

Why you should research
in Austria:

Mobility and Automotive

The Best Contact Partner for Business Location Issues

ABA – Invest in Austria offers you comprehensive service – from funding and market opportunities to tax regulations. Experienced ABA experts provide you with unbureaucratic support, putting their know-how at your disposal – at no charge at all.

Are you considering setting up business operations in Austria or intensifying your research activities? ABA – Invest in Austria assists you with a complete range of cost-free services, including competent consulting in selecting an optimal site, support in dealing with public authorities and funding bodies, on tax and labor issues or in identifying contact partners. In addition, ABA supports you with its broad-based network of experts and cooperation partners.

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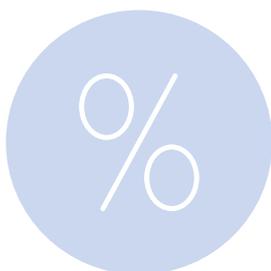
Why You Should Research in Austria

Eight reasons why you will find an optimal business environment here



Inventiveness

More than 1,600 automotive patents in five years



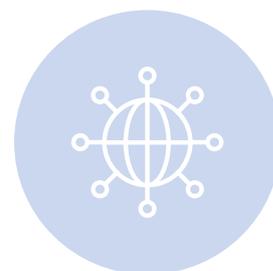
Tax advantages

e.g. 30% tax free allowance for migrants working as scientists and researchers



Stability

Security and quality of life for your companies and employees



Central location

in close proximity to major automobile manufacturers



Strong funding

14% research tax credit for large companies and SMEs



Top researchers and specialized employees

Outstanding professionals thanks to technical schools and top-notch international researchers



Close-meshed networking

Close links between the business and scientific communities



Multifaceted ecosystem

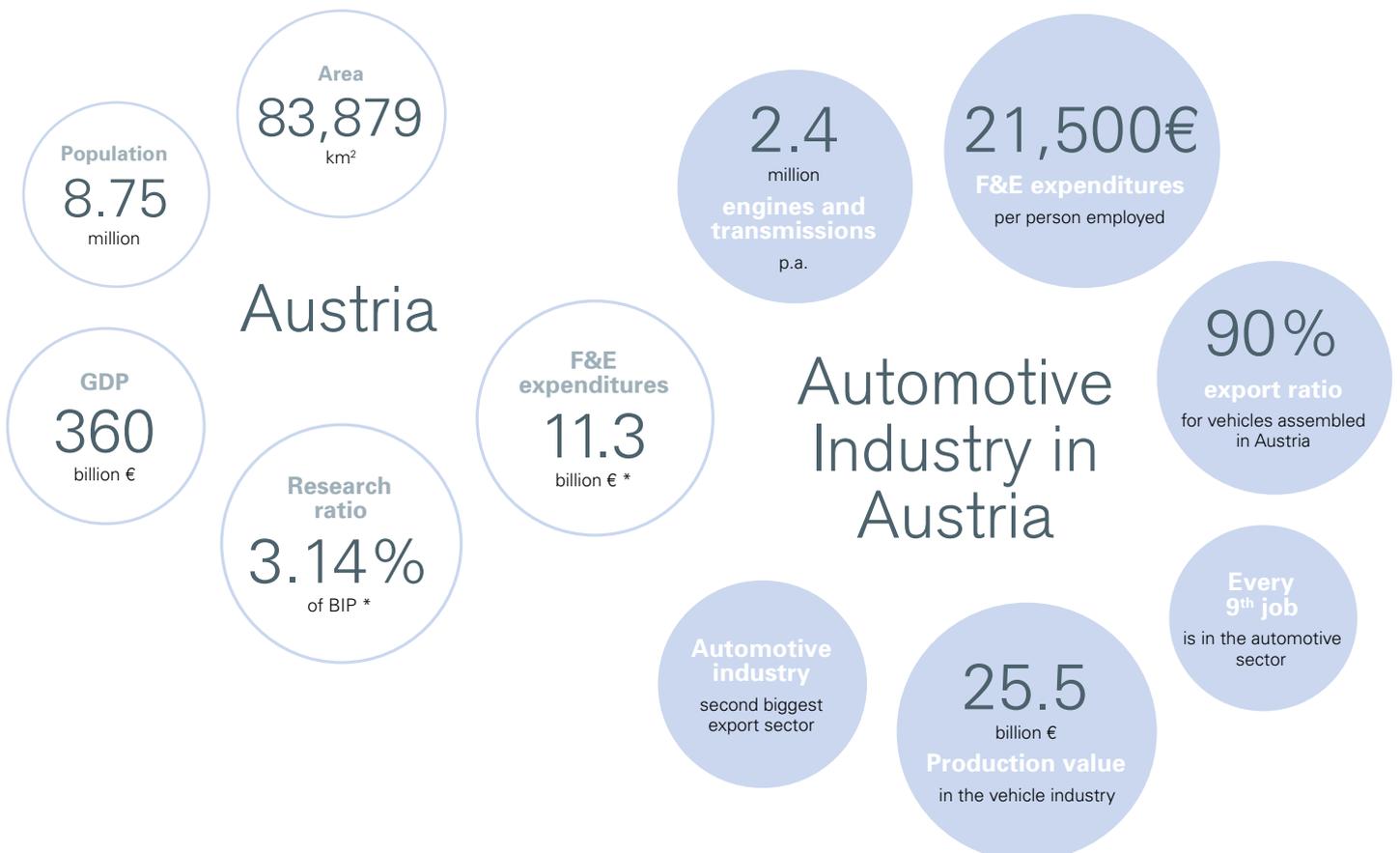
Fascinating ecosystem featuring a highly interdisciplinary approach and diversity

