

2022 Green Bond Reporting

Editorial

The Grand Paris Express is first and foremost a project serving the ecological transition.

While the weight of the development and transport sector in greenhouse gas emissions is particularly significant, the objective of modal shift and development that the project brings is indisputable and its expected effects are major. However, it is also necessary to integrate the most ambitious environmental requirements from the construction phase.

To live up to this ambition, we have set up a project management team focused on innovation and able to offer new construction methods: with more than 150 sites currently in activity, our project constitutes, moreover, a unique opportunity to test and innovate.

After having developed low-carbon concretes and steels, the project management of the Grand Paris Express has just carried out an experiment to replace cement with millstone clays from construction sites on line 18. The tests carried out were particularly conclusive and this solution will be able to enter an industrialization phase. Aware of its responsibility and the issues that go well beyond the new metro projects, the Société du Grand Paris was keen to make the results of this study available to all construction stakeholders.

Jean-François Monteils

Chairman of the Société du Grand Paris Management Board

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A vital project for tomorrow

By building 200 km of new automated metro lines connected to the existing infrastructure, along with 68 additional stations, Société du Grand Paris is developing the Greater Paris region and enhancing its appeal.

Société du Grand Paris is a public establishment of an industrial and commercial nature (EPIC). It is wholly owned by the French government and was instituted by the Grand Paris Act of 3 June 2010. Its primary purpose is to "design and develop the overall plan for the set of infrastructure projects that make up the Grand Paris Express, and oversee the construction of the lines, fixed structures and facilities, the construction and development of stations and interchanges as well as the procurement of the rolling stock that will run on this infrastructure".

The four new Grand Paris Express lines (15, 16, 17, and 18), as well as the extension of Line 14 to the north and the south, will be connected to the existing transport network.

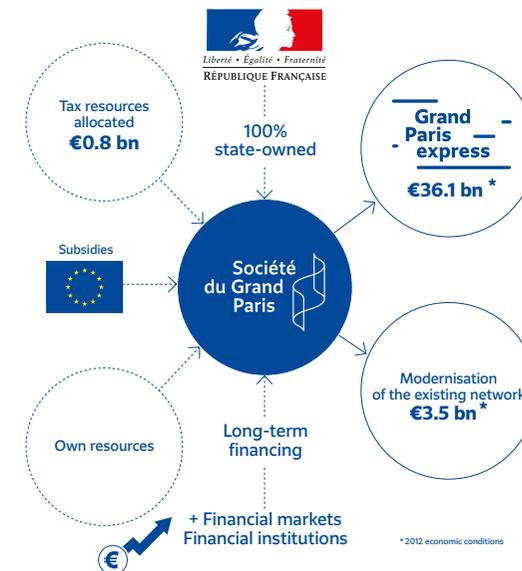
As an "urban, social and economic project of national interest" that aims to promote "sustainable and inclusive

economic growth and driving job opportunities in the Greater Paris region", the Grand Paris Express will boost the region's appeal and maintain its competitive edge on the world stage.

With 200 km of new automated metro lines around the French capital, effectively doubling the existing metro network, as well as 68 additional stations, the Grand Paris Express offers solutions to the challenges the region has been grappling with in recent years: increasing mobility for everyone, reducing social and geographical inequality, and improving quality of life while benefiting the environment. The new metro will also help reduce greenhouse gas emissions, with annual savings of 755,000 to 1.3 million tonnes of CO₂ equivalent once it is completed.

Thanks to the Grand Paris Express, the Paris region will be bigger, greener, and more united than ever.

Société du Grand Paris financial model



Innovation for a responsible Grand Paris Express

Innovation is at the heart of the environmental strategy of the Société du Grand Paris for resilience to climate change. A true innovation laboratory, the Grand Paris Express asserts itself as a sustainable and resilient project, serving the ecological transition.

Shared innovation for a sustainable project

Twenty years after its commissioning, the new metro will help reduce greenhouse gas emissions by at least 14.2 million tonnes of CO₂ equivalent in Île-de-France thanks to a strong modal shift and development of station districts, thus helping to limit urban sprawl and the artificialization of land. The construction of the Grand Paris Express is therefore fully in line with France's national low-carbon strategy, which aims for carbon neutrality by 2050.

However, if the carbon footprint of the new metro is favourable, the Société du Grand Paris is still seeking to improve it by implementing innovative solutions to reduce greenhouse gas emissions from the new metro. To meet this environmental challenge, the Société du Grand Paris integrates innovation

at all levels of the project, from its design to its commissioning and in the development of station areas. A true laboratory for sustainable innovation, the Grand Paris Express sets up mechanisms to encourage experimentation, through innovation bonuses, calls for projects or research and development programs.

Out of a desire to place innovation at the heart of its approach and its organization, the Société du Grand Paris merged in 2022 the teams dedicated to the environment and innovation into an executive management of Strategy, Environment and of Innovation. This executive management is notably responsible for putting innovation and its ecosystem at the service of the project and the environmental ambition of the Société du Grand Paris.

This decarbonization strategy based on innovation should make it possible to evolve practices in the world of construction and transport and encourage partner companies of the Société du Grand Paris and other project owners to imagine, share and disseminate more ambitious and sustainable solutions.



An ambitious climate policy that is bearing fruit

The environmental issue of reducing greenhouse gas emissions is considered throughout the Grand Paris Express project cycle. The construction phase represents two-thirds of the project's emissions, it is on this phase that the Société du Grand Paris has set itself an ambitious decarbonization objective, set based on estimates from companies and the scientific committee: reduce by 25% emissions linked to the construction of the infrastructure, i.e. 1.1 million tonnes of CO₂ less than the 4.4 million tonnes of CO₂ planned⁽¹⁾ upon completion. Its efforts and those of its partners are bearing fruit while the Grand Paris Express construction sites are very active. In February 2023, 90 km had been dug and 35 km of double tracks laid, and 6 tunnel boring machines remained in action. In 2022, the project is in line with its carbon objectives, a trajectory consistent with the 25% reduction in CO₂ emissions for the Grand Paris Express cumulatively, upon completion (ref. 2018).

