCED BATTERY RESIDUAL ENERGY MODEL**
Guangming LIU, *Tsinghua University*, CN

Hybrid Electric Vehicles

DS2-36 **STUDY ON MULTI-OBJECTIVE COOPERATIVE AND OPTIMIZATION CONTROL METHOD FOR HYBRID BUS WITH DUAL-PLANETARY STRUCTURE**
Zhiguo KONG, *China Automotive Technology and Research Center*, CN

DS2-37 **NEW EXPERIMENTAL METHOD FOR SWITCHIING NOISE OF MOTORS**
Hyunsu KIM, *Hyundai Motor Group*, KR

DS2-38 **LOSS ANALYSIS AND THERMAL DESIGN IN 48V MILD HYBRID DC-DC CONVERTER**
Deok-Kwan CHOI, *Hyundai Mobis*, KR

DS2-39 **DESIGN SPACE EXPLORATION AND HYBRIDIZATION OF THE KIIRA-EV SMACK**
Richard MADANDA, *Electric and Hybrid Vehicles*, NL

DS2-40 **CHARACTERISTIC ANALYSIS OF THE SELF-EXCITED EDDY CURRENT BRAKE ACCORDING TO THE PARAMETER VARIATIONS**
Taechul JEONG, *Hanyang University*, KR

DS2-41 **ECONOMIC HYBRID TRANSMISSION SYSTEM USING CLUTCHLESS GEARED MANUAL TRANSMISSION**
Huiun SON, *KAIST*, KR

DS2-42 **AN EFFICIENCY-BASED ENERGY MANAGEMENT STRATEGY FOR SERIES HYBRID ELECTRIC VEHICLES**
Soonkyu JEONG, *Agency for Defense Development*, KR

DS2-43 **EFFECT OF DRIVING PATTERN PARAMETERS ON FUEL-ECONOMY FOR DIESEL AND HYBRID ELECTRIC CITY BUSES**
Ming CHI, *Tsinghua University*, CN

DS2-44 **DESIGN OF A HIGH EFFICIENCY CONTROLLER OF A BI-DIRECTIONAL DC-DC CONVERTER FOR 48V MILD HEV**
Seongjun LEE, *Hyundai Mobis*, KR

DS2-45 **SIMULINK MODELING FOR HYBRID VEHICLE DYNAMIC CHARACTERISTICS**
Jung Pyo HONG, *Hanyang University*, KR

DS2-46 **FUEL SAVING OF POWER TRAIN MODELING IN THE PARALLEL HYBRID TRACTOR**
Hyeonseop YI, *Seoul National University*, KR

DS2-47 **PARAMETER DESIGN OF REGENERATIVE BRAKING STRATEGY AND BATTERY RANGE OF USE OF ELECTRIC VEHICLE USING THE OPTIMIZATION TECHNIQUE**
Kiyoung KIM, *Seoul National University*, KR

DS2-48 **MULTI-OBJECTIVE OPTIMIZATION OF A MULTI-MODE POWER-SPLIT HYBRID ELECTRIC VEHICLE CONSIDERING BATTERY DEGRADATION**
Chengliang YIN, *Shanghai Jiao Tong University*, CN

DS2-49 **DEVELOPMENT OF FUEL EFFICIENCY IMPROVEMENT ALGORITHM FOR HYBRID ELECTRIC VEHICLE BASED ON THE ADAS SENSORS**
Jaejoon KWON, *Kookmin University*, KR

DS2-50 **STUDY ON OPTIMIZATION OF PARALLEL HYBRID ELECTRIC ASSIST CONTROL STRATEGY**
Zhenpo WANG, *Beijing Institute of Technology*, CN

DS2-51 **FUEL ECONOMY IMPROVEMENT OF AN ELECTRIC ALL WHEEL DRIVE SYSTEM (E-AWD)**

Sangjae LEE, *Hyundai Motor Group*, KR

Plug-In Hybrid Electric Vehicles

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