

FRENCH RAIL EXCELLENCE



Global demand for passenger and freight transport will rise tremendously between now and 2050, driven by the needs of developing countries and growing urbanisation. This international trend heralds progress, but it carries risks as well. It is our responsibility to ensure this growth is sustainable and to monitor its impact on the environment.

The rail industry must capitalise on these challenges as a way to reaffirm that its global, sustainable mobility solutions are an appropriate response: they offer a smaller carbon footprint and frugal use of infrastructure and land, while reducing congestion and providing safety and universal accessibility.

**WE ARE AT A KEY TIME
FOR RAIL TRANSPORT,
HIGHLIGHT TOGETHER OUR EFFORTS FOR
SUSTAINABLE MOBILITY IN FRANCE AND
AROUND THE WORLD**

We are able to mobilise our high-level expertise worldwide to coordinate relations with operating authorities; provide infrastructure engineering, construction and management; supply rolling stock and equipment; and handle operations and maintenance.

In order to meet this global challenge, the French rail industry is pursuing three ambitious goals: continually expand its competitiveness and capacity for innovation, promote greater cooperation among industry professionals so as to offer a comprehensive vision, and build a relationship with partner countries that is based on trust and focused on the future.

Our association is determined to forge a united, attractive industry, one that can respond to regional and business needs with high-performance solutions for the transport of passengers and goods.

We are convinced that by maintaining our innovation in France, a true centre of excellence in this field, we can create rail transport that is constantly more efficient, connected and sustainable, and that the solutions we provide will continue to make a persuasive argument worldwide in the future.

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Nicolas JACHIET

President
of Fer de France

FER DE FRANCE

PROFILE

THE DISCUSSION FORUM WHERE FRENCH RAIL INDUSTRY STAKEHOLDERS MEET

Fer de France is an industry association that unites all the public-sector and private-sector stakeholders in the French rail industry: public authorities, public transport authorities, passenger and freight service operators, infrastructure managers, manufacturers and engineering companies.

Its purpose is to focus the excellence and expertise of the French rail industry on achieving a set of shared visions and ambitions in France and internationally.

With its commitment to the energy transition and to managing climate change, Fer de France is confronting the challenge of the modal shift to clean forms of transport. Rail is among the most efficient transport modes in terms of energy, carbon footprint, congestion reduction and modest use of land. Its safety adds

STIMULATING ACTION IN A UNITED, GLOBAL AND INNOVATIVE RAIL INDUSTRY

The strength of the industry lies in the strength of its individual stakeholders, each of which has its own strategy. Fer de France stimulates initiative with the aim of a collective improvement for the benefit of all. It also encourages cooperation that creates value.

Together, the members of the rail industry have an enormous body of skills and experience developed worldwide and relevant to every key link in the value chain. With input from thousands of stakeholders,

to its effectiveness for the public.

Fer de France is also committed to promoting the efficiency and effectiveness of industry partners, including competitiveness clusters, universities, graduate schools and technology research institutes.

Fer de France promotes shared expression, innovation and its international influence in the preparation of new regulatory and technological standards, as a source of competitiveness.

Fer de France encourages the sense of competition as a powerful factor for shared progress. Its commitment to identifying points of convergence between French rail industry stakeholders is implemented in strict compliance with rules on promoting competition, including between its members.

Fer de France members contribute to developing specific mobility solutions alongside their customers on every continent.

“ Two priorities: increase the efficiency of the French railway system with proposals and concrete actions, and improving the efficiency of industry stakeholders for export. ”

11 MEMBERS

ALSTOM

ARF ASSOCIATION DES RÉGIONS DE FRANCE

EUROTUNNEL

FIF Fédération des industries ferroviaires

IGART GROUPEMENT DES AUTORITÉS RESPONSABLES DE TRANSPORT

Ministère de l'Énergie, du Développement durable et de l'Énergie

GROUPE RATP

SNCF RÉSEAU

SNCF

SYNTEC-INGÉNIERIE

UTP Union des Transports Publics et Ferroviaires

RESPONSIBLE GOVERNANCE

The **strategy committee** of Fer de France, made up of member company Chairmen, sets the broad strategy guidelines. These are then directed and implemented on a continual basis by an **operations committee** chaired by the Managing Director and the Chairmen's representatives.