To verify its positioning regarding this objective and to manage its carbon trajectory, the Société du Grand Paris has committed since 2021 to annually carrying out and publishing a report on the emissions of the Grand Paris Express.

This report includes the three emissions perimeters⁽²⁾ and is established based on data collected since 2017 from construction companies which makes it possible to know the quantities of materials used (concrete, steel, lime, etc.) and energy consumption linked to the operation of construction sites, their supply, and the evacuation of waste.

This data is subject to verification audits by the Environment and Innovation Strategy department. In addition, the 2022 carbon footprint accumulated since the start of the work was in 2023, for the first time, verified by an independent third-party organization⁽³⁾.

The carbon footprint of the Grand Paris Express under the microscope

For the year 2022, greenhouse gas (GHG) emissions from the Grand Paris Express construction sites amount to 446 kTeCO₂, i.e. a cumulative total of 1.8 kTeCO₂ since the beginning of the project. This is consistent with our objective of reducing greenhouse gas emissions by 25% upon completion. Concretes and metals (mainly steel). These two items represent 76% of CO₂ emissions linked to GPE construction work since the start of construction.

A Commitment made:
-25% emissions for the construction phase and rigorous and transparent monitoring of actual emissions.

INNOVATION +

CarbOptimum: a prospective tool for measuring emissions

Since 2012, the Société du Grand Paris has engaged in a process of forecasting the impact and benefits of the Grand Paris Express project regarding greenhouse gas (GHG) emissions. To this end, it has developed a dedicated tool, CarbOptimum®, which makes it possible to estimate the GHG emissions generated or avoided over all phases of the project's life and its resulting changes. This spreadsheet makes it possible to consider the impacts of all phases of the project, from preliminary studies up to 30 years after the commissioning of the first metro lines. This specific tool was tailor-made for the Île-de-France context and the Grand Paris Express project based on emissions measurement methodologies developed by ADEME or other international methodologies such as the Greenhouse Gas Protocol. It offers a more prospective vision than these and makes it possible to assess the impact on the environment and to visualize the evolution of induced and avoided emissions over the years.

The Société du Grand Paris is maintaining its carbon footprint trajectory.

1.8 million tonnes of CO₂⁽⁴⁾ emitted since the start of work on the Grand Paris Express



Model of the rolling stock at the Fabrique du Métro

(1). Reference 2018

(2). Scope 1: stationary combustion sources, mobile sources with thermal engines, fugitives, from biomass (soils and forests) | Scope 2: electricity consumption, steam consumption, heat or cold | Scope 3: purchase of products and services, immobilization of goods, waste, upstream and downstream transport of goods, business travel, upstream leasing assets, investment, transport of visitors and customers, use and end of life of products sold, downstream franchise, downstream leasing, commuting, other emissions.

(3). The Auditor

(4). As of December 31, 2022

Bringing out innovative solutions

The Société du Grand Paris is deploying various measures to encourage companies working on Grand Paris Express projects to imagine more ambitious and sustainable solutions, whether in the design, construction, or preparation for operation phase.

The different levers that promote innovation on the Grand Paris Express are complementary because they take different forms. Creating the conditions for innovation means, for example, relaxing certain frameworks, encouraging the evolution of certain regulations or encouraging and piloting innovative solutions through research and development or even bonuses or, conversely, penalties. It also means demonstrating through experimentation that these innovations are useful and effective. Finally, the Société du Grand Paris strives to involve all stakeholders in the project to listen to all those bringing innovative solutions, regardless of their size or the maturity of the ideas proposed.

INNOVATION +

Fiber-reinforced concrete voussoirs

The Société du Grand Paris invited candidates for the construction contracts for the three civil engineering lots of line 16 and the first section of line 18 to propose alternative offers with innovative technical solutions with strong environmental performance. Result: the Grand Paris Express is the first infrastructure project of this magnitude where fiber-reinforced concrete is used on a massive scale for segments. Fiber-reinforced concrete consumes half as much steel for the same performance as "classic" so-called reinforced concrete: for a 10-kilometer tunnel, steel consumption is halved, saving around 5,000 tonnes of steel, and therefore significant savings in costs and CO₂ emissions, with around 700 tonnes of CO₂ equivalent saved on average per kilometer of tunnel compared to reinforced concrete.

A PUBLIC PURCHASING STRATEGY TO PROMOTE INNOVATION

The method of innovation through purchasing allows companies responding to consultations issued by the Société du Grand Paris to directly propose avenues for innovation. This involves creating a more flexible framework within the specifications to act at the heart of the process and innovate from the moment contracts are awarded. Certain proposals with high potential value but requiring more experimentation join an "innovation portfolio" and will first be tested before being reintegrated into the basic offer.



AN ENVIRONMENTAL INNOVATION PREMIUM TO SUPPORT NEW METHODS

For companies that already hold a contract with the Société du Grand Paris, an incentive mechanism known as the Reverse Carbon Initiative has been put in place to bring to light, during the execution of contracts, avenues with strong economic and environmental potential.

Through this system, which complements the clauses already present in the markets, companies are financially encouraged to offer less polluting alternative solutions or new materials (low-carbon segment, low-carbon concrete, etc.) while maintaining quality.

