Company Presentation

2025

About Us

We are one of the world’s leading mobility technology companies for development, simulation and testing in the automotive industry, and in other sectors such as rail, marine, and energy.

Based on extensive in-house research activities, we deliver concepts, technology solutions, methodologies, and development tools for a greener, safer, better world of mobility and beyond.

Our Core Values

Our values are the guiding force behind our everyday work.

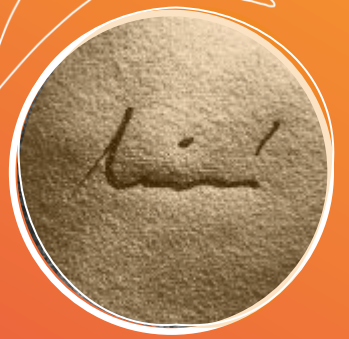
They have shaped our corporate culture since the very beginning.

Customer Orientation

Pioneering Spirit

Problem-Solving Competence

Responsibility



Independence

AVL at a Glance

1948
Founded

75+
Years of Experience

29
Countries Represented

50+
Global Tech and Engineering Centers

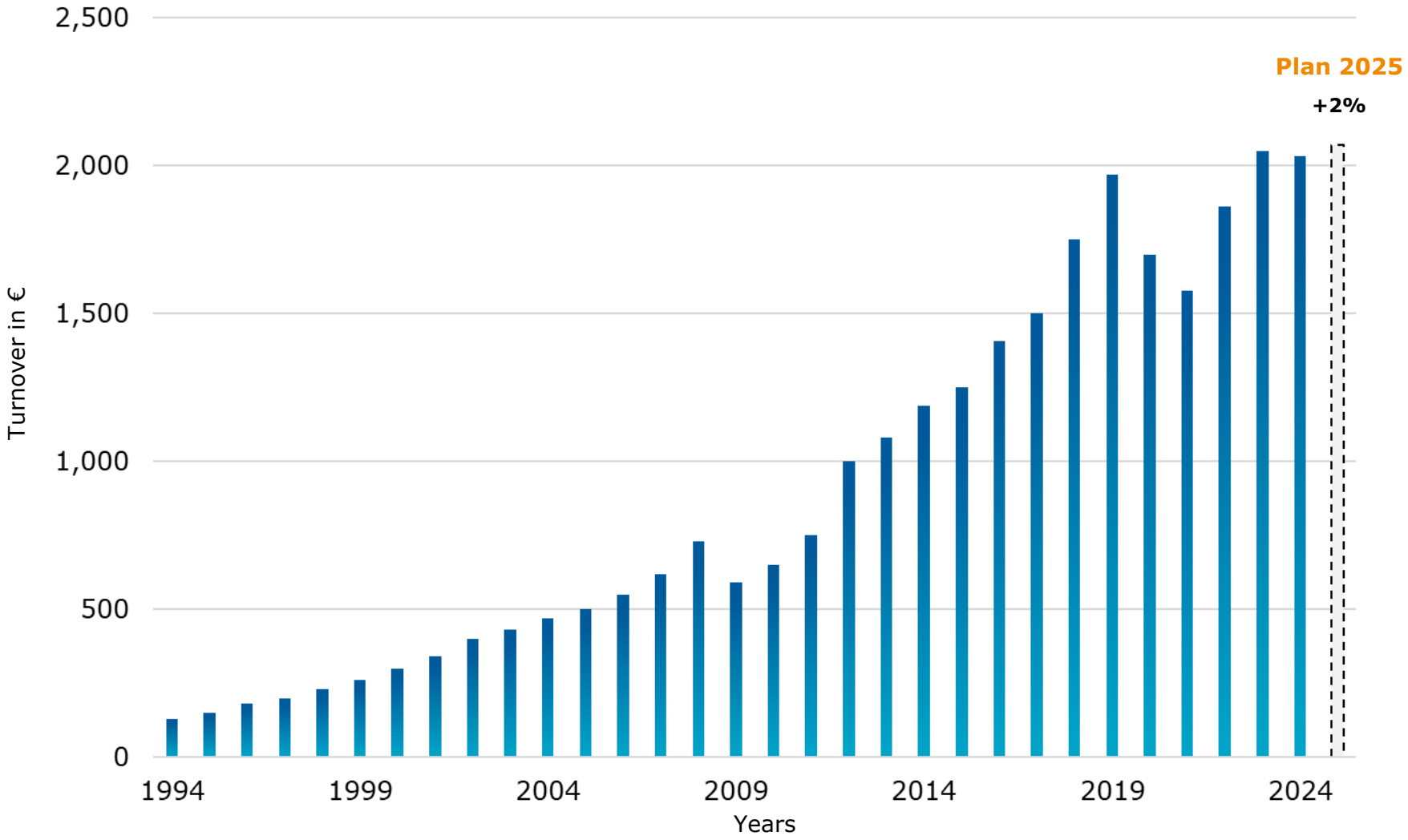
12,200
Employees Worldwide

67 %
Engineers and Scientists

11 %
Of Turnover Invested in Inhouse R&D

2,300
Granted Patents in Force

Our Turnover



2.03 Bn €
Turnover in 2024

96 %
Export Quota

AVL – A Global Partner

WHEREVER YOU ARE, FIND US THERE

Our Global Tech and Engineering Centers

NORTH AMERICA/ CANADA
- Plymouth **USA**
- Lake Forest **USA**
- Ann Arbor **USA**
- Vancouver **CAN**

EUROPE
- HQ Graz **AUT**
- Steyr **AUT**
- Hart bei Graz **AUT**
- Paris **FRA**
- Reggio Emilia **ITA**
- Budapest **HUN**
- Istanbul **TUR**
- Stuttgart **GER**
- Munich **GER**
- Ingolstadt **GER**
- Regensburg **GER**
- Heilbronn **GER**
- Berlin **GER**
- Remscheid **GER**
- Neuenstadt **GER**
- Basildon **UK**
- Coventry **UK**
- Södertälje **SWE**
- Haninge **SWE**
- Gothenburg **SWE**
- Trollhättan **SWE**
- Maribor **SLO**
- Warsaw **POL**
- Zagreb **CRO**
- Valladolid **ESP**
- Barcelona **ESP**

AFRICA
- Rabat **MOR**

ASIA
- Delhi-Gurgaon **IND**
- Shanghai **CHN**
- Tianjin **CHN**
- Chengdu **CHN**
- Seoul **KOR**
- Tokyo **JPN**

SOUTH AMERICA
- Sao Paulo **BRA**

AVL Electrification Competence Highlights

Engineering Services