FOCUS GROUP FOR ADDRESSING INDUSTRY CHALLENGES

Even though French rail companies compete in a number of international markets, they still work together on joint initiatives to make the industry more effective: promoting the expertise at work throughout the rail system, hosting foreign delegations and executives, raising the industry's profile. Fer de France and its **Export Committee** launch industry-wide promotional campaigns. A partnership with Business France provides support to small, high-value firms within the industry and helps to enhance their international reputation. Fer de France is the natural go-to point on rail issues for French government bodies and diplomats. In addition, the organisation works with industry partners (public authorities, Bpifrance) to improve resources for export financing.



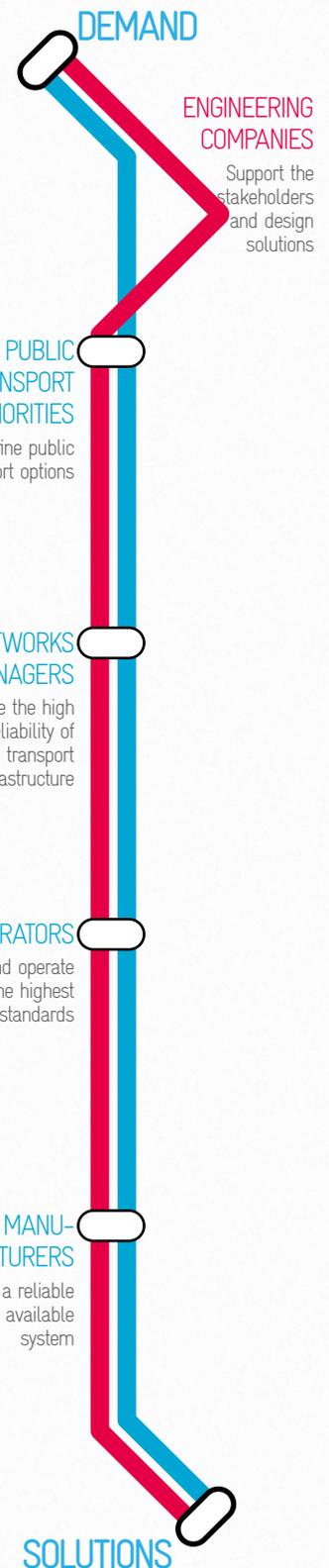
This operations committee is supported by the work done in **focus groups**.

The **Planning Committee** studies natural fluctuations in activity to as to anticipate more effectively the implications for employment and the skills the industry needs to develop.

The **Strategic Watch Committee**, successor to the **High-Level Standardisation Committee**, drafts joint proposals drawn from discussions among Fer de France's membership, some of which are relayed to public authorities in France and across Europe.

The **Training Committee** encourages regular discussion between sector members and schools and universities that offers vocational training in railways. Its goal is to enhance the appeal of railway programmes at France's institutes of higher education, anticipate industry trends over the next five years and help expand the sector's reach worldwide. Meanwhile, the **Moisson-Desroches programme** for young rail industry professionals is designed to give future rail executives the preparation they need to anticipate changes in their industry.

The purpose of Fer de France's **Innovation Committee** is to accelerate the pace of breakthrough innovation and promote cooperative projects that can generate value, notably in areas that require a comprehensive approach. The committee encourages priority initiatives to, for example, expand the digital economy in production processes, modernise rail testing procedures and reduce life cycle cost. It also enlists academic partners to provide support for these programmes.



FROM MOBILITY NEEDS TO INDUSTRIAL RESPONSES, FER DE FRANCE IS PRESENT THROUGHOUT THE VALUE CHAIN

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A PRESENCE THROUGHOUT THE VALUE CHAIN

DEFINING PUBLIC TRANSPORT OPTIONS

The value chain for public transport begins with transit authorities. Fer de France brings public bodies (such as the **Ministry of Transportation**) together with the transit authorities responsible for defining transit options, via the **Association des Régions de France (ARF)** and the **Groupe des autorités responsables de transport (GART)**.

In France, more than 350 transit authorities have the task of defining transit policies at the urban and regional levels. **They have developed top-level expertise in coordinating needs and managing public services.** In most cases they call on the services of public or private operators to run their networks. They have also introduced a unique financing mechanism for daily transport that includes support from businesses.