Multifaceted, Interlinked Ecosystem

The inventiveness of the Austrian automobile sector speaks for itself

In the year 1900, Ferdinand Porsche already developed an electric-powered vehicle and a hybrid car. Austria can not only look back at a long tradition in the automobile sector, but its automotive and component supply industry continues to rank among the most important industrial sectors in the country. 800 start-ups and companies, including university and non-university research facilities, research clusters and networks, are making decisive contributions in Austria to the mobility of the future.

Europe's most diverse testing environment for autonomous driving, the world's lightest and most efficient high-performance batteries for electromobility and the promotion of the use of artificial intelligence are among the focal points in Austria in the field of mobility. More than 1,600 patents were registered in the automotive sector in the period 2011 – 2015.



Clusters, Competence and Research Centers



Clusters and networks

- Automobil-Cluster (AC) Business Upper Austria
- ACstyria
- A2LT Austrian Advanced Lightweight Technology
- AustriaTech



University-level and applied research

- AIT Austrian Center for Technology, Vienna
- Vienna University of Technology
- Graz University of Technology
- Montanuniversität Leoben
- Karl Franzens University of Graz
- Joanneum Research, Graz
- Carinthian Tech Research, Villach
- PCCL Polymer Competence Center Leoben
- RISC Research Institute for Symbolic Computation, Hagenberg
- RECENDT Research Center for Non-Destructive Testing, Linz
- Johannes Kepler University of Linz



Competence centers

- Light Metals Technologies, Ranshofen
- LEC Evolutionary Large Engines Technology for the Next Generation of Gas and Dual Fuel Engines
- K1-Center in Polymer Engineering and Science
- K2-Mobility SVT Sustainable Vehicle Technologies
- K2-Digital Mobility Context-Embedded Vehicle Technologies

The ACstyria Automotive Cluster (288 members) and the Automotive Cluster (AC) of Business Upper Austria (260 members) initiates, promotes and coordinates the successful cooperation and scientific exchange of companies in the automotive sector. They serve as the link between business, research and public institutions.

With its COMET program, the Austrian Research Promotion Agency FFG promotes the development of competence centers. The centerpiece of this initiative is a high-level research program jointly defined by business and science.

From Weak to Strong Artificial Intelligence

Soon machines will understand how the world works



Sepp Hochreiter,
Head of the Institute of
Bioinformatics at the Artificial
Intelligence Lab (JKU Linz)

→ www.jku.at

Born in Bavaria, Sepp Hochreiter is one of the leading researchers in the field of artificial intelligence. He has served as the Head of the Institute of Bioinformatics at Johannes Kepler University (JKU) in Linz since the year 2006. Microsoft and Google are just as interested in Hochreiter's research findings as Audi, with which he is pressing ahead with the deployment of artificial intelligence (AI) in automobiles. He heads the new Linz Institute of Technology (LTI AI Lab) and the Audi.JKU deep learning center. For example, research is being carried out on how a piloted, self-driven car can precisely perceive and interpret its environment in complex traffic situations.

In which direction is artificial intelligence evolving in the automotive sector?