Ouvrage Finot in Saint-Denis: installation of low-carbon rails

INNOVATION +

« Low carbon » rails on metro lines 16, 17, 15 South and 18

The Société du Grand Paris has chosen to finance, thanks to the Reverse Carbon Initiative, the use of so-called "low carbon" rails on several sections of the Grand Paris Express: the common section of lines 16 and 17, a section of the line 16, three sections of line 15 South and line 18 East. The manufacturing of these rails emits between 60% and 90% less CO₂ compared to rails from the "historic" cast iron sector and saves around 1.5 tonnes of CO₂ per tonne of rails delivered to the site. The so-called "low carbon" rail is based on a steel manufacturing process in an electric arc furnace using more than 95% recycled steel, unlike the historical blast furnace manufacturing process which uses large quantities of iron ore and coal generating high CO₂ emissions during the heating of the blast furnace and the refining of the cast iron into steel by a chemical process. Rails made from recycled steel are composed of 30 to 40% used rails and 60 to 70% other low density scrap metal.

In total, thanks to the environmental bonus, 65 kilometres of double tracks will be laid, i.e. around 16,600 tonnes of rail and 24,194 tonnes of CO₂ equivalent avoided. The first 100% "low carbon" rails of the Grand Paris Express were laid on lines 16 and 17 in June 2022 in the tunnel connecting the Finot structure in Saint-Ouen-sur-Seine and the Saint-Denis Pleyel station.



Ultra-low carbon concrete

35,439

tonnes of CO₂ avoided thanks to the Reverse Carbon Initiative in 2022

The amount of financing allocated by the Société du Grand Paris is fixed according to the quantity of CO₂ avoided by the alternative solution proposed and a price given to this tonne of CO₂. In 2021, as part of the Reverse Carbon Initiative, the amount per tonne of CO₂ has been set at €100/tCO₂ avoided, the Société du Grand Paris having chosen to base this amount on the value of climate action, also called carbon tutelary value, from the Quinet report. In 2022, this system made it possible to avoid 35,439 tonnes of CO₂ by financing solutions such as the implementation of “low carbon” rails or cushioning concrete with lower emissions than the concrete conventionally used for this purpose.

INNOVATIVE CALLS FOR PROJECTS TO DEMONSTRATE NEW SOLUTIONS

Calls for projects are regularly organized to test solutions for the construction and operation of infrastructure, the development of future public spaces and real estate projects around stations or even the environmental management of construction sites. The objective is to allow companies, holders and non-holders of Société du Grand Paris contracts, to experiment with projects in favor of the environment as part of the construction of the Grand Paris Express.

Launched on February 7, 2022, the Greater Paris Environment call for projects allowed companies – including start-ups – research laboratories and universities to submit an experimental project proposing an innovative approach with impact.

The Société du Grand Paris received 66 applications and selected ten winners and projects on the issues of biodiversity, climate, circular economy, or water quality. The Société du Grand Paris dedicates a budget of 2.5 million euros to the winning experiments, which were able to be implemented from fall 2022 for a maximum duration of 24 months.

2.5 million euros dedicated to the winning experiments of *Le Grand Paris de l'Environnement* call for projects

INNOVATION +

Ultra-low carbon concrete

Among the candidates for the Grand Paris Environment call for projects, the Société du Grand Paris selected the Bouygues Travaux Publics project which will develop and validate a new ultra-low carbon concrete formula with a clinker-free binder⁽⁵⁾ H-UKR from the HGCT company for a 100-year-old structure. In “standard” concrete, the clinker is fired at very high temperatures and represents around 94% of CO₂ emissions from concrete manufacturing. The experiment, which is financed to the tune of €242k by the Société du Grand Paris, consists of replacing the clinker with a non-standardized alkali-activated binder based on blast furnace slag. Concrete formulated with this binder has excellent mechanical and durability properties while reducing carbon emissions by around 75% compared to “standard” concrete, or 35 kg of CO₂ per cubic meter of concrete. The deployment of this new ultra-low carbon concrete is planned for the summer of 2023 for the construction of part of the emergency exit of the new Issy RER station, on line 15 South.

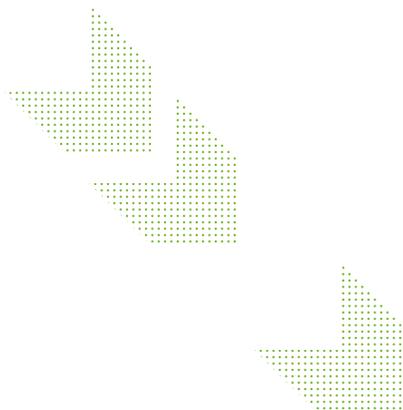
➤ *Innovation essentially lies in the way we buy. Purchase clauses in the markets are our main lever for implementing low-carbon solutions on construction sites. We also encourage companies to propose innovative avenues for their offers via the innovation brief, when awarding contracts.*

Marie Bourdon,
Innovation project manager

⁽⁵⁾ Clinker results from the firing at very high temperatures (around 1,450°C) of a mixture composed of around 80% limestone and 20% aluminosilicates.

EXPERIMENTAL RESEARCH AND DEVELOPMENT TO SHAPE THE FUTURE

Finally, research and development programs are set up and partnerships are established with universities and research laboratories or other project owners, to test solutions that could be deployed on the Grand Paris Express.



Ouvrage Verdun, in Le Bourget / Ultra-low carbon Voussoirs

INNOVATION +

Ultra-low carbon Voussoirs on metro line 18

In conjunction with Vinci Construction, Société du Grand Paris carried out a large-scale experiment on line 18 with the installation of prefabricated segments using ultra-low carbon concrete, which has the same performance as traditional concrete. The use of these segments, based on cement-free alkali-activated slag, offers a reduction of around 70% in CO₂ emissions compared to "standard" concrete and 50% compared to low-carbon concrete, or 62 kg of CO₂ per cubic meter of concrete. France is a pioneer in this innovative and more ecological concrete.