OPERATING TRANSIT NETWORKS

Network operators are represented by the **Union des Transports Publics et Ferroviaires (UTP)**, a trade union that brings together public and rail transit companies. Its purpose is to serve as the industry's voice for expanding transit services, promote the shared interests of industry firms and manage collective bargaining agreements in the sector.

The **Eurotunnel Group** is the holder of the Channel Tunnel concession and a rail freight operator. It manages the

cross-Channel fixed link, which upon its completion became the world's longest rail tunnel. It also operates Le Shuttle, the rolling motorway that connects Britain with the European continent. The tunnel is used by the high-speed trains that connect France, Belgium and the UK as well as freight trains.

The **RATP Group** manages and operates the historic multimodal network in Paris that encompasses every form of collective mobility, including the regional rapid transit system, airport shuttle, conventional and automated metro, tramways and buses. The Group is also expanding its scope both in France and worldwide, where it jointly operates both rail and road networks.

SNCF is France's state-owned railway company. In addition to being Europe's largest high-speed rail operator with more than 50% of the market, SNCF is a leading operator of suburban and regional transit networks. It also plays a major role in Europe's freight transport industry. Through Keolis and Geodis, the SNCF Group is present on every continent and generates 25% of its revenue outside France.

SNCF Réseau manages, operates and modernises the French rail network while ensuring that all rail companies have equal access to the network. Each day, 15,000 trains carry 5 million passengers and 25,000 tonnes of freight. SNCF Réseau is implementing a large-scale network modernisation plan that gives top priority to safety.

SUPPLYING TRANSPORT SOLUTIONS

Manufacturers are represented in Fer de France by the **Fédération des Industries Ferroviaires (FIF)**, whose 280 member firms are drawn from every segment of the rail industry. The FIF represents the entire industrial chain within the rail industry: rolling stock manufacturers, engineering firms, railway equipment suppliers, track and signalling manufacturers, testing.

Alstom designs and sells rail industry systems, equipment and services. It offers the widest range of solutions on the market, from high-speed trains to metros and tramways, along with offerings for maintenance, modernisation, infrastructure and signalling. Headquartered in France, Alstom operates in more than 60 countries and currently employs 32,000 people.

SUPPORTING INDUSTRY FIRMS

Engineering companies are active at every stage of the value chain, defining needs and supplying high-level expertise. France's railway engineering industry is among the most powerful in the world, thanks to top names such as Egis, Systra, Assystem, Artelia, Setec and more. All are members of **Syntec Ingénierie**, a federation of more than 1250 engineering companies that provides technical support and research, technological consulting, monitoring and inspection services.

DESIGNING MOBILITY SOLUTIONS ON EVERY CONTINENT

The Fer de France members have a global outreach activity. The French rail industry has a presence on every continent in 106 countries serving 91% of the global population.

In Italy, Alstom operates Italo, the articulated high-speed train with motorised power cars at either end. Africa's first TGV (high-speed train) network in Morocco will be an Alstom system. SNCF leads the mobility market in Europe.

Transdev is the leading private operator in Germany, whilst RATP Dev operates metro systems on every continent, in Seoul, Algiers and Mumbai. Keolis manages about ten rail network franchises in four European countries, Australia, the USA and India.

Siemens France, member of the FIF, has based its global centre of excellence for automated metro systems in France, and the city of Valenciennes hosts a rail centre of excellence combining industrial and universities. Bombardier and Alstom have developed and built in France modular single/double deck multipurpose regional trains.

In the field of rail freight, Eurotunnel operates the world's largest rolling motorway between Britain and France.

French engineering is at work in the

GLO-
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transport systems of hundreds of cities. The engineering companies' members of Syntec-Ingénierie operate on every continent of the world. More than half of all the world's metro systems use French engineering skills.

Working within Fer de France, the public transport authorities (ARF and GART) have worked with operators and manufacturers to develop highly efficient coordination, project management and contractual management methods. This impressive expertise is made available under cooperative ventures with city authorities and governments worldwide.

Fer de France is also engaged in wide-ranging, socially responsible and long-term cooperative ventures. In terms of employment, French businesses connected with the rail industry generate 60,000 jobs outside France. Alstom, for example, has developed joint ventures with Gibela in South Africa, TMH in Russia and Cital in Algeria, among others.

