

## Sustainable mobility in Torino Piemonte

*Torino and Piemonte are emerging among the leading centers for the convergence of all sciences related to the development of sustainable mobility.*

Driving in today's major metropolitan areas, and to depend on personal means of transportation has become synonymous with jumping hurdles: juggling lanes, constant traffic jams, lack of parking spaces, traffic restrictions and most importantly elevated pollution levels.

In Torino and in Piemonte, these issues are embraced as great opportunities in terms of development of sustainable mobility. By managing sustainable mobility matters in a systemic way, and taking advantage of all new technologies and of the new available sustainable materials, it will be feasible to develop and deploy projects, such as:

- new vehicle architectures specific to urban mobility
  - intelligent systems for traffic management
- Investing in advanced systems for intelligent transportation and info-mobility is the road to:

- make inner-city traffic more agile, safer and more comfortable
- reduce emissions and therefore pollution
- enhance environmental sustainability of urban mobility.



### New vehicle architectures



- development of new architectures for eco-friendly vehicles
- style research
- modular architecture

### New powertrains and engines



- petrol engine evolution
- diesel engine evolution
- electric/hybrid cars
- fuel cells
- hybrid diesel-electric engines

### Intelligent transport systems (ITS)



- wireless communication
- on-board data acquisition, management and transmission systems
- V2V and V2I
- geo-positioning
- smart traffic management systems
- integrated connectivity systems



Piemonte Agency is the one stop shop to get in touch and make business with Piemonte-Italy. The Agency is the reference point to come to know about the local economic system, to get information on business opportunities in the area, to find a quality destination for direct investment, to discover the perfect host for leisure and travel.

The Agency provides a complete range of free services to foreign companies wishing to locate in the area, searching for suppliers and partners in a variety of sectors, requiring training in international trade and commercial strategies, willing to discover Piemonte's tourist vocation.

The Agency matches the regional production offer with the needs expressed by international markets and proposes targeted activities to connect highly qualified local companies with foreign partners such as incoming trade missions for foreign business delegations, b2b meetings, the participation of Piedmontese enterprises to international fairs, projects for partners' research in mutual cooperation with other international organisations.

Piemonte Agency collaborates with foreign companies willing to locate in the region sharing knowledge of the many opportunities the region has to offer. It provides free, responsive, tailored assistance at every stage of the investment project, including aftercare activities.

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CAMERA DI COMMERCIO  
INDUSTRIA ARTIGIANATO E AGRICOLTURA  
DI TORINO

The Torino Chamber of Commerce is a public institution with autonomous statute, regulations, management and accountability, and relies on a flexible, innovation and efficiency-based structure.

### Our Mission

The mission of the Chamber is to foster the growth of the local economy and enhance it through effective and targeted initiatives, speaking on behalf of more than 237,000 companies working in the Province and registered in the Torino Chamber of Commerce's Registrar of Enterprises.

The Torino Chamber of Commerce promotes the local excellencies abroad with a focus on the hi-tech sectors such as automotive, aerospace, IT, nanotech and biotech.

In order to foster technology transfer, the Torino Chamber of Commerce coordinates and manages ALPS Consortium, a contact point of the Enterprise Europe Network, which is present in more than 40 countries.

Furthermore the Chamber can count on a propriator network of foreign offices based in Eastern Europe, the Mediterranean Area, Asia and America.



The Torino Chamber of Commerce provides both local and foreign companies interested in international cooperation with a full range of services:

- training
- access to local and national
- financing
- support on EU funding schemes, research projects, legislation and policies
- IPR services
- identification and promotion of technology/commercial company profiles
- advisory services on international trade
- reliability analysis on both local and foreign potential partners
- organization of both incoming and outgoing trade missions
- organization and participation in international technology brokerage and b2b events
- data and statistics.

Our services are free, responsive, tailored to your needs and totally confidential.

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## Sustainable Mobility



## in Torino Piemonte Northwest Italy

## A favourable environment

### Discover Torino Piemonte

Piemonte, located in North-Western Italy, right at the heart of Europe's most highly developed core, plays an essential role in the nation's economy. Technologically and mechanically advanced, it is a land of excellence with approximately 468,000 enterprises organized in extremely innovative, flexible and efficient clusters.

The region brings together industrial tradition, innovation, leisure and entertainment. Piemonte is famous worldwide for being the cradle of the Italian car industry, but it is also home to top-class companies specialised in aerospace, ICT, industrial design, eco-industry, life sciences, mechatronics, agro-food, fashion and beauty.

The region is dynamic both in industry and in service sectors, with a skilled, flexible and versatile workforce. It hosts research, education facilities and competence centres of international standing. Thanks to this unique richness in terms of production and know how and its strategic geographic position, Piemonte is very attractive to foreign investors.