Today artificial intelligence systems recognize traffic signs better than a human being. This comprises the beginning of artificial intelligence. However, the systems still lack an "understanding of the world". In research we want to progress from weak to strong AI. I mean machines which behave like people, understand how the world works and recognize what a person, a dog or a child is. There is still enormous potential in deploying AI methods in autonomous vehicles, which not only enable speech recognition but also even foresee and react to the intentions and wishes of passengers.

What do you find good about Austria as a research location?

More specifically here in Linz, a close cooperation exists between research and politics. For example, policymakers are very interested in the AI initiative. You can make your voice heard quickly, and the paths are short, especially for companies locating here. We have very motivated students who have a strong sense of identity with their region and are proud of their local university. Austria offers a high quality of life, but not only in Vienna. We have wonderful landscapes, lakes and mountains. Employees can come here with their families.

From the Virtual Lab to the Most Versatile Testing Area

In Austria, business and science cooperate for the mobility of the future

Business and science are carrying out research in Austria on the mobility of the future. Before it is introduced on the marketplace, a vehicle has to be driven 150,000 test kilometres. This can only be accomplished today by efficiently deploying virtual testing methods. The research and development center Virtual Vehicle founded in 2002 in Graz is a specialist in this area. It focuses on application-oriented vehicle development and future vehicle concepts for road and rail. Audi, AVL, BMW, MAN, Porsche, Siemens and Volkswagen are among its 90 industrial partners. About 100 research projects are currently being implemented with leading international research partners. Virtual Vehicle is participating in 25 EU projects. Disruptive digitalization, human-centered approaches and context-embedded vehicle technologies comprise the focal points of the “K2 Digital Mobility” program publicly subsidized to the amount of EUR 48 million which is starting in 2018 and will continue until the end of 2021.

→ www.v2c2.at

→ www.joanneum.at

The peculiarities of Alpine driving environments such as winter road conditions, tunnels and toll booths make ALP.Lab the most diverse testing environment in Europe for autonomous driving. In addition to a complete simulation environment and dedicated test tracks, Austria’s testing laboratory for automated driving systems also offers real-life tests e.g. on public roads and a highway section. Members of the consortium are AVL List, Magna, the Graz University of Technology, Virtual Vehicle and the research organization Joanneum Research. The Austrian Federal Government has made close to EUR 6 million in funding available for projects. The research project “Dynamic Ground Truth” involving scientists from TTTech and Vexcel is designed to enable a high-precision measuring system aimed at the reliable recognition of the environment. Such systems serve as the “eyes” of every autonomous vehicle. The publicly supported project entitled LiDcAR, in which Infineon and the Vienna University of Technology are participating along with Virtual Vehicle, aims to develop sensors for distance and speed measurement.

Driver Assistance Systems from Austria

3D camera with image sensor chips

Image sensor chips developed in Graz are built into infrared cameras and scan the head of the driver 50 times/second with more than 100,000 pixels via the steering wheel. They recognize whether the driver is getting tired and send out a warning signal. (Infineon)

Reliable engine control

Increasing autonomous driving also raises demands placed on highly reliable engine controls capable of mastering growing complexity. (AVL)

