

# Initial tests on the hybrid TER in France.

## Sustainable mobility for commuters.

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**The Grand Est, Nouvelle-Aquitaine and Occitanie regions are joining with SNCF and Alstom to design the first hybrid TER, a train with even lower energy consumption.**

To take part in the necessary energy transition and reduce greenhouse gas (GHG) emissions and noise for the benefit of commuters and the environment, SNCF and Alstom are partnering with the Grand Est, Nouvelle-Aquitaine, and Occitanie regions to carry out tests on the first Alstom Régiolis train<sup>1</sup>.

Tests on the first hybrid Régiolis will get underway in 2020 with the aim of achieving a 20% reduction in energy consumption.

SNCF has worked with Alstom on the development and production of the first hybrid TER. The Grand Est, Nouvelle-Aquitaine, and Occitanie regions along with SNCF and Alstom are investing €16.6 million in this test phase, with the regions also paying the cost of providing a Régiolis unit from the Occitanie fleet for conversion to a hybrid train. The aim is to put this train into commercial service some time in 2021 to validate the operational characteristics and performance of this solution. Full-scale deployment is planned for 2022.

Alstom's objective is to reduce its products' energy consumption by 20%. The hybrid Régiolis is thus an important step toward the achievement this goal. The Reichshoffen site, an Alstom centre of excellence for regional rolling stock, will design and manufacture this new-generation Régiolis train in cooperation with two Alstom sites in France: Tarbes (traction chain) and Villeurbanne (on-board electronics).

<sup>1</sup> The Régiolis is one of the trains in Alstom's Coradia polyvalent regional train range. More than 200 of the new-generation Régiolis are currently in service in France.

«No other solution available in the short term for rolling stock currently in operation will achieve a comparable reduction of 20% in energy consumption and greenhouse gas emissions», says Frank Lacroix, general manager TER. In addition, traction maintenance costs will be lower because two diesel engines on the train will be replaced with batteries. Depending on the situation, the hybrid TER will be able to make optimal use of several energy sources: electric power from the catenary, diesel fuel, and energy stored in batteries.

«All the partners shared the ambitious goal of getting a first hybrid train up and running very quickly. That goal will become a reality in 2020 and mark an important step on the road to greening the rail fleet», says Pierre Izard, deputy general manager, SNCF Rail Systems and Technologies.

«Alstom is especially proud to contribute along with SNCF and the Grand Est, Nouvelle-Aquitaine, and Occitanie regions to the development of cleaner and more sustainable mobility. We believe hybridisation of the diesel fleet is a realistic solution both technically and economically to reduce emissions and operating costs», says Jean-Baptiste Eyméoud, CEO, Alstom France.

«Hybridisation of the Régiolis is important for the Grand Est region, which has a fleet of 59, including six in production. The Grand Est region is joining in the substantial, ongoing effort to provide the regional passenger transport network with an offer of efficient services with low energy consumption and a small carbon footprint. This train is a first step toward zero-emission rolling stock for regional transport, notably through the development of hydrogen-powered trains, for which the hybrid Régiolis will likely be one of the building blocks», notes Jean Rottner, president of the Grand Est region.

«In the Nouvelle-Aquitaine region, only 40% of the 3,250 km of TER lines are electrified today, and that is done with «Midi» catenaries whose average age is easily over 80 years. The development of rolling stock with alternative traction modes is not just an essential step toward zero-emission trains; it also offers new possibilities for the optimised operation of small rail lines, which will allow more balanced development of our region», says Alain Rousset, president of the Nouvelle-Aquitaine region.

«To achieve our objective of becoming the first positive-energy region in Europe by 2050 and to provide better transport services to users in the near future, we are making substantial investments to modernise and renew our TER fleet. This technology would deliver real energy savings, so it offers a great opportunity for the development of transport in Occitanie. With our regional plan for multimodal hubs, the HyPort programme for the development of hydrogen-powered vehicles, and this testing, we are in the process of imagining today the mobility solutions that will be used to provide transport in the future. I want the Occitanie/Pyrénées-Méditerranée region to become the primary testing ground for hydrogen trains», says Carole Delga, president of the Occitanie/Pyrénées-Méditerranée region.

## The Centre-Val de Loire region to partner in the hybrid TER testing

«Rail service in rural areas is an important factor in both regional and economic development. That is why the Centre-Val de Loire region is strongly committed to keeping local infrastructures up-to-date and suitable for tomorrow's rolling stock. Testing of new, hybrid diesel rolling stock is thus especially important for the future. Regardless of how individual and collective modes of transport evolve, zero emissions will continue to be the primary goal, and rural areas, which are served in many cases by non-electrified lines, are central to this challenge. These early tests raise great hopes for collective mobility in the future.»

**François Bonneau,**  
**President of the Centre-Val de Loire region**

The concept of hybridisation applied in the bi-mode Régiolis consists in replacing half of a train's diesel engines with high-capacity, lithium-ion batteries. These batteries recover the train braking energy, most of which is currently dissipated as heat, then store and use it to supply the energy needed by the train.

With batteries, it will be possible to test new operational procedures such as turning off the diesel engines while the train is entering, standing in, and leaving certain stations, particularly in densely populated areas, thus reducing pollution and noise in those stations.

