

An aerial night view of Paris, France, showing a dense, glowing grid of city streets and roads in yellow and orange. The city is illuminated against a dark background, with some green spaces and water bodies visible. The overall effect is a complex, interconnected network of light.

**PROJECT**

# GRAND PARIS – AN UNDERGROUND REVOLUTION

The “Grand Paris Express” infrastructure project will have a fundamental impact on life in the French capital. The city center and outskirts are to merge into a metropolitan region with 12.2 million inhabitants. Herrenknecht is already involved in construction measures in Paris with 21 TBMs. A report on an urban development highlight in Europe.

Text: Mathias Becker, Michael Stührenberg

# “THIS IS WHERE THE FUTURE OF THIS CITY BEGINS.”

Guy Lechantre, Managing Director of the Herrenknecht France S.A.R.L. subsidiary



Guy Lechantre is looking forward to the future of Paris. The pioneer project “Grand Paris Express” will also improve the connection between the city center and the city district he lives in.

February 3, 2018, Paris, Champigny-sur-Marne. This open-air festival did not necessarily require good weather. 3,400 people flocked to the place where a new chapter of Parisian history is starting – despite rain showers and wintery temperatures. They all came to witness the naming ceremony for “Steffie Orbival”, the TBM which will excavate the first section of Line 15 of the “Grand Paris Express” metro project. There was tremendous public interest. “I have never seen so many people at a construction site opening”, says Guy Lechantre, Managing Director of the subsidiary Herrenknecht France. Accordingly, some visitors to Champigny-sur-Marne were obliged to follow the spectacle from the other side of the construction fence.

**Long yearned for by many, the gigantic “Grand Paris Express” construction project will make the capital fit for the future.** Over the next 15 years, the Parisian metro network will be almost doubled in length, from 220 to 425 kilometers. There are plans for four new lines connecting the Paris hinterland, which has been served rather poorly to date. Three of the existing metro lines are to be extended. Total costs are estimated at 35 billion euros. “This is where the future of this city begins”, of that Guy Lechantre is certain.

Nobody doubts that this money is well invested. If anything were to be criticized about the project, then the fact that it is long overdue. The city has been postponing development of its rail network for decades. Now people in Paris and its environs can hardly wait for the tracks and the 68 new stations to be finished. According to estimates, around two million people will use the trains on the new routes. Every day. “There hasn’t been a construction site of this size since the building of the new cities back in the 1960s”, says Philippe Yvin, former President of the Société du Grand Paris, which is responsible for the lion’s share of the project.

If you want to understand what the future looks like on the Seine, you must leave the tunnel and – at least in your imagination – take a bird’s-eye view. Up here, the problem plaguing Paris and its environs is clear. On the one hand, there is the “Paris intra muros”, the city center, once surrounded by a ring of fortifications. Around 2.2 million people live here in 20 arrondissements, spanning 105 square kilometers. This corresponds to 22,000 people per square kilometer. As a comparison: in Munich, Germany’s most densely-populated city, 4,500 people live in one square kilometer; in London the figure is 10,000.

And then there is the “Paris extra muros,” the frayed and rapidly-growing hinterland. Seen from above, it is a patchwork of bleak residential blocks, elegant villa neighborhoods, bustling commercial areas and desolate wastelands. Population: more than 10 million. Local public transport: hardly any. **Together the city and its surroundings form the Île de France, the “Island of France”, which is the second largest metropolitan area in Europe with a population of 12.2 million people.** Only the Greater London area is larger.

But the Île de France is divided. The interior and exterior areas are separated by the Périphérique, a highway ring with eight to ten lanes, which stretches around the old city center like an asphalt corset. It was built between 1956 and 1973 on the ruins of the old city walls. And it seems as if the city planners intended to build another protective wall, behind which the “Paris intra muros” could hide. Today, the Périphérique is regarded as a “psychological boundary”: those fortunate enough to live within the circle easily forget there is an outside. Conversely, many people from the hinterland only ever get to know Paris a little by getting a job in the city.