Intelligent obstacle detection

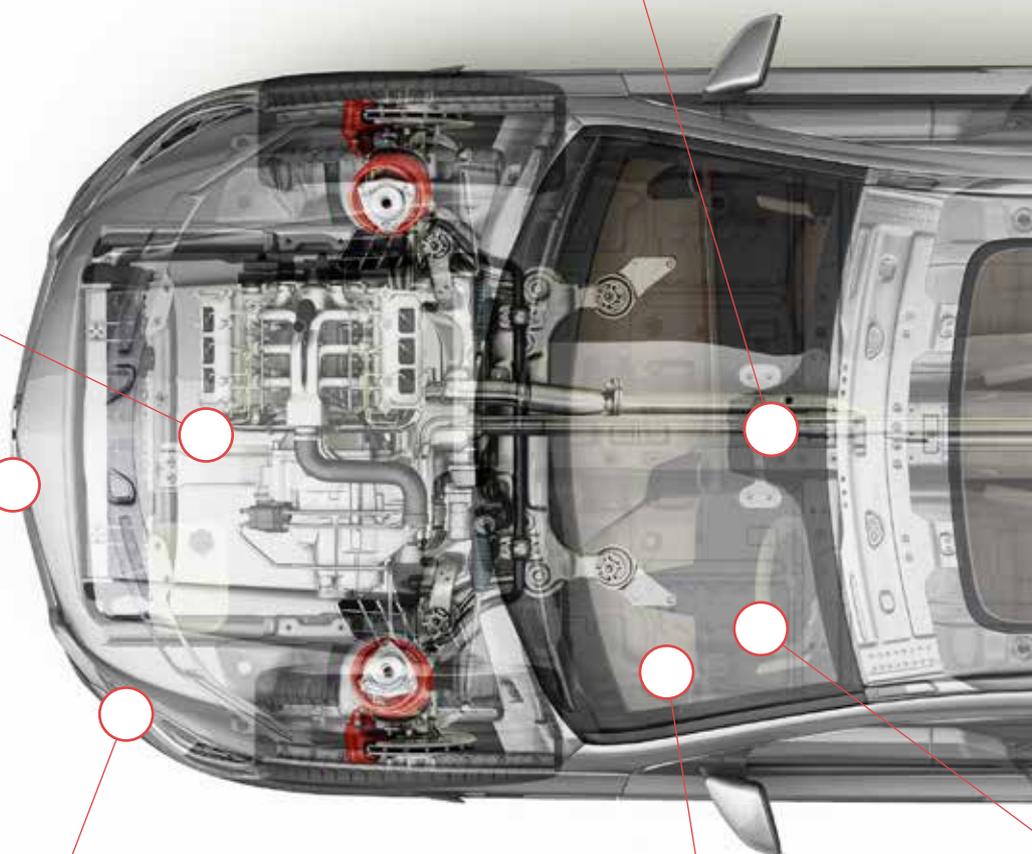
Safety-critical systems such as laser-based obstacle detection systems (LIDAR) originate in Unterpremstätten, Styria. (ams)

Smart headlights

Matrix light systems are controlled by a front camera and consist of individual controllable high-power LEDs, which automatically adjust the high beam headlights to the particular driving situation, depending on other road users, speed, steering angle, weather, time of day etc. This system is designed to provide the driver with the best possible visibility without blinding other road users. The laser high beams help to further optimize visibility and illuminate an area up to a distance of about 600 meters, thus ensuring greater safety in the dark (ZKW Group, Lower Austria)

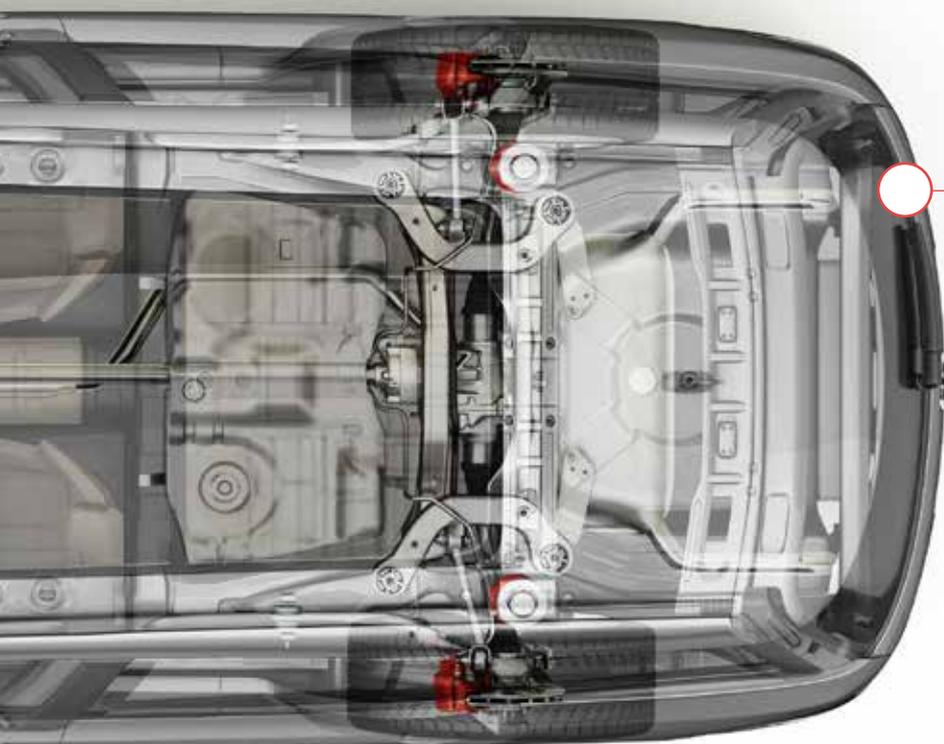
Platform for driving assistance systems

The platform developed in Vienna bundles all processes and data from driver assistance systems. The link-up of the individual computer cores is implemented on the basis of reliable, time-controlled Ethernet communication. (TTTech)