Powertrain System Development

- Optimizing customer KPIs
- Balancing cost and consumer value
- Boosting development efficiency from idea to SOP & in-field

Battery Development

- Cell2Pack
- Integration of new cell technology e.g. solid state
- Immersion cooling
- Flexible, modular BMS (HW & SW)
- Functional integration and production process innovation

Ecosystem

- Sustainable mobility
- Charging
- Interoperability
- Data intelligence

Fuel Cell Development

- Cell, stack, system, powertrain development and validation solutions
- FC virtual test system

E-Drive Components, E-Axle and Hybrid Transmission

- 30.000rpm e-motor / e-axle
- High power density & efficiency
- High durability for heavy duty
- Low EMC & NVH emissions
- Advanced SiC inverters & DCDCs
- Innovative e-drive SW controls

Simulation and Testing Technologies

Battery Expertise

Industrialized solutions from concept to SOP

Battery systems evolved to a decisive component of modern vehicles in all different forms of transportation. For over a decade AVL is the independent market leader in battery technology.

Development and Integration

- Cell2Pack
- Integration of new cell technology e.g. solid state
- Immersion cooling
- Flexible, modular BMS (HW & SW)
- Functional integration and production process innovation

Testing and Validation

- Consultancy on validation programs
- Turnkey solutions for battery labs
- Data and test field management
- Stand-alone products or complete test solutions

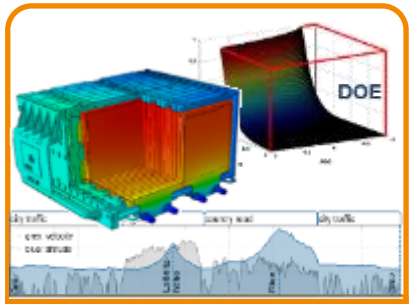
Simulation Tools and Services

- Empirical-based and electro-chemical models
- 1D & 3D solutions
- Aging models for lifetime prediction

Polestar

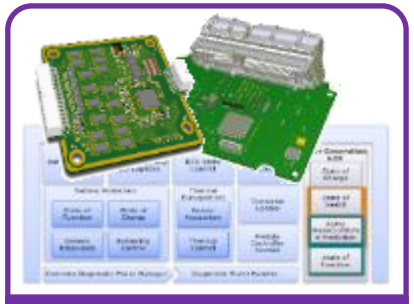
VALMET AUTOMOTIVE

Battery **Development and Integration** - Highlights



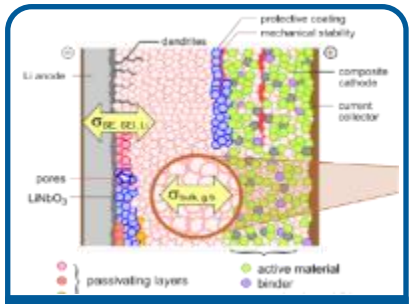
Battery Ageing Modelling

AVL uses a half empirical data driven model based on aging experiments and statistical methods to predict battery aging in the most precise and efficient way.