### Facts and figures

- 4.5 million inhabitants
- € 121,5 billion GDP
- € 34,5 billion exports of goods and services
- Over 200 public and private R&D centres, 380 laboratories, 4 universities, 6 science and technology parks
- 100,000 students enrolled in Piemonte's universities

### 1<sup>st</sup> Italian region for:

- private investment in R&D
- expenditure on innovation in the manufacturing sector
- hi-tech patents

### Automotive and ICT: strategic sectors for sustainable mobility

Piemonte is a favourable environment for sustainable mobility thanks to its strong tradition in 2 strategic sectors: automotive and ICT, with the presence of important companies, research centres and university programmes. The cooperation among industry, institutions and knowledge institutes are driving factors for the development of sustainable mobility in Torino Piemonte.

In the **automotive sector**, Piemonte offers a widespread network of outstanding production facilities with a unique feature: the entire planning and production cycle is all concentrated in the same area.

The tradition of "knowing how to make cars" has always kept up with the times; today a considerable number

of companies that produce for the car industry are organised into groups able to carry out the most complex and delicate jobs along with the lean production chain.

Piemonte boasts a strong tradition in the **ICT sector**. It is the Italian birthplace of cinema, television, telephone and computer industries, MP3 and of major companies like Vodafone, Infostrada, Seat, Telecom, Olivetti. Piemonte ICT solutions can be applied to: aerospace, industrial automation and automotive, electrical components, home & building automation and security, e-government, e-health, games & multimedia, enterprise software and hardware, tlc and intelligent transport systems.

Four out of twelve Innovation Hubs in the region are either directly or indirectly devoted to sustainable mobility, energy saving and mechatronics:

- **Polo ICT** ([www.poloinnovazioneict.org](http://www.poloinnovazioneict.org))
- **Mesap** - Mechatronics & Advanced Production Systems ([www.mesapiemonte.it](http://www.mesapiemonte.it))
- **Polight** - Green Building & Hydrogen Technologies ([www.polight.piemonte.it](http://www.polight.piemonte.it))
- **Polibre** - Renewable Energies & Biofuels ([www.polibre.it](http://www.polibre.it))





## Expertise in Torino Piemonte: knowledge, skills, qualified resources & organisation

*Concept design, engineering, prototyping, component systems, services.*

### New Vehicle Architectures

Many famous style studios, design firms, and designers work in Torino and in Piemonte. These world renowned companies and professionals have shifted the attention from a pure style research mindset, to the focus of designing parts and supplies and vehicles equipped with the most advanced materials, telematics and advanced info-mobility connectivity systems.

New vehicle architectures are developing two key areas:

- **Concept design and advanced design**, meaning style but also characterisation and grouping of new auto functions and applied technologies, such as connective infotainment and evolved infomobility systems to respond to the changing market needs in terms of urban mobility
- **Product engineering**, this being a highly technological process in which new materials and new construction technologies are merged to create new architectures for light-weight, recyclable vehicles which are not polluting and which are cheap at the same time, which means they are eco-friendly, sustainable and accessible to everyone.

### New Powertrains and Engines

In Torino Piemonte, FIAT Powertrain (FPT) and General Motors Powertrain (GMPWT), R&D centres, specialised suppliers, the Università di Torino and the Politecnico di Torino are devoted to developing the procedures and technology of the engines of the future.

Projects underway include:

- a **new generation of diesel engines**, to reduce emissions by downsizing and boosting overall performance
- **evolved electronic systems**, to manage and control engine operation and performance
- **hybrid engines**, to reduce fuel consumption, promoting vehicles which are not dependent solely on endothermic engines to motorists and opening the way for future all-electric cars.

#### KEY WORDS

Traffic Management  
Traffic & Travel Information  
Transport Ticketing  
Incident & Hazard Response  
Demand Management  
Road Management  
Commercial Vehicle Management  
Public Transportation Management

### Intelligent Transport Systems (ITS)

The fast evolution of the new telematics technologies provides cities with evolved systems for intelligent traffic management. Torino and Piemonte are frontrunners in this field. This know-how dates back to the 1980s with the very first intelligent traffic light systems connected directly with the public transportation system's vehicles to assure their priority at the major intersections. It continues today, with new advanced technological devices installed inside the vehicles, enabling during a trip to entertain a dialogue with systems and infrastructures allowing the drivers to gain real time information on traffic conditions, congestions, queues, road blocks and works.