Ethernet communication

Driver assistance systems rely on the reliable, fail-safe and real-time capable communication of devices. Automotive Ethernet solutions from Vienna enable unified network connections and are based on longstanding experience with real-time capable Ethernet for applications such as in the aerospace, aviation and energy sectors. (TTTech)



Radar sensors for an all-round view

The radar technologies developed in Upper Austria provide assistance with pedestrian recognition and distance warning. When it comes to the so-called "blind spot detection" in the back part of the bumper, the radar antenna is integrated in the ceramics as developed in Styria. Miniature radar systems in the rear-view mirror detect obstacles in the blind spot. (Infineon)

Cockpit

An increasing volume of information (i.e. entertainment, navigation, vehicle monitoring) and thus electronic components are integrated into the driver's cockpit. In turn, this imposes increasing requirements on circuit boards to include specific features. Circuit boards for these demands are being developed in Leoben. (AT&S)

Nerve center of the automobile

Infineon in Villach plays a leading role in the development of microcontrollers ensuring the secure exchange data in the vehicle network. These microcontrollers are responsible for safeguarding system reliability, evaluating sensor data, determining driving strategies and accepting control commands. (Infineon)

Researching for Alternatives

The battery is considered to be the “centerpiece” of future vehicle generations.

Ranked
2nd
in Europe for
e-vehicle
patents

233
“e-vehicle”
patents
in the period
2011-2015

Major research efforts are underway to make energy storage devices as small and inexpensive as possible, but still safe. In addition to the model designing and simulation of batteries, the Mobility Department of the Austrian Institute of Technology (AIT) boasts an excellent research infrastructure for the prototyping, testing and validation of battery cells, modules and packages. At present, research is being conducted on a three-volt magnesium-ion battery which should be comparatively economical and lightweight.

The research area “E-Mobility and Alternative Drivetrains” of the Graz University of Technology focuses on the development and optimization of all types of electric-powered and hybrid vehicles. Co-researchers in the “Mobility & Production” area of expertise strive to enhance the performance and efficiency of fuel cells, extending their useful life and reducing costs.

From the garage to a global industrial group

The passion for speed and electromobility was the driving force behind the business operations of the three Kreisel brothers from Upper Austria. They have been developing the world’s lightest and most efficient high-performance batteries for electromobility since the year 2014. The range of solutions implemented with business partners includes electric carts, e-rollers, e-bikes, passenger cars, buses, ships and airplanes. Kreisel jointly carries out complex projects with industrial partners including drivetrains, charging technology and software, and also introduced an innovative quick charging station, the Kreisel Power Charger, on the marketplace. Its first own new plant for volume manufacturing was recently put into operation in Upper Austria. In July 2017, Frost & Sullivan honored the company for offering the world’s best battery technology.

AVL List in Graz is the world’s largest private company for the development, simulation and testing technology of drive systems. AVL is working intensively on the development of innovative drive systems, ranging from modern diesel engines, electric drives and alternative fuels to control software, transmissions and batteries. AVL is the Austrian company which registered the most e-mobility patents in the years 2011 to 2015.

→ www.kreiselelectric.com

→ www.avl.com



Light, Lighter, the Lightest

Modern materials save weight and thus energy.

Every extra kilo reduces the operating range of an electric-powered vehicle. Austria particularly stands out due to its multi-material competence with steel, light metals, plastics, wood and composites. The LKR Light Metal Competence Center Ranshofen carries out research, ranging from the material and process technology to material-related structural design. The University of Applied Sciences Upper Austria offers relevant specialist training in the field of "Lightweight Construction and Composite Materials". The Chinese-Austrian company FACC develops and produces lightweight aircraft interiors and structural components for international aircraft manufacturers such as Boeing and Airbus.

The Salzburger Aluminium Group (SAG) focuses on high-performance materials from aluminum, also for the automotive industry.

Austria's lightweight construction cluster A2LT Austrian Advanced Lightweight Technology bundles the competencies of companies and research facilities across the nation. Corporate partners include AMAG, Magna Steyr Fahrzeugtechnik, FACC, Pankl Racing Systems, Polytec Group, voestalpine and Siemens Industry Software.