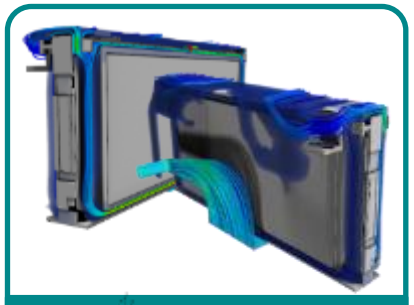
BMS Control

Sophisticated Battery Models and SOX Algorithms make it possible for the BMS to correct for aging modelling errors with a combined online estimation approach.



ASSB

AVL is both active in research and application of new ASSB cell technologies.



Immersion Cooling

AVL's capabilities for advanced fluid distribution & safety scenario simulation, material analyses and the ability to provide ready-to-use cell immersion cooling solutions.

Battery Innovation Center

Development and improvement upon battery production processes and prototyping of different manufacturing techniques for future battery technologies.

AVL Active DVP

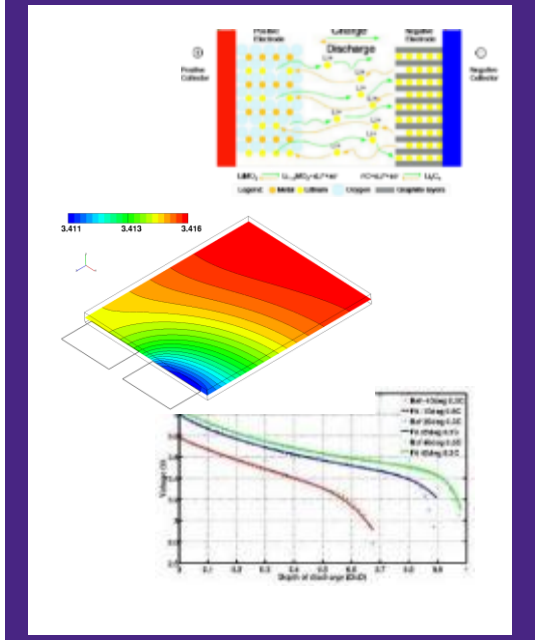
In-house active Design Validation Planning Toolset with the capabilities to provide a customer specific process for the homologation of a battery module or pack.

Battery - **Testing and Validation Solutions**

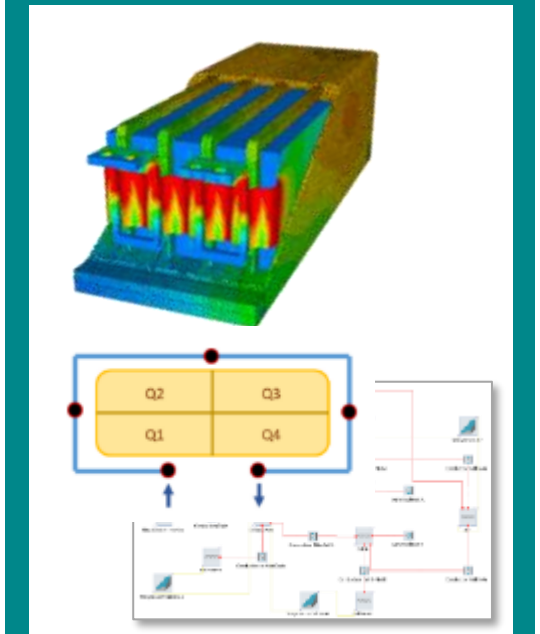
Facility Design	From Products to Test Fields	Operate Battery Laboratories	Data Driven Development	Environmental and Abuse Testing	End of Line Production Testing
					
Engineering support for the design and realization of complete battery testing laboratories	Complete portfolio of battery testing products	Scalable automation and Lab Management system for efficient operation of testing fields of any dimension	Ready-to-run global standard tests, along with templates for intelligent data analysis and reporting	Design and realization of turn-key facilities with AVL solutions and the integration of 3rd party equipment	Standardized solutions for end of line tests - from simple test and charge to full load conformity test

