

Société des Grands Projets



Grand Paris Express' Green Financing Framework

January 2024

INTRODUCTION

- The Grand Paris Express network will serve towns in the inner and outer suburbs of Paris with its four new metro lines and 68 stations dotted around the city, as well as its extensions of existing lines, corresponding to a total of 200 kilometres of new rail tracks. It will offer a faster and low-carbon mobility solution to almost three million passengers each day, bringing the residents of Île-de-France closer to the region's jobs, educational institutions, healthcare facilities and recreational amenities.
- By the end of 2023, 101.5km of rail track had already been bored since the project began out of a planned total of 200 km. On the financial front, meanwhile, 26.2 billion euros of green bonds have been issued since 2018.
- This updated framework is the second revision following the in 2021 version and seeks to offer investors more transparency, perspective and information, particularly with respect to its alignment with the European Union taxonomy criteria.
- It is a priority for Société des grands projets to measure the positive impacts and externalities associated with the Grand Paris Express (GPE) project and to ensure they are measured in a reliable manner. It took this process a step further in 2023 by bringing in an independent third party to verify the carbon footprint accumulated since the works began.
- This revised framework also marks a milestone as the first parts of the Grand Paris Express are being delivered in the run-up to the Paris 2024 Olympic and Paralympic Games (northern and southern section of line 14), and because of the adoption by the French Parliament of the law on SERMs (*services express régionaux métropolitains*, or metropolitan regional express services)¹ which enlarges the geographical scope of intervention of the Société des grands projets.
- This extended scope of intervention is testament to the know-how and expertise of the staff at the Société des grands projets.
- The green bonds allocation and impact reports published so far address a variety of themes. They show that the Grand Paris Express project has looked beyond the theme of climate change mitigation and anticipated climate change adaptation, the pressing need for urban densification, biodiversity conservation and restraint in the use of resources from the very moment it was designed. The project draws on the latest scientific advances as and when they are developed.
- The benefits generated by the Grand Paris Express are resolutely linked to the decarbonisation of mobility and transportation but actually go even further as this is also an urban planning and regional development project, with significant social co-benefits.
- To this end, Société des grands projets strives to innovate in each aspect when developing the metro network and the train station surroundings, from the design stage to the eventual operating stage, by setting up mechanisms to encourage experimentation, innovation bonuses, requests for proposals and R&D programmes.

¹ Société du Grand Paris was renamed Société des Grands Projets subsequent to law n°2023-1269 of 27th December 2023 on metropolitan regional express services, available [here](#) (in French only).

The extended geographical scope of intervention granted to the Société du Grand Paris, now the Société des grands projets, and its participation in future SERMs (metropolitan regional express services) were officially enacted in the law adopted on 27th December 2023². Article 20-4 IV stipulates that the use of tax receipts must be strictly segregated³. Tax receipts allocated to missions carried out by the Société des grands projets in the Île-de-France region cannot finance future SERM projects. The scale, terms and conditions, the practical and financial consequences of the Société des grands projets' involvement in projects outside Ile-de-France, have yet to be defined. This is why potential investments made under SERMs fall outside the scope of this framework and will do so until any subsequent revision. This framework and the green bonds to be issued under it, along with any earlier green bond issues, are therefore exclusively allocated to the Grand Paris Express project.

² Law n° 2023-1269 of 27th December 2023 on metropolitan regional express services, available [here](#) (in French only).

³ Paragraph IV of article 20-4 guarantees that the funds allocated to Grand Paris Express and to each SERM are segregated. Tax receipts of any kind allocated to the Société des Grands Projets at the date on which this law of 27th December 2023 was enacted are used by the Société des Grands Projets solely to cover expenses contributing to the fulfilment of its missions in the Île-de-France region. This principle also applies to expenses incurred to contract, remunerate and amortise loans taken on to finance these missions, in proportion to their use for this purpose.

CONTENTS

Part 1. A national issuer dedicated to low-carbon public transportation	5
1 One mission: leading urban and suburban mobility projects	6
2 Mobility in response to environmental, social and regional cohesion challenges	7
Part 2. The Grand Paris Express, a unique project and financing models	8
1 An unprecedented public transport and urban planning project	9
1.1 The origins and ambition of the Grand Paris Express	9
1.2 A mobility revolution for the residents of Île-de-France: examples of trips taken today/tomorrow	12
1.3 A nationwide investment	12
2 The financing and revenue model of the Grand Paris Express project	13
2.1 Solid tax receipts allocated to the project	13
2.2 Financing secured and at an advanced stage	14
3 A multi-dimensional CSR roadmap for the Grand Paris Express	15
3.1 Three core commitments	15
3.2 Stakeholder involvement	15
3.3 Governance, ethics and accountability at the Société des grands projets	17
4 The Grand Paris Express project's sustainable DNA	18
4.1 The Grand Paris Express network's climate contribution: modal shift and urban densification	18
4.2 Climate change resilience factored in from the design phase	23
4.3 A project in sync with the France 2030 approach and national low-carbon strategy	26
4.4 The project's social footprint	26
5 Responsible construction worksites	31
5.1 A rulebook and procedures to prevent collateral damage	31
5.2 The Grand Paris Express project's social responsibility	39
6 Grand Paris Express: a pioneer and forerunner	41
6.1 Contract engineering and public contract clauses	41
6.2 An incubator of sustainable innovations	42
6.3 Technological breakthroughs and experiments	42
6.4 Involvement and support from academia	42
Part 3. Green bonds	43
1 Use of Proceeds	46
1.1 Scope of use of proceeds	47
1.2 Eligible project categories	48
2 Alignment with the European Union taxonomy	49
2.1 Criteria for contributing to climate objectives	51
2.2 Criteria for doing no significant harm to other environmental objectives (DNSH)	53
3 Process for project selection and evaluation	59
4 Management of proceeds	59
5 Allocation and impact report	60
6 External review	63
Appendices	64
Appendix n°1: Library of green bond, ESG and CSR documentation	65
1.1 Green finance:	65
1.2 Awards in recognition of our EMTN green bond programme and green bond issues:	65
1.3 Key ESG documentation:	65
Appendix n°2: Minimum safeguards	67
2.1 Due diligence on human rights	67
2.2 Taxation	70
2.3 Competition	70

Part 1.
A national issuer
dedicated to low-carbon
public transportation

1 One mission: leading urban and suburban mobility projects

As a state-owned industrial and commercial undertaking (“Etablissement Public Industriel et Commercial” *EPIC*) fully-owned by the French state and created by the law of 3rd June 2010⁴ on Grand Paris, the Société du Grand Paris became the **Société des grands projets** in 2023 in accordance with the law of 27th December 2023 on metropolitan regional express services⁵.

It is tasked with “**designing and developing the overall scheme and infrastructure projects for the Grand Paris public transport network and carrying the project through to completion, including the construction of the lines, fixed structures and facilities, construction and development of the stations, including interconnection arrangements, and the purchase of rolling stock designed for these infrastructures**”. Moreover, the Société des grands projets contributes to the transformation of the Grand Paris metropolis by **executing real estate projects in areas surrounding the new metro’s stations**, on land holdings acquired for the purpose of building the Grand Paris Express.

The Société des grands projets may now also get involved in **executing SERMs (metropolitan regional express services), labelled as such by the French state, across the whole of France**. The metropolitan regional express service seeks to “*improve the quality of everyday transport, in particular by providing suburban areas with more frequent and more reliable connecting services, reduce air pollution, tackle solo driving, open up suburban and rural areas that do have sufficient links with urban centres,*

improve accessibility, especially for the disabled, and decarbonise mobility.”

Depending on the project, the Société des grands projets can now:

- **Be designated project owner for the transport infrastructures needed to implement SERMs**, according to the type of project (new railway lines, new multi-modal connection hubs, stations and maintenance centres, other public transport infrastructures in – or connecting with – a SERM, minor railway lines within the national rail network, as well as lines the management or ownership of which have been transferred to the regional authorities);
- **Participate in designing SERM projects, at the request of the French state and regional authorities** and in conjunction with SNCF Réseau (France’s rail infrastructure operator);
- **Take part in managing all these projects and finance certain operations** if it is responsible for overseeing their compliance with a budget or timetable.

The Société des grands projets is currently one of France’s major project owners with a staff of around 1,000. Its workforce makes up a first-rate and multi-disciplinary team, including experts specialising in major transport projects, development and environmental engineering. It takes part in environmental planning geared towards a new approach to development and construction methods that will make France one of the world’s leading green nations.

⁴ Law n° 2010-597 of 3rd June 2010 on Grand Paris, available [here](#) (in French only).

⁵ Law n° 2023-1269 of 27th December 2023 on metropolitan regional express services, available [here](#) (in French only).

2 Mobility in response to environmental, social and regional cohesion challenges

The mandate assigned to the Société des grands projets is based on **developing and promoting low-carbon public transportation** in response to the issues of the environment and the social and economic cohesion of France's regions. It therefore makes various environmental, social and economic commitments to successfully complete the Grand Paris Express network and SERMs.

It has, for instance, established a CSR roadmap⁶ with reference to the UN's Sustainable Development

Goals (SDGs). The roadmap is made up of three commitments: (i) to lead the project in a spirit of dialogue, humanity and ethics, (ii) to build while protecting the environment and helping to make the city of tomorrow more resilient, and (iii) to help develop sustainable and inclusive cities.

The link towards Société des grands projets' CSR roadmap can be found in the appendices to this framework⁷.

⁶ Société des Grands Projets, "CSR roadmap", available [here](#).

⁷ See Appendix 1 "Library of mandatory green bond, ESG and CSR documents".

Part 2.
The Grand Paris Express,
a unique project and
financing models

1 An unprecedented public transport and urban planning project

The Grand Paris Express will serve towns in the inner and outer suburbs with its four new automated metro lines running around Paris and the northern and southern extensions of line 14, corresponding to 200 kilometres of new rail tracks. It will offer a faster and low-carbon mobility solution to almost three million passengers each day, bringing the residents of Île-de-France closer to the region's jobs, educational institutions, healthcare facilities and recreational amenities. It will replace the car for many trips made on a day-to-day basis.

1.1 The origins and ambition of the Grand Paris Express

Plans to build a transformative transport network forming a ring route around Paris were brought to light during a presidential speech made on 26th June 2007. These plans were reiterated during another presidential speech made at the launch of the “Le Grand Pari(s)” exhibition at the *Cité de l'Architecture et du Patrimoine*⁸ on 29th April 2009: “The development of major zones to propel the Grand Paris region's economic future calls for a new, rapid, high-capacity transport system connecting the major urban polarities of tomorrow”.

The transport network thus came across as forming a crucial part of the new Grand Paris model, offering a solution to the **Île-de-France region's mobility issues**: making it easier to travel from one suburb to another, relieving congestion on the metro and RER (regional express train) networks, and opening up the most isolated areas at the heart of the conurbation. Such a project also needs to play a role in terms of **urban planning and economic development**: creating a dense city connected by the future network's stations and making the entire region a more attractive destination for investors, with benefits in terms of jobs, wealth creation and, ultimately, quality of life.