The consequences of the failed urban planning are devastating. Those commuting by bus or train from the outskirts to jobs in the city can easily travel for more than an hour. And it becomes totally absurd when traveling from one suburb to another as there are hardly any direct connections between the suburbs. Many commuters are obliged to travel tediously from the outskirts to the center before leaving it for another direction. Taking the car doesn’t save much time as around 1.3 million vehicles clog the Périphérique every day, in an attempt to bypass the city center or enter it through one of its 38 gates.

In particular the socially and economically deprived quarters around Paris, the banlieues, largely inhabited by migrants and their offspring, are indicative of the fact that the city not only has a traffic problem. It also has an integration problem. The vicious circle of marginalization, unemployment and crime are part and parcel of everyday life here. Its roots are manifold and extend back to colonial history. However, experts agree that whoever wants to tackle structural inequality and give those who have been left behind an opportunity to become part of society must also ensure that the city and its possibilities move within reach.

The gulf between these worlds is shown by Aïcha Traore’s story. German journalists accompanied this single mother, raising five kids on her own, for a report in 2010. She lives in Epinay-sur-Seine on the northern edge of the city, roughly eight kilometers from the 19th arrondissement where she works in a supermarket. A manageable commute, you’d think. But for Aïcha Traore, it has long become a daily battle against time which she cannot possibly win. It takes her one and a half hours by bus and train to travel from her apartment to the supermarket where she works. That’s three hours a day, 18 hours a week, as Aïcha Traore also works on Saturdays.

Aïcha Traore was born the daughter of an Imam in Mali. She lives with her children in Cité 77. This housing development owes