Battery - **Simulation Tools and Services**

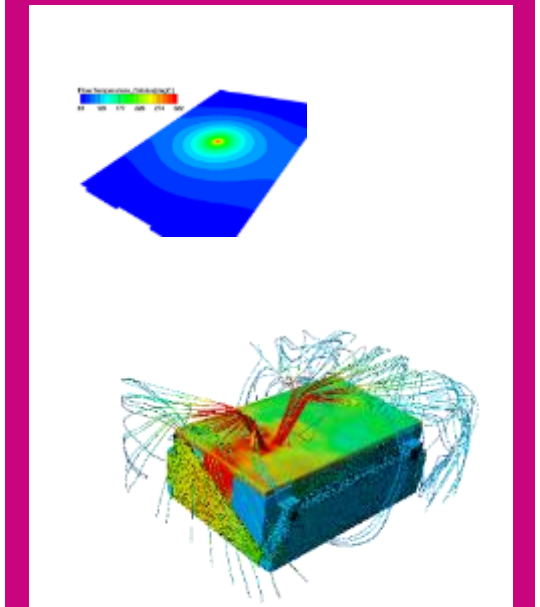
Cell Performance



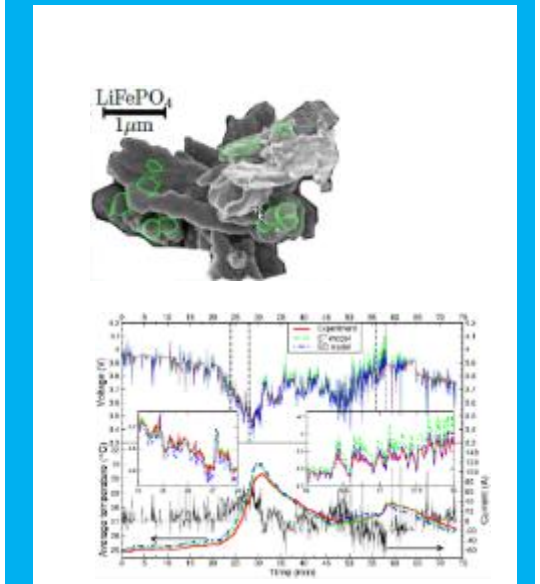
Module/Pack Cooling



Safety



Aging & Lifetime

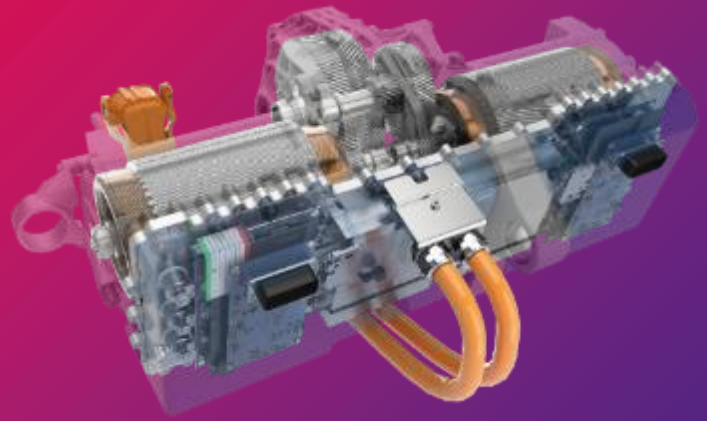


Optimize power density and costs, guarantee safety and extend lifetime

E-Drive Components, E-Axle and Hybrid Transmission Expertise

A modular cost-attractive approach to electrified mobility

Our e-axles are compact units that integrate the required e-drive components – e-motor, transmission and inverter – and offer maximum packaging space for the energy storage. Directly powering your vehicle's axle, they reduce complexity by providing a ready-to-go solution for a range of BEV and hybrid applications.



Development and Integration

- High speed e-axle up to 30.000rpm
- Highly integrated
- Power to weight ratio
- Two speed e-axle
- Integrated SiC inverter
- Two e-machine DHT
- Low and high power DCDCs
- Innovative SW controls

Testing and Validation

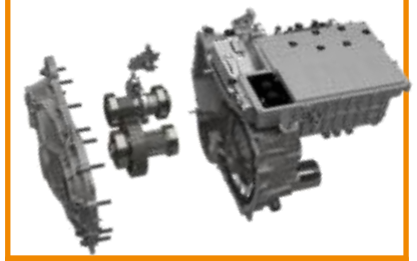
- Power HiL environment
- E-Motor and power electronics validation
- EMC and NVH validation
- E-axle and hybrid transmission validation
- From development to validation to end of line/SOP

Simulation Tools and Services

- E-drive and HEV transmission layout
- Electro-magnetic simulation
- Cooling and thermal analysis
- E-motor and gearbox durability and NVH

Mahindra ELECTRIC · DAIMLER · 北汽新能源 BAIC BJEV · HUAWEI · Nidec · ZIEHL-ABEGG · ABB · NIKOLA MOTOR COMPANY

E-Drive Components, E-Axle and Hybrid Transmission **Development and Integration** - Highlights



1 & 2-Speed E-Axle Common Oil Circuit

AVL e-axle concept for single & 2-speed e-axle systems to support lowest system weight and excellent NVH & efficiency.
Highly efficient 2-speed e-axle using dry clutch (power shift able).