That said, the goals of creating an attractive destination and competing with other global metropolises also had to be compatible (even more so today than in 2009) with the environmental and social issues raised by global warming: **how to transform Paris**

and its region into a low-carbon and resilient global metropolis of the future?

A big step forward was taken in 2010, the year in which the law on Grand Paris was enacted on June 3rd. It created a state-owned undertaking dedicated to building and financing the new metro, the Société du Grand Paris, which was renamed Société des grands projets in 2024. Then, following an extensive period of consultation and public debate, the Minister for Cities and the President of the Île-de-France Region signed an agreement on 26th January 2011 deciding on the route of the future Grand Paris metro. This route upholds the initial principle of connecting the region's major economic hubs while also guaranteeing balanced accessibility for areas that are either densely-populated or with considerable potential to build new housing. The overall scheme was published on 26th August of the following year.

Work on building the new metro will involve and generate many other development projects in the areas surrounding the new stations, including projects with **a concentrated combination of housing, shops, services and amenities** that must help to **limit urban sprawl and soil artificialization**. Within a 10-minute radius by foot of the new metro's 68 stations, corresponding to around 800 metres, there is in total 140 km² of land ripe for urban renewal, corresponding to around 1.5 times the surface area of inner-city Paris (105 km²). This urban renewal has already begun and is going to speed up: in 2021, the *Atelier Parisien d'Urbanisme* (APUR, the Paris Urbanism

⁸ Mines Revue des Ingénieurs (02/2014), “Le Grand Paris Express : une histoire accélérée”, available [here](#) (in French only).

Part 1.
A national issuer
dedicated to low-carbon

Part 2.
The Grand Paris Express,
a unique project and

Part 3.
Green bonds

**Société
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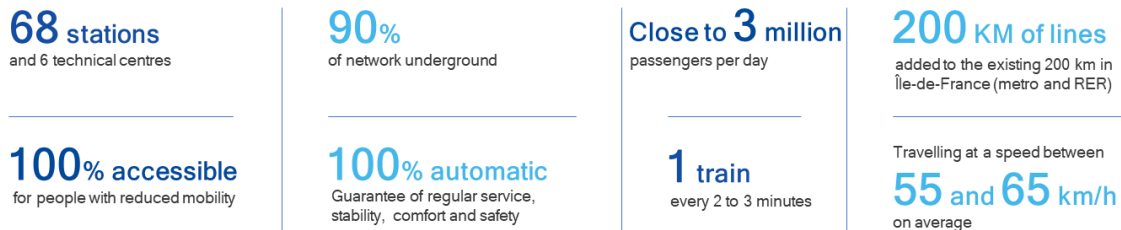
Agency) listed 353 ongoing or planned development projects in areas close to the future stations of the Grand Paris Express, i.e. 32 million m² of planned works⁹.

The Grand Paris Express project also faces a technological challenge from a digital perspective as the new metro's tunnels and stations are going to be used to transmit very high-speed data, catering to passengers as well as the inhabitants and businesses located near these future stations¹⁰.

The Grand Paris Express therefore forms part of a **vast and broad development project spanning the Grand Paris region**, an unprecedented project that seeks to emphasise the metropolis's vibrant economy, inclusive city and ecological transition.

This infrastructure has a considerable economic and social impact, as shown in the assessments carried out by the Société des grands projets itself and in the second opinions obtained on several occasions from independent experts commissioned directly by the *Commissariat Général à l'Investissement*¹¹.

Figure 1 – The Grand Paris Express in figures



Source: Société des grands projets

⁹ Mutations dans les 68 quartiers de gare du GPE en 2021. APUR, available [here](#) (in French only).

¹⁰ Société des Grands Projets (06/2014), "Inventons le métro le plus digital du monde", available [here](#) (in French only).

¹¹ Jean Bergougnoux, Yves Crozet, Carl Gaigné, Panos Tzieropoulos (2014) *Contre-Expertise de l'évaluation socio-économique du Grand Paris Express*. p.56, available [here](#) (in French only).

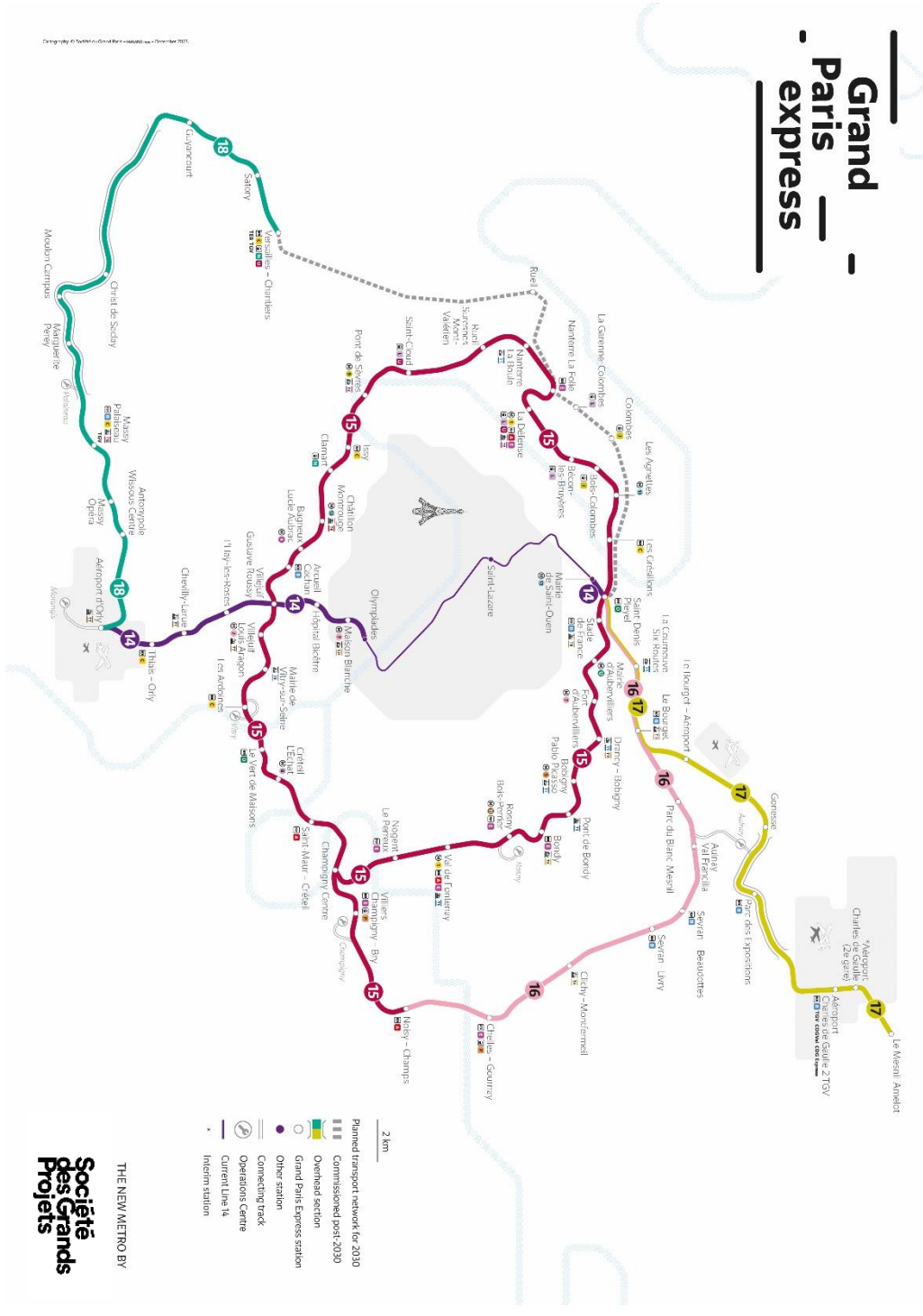
Part 1.
A national issuer
dedicated to low-carbon

Part 2.
The Grand Paris Express,
a unique project and

Part 3.
Green bonds



Figure 2 – Map of the Grand Paris Express network

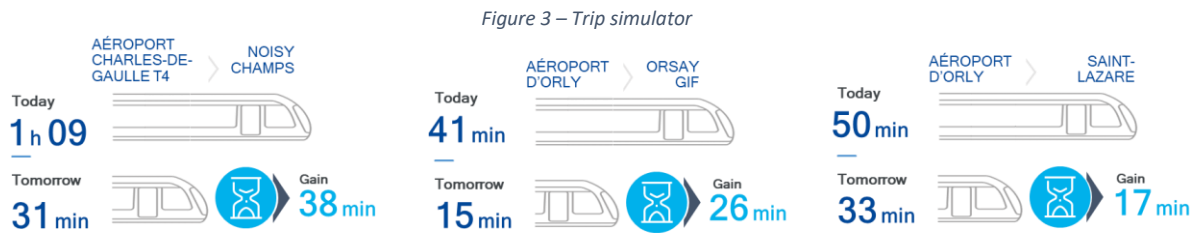


Source: – Société des grands projets

1.2 A mobility revolution for the residents of Île-de-France: examples of trips taken today/tomorrow

In total, 80% of Grand Paris Express stations will be interconnected with the existing RER, metro, tramway and bus network¹², offering extensive transport

coverage, increasing the number of opportunities to travel by public transport and reducing travel time.



Source: Société des grands projets

1.3 A nationwide investment

Grand Paris Express is a public transport infrastructure project **estimated to cost €36.1 billion (excluding financial expenses) plus** related contributions and operational expenses aimed at funding projects in the transport funding plan (*plan de mobilisation pour les transports*) capped at €3.5 billion (CE2012).¹³

An exercise modelling **the full spectrum of socio-economic benefits created by the Grand Paris**

Express project¹⁴ values them at around **€69.4 billion** in the long run.

The Grand Paris Express project could therefore **boost France's GDP by €10-20 billion each year starting from 2030**. It should add about **€4 billion per year in tax receipts** for the French State and regional authority budgets **once the project is delivered and running¹⁵**.

Figure 4 – Socio-economic assessment of the Grand Paris Express project¹⁶

Socio-economic assessment		Data in €bn, present values, baseline scenario	
Benefits for the regional authority		€69.4 bn	
Benefits for transport users		€22.6	
Environmental and urban gains		€8.7	
Valuation of economic attractiveness effects		€20.7	
Agglomeration effects		€11.9	
Worksite jobs		€5.5	
Costs (investment and operational, including opportunity costs of public funds)		€-43.8 bn	
			Net present value €25.6 bn
			Internal rate of return (social IRR, in real terms) 7.3%

Source: Société des grands projets

¹² Figures in reference to the complete overall scheme including links post-2030.