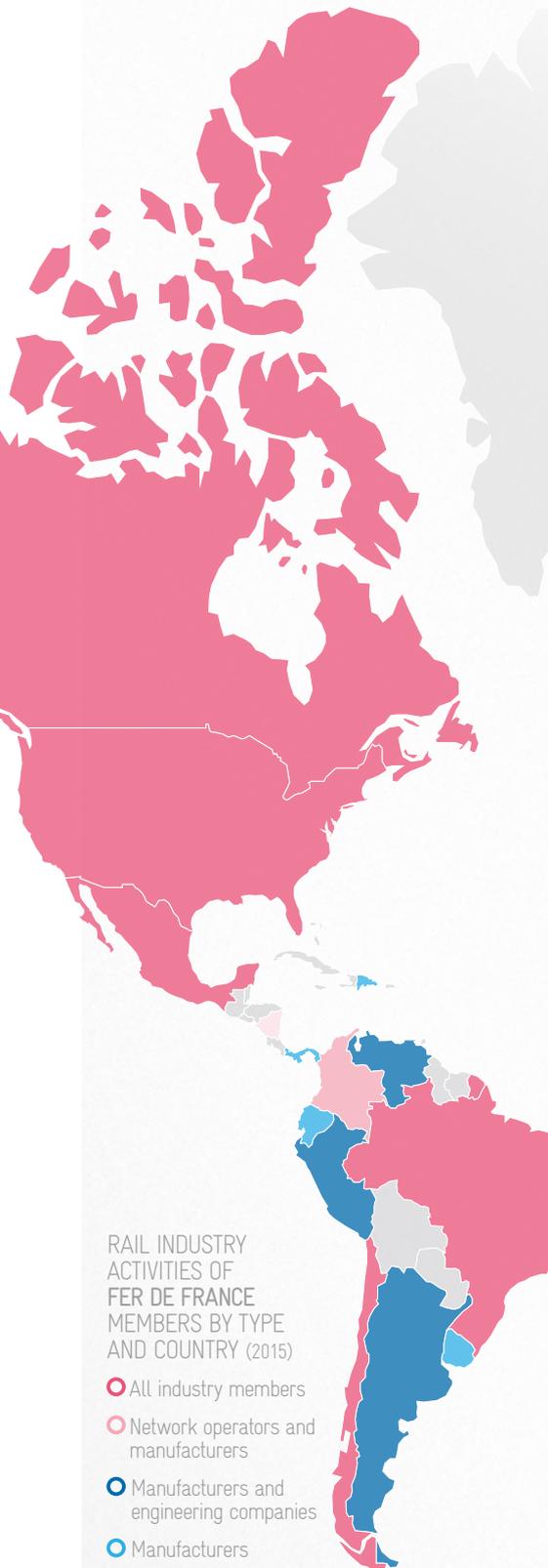
FRENCH EXPERTISE
AT WORK IN

30%

OF TRAM SYSTEMS
WORLDWIDE

French manufacturer and operator members of the UTP (RATP, Transdev and Keolis) lead the world market, and are involved in 30% of the world's 250 most recently constructed or upgraded tram systems. With 24 national networks, France benefits from their expertise at the highest level. Their services and products are now in use on every continent of the world.