Smart System Arrangement

Single & 2-speed, 2-EM e-axle with smallest package supported by smart system arrangement, splash lubrication and wheel torque up to 3700 Nm.
AVL designed e-motors and SiC inverter.

SOP Product Validation Testing

AVL's knowledge, facilities and development process used to support shortest time to market and reducing development cost by optimizing development plan and number of prototypes.

Dedicated eCVT Hybrid System

Modular eCVT hybrid transmission development from scratch including e-motor development and modular AVL software and calibration.

Enable New Players
to get into electrification

Support new or established OEMs and Tiers to transform existing know-how or grow new skills for electrification. Tasks range from HW & SW dev. to FuSa, EMC as well as testing.

Power HIL Testing
(48V, DCDC, HV inverter)

Major and respected OEMs and Tiers trust AVL for power electronics testing & validation. Benefits include high test coverage, flexibility, test time reduction, AVL's independence & engineering expertise.

E-Drive Components, E-Axle and Hybrid Transmission
Testing and Validation Solutions

E-Motor and Inverter Testing

High speed e-motor test systems and inverter PHiL testbeds with accurate dynamic e-motor emulation

E-Axle and E-Transmission Testing

Optimized and flexible test systems for electric drive unit and transmission validation

EMC and NVH Test Solutions

NVH and EMC test chambers available as fixed and mobile solution

Durability Testing

Durability validation test fields with flexible and modular back-to-back e-axle test solutions

End of Line Production Testing

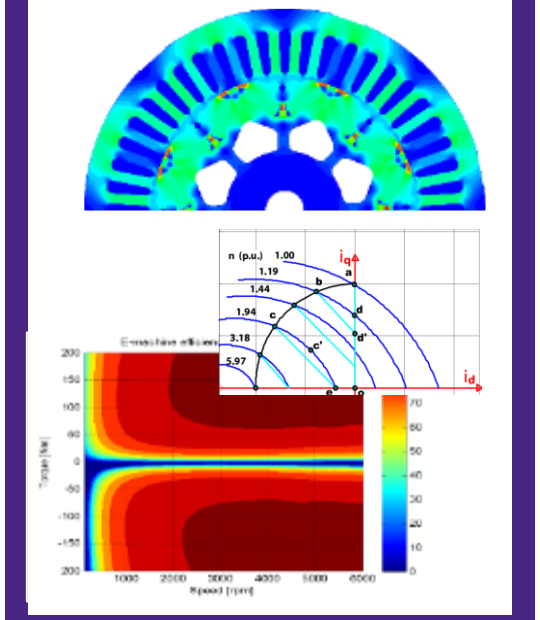
Standardized solutions for end of line tests - from manual to fully automatic DUT handling, for EOL and COP tests

Operate E-Motor Laboratories

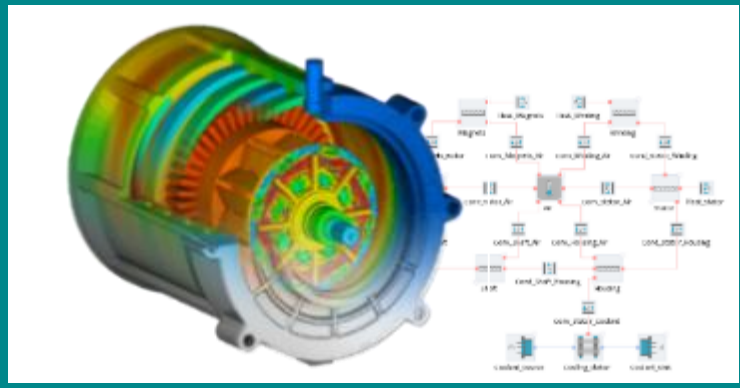
Scalable automation and Lab Management system for efficient operation of testing fields of any dimension

E-Drive Components, E-Axle and Hybrid Transmission
Simulation Tools and Services

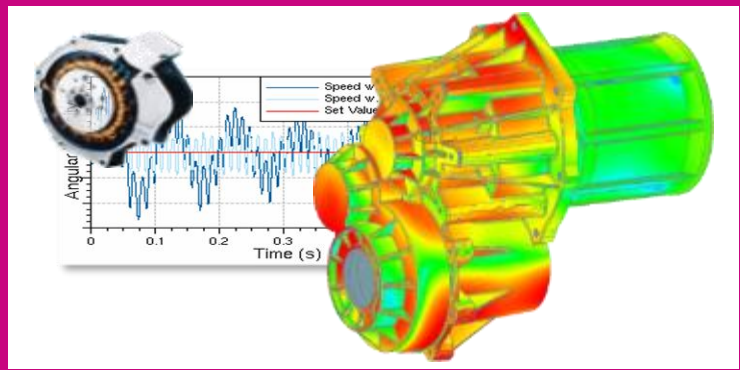
Performance & Efficiency



Thermal



Dynamics & NVH



Balancing of power density, efficiency, thermal stability and acoustic issues

Fuel Cell Expertise

Improving Durability and Reliability

AVL is the industry leader in the development and validation of fuel cell systems. Thanks to our technical expertise – from stacks to the complete PEMFC system – and our leading test solutions, we are the preferred partner for OEMs and suppliers when it comes to future hydrogen-powered propulsion.