¹³ These investments to upgrade the Île-de-France transit network (mainly the EOLE project and line 11 and line 14 extensions) do not concern the Grand Paris Express (GPE) project and therefore lie outside the scope of eligible expenses corresponding to this framework (see part 3.1 "Use of proceeds").

¹⁴ These benefits break down into benefits for transport users, environmental and urban gains, agglomeration effects, construction jobs, and the economic effects of a more attractive destination.

¹⁵ French Senate, (10/2020), "Rapport de la commission des finances du Sénat", available [here](#) (in French only).

¹⁶ Key figures for Grand Paris Express, data at November 2023.

2 The financing and revenue model of the Grand Paris Express project

By law, the Grand Paris Express project is financed from Île-de-France tax receipts which are directly allocated to the Société des grands projets and enable it to repay amounts borrowed from the capital markets, all of which is supplemented with subsidies from the French State and European Union. This solid financing model provides a guarantee that the Grand Paris Express will be completed on schedule and at optimum cost.

2.1 Solid tax receipts allocated to the project

The Grand Paris Express financing model relies on **the allocation of tax receipts from the Île-de-France region**, consisting mostly of the annual tax on office premises, retail premises, storage facilities and parking areas adjacent to these premises (TSB), the tax on parking areas (TSS), the flat-rate tax on network corporations (IFER), the tourist tax surcharge (TATS) and the special facilities tax (TSE)¹⁷. These tax receipts are **dedicated solely to execution of the Grand Paris Express project**. These funds are supplemented with public funding during construction (in particular from the European Union) and with own revenues during commercial operation (state domain fees and proceeds from the development of the private domain).

The Société des grands projets has a certain amount of **borrowing capacity mostly through capital markets**, which is its main source of financing. Its debt ceiling is at 39 billion euros. Funding for the Société des grands projets is assured by the French

State, which has granted it a very secure status, that of an *EPIC* (a state-owned industrial and commercial undertaking). The model selected enables **the infrastructure to be reimbursed over a period of about 50 years**, with the company becoming the **amortization entity once the project is up and running**.

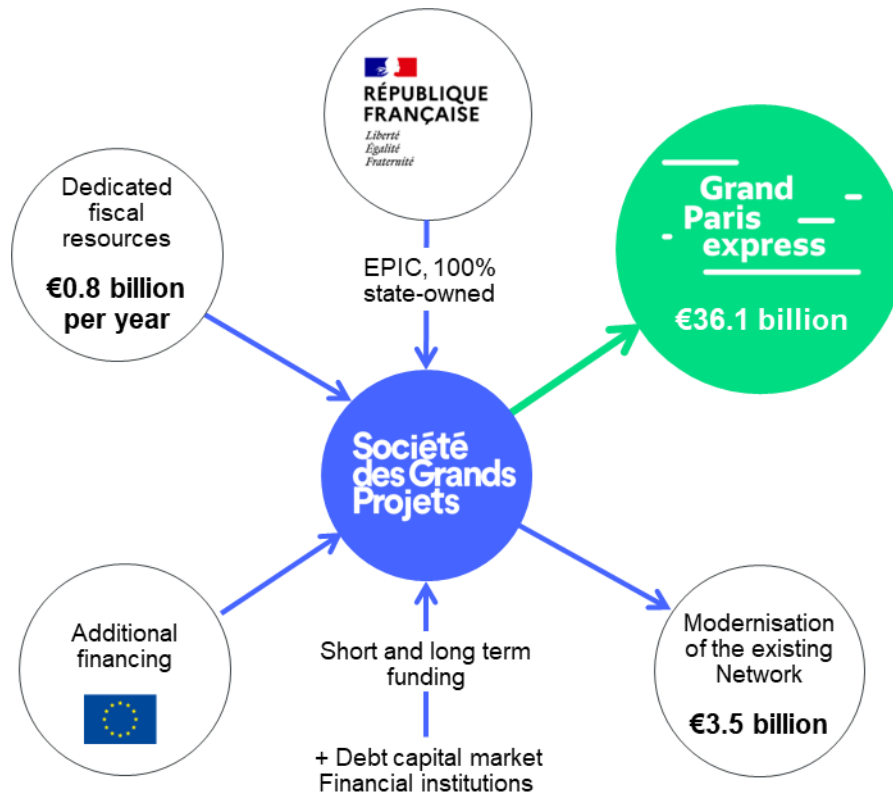
Its institutional credentials make it a top-quality issuer:

- a state-owned industrial and commercial undertaking (*EPIC*) not subject to the law on private sector bankruptcies;
- strong State support and control;
- socially and environmentally responsible.

All in all, the construction of the Grand Paris Express network is a strategic public investment for France and its capital region, **costing an estimated €36.1 billion approximately under the economic conditions prevailing in 2012**.

¹⁷ These two taxes, for instance, corresponded to total proceeds of €676 million in 2019.

Figure 5 – Société des grands projets financing for the Grand Paris Express network



Source: Société des grands projets

2.2 Financing secured and at an advanced stage

Because of the nature of its activities, the Société des grands projets opted to issue only green bonds on the capital markets.

Since issuing its inaugural green bond back in October 2018, the Société des grands projets has successfully raised **€28.75 billion of debt, of which €26.25 billion under its 100%-green EMTN programme in late 2023.**

Nineteen green bonds were issued between 2018 and 2023. All the bond financing issued under the

Société des grands projets EMTN programme are aligned with the ICMA's Green Bond Principles and certified by the Climate Bond Initiative (CBI).

Its **100%-green bonds** approach positioned at the long end of the yield curve makes it a unique and renowned issuer on the green bond market. Details about the issuer are provided in section IV of this document: "The Grand Paris Express project's sustainable DNA".

3 *A multi-dimensional CSR roadmap for the Grand Paris Express*

3.1 Three core commitments

The Société des grands projets has drawn up a CSR roadmap to guide its action¹⁸:

- To lead the project in a spirit of dialogue, humanity and ethics
- To build while protecting the environment and helping to make the city of tomorrow more resilient
- To help develop sustainable and inclusive cities.

Targets together with performance and impact indicators have been set for each of these commitments¹⁹ and they are monitored annually by way of an audit carried out by an independent third party. Certain metrics are used to disclose the benefits created by the eligible assets to which the proceeds from issuing green bonds are allocated²⁰.

All Société des grands projets CSR documentation is referred to in the appendices to this framework²¹.

3.2 Stakeholder involvement

The Société des grands projets involves its stakeholders each step of the way during the design and construction of the new metro: the French State, regional authorities including the Région Île-de-France and Métropole du Grand Paris, regional transport agencies (Île-de-France Mobilités, RATP and SNCF in particular), businesses and trade associations, and of course residents, especially those living near the future lines²².

Thereby **the dialogue initiated during the public debate process** continues day-to-day with **elected**

officials, local residents, user associations and environmental conservation associations, transport agencies, academia and the public employment department. The table below) describes the types of relations that the Société des grands projets maintains with its stakeholders. It is worth bearing in mind that the Société des grands projets does not operate the transport infrastructures it designs and builds in its capacity as project owner. It can only pass instructions to the operators.

¹⁸ Société des Grands Projets CSR roadmap available [here](#).

¹⁹ Société des Grands Projets (2022), "Tableau des indicateurs RSE", available [here](#) (in French only).

²⁰ See Part 3, VI, D. "Allocation and impact report; impact report"

²¹ See Appendix 1, Société des Grands Projets CSR roadmap, available [here](#).

²² For more details about: Relations with local residents: see Part 1, III, 2; Building site safety: see Part 1, III, 2; Relations with subcontractors and SMEs: see Part 1, II, 5; Inclusion and access to jobs: see part 1, II, 5.

Part 1.
A national issuer
dedicated to low-carbon

Part 2.
The Grand Paris Express,
a unique project and

Part 3.
Green bonds

**Société
des Grands
Projets**

Table 1 – The various Grand Paris Express stakeholders

Employees	Staff, staff representatives, trade unions
Service providers	<i>Autorité organisatrice de la mobilité</i> (AOM, or mobility organisation authority), project managers, businesses and suppliers
Transport organisations	RATP Infrastructures, Île de France Mobilité, infrastructure managers and operators of existing networks
Transport users	Frequent and occasional
Civil society and influential organisations	Associations, foundations, think tanks
Academia and economists	Academia, researchers and experts, universities and colleges
Authorities and regulators	Public authorities: European Union, State departments (DIRECCTE, DRIEAT, prefecture)
Administrative supervisors and elected officials	Elected officials: members of parliament, local and regional authorities / Administrative supervisors: ministries
Financial sponsors	European Investment Bank (EIB), investors
Local residents and retailers	Residents, retailers and businesses, road users

Source: Société des grands projets

3.3 Governance, ethics and accountability at the Société des grands projets

3.3.1 Independent governance

The Société des grands projets Management Board²³ operates alongside a number of committees which ensure that the French State and Île-de-France officials are represented. The composition of these bodies allows for **permanent dialogue** to make sure that the government's roadmap is being adhered to and that progress is being made on the project²⁴.

Governance operates around two major bodies:

The Supervisory Board, comprised of 21 members²⁵, oversees strategic decisions and makes sure that the Société des grands projets is managed effectively²⁶. It approves the agency's policy guidelines and audits its financial statements as well as its development and construction operations. The Audit

and Commitments Committee (ACC) informs the Supervisory Board's opinions and observations and is responsible for providing the Supervisory Board with insight through its own opinions and observations about the investment, audit, internal control and risk management policy at the Société des grands projets as well as about its budgeting and financial management.

The Strategy Committee is made up of 182 representatives from the towns and public institutions concerned by the Grand Paris Express. It is a committee in which elected officials at the Société des grands projets can discuss and reflect on the various issues regarding the Grand Paris Express, and its members issue proposals to the Supervisory Board.

3.3.2 Ethics, anti-corruption and accountability

The Société des grands projets makes sure that it **adheres to the legal and regulatory provisions** that apply to it; it is subject, for instance, to strict regulations aimed at preventing risks such as corruption²⁷, conflicts of interest and data protection.

It punishes any unethical conduct, whether with regard to its employees or its service providers, and has introduced **anti-corruption procedures** for this purpose. With backing from the **French anti-corruption agency** and the anti-corruption procedure steering committee, the Société des grands projets makes sure that its employees follow these procedures, for instance through its **code of conduct**²⁸ and **anti-corruption training courses**. Furthermore, it has drawn

up a **plan for preventing conflicts of interest and corruption**, which includes a risk map as well as a plan for monitoring and assisting employees that find themselves involved in a potential or actual conflict of interests.

Various measures have been taken to bolster procedures aimed at tackling internal fraud: **control of delegations of signing authority, internal budgeting and accounting control, as well as campaigns led by the finance department and accounting services department to raise awareness among those along the spending chain**. Lastly, **regular audits** are performed to verify whether access authorisations to the tools are aligned with the confidentiality

²³ The Société des Grands Projets Management Board is made up of three collegial members: Jean-François Monteils, its chairman, since 17th March 2021; Bernard Cathelain, since 25th March 2015, and Frédéric Brédillot, since 20th April 2017. They were all appointed by presidential decree.