All in all, given its ability to reduce energy consumption as well as operating and maintenance costs without any investment in infrastructure, the hybrid TER looks to be an essential building block in the development of low-carbon mobility. It is an early step in the SNCF R&D programme whose long-term objective is to replace all diesel engines with zero-emission technologies like hydrogen fuel cells.

Trains are still one of the cleanest modes of transport: on average, a TER emits 30.7 g of CO<sub>2</sub>/km, or five times less than an automobile. Travelling by train rather than by car avoids the emission of 10 million tonnes of CO<sub>2</sub> each year. Nevertheless, SNCF is stepping up its efforts to support the energy transition, with a goal of improving its energy performance by 20% and its «carbon» performance (GHG emissions) by 25%. The regions, which finance the regional rolling stock owned by SNCF, are focusing their efforts on diesel-powered trains, which carry 40% of passenger traffic and thus have a strong environmental impact. A first step has been taken with the introduction of bi-mode commuter trains, which will allow use of diesel power on non-electrified lines and catenary-supplied electrical power wherever possible.

The Grand-Est, Nouvelle-Aquitaine and Occitanie/Pyrénées-Méditerranée regions have invested more than €1.2 billion in an order for 152 Régiolis and Regio2N new-generation trains.

## About Alstom

As a promoter of sustainable mobility, Alstom develops and markets systems, equipment and services for the transport sector. We offer a complete range of solutions (from high-speed trains to metros, tramways and e-buses), passenger solutions, customised services (maintenance, modernisation), infrastructure, signalling and digital mobility solutions. Alstom is a world leader in integrated transport systems.

In 2017/18, the company had sales of €8,0 billion and booked orders worth €7.2 billion. With headquarters in France, Alstom is present in more than 60 countries and employs 34,500 people today. The know-how of its some 8,650 employees in France benefits both French and international customers. Its activities create 25,000 jobs in France at its 4,500 French suppliers.

[www.alstom.com](http://www.alstom.com)

## About SNCF

SNCF is a global leader in passenger and freight transport services, with revenue of €33.5 billion in 2017, of which one-third on international markets. With 270,000 employees in 120 countries, SNCF draws on its foundations in French rail and its extensive experience as an architect of transport services. It aims to become the benchmark for mobility and logistics solutions in France and worldwide. SNCF has six core businesses: SNCF Réseau (management and operation of the French rail network); commuter transport (mass transit in the Paris region, TER regional rail, and Keolis in France and worldwide); long-distance rail (TGV inOui, Ouigo, Intercités, Eurostar, Thalys, Ouibus, and more, and ticket sales through Oui.sncf); SNCF Gares & Connexions (station management and development), SNCF Logistics (freight transport and logistics worldwide with Geodis, Fret SNCF, and Ermewa), and SNCF Immobilier (management and optimization of SNCF property and land assets).

## About the Grand Est region

Transport is the largest item in the budget of the Grand Est region, amounting to €867 million in 2018. In addition to being responsible for organising regional rail transport (TER), the Region has managed interurban and school transport since 1 January 2017. It also invests in infrastructures and passenger information systems to promote and optimise intermodal transport with the aim of improving travel and preserving the environment.

## About the Nouvelle-Aquitaine region

The transport authority for regional rail transport (TER) as well as interurban and school road transport, mobility and transportation are one of the largest items in the Region's budget. Each day, 53,000 commuters travel on the TER network and 225,000 students take school transport services. Since 2002, the Nouvelle-Aquitaine region has invested €789 million to renew its entire rolling stock fleet consisting of 194 trainsets, including 61 Régiolis and Regio2N trains that were progressively brought into service between 2014 and October 2018.

## About the Occitanie/Pyrénées-Méditerranée region

In its action plan to become the first positive energy region in Europe by 2050, and as the transport authority, the Occitanie/Pyrénées-Méditerranée region is working actively to support the development of innovative modes of transport that consume less energy. The Region decided to pursue a proactive policy to develop and organise coordinated transport services designed to achieve the new mobility and regional development objectives. With the Rail and Intermodality Conference, the new TER agreement, and an investment of €13 billion between now and 2030, the Occitanie/Pyrénées-Méditerranée region has set in motion a collective and strategic program that will benefit the regions and transport users.

## About the Centre-Val de Loire region

The regional transport authority for 20 years, the Centre-Val de Loire has become the main mobility operator for the region following the passage of the NOTRe regional reform law and the transfer to its authority of the departmental road transport services and then the TET lines connecting the region to Paris. To the growing challenges of improving mobility and opening up isolated rural areas, it brings an overall vision and intermodal approach based within the SRADDET regional sustainable development programme on a network of services and a services charter. By offering free school transport, launching a unified «REMI» regional road transport network, and revising its fare schedule, the Centre-Val de Loire region has created the conditions for increased and more systematic use of its public transport offer. Through its commitment to preserving the local rail network, it has reaffirmed its desire to maintain a multimodal, complementary, and efficient transport offer for all parts of the region. In 2018, the Region ordered new rolling stock (Regio2N) worth nearly €460 million to replace the Corail TET fleet. In this renewal plan, it will also receive by the end of 2019 three Régiolis trainsets, which will ultimately be affected by this hybrid test programme.

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