After a test phase in September 2021 which proved conclusive, the first ultra-low carbon concrete segments were installed around line 18, at Orly airport, in spring 2022. This process has been judged to comply with the concrete standard by Cerema⁽⁶⁾ (Center for studies and expertise on risks, environment, mobility and development) and by the European Technical Assessment⁽⁷⁾ (ETA), which have evaluated and validated. The Société du Grand Paris has included in its specifications the use of "performance concrete" on line 18, for the portion going from Villiers-le-Bâcle to Versailles Chantiers.



INNOVATION +

Transforming waste into low-carbon concrete

The Société du Grand Paris finances several research and development projects to use its spoil for the manufacture of binders that can be used in the composition of low-carbon concrete, thus partially replacing "standard" cement for certain Grand Paris Express projects. Among these, "flash calcination" is a virtuous and low-energy solution for reusing excavated soil, developed by a research team from the Institut des Mines Telecom Nord Europe, in Douai. Excavated soil from the line 18 construction sites was "flash calcined" to be used in the design of low-carbon concrete. They thus move from waste status to mineral addition status by improving their properties via flash calcination. The research laboratory team was thus able to demonstrate that it was possible to formulate low-carbon concrete with up to 40% less CO₂ emissions from construction site soil from the Grand Paris Express. The results obtained were made available to the entire construction industry for use.



Transformation of excavated soil from the Grand Paris Express into low-carbon concrete

Develop research and share our solutions

The Société du Grand Paris interacts with its partners and other project owners to gain inspiration, share good practices, and move forward together. The objective of this sharing of experiences and knowledge is also to develop the sectors.

The desire to share knowledge and know-how in the field of research and development has led the Société du Grand Paris to establish partnerships with other project owners or with representatives of the construction industry. A partnership was, for example, signed on 20 September 2021 with the Euralpin Lyon-Turin Tunnel in order to implement research and innovation projects on subjects of common interest. A first project will analyse the most innovative methodologies in terms of reuse

(6). Ministries of ecological and inclusive transition and territorial cohesion.

(7). CE marking on the European market for products not covered or not fully covered by an existing harmonized European standard.

➤ *The aim is to contribute to the deployment of these innovations in the public works roadmap.*

of excavated soil and rocks, to bring about new standards intended to be perpetuated by the profession.

An agreement was also signed on December 13, 2022, with the Regional Federation of Public Works of Île-de-France to promote innovation and the circular economy, with the aim of responding to a strong environmental ambition, which ranges from reducing greenhouse gas emissions from construction sites to promoting the use of recycled materials in works. Here again, it is a question of contributing to the deployment of these innovations in the public works roadmap.

THE ACADEMIC WORLD ALSO INVOLVED

Research teams and students from engineering schools and town planning schools are also asked to contribute to the implementation of innovations

to meet the environmental ambition of the Société du Grand Paris to reduce by 25% greenhouse gas emissions during the construction phase and to identify ecological measures to effectively avoid, reduce and compensate for the impacts of the project on natural environments. The Société du Grand Paris, for example, intervened on this subject with students at SciencesPo École Urbaine or launched a study on the price of carbon with the École des Ponts Paris Tech.

The Société du Grand Paris and the University of Paris-Saclay are setting up a partnership to initiate an action research program, which will give rise to concrete applications within the framework of the Grand Paris Express and the production of scientific knowledge. These will help encourage the spread of innovative practices among construction stakeholders, thus amplifying the scope of the program's environmental impact.

Activities to secure financing are ongoing

Since the start of financing the Grand Paris Express, the Société du Grand Paris has been able to raise €26.75 billion in debt, including €24.25 billion under its 100% green EMTN program.

Since the start of financing the Grand Paris Express, the Société du Grand Paris has been able to raise €26.75 billion in debt, including €24.25 billion under its 100% green EMTN program. In four years, nineteen bond issues have been carried out. All financing issued under the EMTN program is aligned with the 2018 Green Bonds Principles and certified by the Climate Bond Initiative.

In 2022, the Société du Grand Paris adapted its financing strategy to the context of a sharp rise in interest rates. The costs and risks linked to the financing of the project having been secured by the anticipated coverage of cash flow needs in 2020 and 2021, the Société du Grand Paris reduced its call on the bond market. It thus issued an amount of €1.75 billion of debt under its 100% EMTN program thanks to its solid financing model, the quality of its signature, rated Aa2 (Moody's) / AA (Fitch), and the confidence renewed interest from investors.

– April 2022: issue of €1.75 billion bonds with a maturity of 20 years (2042).

To meet its needs and diversify its sources of financing, the Société du Grand Paris was also able to count on the support of the European Investment Bank through bilateral contracts. Since 2017, repayable loans have financed work on line 15 South to the tune of €2.5 billion.

The increase in the Green Euro Medium Term Note program from €30 to €32.5 billion during the year 2022, demonstrates the desire of the Société du Grand Paris to pursue its financial policy and secure its debt and financing costs. The Société du Grand Paris once again confirms its commitments by allocating the funds raised to the Grand Paris Express project, by communicating with investors regularly on the progress of the project and its environmental benefits. The positioning of its 100% green signature operating on the long part of the interest rate curve makes it a unique and recognized player in the impact bond market. **The Société du Grand Paris must therefore respect best market practices as best it can.** In this sense, it is aligned with the GBP (Green Bonds Principles 2018) and certifies its emissions by the CBI (Climate Bond Initiative) through Sustainability.

The Société du Grand Paris continues to contribute to the development of green finance through its participation in debates and reflections on this subject.

It also remains a key player in the areas of land use planning, transport development and urban development in which it strongly participates through various events.