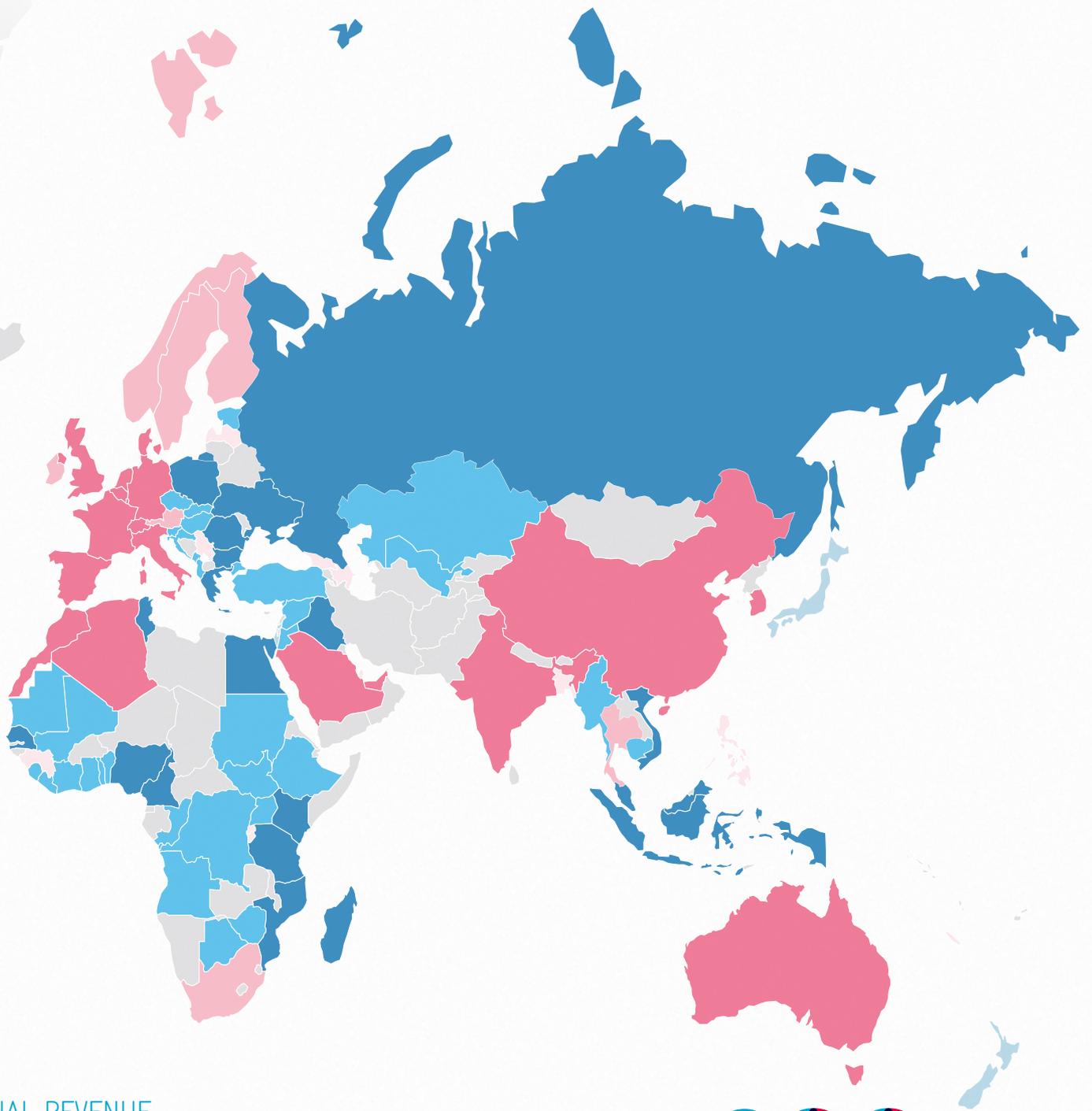
The 1,800 Citadis tram sets manufactured by Alstom Transport provide mobility for residents in more than 43 cities worldwide.



RAIL INDUSTRY
ACTIVITIES OF
FER DE FRANCE
MEMBERS BY TYPE
AND COUNTRY (2015)

- All industry members
- Network operators and manufacturers
- Manufacturers and engineering companies
- Manufacturers
- Engineering companies
- Network operators

WORLDWIDE PRESENCE



ANNUAL REVENUE

€ **35** billion

€ **7.5** billion

IN REVENUE FROM
EXPORTS

300 000
JOBS

SY- NER -GY

574.8
kph
(340.4 mph)

A NEW WORLD SPEEDRECORD AND A COLLECTIVE TRIUMPH

Funded by SNCF, RFF and Alstom, the world rail speed record campaign of 2007 was a collective triumph. A number of rail industry stakeholders worked together to demonstrate the level of performance delivered by their latest technologies, as deployed in production trains. Ultra-stable bogies, the innovative self-guided and speed-responsive Faiveley pantograph and high-performance asynchronous traction system all contributed to reach a new speed record of 574.8 kph (340.4 mph).

During the testing phase, 300 engineers and technicians representing all industry stakeholders contributed their expertise to achieve this unique level of performance.