#### ITS facts & figures

- over 150 public and private R&D centres and companies in ITS field in Piemonte
- over 30 ITS research projects currently underway with the involvement of at least one company or R&D centre
- 2000 skilled staff in ITS and infomobility
- technical and entrepreneurial tradition: presence of FIAT Group, Iveco, Magneti Marelli and related activities
- Infomobility Promoting Committee with members from several public authorities

The City of Torino and Piemonte Region continue to invest in ITS to increase traffic fluidity, improve public transport efficiency and quality, and provide real-time mobility information. Most investments will focus on the following areas over the following three years:

- designing and implementing a regional Traffic Operation Centre (TOC) for monitoring traffic conditions and mobility on the entire regional road network in real time, simulating and forecasting traffic and providing information and public utility services
- designing and implementing an integrated electronic ticketing system for regional public transport called BIP accessible using a single contactless microchip smart card
- new infomobility services on regional level.

**ST** ([www.5t.torino.it](http://www.5t.torino.it)) is a regional agency for supervising ITS development and management in Piemonte. ST manages the Traffic Operation Centre in the metropolitan area of Torino, integrated with the public transport real-time monitoring system, to get traffic smoother and to improve the performance of Public Transport. Starting from the experience of the Traffic Operation Centre, managed during the Torino 2006 Winter Olympic Games, ST is now working on the extent of the traffic monitoring and information system to the whole Piemonte regional area.

**Istituto Superiore Mario Boella – ISMB** ([www.ismb.it](http://www.ismb.it)) is a Research & Innovation Center operating in the ICT domain. Founded in 2000, today it relies on technological and process competences of around 150 researchers working in close cooperation with companies, universities and Public Administration. Since 2010 ISMB has extended its activities to process innovation, orienting its focus on priority themes of the European agenda. Smart Energy, Smart City and Smart Health are the strategic programs tackled by ISMB. In the ITS field, ISMB is involved in cutting-edge research topics, such as Vehicular ad-hoc networks (VANETs), one emerging type of wireless networks that will improve road safety and enable a broad range of applications such as traffic management, direction and route optimization, policing and enforcement, travel-related information.

## Academic Research

*Universities across the region are strongly engaged in R&D and have a good track record when it comes to working in connection with industries.*

### Politecnico di Torino ([www.polito.it](http://www.polito.it))

Two departments specifically deal with energy-related matters, energetics and applied science and technology. They also organise research projects for external clients.

**DENERG-Energy Department** Its main focus is technological innovation and efficiency of systems and components currently in use for the transformation, distribution and use of energy. It also develops methods, instruments and techniques to control the environmental effects of energy and transportation systems. In collaboration with Turbocare ([www.turbocare.com](http://www.turbocare.com)) the department created the first plant for the industrial installation of a SOFC stack in trigeneration configuration in the world.

**DISAT-Department of Applied Science and Technology** The main lines of research in the energy field are:  
- electrochemical behaviour of batteries and accumulators with a special focus on lithium-ion systems for vehicles and on hydrogen powered PEMFC - new catalytic systems for the treatment of flex fuel vehicle emissions (methane, diesel and biodiesel) - environmental impact and safety issues of materials, processes and plants. The department is equipped with laboratories for conducting measurements in all these fields. The electrochemistry group also has innovative dry room for lithium system technology.

The DISAT and DENERG departments have been researching fuel cells and hydrogen for the past 15 years. In particular, DENERG has worked on the experimental characterisation of the basic fundamental elements of single SOFCs and SOEC cells and on the performance of stationary systems for residential and industrial applications.

### Università di Torino ([www.unito.it](http://www.unito.it))

Università di Torino launched the **Automotive Research Hub (RH)** in 2011 to bring together researchers from different departments which share a common interest in the field of sustainable mobility. An interdisciplinary approach to industry-driven research priorities is adopted and multidisciplinary skills to local and international stakeholders are supplied. In particular, research at the Automotive Research Hub focuses on:

- **manufacturing materials** - new advanced materials, coatings for parts subject to wear, hydrogen storage materials, thermoelectric systems, study of new welding methods, new composite material synthesis methods
- **renewable green energy** - development of new sensors, engine aerodynamics and fluid mechanics, research on renewable fuels, catalysts for hydrogen production and purification
- **logistics** - mobile communication networks, opportunistic networking, traffic congestion reduction research, interaction-oriented frameworks and related infrastructures for social computing, Internet of Things, semantic webs
- **safety** - applied ergonomics, formal computing methods, theoretical and computational aspects of new functional spaces
- **regulatory issues and policies.**

All research is carried out at university departments with competences on chemistry, physics, computer science, mathematics, psychology, social sciences and economics. International approach of RH is guaranteed by active participation of researchers in EU funded projects.