- www.ait.ac.at
- www.facc.com
- www.a2lt.at

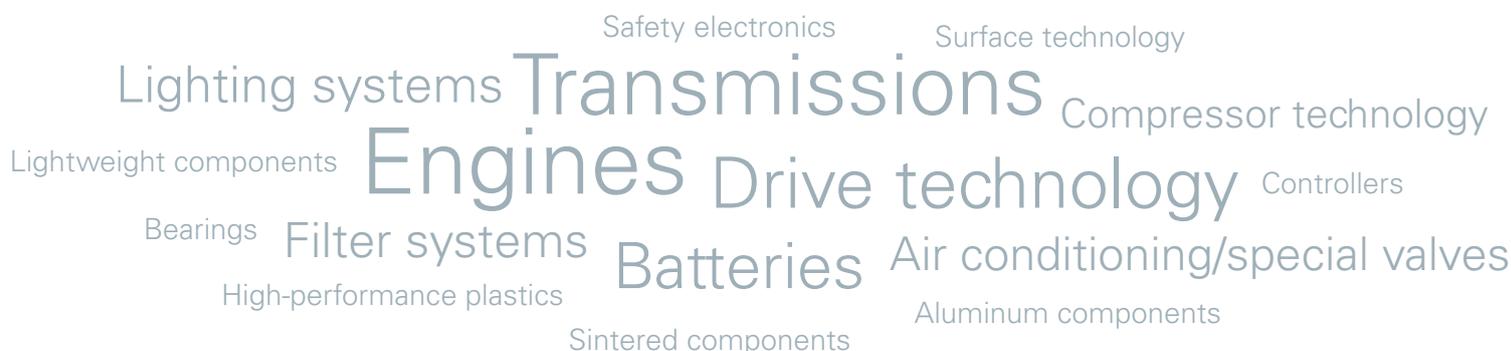
High-Tech for the Global Market

Vehicle producers and the component supply industry profit from Austrian know-how.

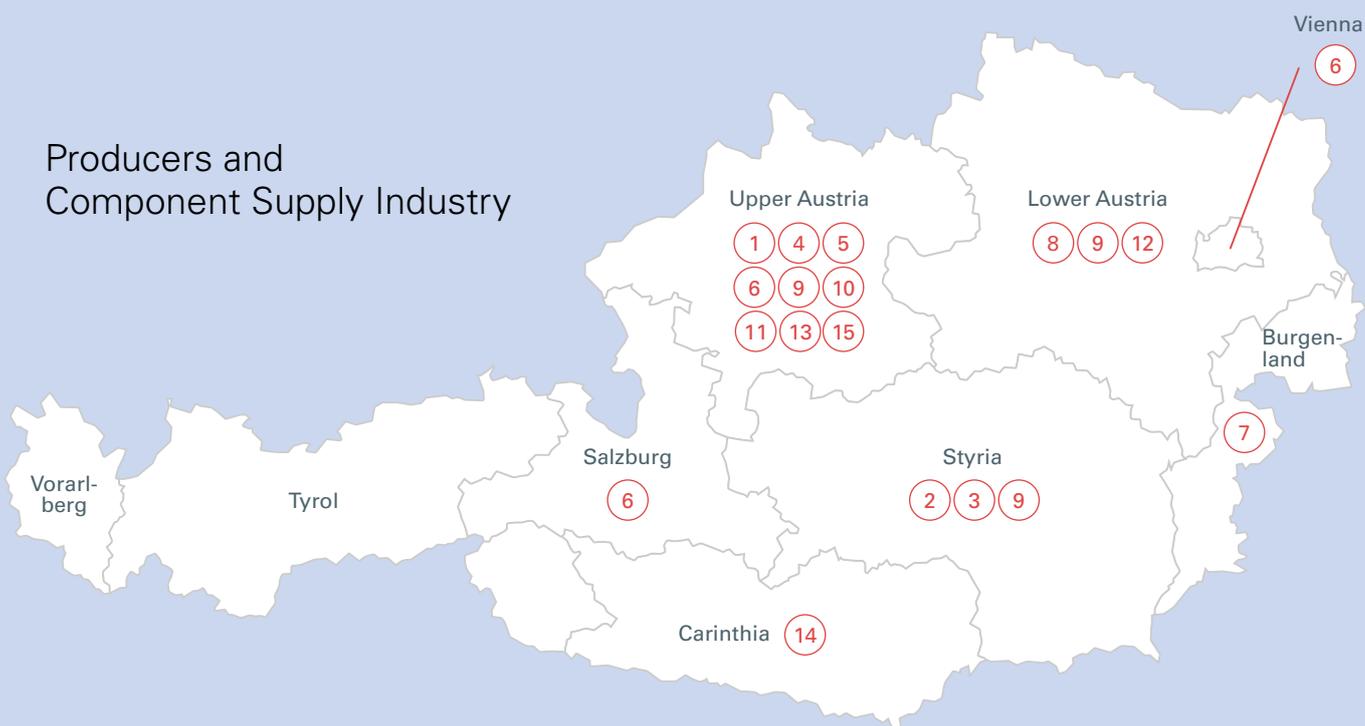
- www.bmw.at
- www.opel-wien.at
- www.magna.com
- www.bosch.at