		
		
2020 Green Bond of the year, supranational, sub-sovereign and agency (SSA) by Environmental Finance SGP EUR 1bn 1,70% 30 years	2020 et 2021 Largest Certified Climate Bond & Largest Subnational Green Bond by Climate Bonds Initiative	2020 Euro rising star Issuer by MTN-i
	2022 Largest Non-Financial Corporate Green Bond Award	

CSR at the heart of the management of the Société du Grand Paris

The Société du Grand Paris is making numerous environmental, social, and economic commitments to design and build the Grand Paris Express and make it a project serving the ecological and energy transition. Integrity, exemplarity, and dialogue with stakeholders also constitute three pillars on which its action is based, in all circumstances.

Discover the CSR roadmap and its documentation in detail: www.societedugrandparis.fr/feuille-route-rse

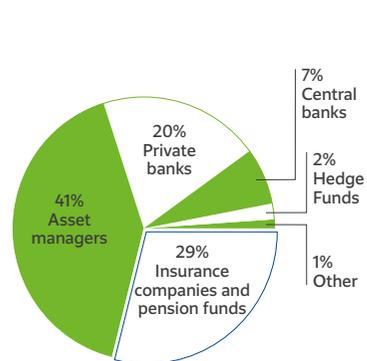
These transactions have helped finance eligible projects that meet the criteria set out in the framework. All the bonds issued by Société du Grand Paris qualified as Green Bonds.

Transactions in 2022

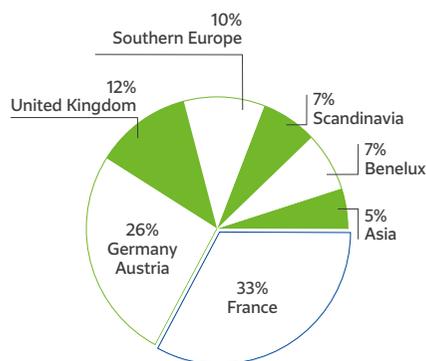
Transaction summary	
Issuer	Société du Grand Paris
Rating	Aa2 (Moody's) / AA (Fitch)
Date	7 April 2022
Maturity date	8 April 2042
Amount in bn €	1.75
Coupon (%)	1.625
Issue spread (bps)	OAT+33

Type of investors and geographical distribution for all bond issues

Investors by type



Geographical distribution



53 investors

Investments directed solely to the project

A major transport infrastructure project like the Grand Paris Express will have an impact on both the environment and the economy and must be built on solid management principles.

The bonds issued by Société du Grand Paris as part of its 100% green EMTN programme require it to demonstrate the environmental impact of the Grand Paris Express, in addition to providing a report to investors on how funds are allocated to the completion of the new metro lines.

Principles of the programme

High-quality transport and major infrastructure drive economic growth. A major transport infrastructure project such as the Grand Paris Express doesn't just transform mobility, it also changes urban development and the structure of the city itself.

The economic impact of the Grand Paris Express is, in fact, one of the purposes of the Greater Paris Act for major transport infrastructures. By virtue of its population and business activities, the Île-de-France region is already the top contributor to French GDP. The Grand Paris Express will further boost its growth.

Société du Grand Paris' programme is also aligned with the Green Bond Principles developed by ICMA⁽¹⁾ in 2018:

– The Société du Grand Paris Green Bond Framework is also fully in line with the work that the European Commission has been carrying out since 2018 with the TEG (Technical Expert Group) and the latest developments on the EU Green Bond Standard that the European Union plans to implement. As such, the framework is eligible for the Taxonomy proposed by the TEG⁽²⁾ and adopted by the European Union, as well as the DNSH⁽³⁾ (Do No Significant Harm) criteria. In March 2021, the Société du Grand Paris framework was updated. The different versions of the Green Bond Framework are available on the Société du Grand Paris website.

– The first Second Opinion, issued by Sustainalytics in 2018, confirmed this alignment with the GBPs. The latest version of the framework gave rise to an updated Second Opinion, issued by Sustainalytics in 2021. The different versions of these Second Party Opinions (SPOs) are available on the Société du Grand Paris website.

Société du Grand Paris has complied with the principles established by the Climate Bond Initiative (CBI) as well as those in the Low Carbon Transport Eligibility Criteria appendix (V1.0)⁽⁴⁾. Sustainalytics is tasked with ensuring compliance with the principles on behalf of the CBI. The 2020 version of the certification issued by Sustainalytics is available on the Société du Grand Paris website.

The 2022 version of the (Green Bond Framework) is available on the Société du Grand Paris website, together with all the financial publications.

<https://www.societedesgrandsprojets.fr/investing-grand-paris-express>

PROJECTS RECEIVING INVESTMENT

The Green EMTN programme is dedicated exclusively to financing the Grand Paris Express.

The net proceeds of the green bond issues are **allocated to investments made by Société du Grand Paris as part of the Grand Paris Express project**, representing the “eligible assets”. These assets include all investments made in the current year and/or over the two years prior to the issue.

All infrastructure and project management investments for the new Grand Paris Express automated metro lines are eligible:

– the construction of new lines and extensions: close to 200 km of new automated metro lines in addition to the existing 200 km in Île-de-France;

– the construction and development of 68 new stations and six operating centres.

(1). ICMA: International Capital Market Association.

(2). https://ec.europa.eu/info/publications/sustainable-finance-technical-expert-group_en.

(3). DNSH: Do no significant harm to the environment.

(4). The Low Carbon Transportation appendix is available on the Climate Bond Initiative website.