“ By working together on shared problems, French rail industry stakeholders can deliver improved coordination at every link in the transport chain, develop innovations the market wants, and become more competitive. ”

INITIATIVES THAT LEAD THE INDUSTRY'S SMALL AND MEDIUM- SIZED COMPANIES

The major corporates of the rail industry play a decisive role in structuring a network of small and medium-sized companies with the potential to grow in international markets. These SMEs make an essential contribution to the industry's powerful innovation and development potential. Fer de France therefore coordinates all its initiatives with those of industry federations and their leading stakeholders in order to promote this development and encourage the emergence of midsize companies. The majority of this work is done through the Pacte PME, which involves all the leading French rail industry manufacturers and operators, with funding from the Croissance Rail (Rail Growth) development fund backed by the industry and coordinated by Bpi France.

Fer de France supports initiatives aimed at developing a **mature relationship between suppliers and project clients** that advances the industry. Towards that end, the 2010 Charter defines 10 best practices applicable to both major clients and SMEs.

These practices include moving from a “lowest-bidder” mindset to

a focus on the best bid for system life cycle and performance, jointly developing innovative solutions and giving suppliers a role in improving procedures. The digital economy offers an additional avenue for promoting **virtual cooperation** on essential processes: it can be used to help manage the supply chain, collaborate on projects, manage life cycle data and share digital models.

EXPORTING EXCELLENCE

Fer de France is committed to boosting excellence within the industry and making it more effective internationally. It encourages initiatives like Croissance Rail, the €40 million investment fund supported financially by Alstom, Bombardier Transport, SNCF Participations, RATP and Bpifrance. The purpose of Croissance Rail is to favour the emergence of innovative small and midsize companies with the ability to operate in international markets.

Fer de France has signed a partnership agreement with Business France to promote the country's rail industry in export markets. A web platform in English has been developed (www.French-Rail-Industry.com) where industry firms can briefly describe their services and provide links to further information about the solutions they offer. Fer de France works in tandem with Business France to organise industry-wide initiatives. At InnoTrans 2014 in Berlin, the three joint French pavilions were among the largest on view, giving French firms an exceptionally prominent presence among potential clients from around the world

RAILWAYS: A CRITICALLY EFFECTIVE WAY TO COMBAT CLIMATE CHANGE

Rail-based transport accounts for less than 1% of the transportation industry's greenhouse-gas emissions.

23% OF GREENHOUSE-GAS EMISSIONS from fuel combustion are caused by transports

Under a business-as-usual scenario, greenhouse-gas emissions caused by transport will double by the year 2050

+184% in the volume of PASSENGER TRANSPORT by 2050 because of increased demand for mobility, notably in emerging countries, and the growth in urban areas around the world

To meet the challenges of the energy transition and combat the negative effects of climate change, Fer de France wants to reinforce the modal shift to railways as one of the most effective solutions for preserving the environment.

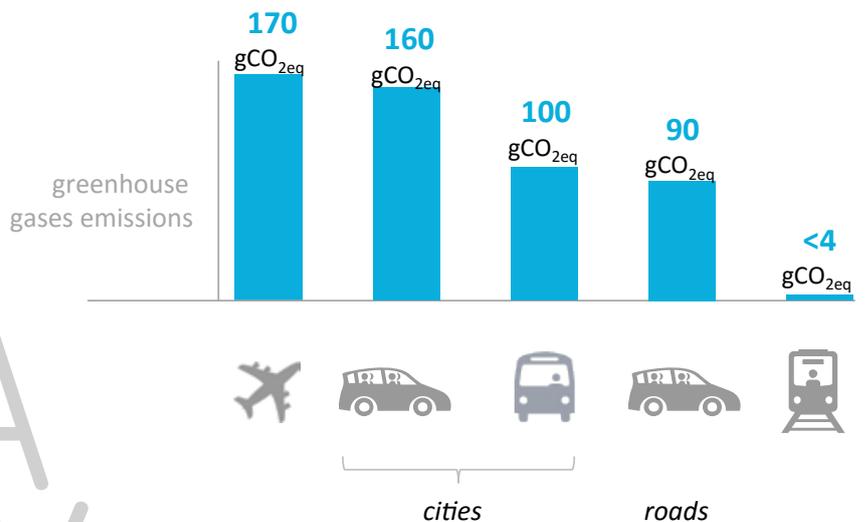
Building sustainable mobility requires more than just developing clean cars. Public transit offers the most environmentally efficient mobility solutions for daily and short-distance travel: a suburban train only generates between 6 and 20 grams of CO₂ equivalent per passenger per kilometre, compared to nearly 150 grams for each person travelling by car. Over the past decade, greenhouse-gas emissions per car have decreased 5%, while unit emissions from trains have fallen at six times that rate (down 30% over the same period).