There is hardly a single automobile anywhere in the world which can leave the assembly lines without products made by the Austrian automobile component supply industry – ranging from the car hood and sports seats to safety systems and batteries. The export ratio of passenger cars manufactured in Austria is 90%.

More than half of all new vehicles sold by the BMW Group have a “core” manufactured by the Austrian engine plant in Steyr, Upper Austria. The factory is the global competence center for the development of BMW diesel engines. Every second Opel runs on a transmission and every third on an engine produced at the engine and transmission plant of Opel Vienna. In contrast, a total of 140,000 complete automobiles produced on behalf of car manufacturers leave the assembly lines of Magna Steyr each year. Magna Steyr belongs to the Canadian company Magna International, the world’s leading brand-independent engineering and production partner for automobile manufacturers. About 7,000 employees in Graz and the surrounding area manufacture vehicles for BMW, Mercedes-Benz and Peugeot, amongst others. Every second four-wheel drive car around the world runs on a drive system originating at Magna Powertrain in Austria. The German company Bosch has upgraded its facilities in Vienna, Linz and Hallein to international automotive engineering development competence centers, employing a workforce of close to 3,000 people.



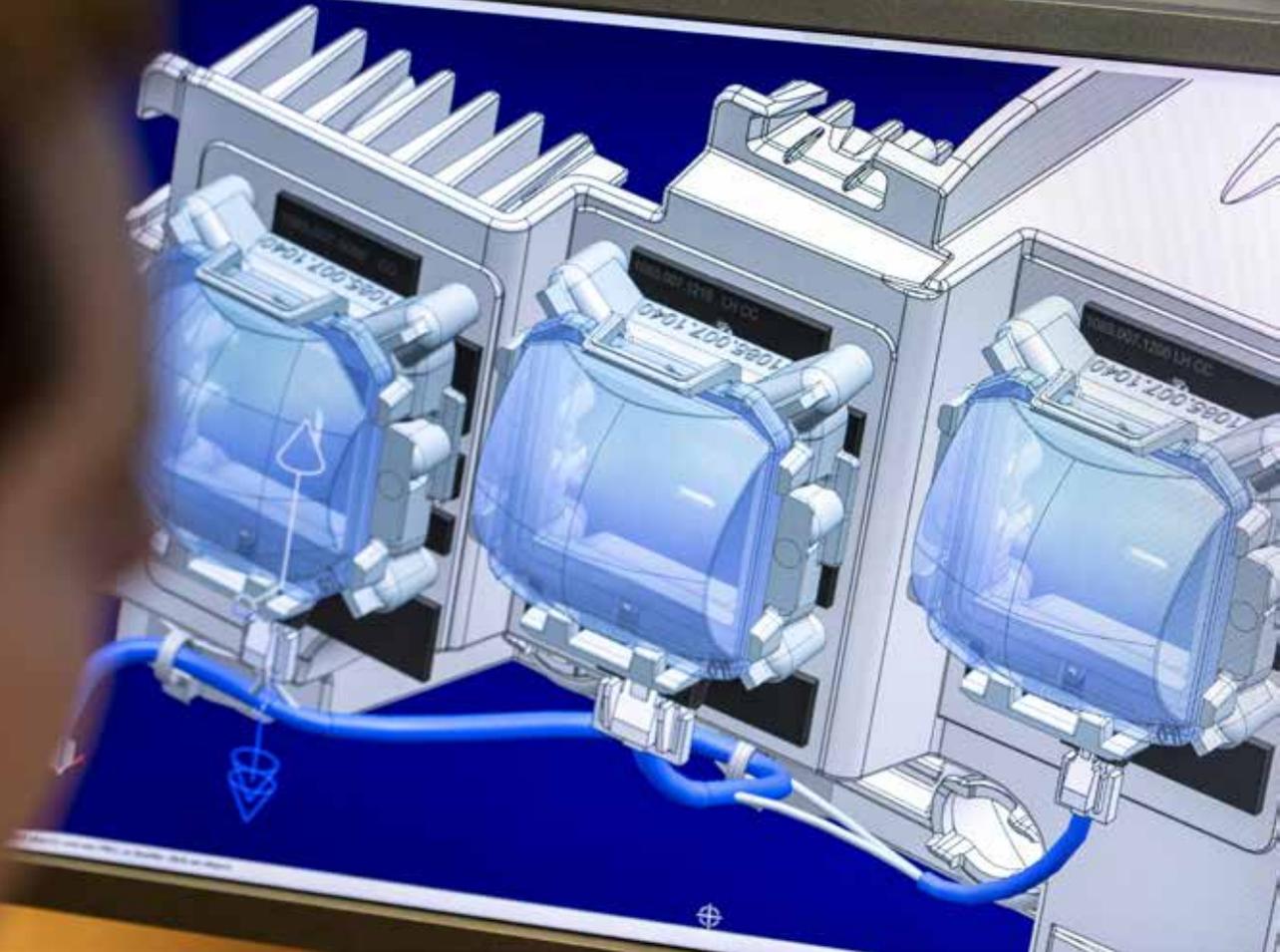
Producers and Component Supply Industry



Austria's biggest vehicle manufacturers and suppliers

Top 15 by revenue (Top 500 Trend 2017)

1.	BMW Motoren, Steyr		9.	Magna Powertrain, Lannach, St. Valentin	
2.	Magna Steyr Fahrzeugtechnik, Graz		10.	Miba, Laakirchen	
3.	AVL List, Graz		11.	BRP Rotax, Gunskirchen	
4.	KTM Industries, Wels		12.	Polytec Holding, Hörsching	
5.	MAN Truck & Bus Österreich, Steyr		13.	CNH Industrial Österreich (Steyr Traktoren), St. Valentin	
6.	Bosch Austria, Wien, Linz, Hallein		14.	Mahle Filtersysteme, St. Michael/Bleiburg	
7.	Kromberg & Schubert, Oberpullendorf		15.	Rosenbauer International, Leonding	
8.	ZKW Group (Zizala Lichtsysteme), Wieselburg				



Business Oriented Education for Success

Innovative companies find the best minds in Austria.

Top researchers as well as highly-qualified specialized personnel are required for practical implementation in order to make innovations marketable. The business location of Austria offers both. There is a long tradition here of application-oriented education, whether at the numerous technical colleges (HTL), schools featuring practical technical training or at the 22 public and 13 private universities or the 21 universities of applied sciences offering more than 640 different courses of study.