DETAILS OF ELIGIBLE ASSETS

LINE 15 WEST

11 stations, 10 with connections to the RER, metro, or tram system
22.4 km of automated metro lines
14 municipalities served across 2 departments
600,000 passenger trips per day forecast

LINE 15 SOUTH

16 stations, all with connections to the RER, metro, or tram system
37 km of automated metro lines
22 municipalities served across 4 departments
300,000 passenger trips per day forecast

LINE 15 EAST

12 stations, all with connections to the RER, metro, or tram system
23 km of underground lines
13 municipalities served across 2 departments
300,000 passenger trips per day forecast
675,000 local residents served

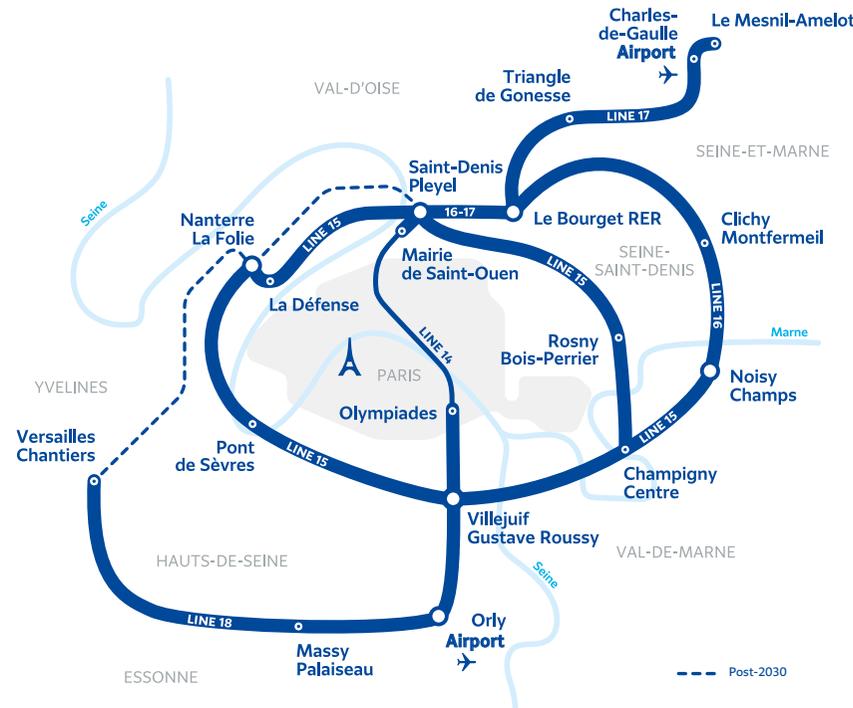
BY 2030, LINE 15 WILL FORM A 75-KM RING AROUND PARIS.

LINE 18

10 stations, 3 with connections to the RER, metro, or tram system
35 km of automated metro lines including 14 km of elevated lines
13 municipalities served across 3 departments
150,000 passenger trips per day forecast

LINE 14 SOUTH

7 stations, 5 with connections to the RER, metro, or tram system
14 km of automated metro lines
13 municipalities served across 3 departments
300,000 passenger trips per day forecast



LINE 17

9 stations, 5 with connections to the RER, metro, or tram system
27 km of automated metro lines, including 5.5 km of elevated lines
13 municipalities served across 3 departments
130,000 to 160,000 passenger trips per day forecast during trade shows
40 to 50 million passenger trips forecast annually

LINE 16

10 stations, 8 with connections to the RER, metro, or tram system
29 km of automated metro lines
16 municipalities served across 3 departments
200,000 passenger trips per day forecast

2022 allocation

As from 31 December 2022, the allocation capacity is €15 billion and breaks down as follows:

- Unallocated balance from previous years, In € or €13.3 billion (A).
- Net 2022 issues from the 100% green EMTN programme, or €1.75 billion (B).

In €	
Unallocated balance on 31 December 2021 (A)	13,293,233,068
Including funds raised from the BEI	484,631,962
Total raised in 2022 (B)	1,750,000,000
2022 total to allocate (C)	15,043,233,068

For 2022, the scope of eligible assets is €3.4 billion (D).

Updating the framework in 2021 made it possible to expand the type of eligible expenditures such as wages, financial fees, and ancillary costs, as well as impact studies, audits, and consulting services that directly and indirectly support the Grand Paris Express, the eligible asset.

The table below details the 2022 allocation based on eligible investments and adjustments for the new eligible asset scopes in compliance with the updated framework.

2022 ALLOCATION				In €
	Wages	Operation	Investment	Total 2022 allocation
Pont de Sèvres/Noisy-Champs (Line 15 South)	–	32,145,523	794,796,788	826,942,311
Noisy-Champs/Le Bourget RER/ Saint-Denis Pleyel/Mairie de Saint-Ouen (Lines 14 North, 16 and 17)	–	18,087,744	814,487,344	832,575,088
Le Bourget/Le Mesnil-Amelot (Line 17 North)	–	1,188,572	199,576,309	200,764,881
Pont de Sèvres/Saint-Denis Pleyel (Line 15 West)	–	23,729,200	24,998,911	48,728,012
Orly/Versailles (Line 18)	–	3,603,884	520,686,192	524,290,077
Saint-Denis Pleyel/Champigny (Line 15 East)	–	31,546,299	54,965,457	86,511,756
Olympiades/Orly (Line 14 South)	–	63,591,282	311,244,943	374,836,225
Land management	–	39,540,669	131,835,875	171,376,545
Non-distributable expenditures	110,882,926	209,386,913	10,466,998	330,736,837
TOTAL	110,882,926	422,819,987	2,863,058,816	3,396,761,729.94 (D)

As the end of 2022, the overall unallocated amount, product of loans issued under the EMTN sub-program, was €11.6 billion (E) and will remain set aside for allocation and is prioritised for allocation in 2023 and beyond. It is the difference between the allocation capacity on December 31, 2022 (€15 billion) less the 2022 allocated scope (€3.4 billion).