Rail transport offers an ideal solution to the needs of a sustainable metropolis: infrastructure is concentrated, space is preserved and noise pollution is reduced. It helps to reduce urban congestion, which is estimated to cost nearly 1% of the world's gross domestic product. Since it is generally available at low cost, rail transit puts mobility within everyone's reach. Lastly, it is unmatched in safety.

For medium-distance transportation between major cities, the volume of greenhouse gases emitted by a train is nearly one tenth that of a short-haul flight, and almost one fifth that of a car.



“ Because of their minimal externalities, rail-based modes of transport play an irreplaceable role. They help to reduce urban congestion, which is estimated to cost nearly 1% of the world's gross domestic product. ”



SUS-TAINABILITY

CO₂ EMISSIONS AND COSTS PER PASSENGER.KM ACCORDING TRANSPORT MODES

Sources: OECD prospective trends, GHG emissions measured by ADEME.

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“ By coordinating the industry's R&D more effectively and capitalising on the results, we can accelerate the pace at which innovations come to market. ”

INNOVATION AT EVERY LINK IN THE VALUE CHAIN

To respond to the mass-transit issues, RATP, Alstom Transport and Siemens France have responded to the challenges of mass transit in Paris by automating an existing metro line without disrupting services.

In responding to the challenges of sustainable development, RATP and Alstom have contributed to the Maximised Energy Efficiency Tramway System (STEEM), which reduces energy consumption by 16%.

As part of improving rail system productivity, SNCF is also committed to optimising network maintenance and availability.

Lastly, to maximise rail freight productivity, Alstom, Faiveley, SNCF and Vossloh Cogifer have all contributed to the Marathon project formed to run the longest freight train in Europe.

Thanks to a partnership between SNCF Réseau, Alstom, CEF, Railtech, Vossloh Cogifer and Ifsttar, testing was conducted in late 2013 on a concrete slab track, with no ballast or sleepers, laid between Serqueux and Gisors, France. And SNCF Réseau is now making use of drones to conduct network maintenance more efficiently.



COORDINATING INNOVATION

To meet the challenges posed by an increasingly competitive market, companies in the rail industry are launching initiatives to promote innovation and invest in manufacturing.

To build on the efforts of its members, Fer de France has joined forces with the Railenium research centre and i-Trans, a competitiveness cluster for the industry, to accelerate the innovation process in various fields of research, with the aim of showcasing the competitiveness of rail transport. By matching businesses with researchers, Fer de France hopes to speed progress in areas such as test performance, new materials, life cycle cost reduction and preventive maintenance techniques.

In addition, the FIF coordinates four regional rail clusters designed to consolidate expertise in every aspect of the transport chain: studies, infrastructure (tunnels, bridges, roads), signalling and automation, rolling stock, electronics systems, software solutions, support, testing, diagnostics, maintenance and renovation.