Development and Integration

- Cell and stack design
- Modular fuel cell system development
- Functional safety management
- FCCU software development
- From concept to SOP

Testing and Validation

- Modular and flexible solution, easy scalability and upgradability
- Suitable for many infrastructures, from container to building
- Highest and most precise measuring performance
- Large SW portfolio applicable for fuel cell testing

Simulation Tools and Services

- Fuel cell system layout
- 3D cell and stack models
- BoP component sizing
- Fuel cell system virtual calibration

NISSAN

NIKOLA MOTOR COMPANY

玉柴机器 YC DIESEL

WIVA P&G Energy Model Region

HYTRUCK

KeyTech4EV

Fuel Cell - **Development and Integration** - Highlights

System Integration

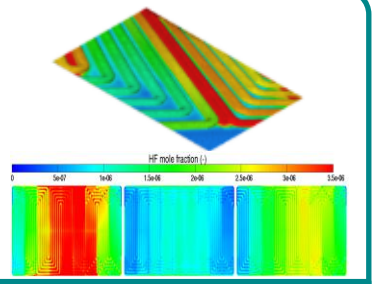
The AVL PEM fuel cell system engineering services include vehicle concepts, PEMFC system development up to system integration including software & controls development.

Cell and Stack Development

AVL Fuel Cell Canada performs cutting edge PEM fuel cell development for all applications. Our team consists of experts experienced in developing fuel cells with major OEMs.

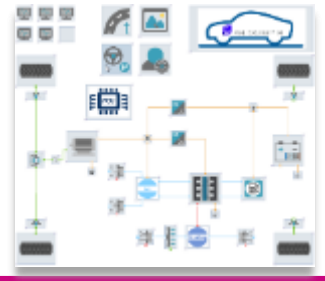
System Development

Development, build-up, calibration and validation of a HD fuel cell system and its key technologies to meet performance, efficiency, reliability, and lifetime criteria of commercial vehicles.



Damage Modelling

Degradation modelling with state-of-the-art AVL proprietary code from the cell to system including entire balance of plant is a key factor to design the next generation fuel cell systems.



Durability Development

Model based development approach based on AVL consistent toolchain supporting agile development methodology and increase robustness & durability.

Fuel Cell Test Center

AVL `s fuel-cell testing infrastructure ranging from cell to entire system test environments meets high power demands even for heavy duty commercial vehicle applications.

Fuel Cell - **Testing and Validation Solutions**

The same tools, from cell to vehicle

Single Fuel Cell TB	Fuel Cell Stack TB	Virtual Testbed	Fuel Cell System TB	Fuel Cell Powertrain TB	FCEV Chassis Dyno
					

Subsystem & BoP Testbeds are not shown

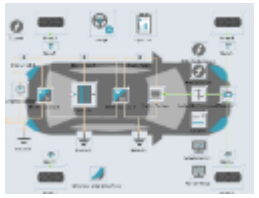
GREENLIGHT INNOVATION

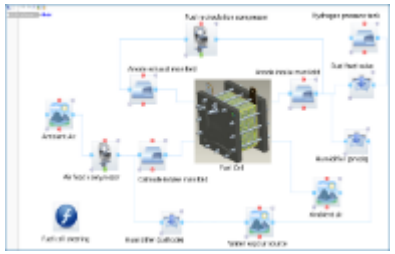
AVL

Greenlight Innovation and AVL are able to supply the whole R&D infrastructure required to execute an FCEV development program

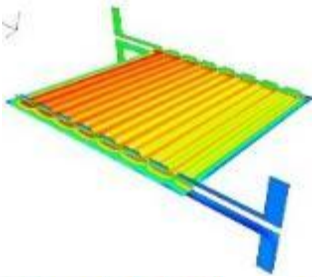
Fuel Cell - **Simulation Tools and Services**