For example, in the field of mobility, the FH Joanneum University of Applied Sciences offers the "Automotive Engineering" bachelor's degree program, and the Vienna University of Technology cooperates with the Slovak University of Technology in Bratislava on a "Professional MBA Automotive Industry". The FH Wien University of Applied Sciences offers extra-occupational master's degree studies in "Green Mobility", whereas the University of Applied Sciences Technikum Wien boasts the bachelor's degree program "Transport and Environment."

14 Euros Tax Credit for Every 100 Euros in R&D Investments

Suitable funding for good ideas

Research takes place in many places. For this reason, small and medium-sized enterprises (SMEs) as well as large companies are equally supported. Thanks to the generous research tax credit, 14% of R&D expenditures incurred by research-based firms can be deducted for tax purposes. The research tax credit comprises an effective complement to direct research funding.

→ www.aws.at

→ www.ffg.at

Attractive tax advantages

Furthermore, Austria offers attractive tax advantages. There is a tax deduction for migrants working as scientists and researchers applying to 30% of research-related income, and can be utilized for a period of up to five years. The tax-exempt apprenticeship allowance, tax loss carryforwards and the possibility to transfer hidden reserves are also among the tax incentives available to companies. Austria with its average effective tax burden of 22.4% ranks in the middle of the pack in the EU.

Direct funding programs for R&D champions

The Austrian Research Promotion Agency FFG and Austria Wirtschaftsservice (aws) support research-based companies through direct funding programs. FFG funds application- and business-oriented research. A total of EUR 615 million was invested in 2016, and 3,307 new projects were approved. As a funding bank, aws supports entrepreneurs and established companies in all phases of their corporate life cycle, providing loans, grants, guarantees as well as participation and equity capital. In 2016, financing amounted to about EUR 811 million.

In addition, the Austrian Science Fund (FWF) supports fundamental research. The FFG Start-up Funding program assists start-ups by providing project financing comprising up to 70% of total costs. The aws Start-up Center offers an extensive support package to new companies.

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