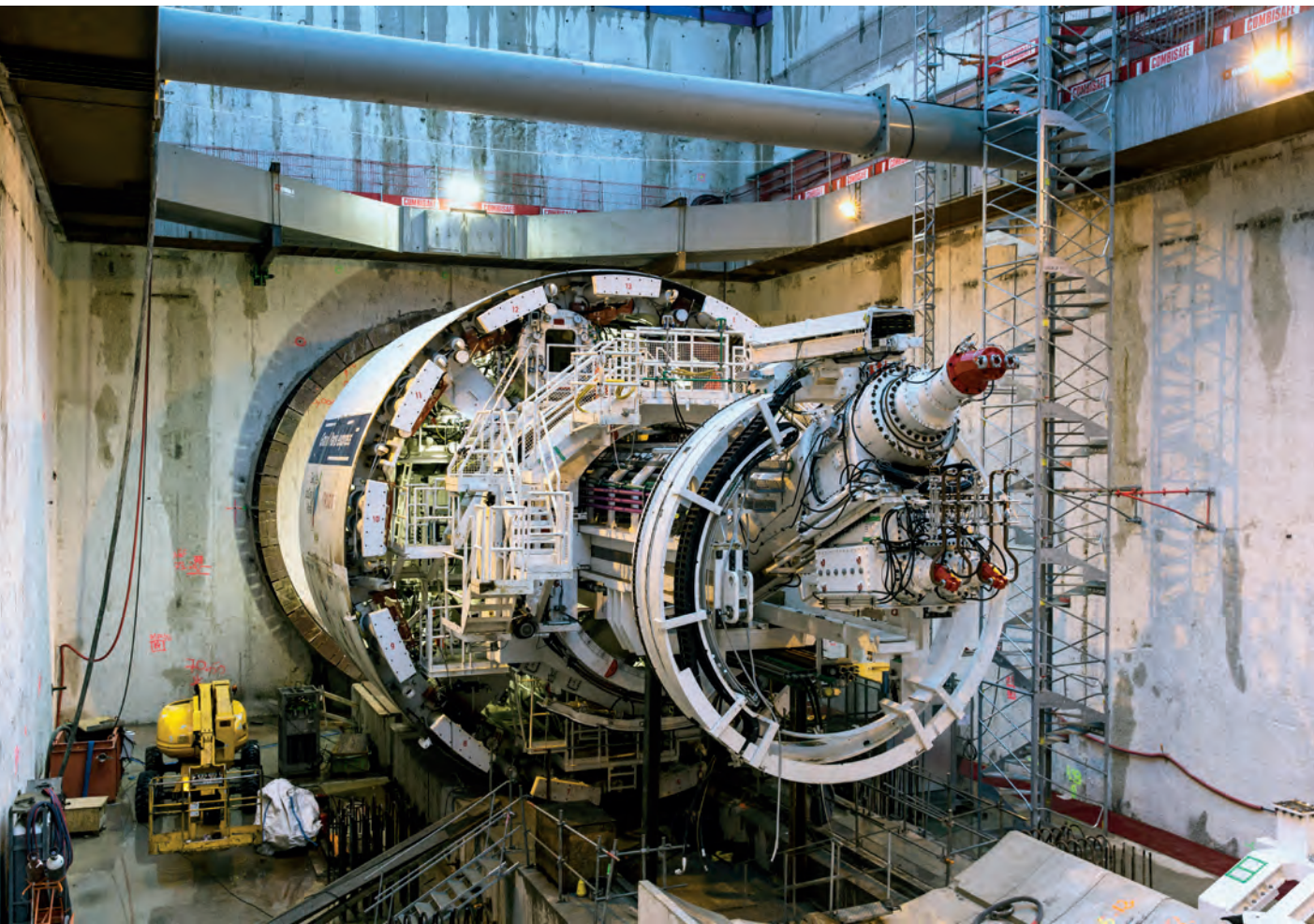


Martin Herrenknecht demonstrates to Philippe Yvin, former President of the Société du Grand Paris, how state-of-the-art technology is created in Schwanau.

Around

# 22,000

people live in one square kilometer in Paris’ city center area.  
As a comparison: in Munich the figure is 4,500.



Shortly before the launch: during assembly in February, the S-1078 TBM still looked a bit like a spaceship. In April, it commenced its underground mission of building a 2.2 kilometer tunnel section.

With total costs of

# 35

billion euros, "Grand Paris Express" is one of the most important urban development projects in Europe.

its name to a single building number: 77 Avenue d'Enghien. Once, more than 1,000 people, distributed across 323 social housing units, lived here under the same address in a gigantic residential complex built in 1965. Initially, tenants were an ethnic mix but white people soon moved away, making space for more "Beurs" (Arabs) and "Blacks," as France's immigrant children refer to themselves. Some of their fathers came from North Africa, mostly Algeria, where they fought against their own people until 1962. Other fathers migrated from France's former colonies in West Africa, from independent but poor republics such as Senegal and Mali. The residential complex on Avenue d'Enghien has meanwhile been demolished, but the problems that have evolved here cannot be simply bulldozed away.

You need to have been out here, for example in Epinay-sur-Seine, to understand the distance between the city of lights on the Seine and its desolate outskirts. Back then, the reporters asked Aïcha Traore's daughter, who was just graduating from high school, which area of Paris she liked best. Aged 20 at the time, the girl simply shrugged her shoulders. She couldn't say. She had only been to Paris three times in her life: on school

excursions to visit Les Invalides, the Eiffel Tower, Notre Dame and the Louvre. Eight kilometers. A world away.

But it is not only the poor banlieues to the north and east which the “Grand Paris Express” is to link up in the future. There are also the elegant villa neighborhoods and the University of Versailles in the southwest, the La Défense business district in the northwest and the two airports, Charles de Gaulle to the northeast and Orly to the south. In the future, they will all be accessible from the center in a fraction of the current travel time.

**The backbone of the extended metro system will be formed by the ring line 15 to be built around the city at a distance of about five kilometers.** Its fully automatic trains are to run every two minutes at peak times. The initial sections ought to be completed by 2022 and the entire ring put into operation in 2030.

Kickoff for construction of line 15 was a few weeks after the rainy naming ceremony in Champigny-sur-Marne. In April, the S-1078 “Steffie Orbival” TBM began its mission to build a 2.2 kilometer connecting tunnel between a metro depot and the future circular metro line. For Frédéric Battistoni, this represents a key milestone on a long journey: as project manager at Herrenknecht, he is responsible for the entire “Grand Paris Express” project. His focus is on the TBMs required for the various construction lots. How do they need to be equipped? How soon can Herrenknecht deliver? At what price? The strings all come together in Frédéric Battistoni’s office. Many strings. “It soon transpired that we would need additional space for spare parts and logistics,” says Battistoni. His to-do list soon had an extra item on it: to find and hire a storage complex in the environs of Paris.