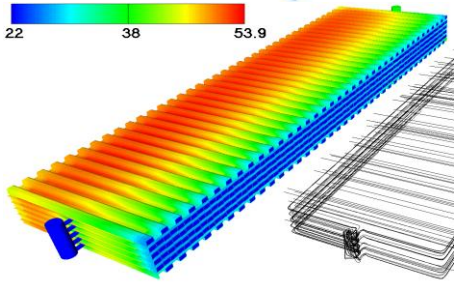
System Concept



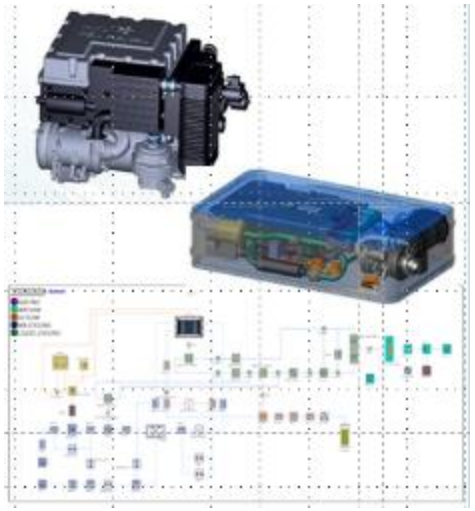


Cell / Stack Design

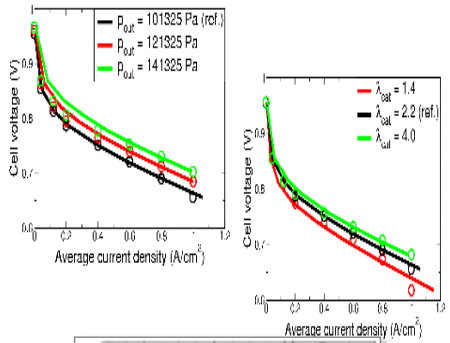


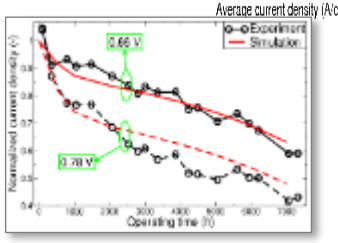


Media Supply Layout



BoP Control





Design and optimize fuel cells on stack and system level

AVL PUMA 2™ Fuel Cell Automation System

AVL PUMA: the automotive development standard

More than 5000 productive testbeds worldwide

One automation system for the whole test field

All testbeds operated with PUMA, from HiL through to vehicle

Interface to complete development toolchain

Models, tools, post-processing etc.

Intuitive user interface tailored for FC testing

Designed with users and UX experts

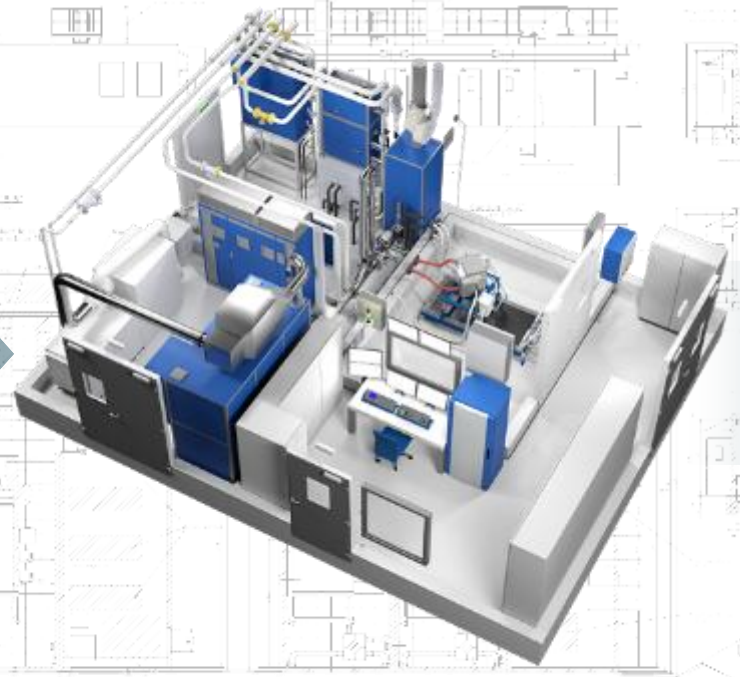
Prepare & validate cycles and parameters in the office