²⁴ This governance structure was established by the law of 3rd June 2010 and by implementing decree n°2010-756 of 7th July 2010 on the Société des Grands Projets

²⁵ The 21 members include representatives from all the Île-de-France departments, the Île-de-France Regional Council, the Mayor of Paris and various members of State (ministries, economic control department, government commissioner).

²⁶ The strategic decisions overseen by the Supervisory Board cover topics such as the annual budget and audit of financial statements, employment-related matters, the debt trajectory, investment operations, and development and construction operations.

²⁷ The Société des Grands Projets is subject to the law on transparency, the fight against corruption and the modernisation of the economy (the 'Sapin 2' law) and the law of 11th October 2013 on transparency in public life (particularly as regards conflicts of interest). The Société des Grands Projets also adheres to the Wasserman law of 21st March 2022 protecting the rights of whistleblowers.

²⁸ Société des Grands Projets, "Code de conduite", available [here](#) (in French only).

Part 1.
A national issuer
dedicated to low-carbon

Part 2.
The Grand Paris Express,
a unique project and

Part 3.
Green bonds

**Société
des Grands
Projets**

commitments made. The Société des grands projets has obtained **the anticorruption compliance certification ISO 37001**²⁹.

The Société des grands projets has also set up a **whistleblowing procedure** and a process for managing personal data and protecting confidentiality. The

Société des grands projets guarantees **access to public procurement** by making information available, **ensuring its service providers respect human rights in the workplace**³⁰, disclosing information and third-party assessments, and setting up a procedure for managing conflicts of interest.

4 The Grand Paris Express project's sustainable DNA

*The Grand Paris Express was thought up by policymakers as an **urban, social and environmentally sustainable development project for the capital region**. It plays a key role in the country's France 2030 vision³¹ and in putting into practice its **national low-carbon strategy**³² (which aspires to make France carbon-neutral by 2050) since transportation accounts for such a large share of greenhouse gas (GHG) emissions and the Île-de-France region is so predominant on a national level. A modal shift is just one of the effects of the Grand Paris Express project; other effects include a reshaping of the urban landscape and the benefits of urban densification.*

4.1 The Grand Paris Express network's climate contribution: modal shift and urban densification

4.1.1 A major contribution to the Île-de-France region's and France's national decarbonisation targets

The Île-de-France region is a demographic and economic heavyweight, which means it is largely responsible for much of France's total GHG emissions. It accounts for some 10% of France's emissions despite covering just 2% of the country's surface area, although it generates 30% of national GDP³³.

The INSEE³⁴ estimates that **the region's overall footprint in 2018** (scopes 1 & 2) amounted to **41 million tonnes of carbon equivalent over the year** (tonnes of CO₂ equivalent – tCO₂eq/year), out of a national total of 440 million tonnes of carbon equivalent³⁵. The region's three biggest sources of emissions are road transportation (29%), residential

²⁹ Société des grands projets "Certification anti-corruption", available [here](#) (in French only).

³⁰ See part 2.1 in Appendix 2: "Due diligence on human rights"

³¹ French Ministry of Economy and Finance "France 2030 : un plan d'investissement pour la France", available [here](#) (in French only).

³² French Ministry for Ecological Transition "Stratégie Nationale Bas-Carbone (SNBC)", available [here](#) (in French only).

³³ Agence National de la Cohésion des Territoires, l'Observatoire des Territoires, "Emissions totales de gaz à effet de serre, par secteur et région", available [here](#) (in French only).

³⁴ INSEE "Émissions de gaz à effet de serre en Île-de-France", available [here](#)

³⁵ CITEPA "Bilan des émissions en France de 1990 à 2022", available [here](#)

buildings (30%) and services (17%), three areas over which the Grand Paris Express network will be able to exert a significantly positive influence.

Using the CarbOptimum® carbon calculator, a study carried out and reviewed in 2018³⁶ estimated that the Grand Paris Express will save 755,000 of CO₂eq each year as soon as it is fully up and running thanks to reduced car usage, speedier urban renewal and spatial densification. This is the equivalent of the annual carbon footprint of over 84,000 French citizens (corresponding to a town the size of Courbevoie).

4.1.2 Measuring in order to optimise

The Société des grands projets has been keen to set an example of societal acceptability ever since it was created and has opted to uphold high environmental standards by developing stringent methods.

Besides complying with **France's environmental laws and regulations** (Environmental Code, Forestry Code, etc.), it endeavours to take its ideas and actions for the Grand Paris Express project beyond what is strictly necessary. Measures aimed at **avoiding, reducing and offsetting impacts** during the **metro's construction and commercial operation phases** have been identified and rolled out at the earliest possible stage in all environmental aspects. The environmental strategy adopted by the Société des grands projets is aimed at:

- **Mitigating GHG emissions and promoting energy efficiency**, with the development in 2012 of a tool for monitoring its GHG emissions called CarbOptimum®, which was updated in 2018³⁷.
- **Adapting to climate change** on the back of an ambitious adaptation plan³⁸ embedded in the project's design.

By 2050, the Grand Paris Express network will have helped to reduce greenhouse gas emissions by at least 14.2 million tCO₂eq in the Île-de-France region, according to a conservative scenario. This will be thanks to a modal shift away from the road and towards public transport and clean forms of mobility like walking and cycling (36%), and to the development of station districts (64%) since urban densification centred around transformative transit hubs helps to limit soil artificialization.

- **Protecting biodiversity and natural habitats and limiting soil artificialization** thanks to an ecological equivalence assessment method developed in 2021³⁹, with a view to rewilding the land holdings of worksites that remain once construction has been completed and to preserving water.
- **Promoting the circular economy and efficient management of resources** through ecodesign and policies to recover the spoil and waste generated at construction sites⁴⁰, and using recycled, excavated and biosourced materials to build structures and station districts.
- **Limiting air and other forms of pollution around building sites.**

The Société des grands projets also makes use of a responsible procurement policy as a means of promoting sustainable development. And it rolls out mechanisms to encourage experimentation, requests for proposals, and research and development programmes⁴¹ in support of the environment and social development.

³⁶ Reduction in GHG emissions evaluated using the CarbOptimum® methodology, available [here](#) (in French only) and described in detail on page 16. (*The low-end scenario expects an overall reduction of 14.2 tCO₂eq by 2050 whereas the high-end scenario forecasts 28.6 tCO₂eq*). The CarbOptimum® tool has been updated regulatory ever since it was developed and is due for its next update in the second quarter of 2024. Updated data and forecasts will be integrated in this present framework.

³⁷ Société des Grands Projets (2018), "Grand Paris Express greenhouse gas emissions report (updated in 2018) - Expected impacts on GHG emissions", available [here](#) (in French only).

³⁸ Société des Grands Projets (2021), "2021 Green Bond Report – Adaptation", available [here](#).

³⁹ Société des Grands Projets (2020), "2020 Green Bond Report – Biodiversity", available [here](#).

⁴⁰ Approximately 99% of the GPE project's waste consists of inert waste.

⁴¹ Société des Grands Projets (2022), "Green Bond Reporting 2022 – Innovation for a responsible Grand Paris Express", available [here](#).

4.1.3 Modelling avoided emissions using the CarbOptimum® tool

In 2012, the Société des grands projets began to measure the Grand Paris Express project's impact in terms of greenhouse gas (GHG) emissions.

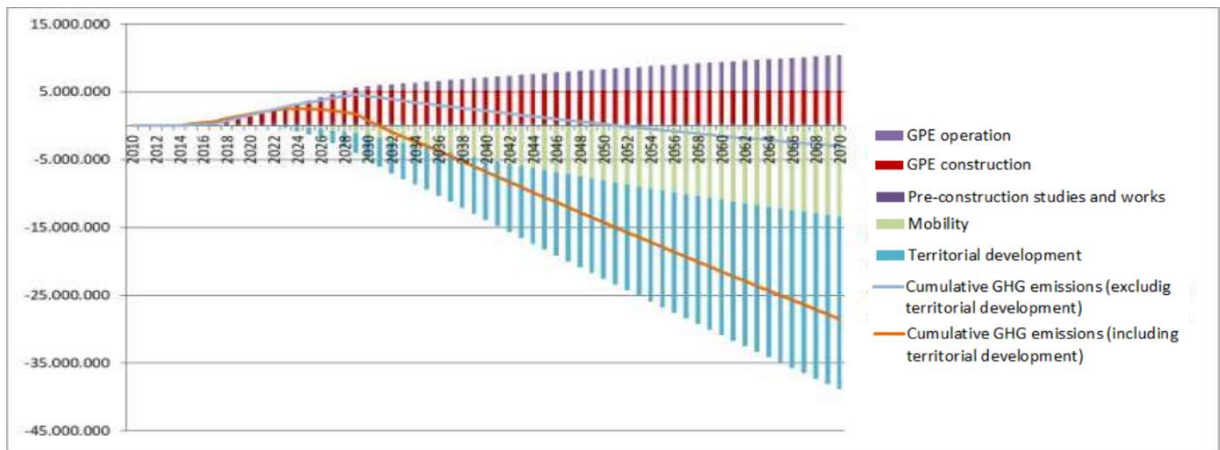
Two complementary approaches are taken to measure the Grand Paris Express project's emissions:

A forward-looking assessment carried out *ex-ante*; the aim here is to measure the impacts and benefits of the Grand Paris Express network in terms of greenhouse gas emissions over the project's entire

lifecycle. This assessment is carried out using the carbon calculator developed by the Société des grands projets: CarbOptimum®.

A quantification of actual emissions during the infrastructure's construction phase; the aim here is to assess the project's actual carbon trajectory and its positioning relative to the targets set *ex-ante* on the basis of the annual carbon footprint of the worksites measured annually⁴².

Figure 6 - Chronological assessment of the GPE's GHG emissions in tCO₂eq



Source: CarbOptimum® 2018

⁴² Société des Grands Projets (2022), "2022 carbon footprint", available [here](#) (in French only).

CarbOptimum®

The Société des grands projets has developed a proprietary tool called CarbOptimum® to make forward-looking assessments of the Grand Paris Express project's induced and avoided GHG emissions; it does so by comparing a project's carbon footprint with emissions avoided during the project's commercial operation phase. The CarbOptimum® methodology assesses the difference in projected emissions between a scenario with and without Grand Paris Express. This lifecycle carbon calculator factors in each of the project's different phases:

- Studies and works prior to construction;
- Construction of infrastructures;
- Operation of infrastructures;
- Mobility in the Île-de-France region (modal shift);
- Territorial development.

The most conservative scenario suggests that the assessment of GHG emissions will become positive as of the 2030s (see figure n°6 above). From then onwards, the assessment of net emissions will improve significantly as additional emissions will then be generated exclusively as a result of operating the infrastructure, which is powered by France's low carbon electricity. The effects of reshaping the urban landscape should begin to materialise at about the same time once work on the Grand Paris Express project has been completed (figure 6, cumulative with spatial development). These considerable impacts reflect the exceptional ambitions surrounding the Grand Paris Express project.