If things continue that way, “Grand Paris Express” will become one of the largest projects in Herrenknecht’s corporate history. To date, the construction companies have ordered 21 tunnel boring machines for Paris – all of them from Herrenknecht. Further calls for tender are in progress so that there could ultimately be more machines gnawing through Paris’ underground. “The fact that we have received 21 orders is already a great success and proof of the confidence we enjoy among our customers,” explains Battistoni. But the race is far from over and additional calls for tender mean additional opportunities for Schwanau to secure orders.



La Défense is currently regarded as Europe’s most important business district. Only a few kilometers from Paris, this quarter will also be linked to the “Grand Paris Express” network.

He holds the strings together:  
Herrenknecht Project Manager Frédéric Battistoni coordinates all of the contractors’ requirements and requests.



**“I HAVE NEVER MANAGED A PROJECT WHERE SO MANY TBMS WILL BE IN OPERATION WITHIN SUCH A SHORT PERIOD OF TIME.”**

Frédéric Battistoni, responsible Project Manager at Herrenknecht

# “WE NEED TO REINVENT OUR PUBLIC TRANSPORT SYSTEM; WE NEED A RADICAL ECOLOGICAL SHIFT.”

Yves Lion, architect and urbanist



Architect Yves Lion is member of one of the planning teams for Grand Paris. He wants to make the city greener and create affordable housing.



Another world: many children from the outlying districts have never been to the city center of Paris.

“Each project is a challenge in itself,” says Frédéric Battistoni, who has been working at Herrenknecht since 1998. The 80 or so projects in which he has been involved have included milestones such as the Hallandsås Tunnel between Malmö and Gothenburg and the Eurasia Tunnel under the Bosphorus in Istanbul. When the world’s largest tunnel boring machine with a diameter of 17.6 meters was deployed in Hong Kong, he was also involved. But for him, Paris will represent an entirely different record: “I have never managed a project where so many TBMs will be in operation within such a short period of time.”

**But any other pace is no longer conceivable in Paris, if the Île de France patchwork is to be turned into a functioning metropolitan region.** A harbinger of change was an administrative reform: In January 2016, 131 municipalities merged with the city to form the “Métropole du Grand Paris.” They want to improve coordination of decisions on housing, environmental protection and economic development. Yves Lion explains how complex the tasks to be managed by Paris really are. The architect and urbanist is one of the planners of the major rebuild: “We need to reinvent our local public transport system, we need a radical ecological shift, we need to transform the artificial cities, built on the outskirts after the war, into lively and independent centers, and compensate for the blatant social disparities. Apart from that, we also need thousands of new apartments.”

It will take some time before the new arteries of the metropolitan region start to flow but there are already indications of some activity. Companies such as L’Oréal or Danone are moving to Saint Denis in the north where land prices are still low. The tool machine and electric tool manufacturer Trumpf from Ditzingen (Germany) has had its French headquarters near Charles de Gaulle Airport since 1987 and is now hoping for improved connections. The district of Patin in the northeast is currently evolving as a hotspot: Chanel, Hermès and the financial service provider Paribas have relocated their headquarters or established major branches here. After all, there is one commodity available in excess beyond the gates of the city, which has become a scarcity in the center: space. Planners are counting on 70,000 apartments to be built in the suburbs. Per year.

A flagship of the future Paris has recently been designated: “Les Lumières de Pleyel” – the lights of Pleyel – is the name of

an entire city district to be developed around the Saint Denis Pleyel station in the city's north. Apartments, offices, hotels, shops, sports and cultural facilities, student accommodation, a park: the Norwegian architectural agency Snøhetta hopes to reinvent Saint Denis entirely. And the Olympic Village is also to be built here for the games in 2024.