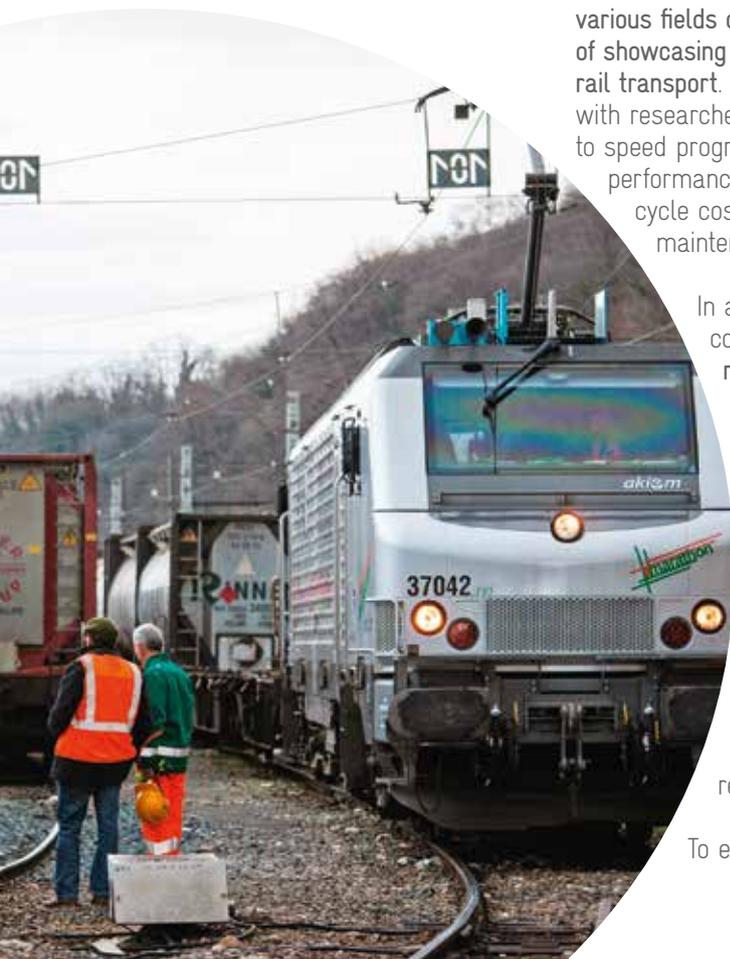
To enhance competitiveness,

Fer de France also promotes the digital economy within the industry as a way to encourage virtual cooperation on essential processes.

JOINED-UP URBAN MOBILITY

In today's increasingly dense and connected megacities, enormous mobility challenges are posed by the need to coordinate high-density passenger flows with high-frequency train, metro and tram services. To address these issues, Fer de France is a member of Vivapolis, the international umbrella brand for French sustainable city development stakeholders. SNCF Group and their partners launched their Lab Mass Transit in 2013. Its aim is to promote innovation that cuts across train performance, network node management, multimodal station operation, and the digital services that involve passengers directly in their journeys.

As part of Vivapolis, engineering companies and many other innovative businesses are modelling advanced technologies for sustainable city applications in destinations such as Santiago de Chile and Astana.



“ As a stimulator of action, Fer de France facilitates the introduction of training programmes tailored to technological change, the constraints and opportunities that result from environmental policies, and the needs of customers around the world. ”



CREATING A MORE ATTRACTIVE INDUSTRY

In order to **gain a competitive advantage**, the industry needs to anticipate demand for training, make the sector more attractive to students and foster support for the industry among its workforce.

With help from firms in the sector, Fer de France is developing vocational training in railway careers for France’s school system, including standardised basic curricula for everyone from operators to highly skilled engineers that reflect the latest industry developments. Boasting nearly **50,000 engineers and senior managers**, the rail sector is expanding its training offerings to encompass a large number of careers.

The industry needs to be promoted and made more appealing to both

French and international students, and especially students from countries where the sector is currently seeing growth.

All Fer de France stakeholders provide training opportunities for young people.

The SNCF Technicampus provides 10,000 students every year with technical training in rolling stock using the most innovative resources, including e-learning, virtual reality and learning workshops. The Transdev talent development centre offers training opportunities under work/study contracts and open-ended contracts of employment. And RATP has developed a cutting-edge metro simulator that is revolutionising learning methods.

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Moisson-Desroches



Cycle des Jeunes dirigeants du ferroviaire

THE MOISSON-DESROCHES PROGRAMME FOR PROMOTING AN INDUSTRY SPIRIT

Fer de France believes that one key to transforming the industry is to give future executives the opportunity to work freely across multiple divisions at a critical time in their career track. Therefore, in 2014 Fer de France launched the first year of its Moisson-Desroches programme, designed for young railway industry executives. This high-level cross-disciplinary exchange was named for Pierre-Michel Moisson-Desroches, a French engineer born in 1785 who was ahead of his time in grasping the strategic value of railroads.

The goal is to have participants work on collective challenges in a globalised industry and in response to worldwide demand: interactions within the industry, international and intermodal competition, emerging trends in mobility, innovation.

The students take part in a series of conferences and tours over the course of a year, all with an international perspective. They work in groups to develop discussion briefs on strategic topics.

The programme as a whole is designed to give participants a broader and more precise view of the role of rail transport within its “ecosystem”.



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