Saves valuable testbed time

Central test and data administration

Data exchange between testbeds, central roll-out of parameters

AVL supports you from a single product to a turnkey project

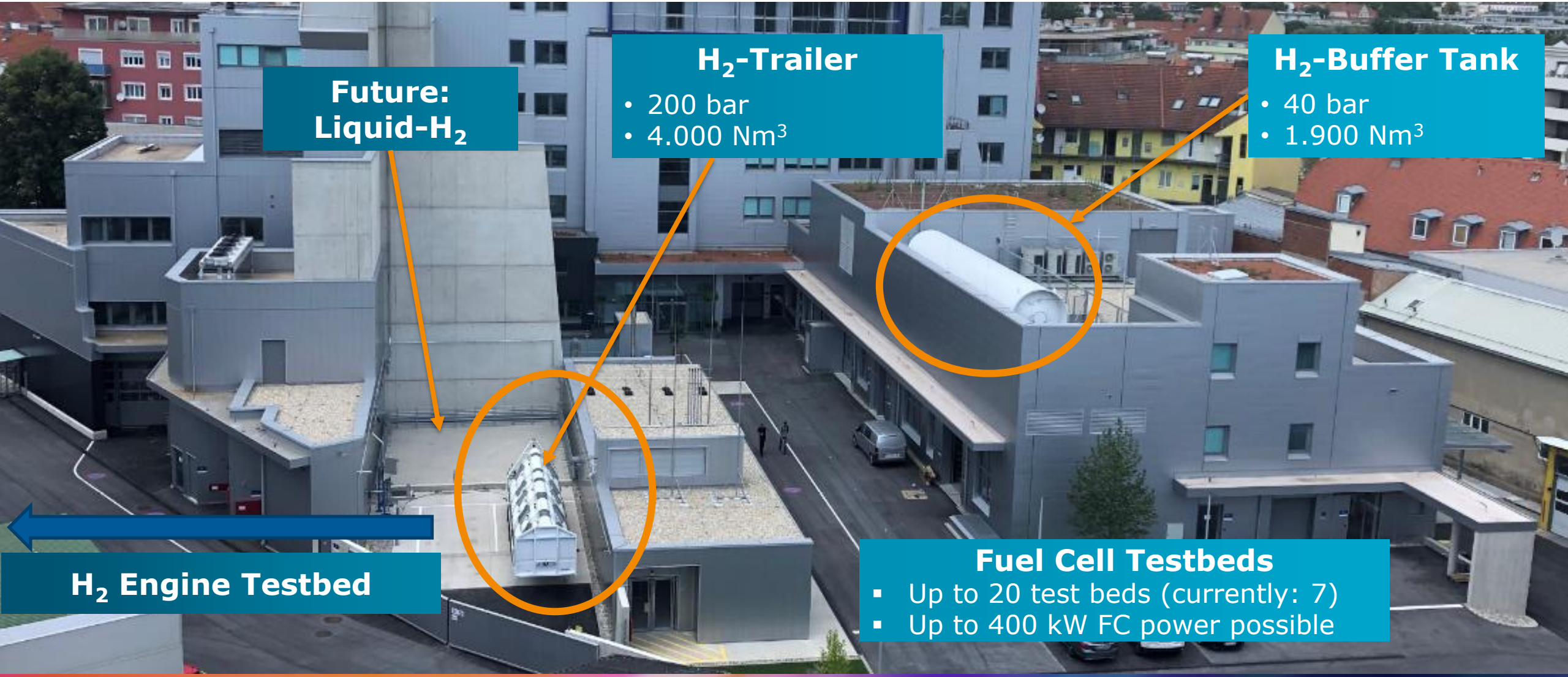


AVL Products
e.g., AVL PUMA 2™ Fuel Cell, AVL HyTron™

Test Systems
e.g., AVL Fuel System Testbed

Test Center
e.g., turnkey FCEV Test Field

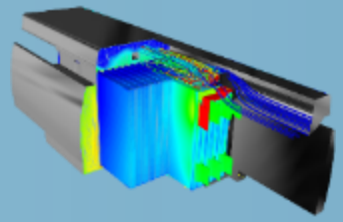
Fuel Cell Test Beds & Infrastructure, Graz



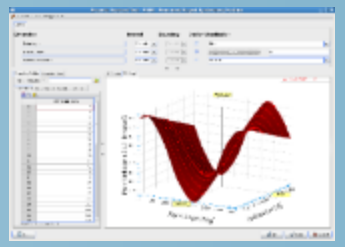
AVL Electrification Integrated Tool Chain - Takeaways

Simulation Tools

AVL FIRE™



AVL EXCITE™

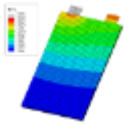


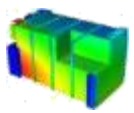
AVL CRUISE™

Vehicle Integration
Test and Optimisation

Engineering

MIL/SIL/HIL



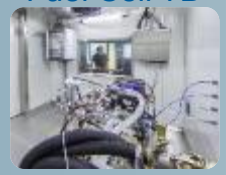


Component Simulation, Design and Test

AVL-M.O.V.E./DRIVE

Powertrain TB

Fuel Cell TB



E-Drive TB

Vehicle TB

E-Integration TB

Hybrid ICE TB

Starter TB

Inverter TB

Battery TB

Virtual TB

Test Systems

Thank you

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