4.1.4 The Grand Paris Express project's carbon footprint examined closely and verified

The Société des grands projets stepped up its environmental strategy in 2021 by setting itself the goal of **reducing total GHG emissions generated from the construction of Grand Paris Express by 25%** relative to an **ex-ante assessment**. The Société des grands projets endeavours to be as transparent as possible about its positioning and progress towards this target and to manage its carbon trajectory, so it publishes a review of the Grand Paris Express project's emissions on an annual basis.

This review covers the **three scopes of GHG emissions**⁴³ so as to offer a consolidated and accurate view of the benefits and impacts of the Grand

Paris Express project. It is based on data collected since 2017 from **construction firms** and is therefore able to identify the Grand Paris Express project's biggest sources of emissions (concrete, steel and spoil transportation).

Such reporting data provided by construction firms is subject to **verification audits** performed by an operator commissioned by the Société des grands projets. In 2023, the carbon indicators for the Grand Paris Express project and the Société des grands projets dating from end-2022 were audited by an independent third party⁴⁴.

⁴³ All three emission scopes are counted. Scope 1: stationary fuel combustion sources, mobile thermal engine sources, fugitive sources, emissions generated from biomass (soil and forests) | Scope 2: electricity consumption, steam consumption, heating and cooling | Scope 3: purchased goods and services, capital goods, waste, upstream and downstream transportation of goods, business travel, upstream leased assets, investments, transportation of visitors and clients, use and end-of-life of sold products, downstream franchises, downstream leased assets, employee commuting, other emissions.

⁴⁴ Verified by the statutory auditor.

Focus on the main drivers of emission reductions

Emission reductions resulting from spatial development

The public transport component of the Grand Paris project is one of the conditions for developing the region, with an emphasis on densified housing and facilities in the districts surrounding the new stations alongside other accompanying measures geared towards achieving a meaningful reduction in CO₂ emissions based on the following mechanisms:

- As regards the urban configuration of built-up space, the aim is to **densify residential and tertiary space**, creating the need for connecting infrastructure;
- As regards the energy performance of buildings, the aim is to **encourage renovation and construction/demolition operations** as part of the project's urban planning.

Replacing existing buildings makes it possible to construct more energy-efficient ones.

These gains can significantly offset the energy costs incurred during the construction of new buildings; this is thanks to shorter travel times and a modal shift towards public transport driven by a development strategy incorporating urban density and urban diversity around the new hubs of a large-scale public transport infrastructure.

Emission reductions resulting from modal shift from private cars to public transport

The Île-de-France region's road infrastructure is often highly saturated, whereas the Grand Paris Express network will make 2.25 million trips each day after 2030, linking up the Île-de-France region's main economic and research hubs.

The development of these new lines goes hand in hand with a vast plan to upgrade and extend the existing network: extension of RER E to the west, extension of metro lines (line 14 to the south, line 11 to the east and line 12 to the north), introduction of new tramways and buses offering a high standard of service, upgrades of RER trains, and improvements to lines along the region's Transilien commuter rail network.

Once the Grand Paris Express network has been completed, 90% of Île-de-France residents will live within 2 km of a station. This will drive a massive modal shift from private cars to public transport.

The socio-economic and environmental studies carried out on the project estimate that traffic will decrease by an annual average of 2,000 million vehicle-kilometres⁴⁵ travelled once the network is fully up and running. The Grand Paris Express project's effects on mobility in the Île-de-France region will push France a step closer to the greenhouse gas emission reduction targets set out in the country's energy transition law.

⁴⁵ Vehicle kilometers traveled is the total kilo meters traveled by motor vehicles on the highway system during a given period of time.

4.2 Climate change resilience factored in from the design phase

Climate change studies carried out for the purpose of the Île-de-France region's climate plan emphasise that temperatures are rising in summer and winter alike and that rainfall is becoming more frequent and more intense during the spring. *Météo France*⁴⁶ points out that heatwaves are growing longer and more intense, and that rainfall is increasing by more than 10% during the winter and falling during the summer.

Climate change will trigger extreme events like **heat-waves, flooding and droughts as well as episodes of rain that lead to runoff or landslides.**

Under **France's climate change adaptation strategy**, it is critical for the Grand Paris Express project's infrastructure to withstand climate change. The Société des grands projets therefore plays a decisive role in adapting the Grand Paris metropolis, so in 2021 it carried out an **analysis of the physical vulnerability** of the Grand Paris Express project's various components to climate events. The aim here was to confirm its network's intrinsic physical resilience.

The scope of its analysis covered the various different components of the Grand Paris Express

transport system, with a distinction made between the **network's overhead sections, underground sections and passenger areas.**

The regulatory requirements and specifications set out in the Grand Paris Express project's technical and functional programme demand a high level of resilience to climate events and climate change. **The component/climate event cross-analysis** performed shows that climate risks are being addressed during the design and construction of the Grand Paris Express project (see 4.2.4 "physical risks analysed by a third party). However, while not posing a physical threat to the infrastructures, climate change does by nature create a residual degree of sensitivity which varies from one structure to another, with **constraints passed onto the maintenance and commercial operation phases** (quality of service, frequency of operation, cost of maintenance).

The adaptation solutions introduced revealed no significant impact on adaptation efforts or on the resilience to physical climate risks of other populations, nature, cultural heritage, property or other economic activities. The next sections individually analyse flooding, drought and fluctuating temperature risks.

⁴⁶ Météo France is France's official meteorology and climatology department and a public administration (*établissement public à caractère administratif*).

4.2.1 Flooding risks

The Grand Paris Express network runs near the Seine and Marne rivers. The Société des grands projets therefore identified which areas were at risk of flooding by referring to the latest *PPRIs* (**flood risk prevention plans**) for the areas the network crosses. It then carried out risk assessments for the entire project's infrastructure.

Having identified these areas, the Société des grands projets then developed a strategy to **manage this flood risk**, which it shared with State departments and factored into the design phase of each structure. This involves **keeping volumes steady in areas where water levels tend to rise by taking various measures or introducing certain features: the openings of structures are placed +20 cm above the level stipulated in the flood risk prevention plan (PPRI), detachable anti-flooding protective devices are set up at level R1.15** (9.10m in Paris, or 115% of the reference water line

reached in 1919), **and lift pumps and bilge systems are being put in place**. These features ensure that the project complies with all its regulatory requirements and are located above the water level stipulated in the *PPRI* (+15%).

In some respects, the targets set out in the strategy are more demanding than those imposed by the regulations. Plans therefore include:

- Designing structures that can resist flooding above the reference water line of 1910⁴⁷;
- **Purchasing and making use of top-quality detachable protective devices** that can be put in place rapidly if flooding is forecast during the commercial operation phase;
- Carrying out works that factor in **the risk of flooding (with the water level defined** during the construction phase) and planning adequate risk management scenarios.

⁴⁷ The 1910 flood that caused the Seine River to break its banks is used as a reference water level in studies aimed at adapting Parisian infrastructure to flooding. This weather event pushed the Seine up to its highest level ever in Paris (8.6m at the peak). Also refer to: Paris Archives (2023) "La crue de 1910, une société face aux risques", available [here](#) (in French only).

4.2.2 Drought risks

Surface clay shrinks and expands during periods of intense drought, which could become more frequent and result in subsidence or expansion affecting buildings with surface foundations. Episodes of drought have no impact on the stability of the Grand Paris Express project's infrastructure or structures. For the structure sections that are aboveground, the design phase factors in the possibility of differential subsidence resulting from ground contraction. And although

the Grand Paris Express project does pass through green clay areas to the east of Paris, clay expansion poses little risk as the structures built for lines passing through areas at risk of flooding have deeply-rooted foundations. Natural risk prevention plans (*PPRn*) to address such events have been factored in when choosing the construction measures taken to build the tunnels (use of tunnelling machines) and stations (diaphragm wall method)⁴⁸.

4.2.3 Fluctuating temperature risks

The infrastructures and rolling stock are designed to ensure that the network can continue operating in challenging weather conditions, for example during **episodes of snow or high temperatures**.

The rail infrastructure is 90% underground and has little exposure to situations of temperature stress. The Grand Paris Express network is therefore

intrinsically highly resilient to episodes of extreme heat. Moreover, each station is integrated into its environment in a way that reduces the negative effects of **hot spots in dense urban areas**. These structures are designed in a way that addresses the need for thermal comfort so that temperatures are kept at a reasonable level for passengers in all circumstances.

4.2.4 Physical risks analysed by a third party

The Société des grands projets commissioned a climate strategy consultancy, Carbone 4, to assess its infrastructure's sensitivity to the most likely climate events to affect the Île-de-France region. The firm accordingly drew up a climate event map based on an analysis of climate scenarios in order to specify which risks the infrastructure faced.

The study's scope covered the **network's overhead sections** (railway lines, power supply, concrete and metal structures), **underground sections** and **passenger areas** (overhead and underground stations).

Five main climate trends - temperature, fire, rainfall, humidity and strong winds - among 15 associated climate event indicators are addressed.

The projections made for the purposes of this study were taken from the DRIAS portal⁴⁹ based on the **IPCC's worst-case scenario RCP 8.5** (+3.2 to 5.4°C in 2100), set out in the IPCC's fifth assessment report, for 2055 and 2085⁵⁰. The climate data were taken from each of the EURO-CORDEX models⁵¹ (including CNRM⁵², IPSL⁵³ and other models from other climate centres).

⁴⁸ Société des Grands Projets (02/2017), "Le catalogue des fiches formations géologiques", available [here](#) (in French only).

⁴⁹ French Ministry for Ecological Transition (2023) "DRIAS, projections climatiques pour l'adaptation de nos sociétés", available [here](#).

⁵⁰ IPCC (2023) "Synthesis Report of the Sixth Assessment Report: Climate Change" available [here](#).

⁵¹ European Environment Agency (2019) "Regional climate model (EURO-CORDEX)", available [here](#).

⁵² Centre National de Recherches Météorologiques

⁵³ Institut Pierre-Simon Laplace

The analysis tends to show that **the Grand Paris Express network is robust as regards its ability to continue operating in the climate conditions of the future as projected today**. Gradually rising temperatures, in particular, should generally have little direct impact on the Grand Paris Express structures over their lifespan. The overhead sections of the Grand Paris Express (line 17, line 18 and surface structures), on the other hand, will be more vulnerable to extreme events such as heatwaves and vegetation fires. However, any disruption to the quality of

service affecting overhead sections is unlikely to spread to the rest of the network.

When it comes to network operation and maintenance, the Société des grands projets, in its capacity as project owner, will inform the Grand Paris Express network's maintenance firms and operators of its requirements which must be applied during extreme circumstances, such as clearing vegetation or carrying out heat inspections (more frequent inspections) in the event of high temperatures.