### Università Piemonte Orientale ([www.unipmn.it](http://www.unipmn.it))

The **Department of Science and Technological Innovation (DiSIT)** and the **Interdisciplinary Nano-SiSTeMI Centre** ([www.centronanosistemi.it](http://www.centronanosistemi.it)) work in the field of materials and technologies in industrial processes, in particular on new nano-catalysts for fuel cells, for the reduction of toxic emissions and the production of high added-value products starting from raw materials of vegetable origin. Additives for biofuels and polymer composites, along with materials for electroluminescent displays are also developed. In the field of photovoltaic solar energy, the Nano-SiSTeMI Centre co-ordinates a European project for the development of a new generation of solar cells through the optimisation of the fundamental components of organic dye-sensitized solar cells (DSSC). Moreover, the Department runs research activities on: - optimisation of new high-performance enzymes for the production of 2<sup>nd</sup> generation bioethanol from wood-cellulose biomass in the framework of a project set up in collaboration with the company C5.6 Italy - experimentation of the cultivation of maize and millet from integral shreds for biomass for agricultural energy use - production of energy from renewable sources, in particular from biomass cogeneration and a solar thermodynamic system integrated with biogasification and self-fertilising closed cycle phytodepuration.

#### DESIGN AND SUSTAINABLE MOBILITY POLYTECHNIC CITY

Brainchild of a re-qualification project of the Mirafiori industrial area in Torino, the Design and Sustainable Mobility Polytechnic City is home to the Industrial Design, Visual Communication and Automotive Engineering courses. Approximately 1500 students attend classes here. The structure has classrooms, workshops, study rooms and cafeterias.

## Industrial Research & Development

*Piemonte is the Italian region with the highest share of private R&D expenditure. This is partly due to the presence of large innovative firms which stimulate creativity, innovation and knowledge-intensive activities. The whole region also ranks first in Italy for expenditure on innovation in the manufacturing sector.*

**Chemtex Italia** ([www.chemtex.com](http://www.chemtex.com)) is the Mossi & Ghisolfi Group engineering and technology development centre of excellence, devoted to technological support including techno-economical feasibility studies of new technologies and development of basic engineering. Chemtex Italia works closely with the other engineering arm in M&G, Chemtex International. With approximately 1,000 engineers spread around the world, Chemtex Int. is involved on a global scale in engineering, procurement and construction of chemical plants including bioethanol and biodiesel production.

**CRF-Fiat Research Centre** ([www.crf.it](http://www.crf.it)) The mission of CRF, founded in 1978, is to develop and transfer products, processes and innovative methodologies to increase the competitiveness of Fiat Group in the international marketplace. For this purpose, CRF develops collaborative research projects on sustainable mobility in partnership with all stakeholders, public and private. CRF is supported by a network of relationships with more than 1700 academic and industrial partners. Research activities span from innovative solutions aimed at improving the environmental sustainability of internal combustion engines, to new ecological and recyclable materials for making vehicles lighter, to advanced vehicle connectivity for integrated safety and traffic management, to driving comfort and on-board wellbeing. Manufacturing technologies and processes are other particularly significant research areas.

**Hysylab** ([www.hysylab.com](http://www.hysylab.com)) is a centre of excellence for hydrogen technology and is the most advanced laboratory in the Environment Park. With the main goal of supporting the growth of industrial knowledge applied to hydrogen-related issues, Hysylab projects tackle the following macro objectives: fuel cell and fuel cell system testing, hydrogen production, hydrogen storage, auxiliary component testing, and development of testing protocols.

### MAIN FUNDED PROJECTS

**Gas HighWay.** A project funded by the IEE European Programme for promoting the use of natural gas and bio-methane for transport applications in Europe. Partners include CRF, Hysylab, Politecnico di Torino.

**SEBE** (Sustainable and Innovative European Biogas Environment). Funded within the scope of the Central Europe Community Programme and dedicated to developing an international competence centre and a common strategy for promoting the application of technology for exploiting renewable energy sources for energy production ([www.sebe2013.eu](http://www.sebe2013.eu)).

**MHYTO.** Regional project for developing a high-power PEM-FC generation system for application in the automotive sector.

**Hy Tractor.** An innovative project in the scope of the "Industria 2015" national programme. It groups a supply chain of 13 Italian companies with the objective of developing an electric hydrogen fuel cell powered (zero emissions) tractor.

**Progetto S.I.MO.NE.** National funded project aimed to deploy an innovative ITS architecture for gathering and integrating traffic data from mobile traffic sensors (floating car data) into the local mobility management centres and deliver real-time traffic and limited access zones information services, according to the actual vehicle position. It is coordinated by 5T (<http://simone.5t.torino.it>).

**Easy Rider** National funded project, promoted by Magneti Marelli and aimed to design and develop innovative ITC solutions to reduce pollution and increase safety in urban and suburban mobility, with a particular focus on traffic and travel information services and onboard units enabling electronic payment systems.