In €	
Remainder to be allocated 2022 (C)	15,043,233,068
2022 allocated scope	3,396,761,730
Remainder to be allocated 31/12/2022 (E = C - D)	11,646,471,338

100% of investments and expenditures were made in France, specifically in the Île-de-France region.

100% of the funds raised in 2020, 2021, 2022 are or will be allocated to finance eligible assets.

Fund management policy

Société du Grand Paris, which is subject to the French rules on public sector budget and accounts management (GBCP), can only temporarily invest the value in euros of the proceeds from its Green Bond issues in the Treasury account before such funds must be allocated definitively. On 31 December 2022, the cash flow balance in the Treasury account was €13.629 million (including the unallocated amount for 2022, namely €11.646 million).

KPMG assurance report

The allocation of funds to eligible projects is certified by the Statutory Auditor, KPMG.

AN EXTRACT OF THE KPMG ASSURANCE REPORT APPEARS BELOW. THE FULL REPORT IS AVAILABLE ON THE SOCIÉTÉ DU GRAND PARIS WEBSITE

Conclusion:

Based on the work performed, as described in the "Nature and scope of our work" section, and based on the information we have collected, nothing material has come to our attention that causes us to believe that the Information that has been prepared is subjective or in violation of the Framework, available on the Company's website.

Additional statement:

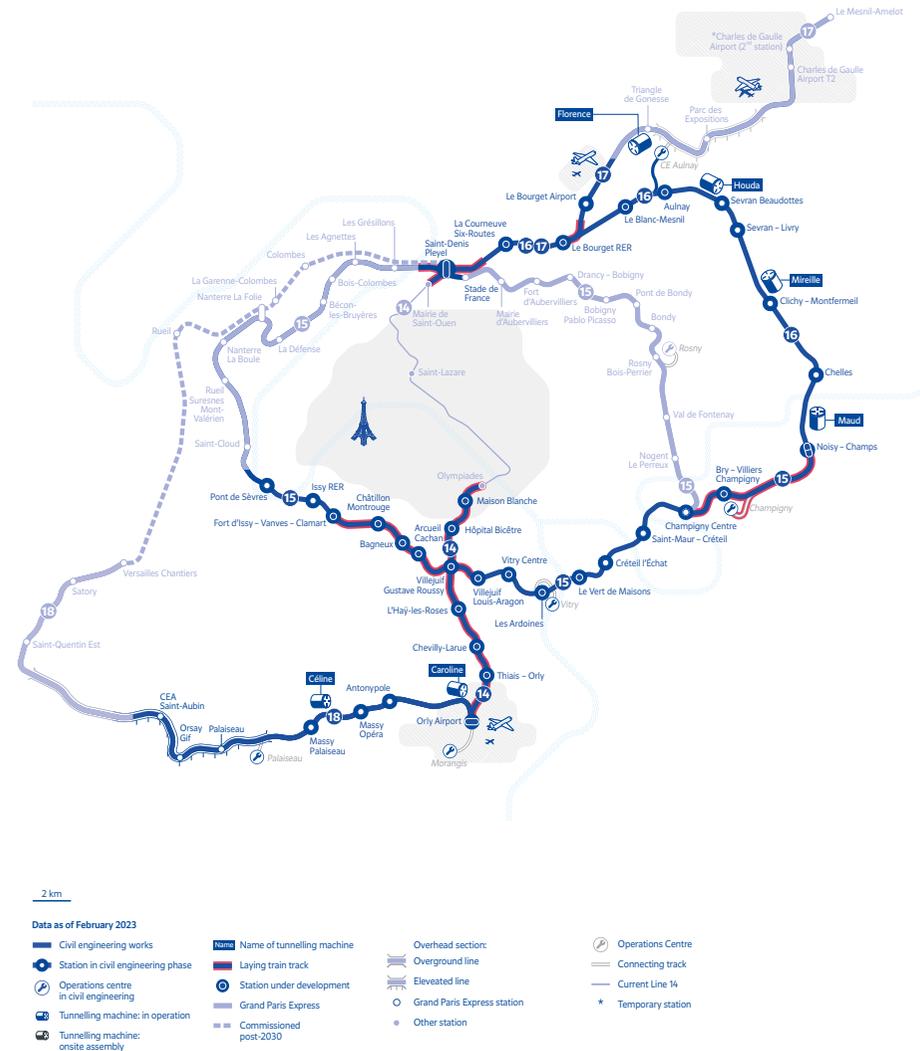
Without calling into question the conclusion expressed above, we make the following statement: the breakdown of funds disbursed by metro line still needs to be improved in terms of robustness of process and internal control.

The Grand Paris Express at the half-way mark

The project has entered the industrialisation phase, with fast growth in the number of worksites and the arrival of the rolling stock.

2022 worksites

87 km of tunnels dug by the end of 2022



A look back at the highlights of 2022
Since the start of construction work in 2016, each year allows the Grand Paris Express to reach new milestones with a view to the first commissioning which will take place in 2024, for the extensions of line 14 and line 15 South. Here are some highlights that marked the life of the project in 2022.

— **January:** inauguration of the traveling exhibition “Grand Paris Express” at the France Dubai 2020 Pavilion,

— **January:** the design of the line 18 metro is chosen by Île-de-France residents,

— **February:** four system contracts (platform facades, operating radio system, space surveillance systems, fire safety systems) are awarded on line 18,

— **February:** digging of the Clichy-Montfermeil station on line 16 East completed,

— **March:** the Bantan tunnel boring machine finishes digging the common section of lines 16 and 17,

— **March:** baptism of Maud in Noisy – Champs, the last tunnel boring machine for line 16,

— **April:** installation of the first ultra-low carbon segment of the Grand Paris Express on line 18,

— **May:** the first escalators of the Grand Paris Express arrived at Villejuif Gustave Roussy station which will connect lines 14 and 15,

— **May:** the Florence tunnel boring machine completes its first route at the Rolland structure in Le Bourget, on line 17,

— **May:** notification of two contracts for the construction and development of the three aerial stations of line 18: Palaiseau, Orsay-Gif and CEA Saint Aubin,

— **June:** installation of the first low-carbon steel rails of the Grand Paris Express on the common section of lines 16 and 17,

— **October:** award of the waste management contract on line 15 East including an objective of recovering up to 99% of the waste,

— **October:** the laying of the tracks for the extension of line 14 to the north, between Mairie de Saint-Ouen and Saint-Denis – Pleyel, is completed,

— **December:** the Grand Paris Express wins the Harvard University urban planning prize.

