

Inhaltsverzeichnis

EVmore Ultimate Efficiency Driveline Concept	1
Stephan Demmerer, Christian Gürlich, Daniel Langhof and Johannes Ochsenreiter	
1 eMobility@ZF	1
2 Ultimate Efficiency Driveline Concept	2
3 EVmore—Demo Vehicle	5
4 Summary and Conclusion.....	7
References.....	8
 From Electrolyzer to Fuel Cell: Sustainable Mobility Along the Hydrogen Chain	
Tim Hosenfeldt	
1 Introduction	10
2 Pathways to Sustainable Products	11
3 Components for Energy Converters in the Hydrogen Chain	13
4 Summary.....	17
References.....	18
 High Power Density Fuel Cell Systems for Commercial Vehicles	
Alexander Schenk, Falko Berg, Johannes Linderl and Rolf Doeberiner	
1 Market Expectations on Fuel Cell Trucks	19
2 AVL’s Fuel Cell Demo Truck Development.....	20
3 Summary and Conclusion.....	26
References.....	27

BiFoilStack—Novel Cell and Stack Design with Compound-Foil-Based Bipolar Plates for Heavy-Duty Fuel Cell Systems. 28

Marius Zubel, Marius Walters, Samira Jafari, Matthias Soddemann, Jakub Kadlcak, Sarah-Elisabeth Dechent, Fabian Laubacher, Peter Keller, Jan Ott, Julian Toussaint, Michael Joemann, Laura Huwald and Maximilian Wand

1 Introduction 29

2 Heavy-Duty Stack Requirements 30

3 Conceptual Cell Design 33

4 Continuous Fabrication and Characterization Methods of Thermoplastic Bipolar Foils. 45

5 Summary. 47

References. 48

Torque Density on a New Level—Results of a Holistic e-drive System Optimization. 50

Viktor Warth, Joao Bonifacio and Stephan Scharr

1 Benchmark and Target Setting 50

2 Challenges and Trade-offs for Maximizing the Torque-to-weight Ratio of e-drive Systems. 52

3 Thermal Consideration and Limitations at System Level 56

4 System Simulation and Optimization. 57

References. 61

Early Evaluation of Battery Electric Powertrain Architectures with Focus on Axial Flux Machines. 62

Felix Wipfler and Dieter Gerling

1 Introduction 63

2 Simulation Environment. 65

3 Definition of Powertrain Architectures. 68

4 Definition of Vehicle and Drivability Requirements 69

5 Derivation of Machine Requirements for Different Powertrain Architectures 71

6 Evaluation of Powertrain Solutions with Derived EM Designs 73

7 Summary and Outlook 75

References. 76

Innovative PMaSynRel Rotor Shape for Traction Electrical Machines in Recycling-Oriented Value Chain 77

Baptiste Chareyron, Misa Milosavljevic, Denis Grosjean, André Nasr, Samy Laabidi, Olivier Guyon, Stéphanie Desrousseaux and Gerard Delette

1 Introduction 77

2 Compliance of Motor Requirements with Circular Economy 79

Inhaltsverzeichnis	XI
3 Motor and Magnets Performances	81
4 Life Cycle Assessment	86
5 Conclusion	92
References	92
System Optimization of SiC Inverters Regarding Efficiency, Cost and Reliability	94
Thomas Orlik, Michael Maiworm, Mathias Lindner, Christoph Danzer, Heiko Rabba and Matthias Schultalbers	
1 Introduction	94
2 Synthesis of Optimized Electric Drive Systems	95
3 Optimized Operating Strategies for Traction Inverters	97
4 Powertrain Simulations	100
5 Results	103
6 Conclusion	107
References	107
Between Thermal Limits and Battery Degradation—Cell-Specific Optimization of Fast Charging Strategies	109
Mareike Schmalz, Christian Lensch-Franzen, Gert Hinsenkamp, Jürgen Geisler and Amalia Wagner	
1 Motivation	109
2 Market Observation	110
3 Fast Charging	112
4 Battery Degradation	114
5 Development Tools	115
6 Conclusion	120
References	120
Fast Charging for Trucks and Cars—Status, Challenges, and Solutions for the Widespread use of BEVs	121
Benjamin Langer, Gerhard Meister and Wenzel Prochazka	
1 Introduction	121
2 Charging—Use Case Passenger Car	122
3 Charging—Use Case Heavy Duty Truck	126
4 Insights on Public Funded <i>NEFTON</i> Project	130
5 Conclusion	131
References	132
e-Charging: Success Factors for Data and Service Management in Growing Markets	133
Philipp Merlitz and Johannes Ment	
1 Introduction	133
2 A Storm is coming—data Volumes and Complexity are about to Explode	134

3 Digitizing the Market—project Examples and Best Practices 138

4 Outlook. 141

References. 141

Data Acquisition and Management in Connected Energy Systems - lessons learned from the Research Project “Bidirectional Charging Management” 143

Xaver Pfab

1 The BDL Project. 144

2 Customer requirements. 144

3 System Architectures for Wide-range Connection 146

4 Data Transfer—Data use—Data Privacy 150

5 Connecting Data domains in the Customers Energy System 151

6 Summary and Outlook 155

References. 155

Project Bidirectional Charging Management—Results and Findings from the BCM Field Trial. 157

Adrian Ostermann, Theodor Haug and Vincenz Regener

1 Project Bidirectional Charging Management 157

2 BCM Field Trials 160

3 Conclusion & Outlook 172

References. 172

User Perspective on Bidirectional Charging—Insights from the Field Trial of the Research Project “Bidirectional Charging Management—BCM”. 175

Sebastian Hirsch, Franziska Kellerer, Johanna Zimmermann and Stefan Mang

1 Introduction 175

2 Capturing User Perspectives—Mixed Method Approach 176

3 User attitudes and perceptions towards bidirectional charging 179

4 Conclusion 185

References. 185

Home Refueling for FCEV. 187

Linda Schorer, Sven Schmitz and Thomas von Unwerth

1 Introduction 187

2 System Description. 190

3 Results of the Energy Analysis. 192

4 Conclusion 199

References. 200

Hydrogen Production by Electrolysis in the Light of a Decentralized Supply	202
Andreas Lenk	
1 Green Hydrogen Demand and Capacities	202
2 Electrolyzers Types.....	203
3 Decentralized Supply	208
4 Summary.....	211
References.....	211
 Addressing the Challenges of a Cross-Industry Consortium Project for the Integration of Electric Vehicle in the Energy System	212
Elisabeth Springmann, Jakob Zahler and Kirstin Ganz	
1 Motivation.....	212
2 unIT-e ² —Living Lab for integrated E-Mobility.....	213
3 Analysis of the Grid and System Integration of E-Mobility in international Context	218
4 Conclusion	223
References.....	224
 Simulation of e-bus Operation and Automated Planning of Charging and Tank Infrastructure	226
Alexander Windt, Julian Brendel, Paul Scheer and Tim Röpcke	
1 Introduction	227
2 Methodology.....	227
3 Results	234
4 Discussion and Outlook	239
References.....	239
 Innovative Charging Functions using ISO 15118-20	241
Ursel Willrett	
1 Introduction	241
2 ISO 15118 Standardization Family	242
3 Enhancements of ISO 15118-20.....	244
4 Conclusion	250
References.....	251
 Grid Integration of Electromobility into the Electricity Distribution Grid	252
Eric Ahlers	
1 The World must become Greener.....	253
2 Netze BW GmbH—key Actions and Solutions of a distribution Grid Operator for the Successful Integration of Electromobility into the Power Grid	256
3 The Future drives Electric	261
References.....	262