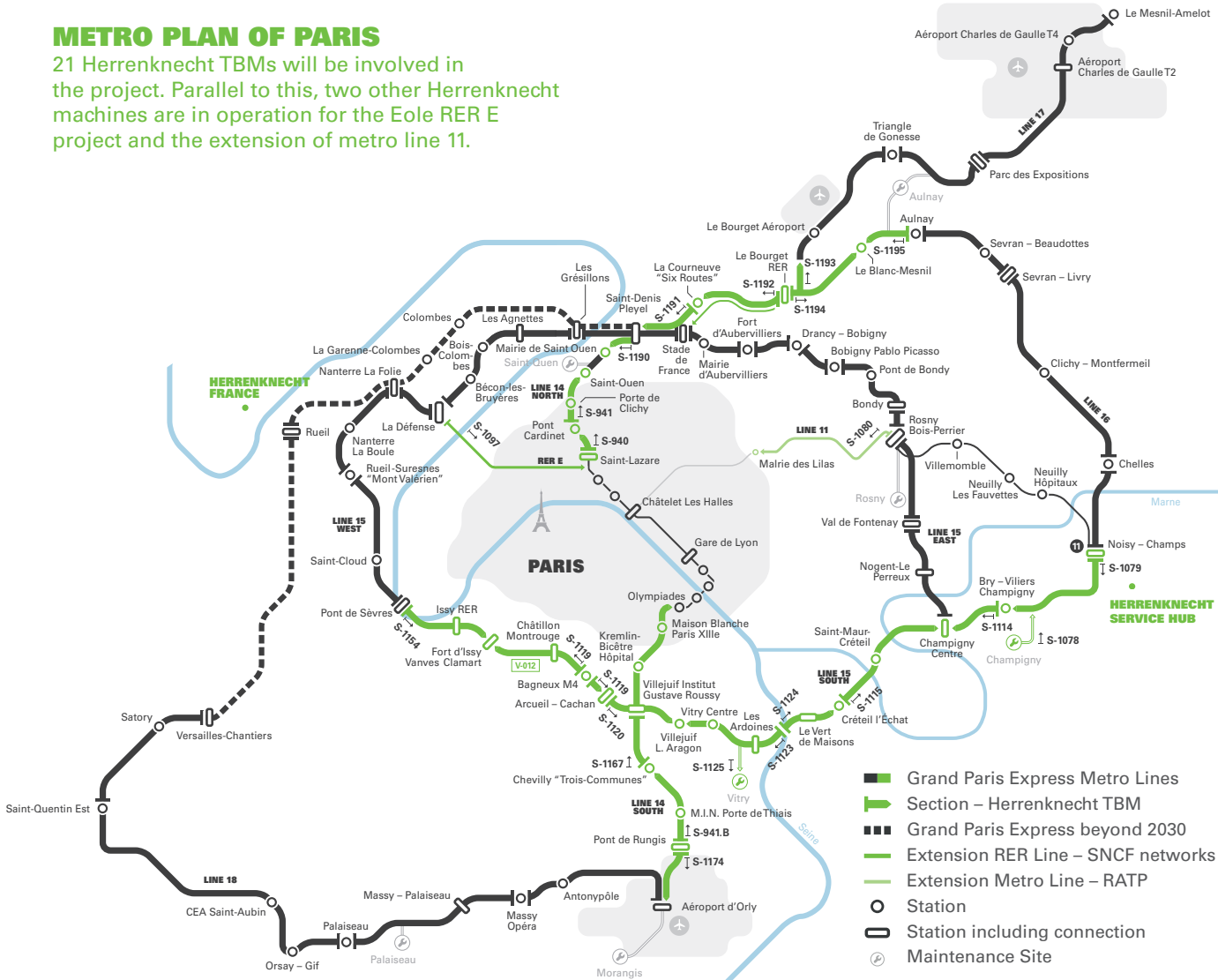
Engineer Guy Lechantre himself can hardly wait for the new metro routes to be finally put into operation. He lives in the suburb of Lagny-sur-Marne, around 30 kilometers beeline east of the center. "If I need to get to Charles de Gaulle Airport these days, it takes me about two hours using public transport. It's faster by taxi but costs about 50 euros. But as soon as the 'Grand Paris Express' is in operation, I'll be living six stops, 25 minutes and two euros from the airport. That is fantastic progress!"



Ultra-modern Paris: an attractive quarter will be created around the new Saint Denis Pleyel metro station.

**METRO PLAN OF PARIS**

21 Herrenknecht TBMs will be involved in the project. Parallel to this, two other Herrenknecht machines are in operation for the Eole RER E project and the extension of metro line 11.



The cutting wheel of the S-1078 TBM – seen here at its naming ceremony on February 3, 2018 in Champigny-sur-Marne – is reminiscent of an artificial moon.



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# Steffie ORBIVAL

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