4.3 A project in sync with the France 2030 approach and national low-carbon strategy

France's roadmap for achieving the Agenda 2030 sets a number of priorities, including **priority 1.1**: "*By achieving sustainable regional development that opens up isolated areas and building a comprehensive network of clean and accessible transport, it is possible to provide access to essential services for everyone*". The Grand Paris Express network's route addresses **the issue of equal opportunities** (priority 1.3) by developing low-cost transport in underserved and working-class areas. Developing public transport services in the Île-de-France region is thus

an essential driver of the **just transition** (issue 1.1) in the country's most populated region.

The Grand Paris Express will generate a massive modal shift from private cars to public transport (see above "The Grand Paris Express network's climate contribution: modal shift and urban densification") and **profoundly transform the region's "social model"** (issue 2) by working towards the **goal of reducing greenhouse gas emissions by 40% by 2030 compared to 1990** (issue 2).

4.4 The project's social footprint

The Grand Paris Express is a resolutely green project as it will help to significantly reduce GHG emissions in the Île-de-France region by 2050; but it is above all a social project that will eventually make it possible **to open up certain suburban areas, particularly isolated areas**, and boost regional diversity while developing a European research and development hub. The Grand Paris Express is, by nature,

part of a broader economic and social development project for the Île-de-France region and will bring its residents closer to the region's **jobs, educational institutions, healthcare facilities, and cultural and recreational amenities**. Developing public transport services in the Île-de-France region is thus an essential driver of the **just transition** in France's most populated region.

4.4.1 Promoting territorial balance

A A route designed to counter social isolation

INSEE notes that **inequalities have widened in the Île-de-France region** in the past 20 years⁵⁴. A whole range of analyses show that the most working-class areas still tend to be found in the north and northeast, in **areas that currently have poor access to public transport** and where public transport is saturated. The Grand Paris Express network's route addresses **the issue of equal opportunities** by **developing low-cost transport in underserved and working-class areas**. It covers isolated areas experiencing socio-economic difficulties. This is particularly evident with line 15 East and line 16 (see the box below "Lines 16 and 15 South for social, economic and educational development").

The latest studies modelling travel in the Île-de-France region⁵⁵ find that the Grand Paris Express generally **helps to decongest the historical network**, especially in dense areas, but also makes areas more accessible. Accessibility will improve in particular thanks to the **ring road shape of the Grand Paris Express project**, with a focus on **developing stations in areas that currently lack them** and on creating links between suburban towns. The Grand Paris Express will therefore reduce travel time significantly on many of the trips taken by Île-de-France residents, as shown in the figure 9 below.

Figure 9: Time saved for public transport users at peak hours

Time saved for public transport users at peak hours

Examples	Current travel time	With GPE	Time saved
La Plaine St Denis – Créteil	50'	35'	15'
Bobigny – Cité Descartes	46'	26'	21'
La Défense (L15) - CDG	60'	35'	25'
Gennevilliers – Pont de Sèvres	40'	18'	22'
Orly – Gare de Lyon	45'	22'	23'

Source: Société des grands projets

With connectivity and inclusion in mind, the Grand Paris Express will be a metro that is accessible to all, including the disabled, with the aim of bringing **100% of Grand Paris Express stations and trains up to accessibility standards**. From the moment a passenger enters the station to the moment they enter the train, the itinerary will be direct, straightforward and fitted with elevators and escalators, on the way up and on the way down. There will be suitable equipment, information systems and services to

assist passengers so that they can all travel autonomously and securely.

Besides ensuring strict compliance with regulations, a consultation protocol is being followed with associations representing all types of disabilities to discuss the topic of accessibility of the Grand Paris Express network's future stations and trains; the consultation is taking place in the form of around twenty workshops⁵⁶.

⁵⁴ INSEE (06/21), "Statistiques et études", available [here](#) (in French only).

⁵⁵ Direction Régionale et Interdépartementale de l'Équipement et de l'Aménagement d'Île-de-France (2021), "Modélisation des déplacements en IDF avec MODUS 3.1" - Prefect of the Île-de-France region, available [here](#) (in French only).

⁵⁶ Société des Grands Projets (11/2020) "Un métro 100% accessible, une ambition qui se concrétise", available [here](#) and [here](#) (in French only).

B Job creation and access to jobs

Opening up parts of the region will eventually facilitate access to jobs for those residing in suburban towns. **Links between the different population and employment basins will improve thanks to affordable fares, convenient access to transport and reduced travel time.** For example, the number of jobs accessible within 45 minutes of Clichy-sous-Bois via public transport will increase eleven-fold thanks to metro line 16.

Most of today's job seekers are located in the east of the conurbation, in areas with poor access to the region's employment basins⁵⁷. A study carried out by the Laboratory for Interdisciplinary Evaluation of Public Policies (LIEPP) in 2017 concluded that the

Grand Paris Express will eventually create 150,000 jobs⁵⁸.

In addition, the Grand Paris Express will be able to create new opportunities for those residing in currently isolated neighbourhoods, allowing them to also consider a professional future close to home. With a Grand Paris Express station nearby (and the Grand Paris Connect fibre optic network installed along the Grand Paris Express network), it will be easier to create businesses and to set up or relocate public services, associations, solidarity initiatives and cultural activities. All this will also have benefits for local trade.

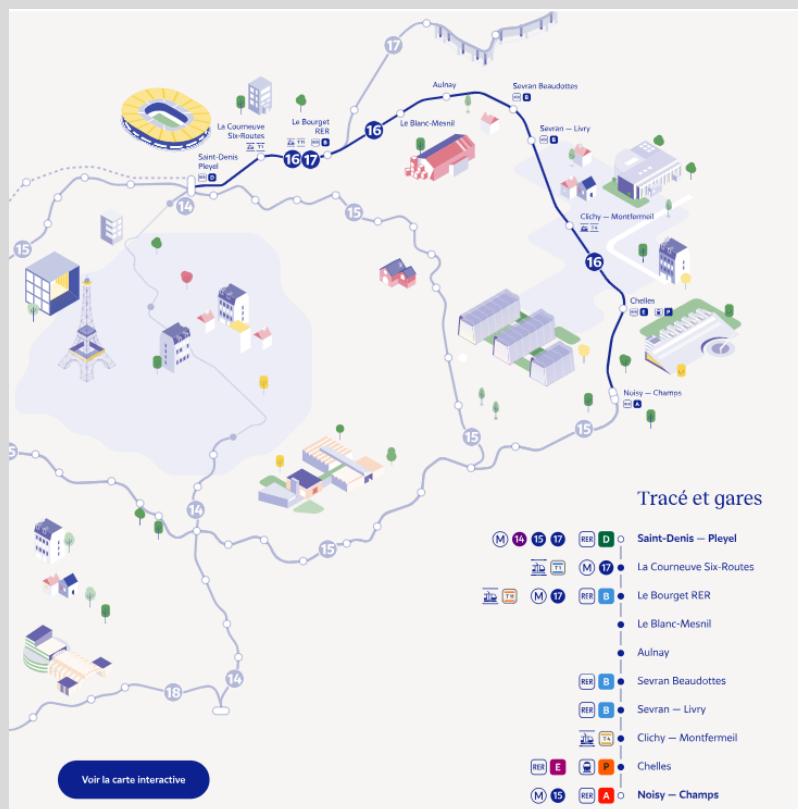
⁵⁷ INSEE (2023), "Taux de chômage localisés au 3^e trimestre 2023", available [here](#) (in French only)

⁵⁸ Laboratory for Interdisciplinary Evaluation of Public Policies (LIEPP), IEP Paris (2017), "Impact du Grand Paris Express sur le marché du travail et le marché du logement", available [here](#) (in French only).

Lines 16 and 15 South for social and economic development and access to education

Line 16 will pass through towns that are currently underserved and thus make it easier for around 800,000 residents to access jobs. It will increase six-fold the number of jobs available within 45 minutes of Aulnay-sous-Bois by public transport. For the residents of Clichy-sous-Bois and Montfermeil, the number will increase eleven-fold. In addition, it will take just 30 minutes to travel from Saint-Denis Pleyel to Noisy-Champs, and 8 of the line's 10 stations will be connected to the existing network.

By 2026, it will enable many students residing in the eastern part of the Île-de-France region to reach higher education institutions on the Descartes university campus located near the Noisy-Champs station. From Clichy-sous-Bois, access to the University of Créteil will take just 29 minutes using lines 16 and 15 South, compared with more than 1h20 today; and the line 16 station serving the Cité Descartes campus will give 15,000 students and 3,500 professors and researchers easier access to this major research and learning hub⁵⁹. Lastly, it will create a link between the Plaine Saint-Denis business park and this university hub.



⁵⁹ Société des Grands Projets (2023), “La ligne 16, le métro en rocade à l’est du Grand Paris”, available [here](#) (in French only).

C Research and education

In addition to lines 15 and 16, which will create links to various university campuses (Descartes, Créteil, Nanterre), line 18 of the Grand Paris Express network will also advance the planning and development of one of the pillars of the Métropole du Grand Paris, **the Saclay hub**. This innovation cluster brings together research organisations, *grandes écoles*,

universities and private firms. It will eventually become an international centre of scientific and technical excellence and concentrate 20% to 25% of France's scientific research⁶⁰. In total, over **130 educational institutions will be easier to access** thanks to the Grand Paris Express as a whole.

4.4.2 Access to economic opportunities created by the project's worksites

The Société des grands projets has drawn up a policy of requirements applicable to its service providers whereby social responsibility clauses are included in its contracts, in an effort to ensure that as many people as possible receive the economic and social benefits of the project:

- **Enabling people to find sustainable employment through job placements:** at least 10% of the hourly volume of contracts is reserved for people in back-to-work programmes.
- **Helping VSEs/SMEs to access contracts:** at least 20% of the amount of works contracts must be reserved for VSEs/SMEs (co-contracting, sub-contracting, supplies or services).
- **Anticipating companies' needs and ensuring that adequate training is in place:** any company awarded a works contract must inform the Société des grands projets of all its projected hiring and training needs on a quarterly basis and file its job offers with *France travail* (the French public employment service operator, formerly called Pôle Emploi).

The Société des grands projets also makes it easier to adhere to these clauses, in particular by signing **agreements with officials in the areas covered by the new metro lines to promote local employment**, with a system of one-stop shops (regional

contacts for the Grand Paris Express project) facilitating links between businesses, job seekers and SMEs.

It has also signed **agreements with local employment bodies** (*Cités des Métiers*, community projects, *Pôle Emploi*) to set up venues that can provide information and hold events on the job vacancies or types of demand at the Grand Paris Express, especially for young people, job seekers and women: these venues include various satellite sites and *La Fabrique du Métro* dedicated to promoting the project.