Impact and performance indicators

Performance indicators		Impact indicators	
The Grand Paris Express uses performance indicators to track project-related progress.		Impact indicators estimate the impacts of the Grand Paris Express project on the climate, the environment, and society.	
% of sites audited to a satisfactory level or higher in relation to the Société du Grand Paris safety audit standards	61%*	Ex-ante estimate of greenhouse gas reductions (tonnes of CO ₂ equivalent/year)	28 to 51 million tonnes by 2070*
Percentage of local residents who agree with Société du Grand Paris's proposals (individuals outside professional business activities)***	77.2%*	Trajectory in line with the 25% reduction in cumulative CO ₂ emissions for the Grand Paris Express, on completion (ref. 2018)	38% cumulated in 2022*
Budget allocated to hub studies	€6,600 K*	Millions of tonnes of earth excavated	27,955,559 since the beginning* In 2022: 4,584,427*
Real estate projects awarded to developers	11	Spoil recycling	51.6% since the beginning of the project* In 2022: 49.1%* In 2022: 2,966,501 tonnes of materials reused* In 2022: 10.4% of waste was transported all or part of the way to its final disposal site by river*
Independent VSEs/SMEs** that have worked on the worksites since the beginning of the project	4,392*	Restored surface offsets	Forest offsetting: 18.96 hectares in 2022 59.87 hectares since the beginning of the project* Ecological offsetting: 9 hectares in 2022 48.47 hectares since the beginning of the project*
Total amount paid to independent VSEs/SMEs** for the contracts in progress	€2,325 M*		
Target amount contracted to date for independent VSEs/SMEs****	€2,499 M*		
Hours of work completed by the long-term unemployed as of 31 December	3,798,570*		
Hours of work earmarked for the long-term unemployed as of 31 December	3,507,834*		

* Data verified by the statutory auditor.

** Independent VSEs/SMEs: Under 25% of the capital/voting rights held by a third-party business, according to the definition of very small, small, and medium enterprises in Recommendation 2003/361/ EC. The VSE/SME category is provided for information.

*** Now includes agreements made with social housing authorities in addition to individual agreements closed on 31/12/2021.

**** 99 contracts and 9 contracts ended.

Overall conclusions

Through the Green Bond 2022 reporting, Société du Grand Paris demonstrates its ability to meet the requirements of its environmental strategy. It has set itself the objective of reducing greenhouse gas emissions linked to the construction of the Grand Paris Express by 25%, i.e. 1.1 million tonnes of CO₂ less out of the 4.4 million tonnes of CO₂ planned at the start of the project in 2018.

The efforts of the Société du Grand Paris to reduce the environmental impact of the design, construction and operation of the Grand Paris Express are reflected in a sustainable innovation strategy, shared with partner companies. By encouraging experimentation with low-carbon solutions, the production of recycled-based materials or the evolution of construction methods towards less emitting processes, the Société du Grand Paris is implementing the carbon-free solutions of today and tomorrow.

For the year 2022, the allocated amount of €3,397 million was allocated from a total debt estimated at €35 billion, or 9.7%.

Applying this percentage to the figures from the updated 2018 CarbOptimum® gives the following impact assessment*:

In millions of tonnes of CO ₂ equivalent	Timescale	
	2070	2022 share
Low	-27.4	-2.66
High	-51.3	-4.97

Developed by Stratec for Société du Grand Paris, the CarbOptimum® program makes it possible to quantify the Grand Paris Express's carbon footprint. Upgrading the software provided the option to reframe the carbon trajectory as follows:

By 2070, according to the forecasting scenario, the finding is positive: CO₂ emissions will be reduced by 27.4 M-51.3 M tonnes of CO₂ equivalent.*

* Excluding refinancing.

CarbOptimum® Methodology

Société du Grand Paris has developed CarbOptimum®, a proprietary tool to assess the reduction in greenhouse gas emissions.

This life cycle carbon calculator takes into account five direct and indirect sources of emissions, which can be generated or prevented:

1. Studies and pre-construction works
2. Infrastructure construction
3. Infrastructure operations
4. Impact on mobility in the Paris region
5. Impact on regional development

CarbOptimum® uses a transparent methodology similar to those used by the Greenhouse Gas Protocol and Bilan Carbone®, which are recommended by ADEME (French environment and energy agency).

TO LEARN MORE

All the documentation on this Green Bond programme (*Green Bond Framework, Second-Party Opinion, Climate Bond Initiative Certification, Green Bond Investor Presentation, etc.*) is available on the Société du Grand Paris website on the “finance durable” (sustainable finance) page.

<https://www.societedesgrandsprojets.fr/investing-grand-paris-express>

[Framework](#)

[Second opinion](#)

[CBI](#)

[KPMG Assurance Report](#)

[Société du Grand Paris 2022 Activity Report](#)

[56th report of the National Transport Accounts Commission \(in French\)](#)

[Sign up for the financial newsletter](#)

The 2022 version of the Green Bond Framework is available on the Société du Grand Paris website, together with all the financial publications.
<https://www.societedesgrandsprojets.fr/investing-grand-paris-express>

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