By November 2023:

- Over 127 contracts contained CSR clauses;
- Over 4,000 people had benefited from a job placement contract, with over 4.5 million back-to-work hours completed since works began on the Grand Paris Express project, 16% of which by women;
- Over €2.4 billion had been paid to VSEs/SMEs since works began;
- 16 one-stop shops had been set up for job placements and economic development run by regional public institutions and conurbation authorities in the Grand Paris region;
- 7 satellite sites had been set up, including *La Fabrique du Métro*.

⁶⁰ Paris Saclay, (09/2023), "Comprendre l'Opération d'intérêt national Paris-Saclay", available [here](#) (in French only).

5 Responsible construction worksites

The Grand Paris Express project offers intrinsic climate and social benefits, supplemented with strict environmental and social due diligence. The project's net sustainability footprint is enhanced by efforts to reduce negative externalities.

5.1 A rulebook and procedures to prevent collateral damage

5.1.1 No significant harm to the environment

The Grand Paris Express project is subject to the **environmental impact assessment process**⁶¹ in accordance with the EU Directive on assessing the effects of certain public and private projects on the environment⁶².

This process aims to ensure that **environmental issues are addressed when preparing the project**, to assess the potential impacts on the various environmental themes, and to propose specific measures to **avoid, reduce or, where appropriate, offset these impacts**. The environmental assessment process serves to inform the project owner and the competent authorities about the project, as well as to inform the public and guarantee its participation.

For each metro line, these public inquiries include the following: a Natura 2000 impact study, a spoil processing study, a master plan for disposing of waste, a geological issues report and a permit application in accordance with the Water Law⁶³. As soon as the first design studies were launched for the Grand Paris Express project, extensive efforts were

made to identify the environmental issues involved in order to ensure that they were addressed when choosing the location of the works and the construction methods that would be used.

None of the future metro's structures or works are located within a Natura 2000 protected area. All such sensitive sites have been avoided.

Potential impact studies have been carried out for structures that are to be built near these sites, particularly on the topics of **hydrogeological function and ecological function**. The results of these studies were included in the project's administrative authorisation applications; they were also presented to the public and subject to an investigation by the French State's investigation services. All potential impacts on these sensitive areas were deemed to be non-substantial. Specific measures have been taken to further limit any potential impacts. Biodiversity is an issue that is addressed extensively in the studies carried out and approaches taken by the Société des grands projets.

⁶¹ Prefect of the Île-de-France region (2023) - example of a public inquiry conducted for the Grand Paris Express project: [Line 15 \(South\)](#); [Line 15 \(East\)](#); [Line 16](#); [Line 17](#); [Line 18](#) (in French only)

⁶² Directive 2011/92/EU of the European Parliament and of the Council.

⁶³ Required by Directive 2000/60/EC, transposed to Law No. 2004-338 of 21st April 2004.

5.1.2 Protection of water resources

An analysis on water quality preservation and water stress has been carried out with the aim of securing 'the good status and good ecological potential of bodies of waters'⁶⁴ for each environmental authorisation procedure or amending declaration of public utility procedure followed.

The Société des grands projets seeks to **protect groundwater and surface water from pollution** and therefore takes appropriate measures in accordance with the provisions set out in the French Environmental Code. Strict water pollution prevention measures are taken at the project's worksites: **storage guidelines for hazardous products, water collection and treatment, risk management in the event of accidental pollution**. Each of the project's partner companies must draw up an internal organisation plan (*POI*) as soon as its mission begins in order to identify the risks and determine the organisational and technical measures to take so as to prevent any pollution. For example, devices to prevent **potential pollution** (absorbent products, absorbent booms, floating dams) can be activated at the worksite in order to react as quickly as possible in the event of an incident.

The Grand Paris Express project integrates local regulations defined by the network managers based on general planning documents (master plan for water development and management, water development and management plan, etc.) and respects the thresholds applicable to each chemical and biological parameter. Groundwater is pumped out as part of

the underground works carried out on the metro's structures. In certain specific and isolated areas, pumped water may contain pollutants. **This water (runoff water and process water) is collected systematically and treated in order to remove suspended matter and hydrocarbons**. Decontamination is controlled systematically to ensure that local standards are adhered to when this water is discharged into the natural environment or pipe networks. In addition, hazardous products (diesel, oils, paints, etc.) are stored in suitable storage depots. Watertight areas are installed at each worksite outside any sensitive areas. They are connected to a treatment system or authorised pipe network, making it possible to handle hazardous products safely.

Feedback on all water management procedures is provided to the French State's water supervisory authorities and **environmental monitoring reports are provided to them quarterly**. This procedure is well-suited to local conditions and makes it possible to foresee an environmental incident that is likely to cause damage to the ground or water.

Staff training in risk prevention and emergency response is a driver of success. Situational exercises are organised by the service provider and feedback on these field exercises is provided to the project manager and to the Société des grands projets, which can therefore make continuous improvements to procedures and recreate best practices at other Grand Paris Express worksites.

⁶⁴ See definition taken from Regulation 2020/852, Article 17, point 1.c.i

5.1.3 Recovery of waste from worksites

The overall volume of spoil from the Grand Paris Express project is estimated at a total of about **47.5 million tonnes** up to the project's completion.

Some 99% of this total is made up of spoil generated from **building the tunnels, stations and structures essential to the metro network's operations** (operating centres, ancillary structures)⁶⁵ and stands at about **47 million tonnes**, 90% of which consists of **soil debris and excavated stones**. About 1% of the remaining total spoil consists of **debris from the demolition of buildings and non-building structures** (e.g. bridges, roads) with an estimated tonnage of about 525,000 tonnes up to the project's completion.

The Société des grands projets aims to **recover materials corresponding to 70% of the total volume of spoil created by the Grand Paris Express project**, in line with the 2008 European Framework Directive⁶⁶, the energy transition law⁶⁷ and the Île-de-

France region's waste prevention and management plan⁶⁸.

A master plan for the management and recovery of spoil⁶⁹ is adapted metro line by metro line, dealing in particular with evacuation procedures and routes. Measures are being implemented to reduce the generation of waste during construction and demolition.

A resources and waste diagnosis lists the materials concerned and identifies the most virtuous 3R (Reduce, Recover, Recycle) options. A circular economy kit has also been drawn up, centred around excavated soil and describing solutions that promote the Grand Paris Express project's eco-circularity loop⁷⁰.

This strategy is adapted and applied to all contracts concerned and is divided into three sections: (1) spoil traceability, (2) use of alternative modes of transport as opposed to road, and (3) spoil recovery⁷¹.

A Spoil: excavated soil, accounting for most of the waste from the Grand Paris Express project

Construction of the Grand Paris Express mainly generates waste consisting of soil and stones⁷².

Traceability determines recovery potential as knowledge of the origin and quality of the spoil reassures those receiving it (urban planners, industrial groups). It is also required under the decree of 31st May 2021 which determines the content of the waste, excavated soil and sediment registers⁷³.

Information about the traceability of this spoil has been reported since 2017 via a data collection

platform: **the T-Rex tool**⁷⁴. This online platform traces the **path followed by the spoil from its excavation to its final destination**. The tool must be used by all those organisations that have been responsible for a batch of spoil from the Grand Paris Express project at any time. An interactive map lists the recovery sites⁷⁵.

Recovery assumes that the storage of spoil at approved sites is kept to a minimum and that preference is given to repurposing, reusing and

⁶⁵ Calculation based on 2 tonnes per cubic metre. The production of this total tonnage is spread over about fifteen years starting from 2016. See Société des Grands Projets (2022), "Schéma de gestion et de valorisation des déblais", available [here](#) (in French only).

⁶⁶ Directive 2008/98/EC on waste management, available [here](#)

⁶⁷ French Ministry for Ecological Transition "Loi relative à la transition énergétique pour la croissance verte", available [here](#) (in French only).

⁶⁸ Région Île-de-France (11/2019) "Plan régional de prévention et de gestion des déchets", available [here](#) (in French only).

⁶⁹ Société des Grands Projets (2022), "Spoil management and recycling plan", available [here](#) (in French only).

⁷⁰ Société des Grands Projets "Le kit de l'économie circulaire", available [here](#) (in French only).

⁷¹ According to article L.541-1-1 of the French Environmental Code, available [here](#) (in French only), "recovery means any operation the main outcome of which is that waste is used for useful purposes as a replacement for other substances, materials or products that would have been used for a particular purpose, or that waste is prepared to be used for that purpose, including by the waste generator."

⁷² Approximately 47 million tonnes over the entire project, with a total amount of 31 million tonnes excavated between 2016 and the third quarter of 2023, which means that about two thirds of the total amount of spoil has already been excavated.

⁷³ "Arrêté du 31 mai fixant le contenu des registres déchets, terres excavées et sédiments", available [here](#) (in French only).

⁷⁴ Société des Grands Projets (2021), "T-Rex un outil innovant", available [here](#) (in French only).

⁷⁵ Société des Grands Projets (2023), "Interactive map of recovery sites", available [here](#).

transforming it into eco-products and eco-materials. The Société des grands projets has launched innovative land use projects and established partnerships with organisations involved in waste management and development projects. In some contracts, it makes **a distinction between material recovery** (the transformation of spoil corresponding to its use, possibly after being treated, as a material in the construction industry in particular, e.g. brickworks, concrete) **and volume recovery** (re-use as is, e.g. the redevelopment of quarries and development projects), with a focus on developing the former. Experiments are underway to develop new recovery options. The Grand Paris Express has therefore led to

B Other waste: demolition rubble

The volumes of soil and stones resulting from the aforementioned construction work fall outside the scope of “doing no significant harm” (DNSH) to the European Union taxonomy’s circular economy objective. For activity 6.15 corresponding to the Grand Paris Express project⁷⁷, the DNSH to the circular economy criterion for assessing substantial contributions to the two environmental climate objectives (climate change mitigation and climate change adaptation) **excludes waste consisting of non-hazardous soil and stones**⁷⁸. The latter do not fall within the scope for calculating the recovery requirement, which is set at 70%.

For the Grand Paris Express project, therefore, **the DNSH criterion applies exclusively to non-hazardous waste resulting from the demolition of buildings and non-building structures during preparatory operations.** The tonnage of these two

an experiment in integrating millstone clay removed from worksites along line 18 into the manufacture of cement. **In addition, internal standards, procedures and good practice guidelines on waste management and prevention were introduced**⁷⁶.

Finally, the Société des grands projets is keen to limit all forms of pollution around its worksites and optimise the environmental impact of transporting waste, so it makes use as far as possible of **outlets joined up to the waterway** and rail networks to reach its goal of transporting **15% of total spoil by means other than by road.**

categories of waste over the entire project is estimated at about 525,000 tonnes.

The Société des grands projets calculates the recovery rate of such demolition debris by cross-referencing various data, including waste and monitoring registers⁷⁹ and data from the organisational waste management and elimination plans (*SOGED*) that are required for any demolition contract⁸⁰, or, a less favourable assumption, by applying average national recovery rates⁸¹.

At the date of publication of this framework, the recovery rate is estimated at 82% for all demolitions carried out for the Grand Paris Express project. This rate will be updated annually based on the information collected on current or future demolitions, and such waste has been fully monitored since 2023 thanks to its inclusion in the aforementioned T-Rex tool. The Société des grands projets seeks to

⁷⁶ Société des Grands Projets (2022), “Spoil management and recycling plan”, available [here](#) (in French only).

⁷⁷ Activity 6.15. Infrastructure enabling low-carbon road transport and public transport.

⁷⁸ Soil and stones correspond to code 17 05 04 under the European nomenclature (Decision 2001/118/EC). See the classification of construction waste in France, available [here](#) (in French only).

⁷⁹ Register provided for in article L.54-2 of the French Environmental Code (available [here](#) in French only) requiring chronological records of waste produced, shipped, received and treated. Such records must be kept for at least three years.

⁸⁰ Any company working on any GPE contract, especially a demolition contract, must take a series of measures relating to the circular economy and waste recovery. In the environmental protection notice (a contractual document included in all GPE contracts), the company is asked to make waste management arrangements based on the sorting and recovery of waste (described in the *SOGED*, or organisational waste management and elimination plan), while making use of firms that are specialised in and certified for treating and recovering waste. The actions these companies are required to take include measures to reduce waste at source and to repurpose, sort and comply with the waste treatment hierarchy, as well as to set up a waste traceability system.

⁸¹ The recovery rates for GPE demolition waste are very close to the national averages, or even higher for some worksites. The average national rates used are those indicated in the ADEME 2021 preliminary study of the EPR building products and materials industry (where EPR refers to Extended Producer Responsibility), estimated at 76.6% for inert waste, 90% for metals, 77% for wood, 16% for plaster and 26% for plastics. Read the full ADEME study “Performances de traitement de la filière REP PMCB – Proposition d’une trajectoire pour le 1^{er} agrément”, available [here](#) (in French only).

maintain or even improve its recovery rates and therefore incorporates incentives and bonus/penalty systems based on recovery rates into its demolition contracts.

Targets for the next few years have already been set:

— **For building demolition waste**, a recovery rate at least on a par with that of the extended producer responsibility chain for building products and materials, with targets of 77% in 2024 and 88% in 2027 for inert waste⁸².

— **For waste resulting from the demolition of non-building structures**, mainly public works such as networks, roads or others, a recovery rate at least on a par with the targets set out in the Île-de-France region's Regional Plan for the Prevention and Management of Waste (PRPGD). The following material recovery rates apply to construction waste:

- 70% by 2020;
- 75% by 2025;
- 85% by 2031.

5.1.4 Pollution control

A Noise pollution

Noise is a major issue for a project on the scale of the Grand Paris Express. Studies are carried out at different stages, based in particular on readings of baseline noise levels. Certain construction methods, such as pile driving, were forbidden right from the very start of the project.

Several aspects are taken into consideration **during the construction phase** to reduce the risk of noise pollution:

- Location of worksites;
- Choice of construction methods;
- Measures to reduce noise pollution: use of the "Cri du Lynx" system⁸³ to avoid reversing beeps, sound barriers installed around worksites, worksites organised so that equipment is positioned as far away from homes as possible, engine cowls, machinery compliant with the latest standards;
- Real-time monitoring of worksites via the "Météo des chantiers" application⁸⁴.

The sources of noise pollution **during commercial operation** will mainly concern aboveground

structures: stations, ancillary structures, maintenance sites, viaducts, ground levelling⁸⁵.

Baseline noise level measurements were taken perpendicular to each structure. Noise levels were modelled for the purposes of environmental studies and administrative procedures, in order to evaluate the thresholds that must apply when the metro is operating.

On this basis, installations perpendicular to ancillary structures are adapted to local conditions. The modelling of viaduct and ground-levelling sections shows **acceptable levels of noise when trains pass by**⁸⁶.

Once the metro is up and running, the depth of the tunnel (up to more than 50 metres below ground) will mitigate **the transmission of train vibrations to the ground**. For reference, the historic Parisian metro sometimes lies just a few metres below ground level. To avoid the transmission of train vibrations, **an anti-vibration buffer will be installed between the ground and the rail track across the entire iron track alignment and will be reinforced in sensitive areas**.

⁸² Decree of 10th June 2022 laying down specifications for Extended Producer Responsibility (REP) in the building industry.

⁸³ Bruits.fr (2019) "Silence Chantier, une précieuse contribution à la réflexion sur les nuisances sonores des chantiers", available [here](#) (in French only).

⁸⁴ Bruitparif, 2023, "La météo des chantiers", available [here](#) (in French only).

⁸⁵ This refers to rail tracks returning to ground level from a viaduct or when emerging from a tunnel.

⁸⁶ Acceptable level according to the transposition into the French Environmental Code (article L572-6) of the European directive on limit values in dB(A) by type of noise source. See: "Cartes stratégiques du bruit", Mairie de Paris, available [here](#) (in French only).

To limit noise pollution during commercial operation, especially at sensitive sites, soundproofing systems are to be installed inside safety structures installed.

B Air pollution

Measures are being taken **to reduce dust and pollutant emissions** during **construction and maintenance works**. All worksites follow *ICPE* procedures (applicable to facilities classified for environmental protection); these are filed for authorisation, declaration or registration purposes (classification by substance and by activity) in order to control, identify and then apply for the relevant prefectural authorisations for the operations that are planned. All processes adhere to French regulations⁸⁷.

Various measures have been taken to protect Grand Paris Express passengers from **air pollution when the new metro begins operating**. Air quality sensors will be deployed in various stations and full-height platform screen doors will protect users waiting on station platforms. Fine particle emissions in tunnels will be reduced at source thanks to **electric braking deployed across almost 100% of the operating range**⁸⁸ and a 25% to 35% reduction in axle load compared with current RER (regional express

every 800 metres, allowing firefighters to access the tunnels.

network) systems. For passengers inside the trains, there will be air renewal and cooling on board in order to limit the spread of particles from the tunnels to the trains. Last of all, ventilation systems will be separated between tunnel and station.

The Société des grands projets is currently working on a partnership with an **ESTACA laboratory to have this system reviewed externally**. Its aim is two-fold: to model the movement of particulate pollutants in order to gain a better understanding of how pollutants spread between tunnels, the station and the surrounding areas; and to evaluate the Grand Paris Express air quality measurement system so that the benefits can be quantified.

On a broader scale, the Grand Paris Express will encourage a modal shift from the car to the metro, thereby contributing to a general improvement in air quality in the Île-de-France region. Estimates will be made to assess this point.

⁸⁷ National air quality criteria are defined in the French Environmental Code (articles R221-1 to R221-3) available [here](#) and in the decree of 21st October 2010, available [here](#) (in French only).

⁸⁸ Train operation generates particle emissions, especially during braking.

5.1.5 Biodiversity conservation central to the project

One of the four ambitions set out in the Société des grands projets CSR roadmap⁸⁹ is to “design and build while protecting the environment”. Its primary focus is more specifically on limiting impacts on territories and natural habitats.

A Impact on territories

Some 22% of the Île-de-France region’s surface area is thought to consist of land take⁹⁰. Such use of land, mainly for agricultural purposes, is above the European average and increasing at a faster pace than the population.

Land take refers to the transformation of an agricultural, natural or forest land area by a development project where the associated land sealing disrupts a function served by the initial soil state. These functions include **water absorption by soil, carbon storage (by vegetation), the presence of biodiversity (flora or fauna) and crop cultivation**. Land take is one of the main causes of climate change and biodiversity erosion.

The Grand Paris Express helps to limit land take and control urban sprawl in the following ways:

- Most of the infrastructure is underground, which limits surface impacts;
- Where possible, occasional aboveground structures (stations, operating centres) are located within brownfield sites, urbanised areas and roadways.

Technical data obtained from project management studies and companies at December 2022 estimate **the maximum total area of land take during the construction phase at 177 hectares and the final amount of land take during the commercial operation phase at 60 hectares**.

In January 2023, the Socio-Economic Studies department at the Société des grands projets made an estimate of **the number of hectares saved as a result of urban densification policies** in the areas surrounding Grand Paris Express stations. **These**

savings are estimated at between 2,400 and 3,400 ha, mainly in the outer suburbs, thanks to urban densification policies. This is due to a combination of three effects: improved accessibility around the metro route; compact urban planning; and a network passing through areas where land take is already high, making it possible to rebuild “cities within a city” without impacting too much on new areas.

Regarding the **potential impacts on wildlife**, the project is predominantly an underground one, which itself is an essential impact avoidance measure. Additional impact avoidance or reduction measures have been taken, such as building **replacement hideouts and installing small animal fences/anti-intrusion systems**. Regarding the viaduct infrastructure, measures have been taken to protect flying species around the L18 viaduct, for instance, such as the decision not to use overhead lines and the installation of steel cable nets placed at a level higher than the rolling stock.

The Société des grands projets has strived to **counter the spread of invasive species** from the moment the project was designed, by conducting environmental impact studies and taking action during the construction phase to tackle the spread of invasive plant species (IPS). For example, it is specified in the environmental impact study (EIS) for line 16⁹¹ that the following measures have been taken to prevent invasive species from spreading: scraping and depositing, removal of plant soil, and seeding of rustic and local species. It should be noted that the operator will be responsible for maintaining the tracks and infrastructure once the line has been delivered.

⁸⁹ See Part 1, IV, of this document: A multi-dimensional CSR roadmap.

⁹⁰ INSEE (01/2022), “Objectifs du développement durable : regards sur l’Île-de-France”, available [here](#) (in French only).

⁹¹ Environmental impact study, line 16, available [here](#) (in French only).

B Assessment of impacts on the natural environment

Biodiversity is observed locally, by definition, so it is difficult to establish quantitative impact parameters and then aggregate them, as with tonnes of CO₂. It is indeed complex to understand the diversity of living organisms and the way in which ecosystems function in a consolidated and comprehensive manner.

Some harm to biodiversity can be prevented through the **avoidance and reduction measures** taken during execution of the Grand Paris Express project, and in particular **the underground route**; but the **construction of aboveground structures** (stations, safety structures, aerial tracks, work bases) **impacts on biodiversity and makes it necessary to take environmental offset measures.**

No methodological framework exists at the national level, so the Société des grands projets called on **CDC Biodiversité** to develop a **specific method**⁹² suited to the features of the Grand Paris Express project. With support from scientists, CDC Biodiversité therefore developed an innovative and robust method that incorporates operationality and scientific and regulatory acceptability criteria.

The method quantifies and compares potential biodiversity losses (generated by project impacts) and potential gains (generated by environmental offset measures); on this basis it assesses the equivalence between losses and gains and shows how the project-wide objective of zero net loss of biodiversity can be achieved.

⁹² CDC Biodiversité and Société des Grands Projets (02/2021) "Développement d'une méthode d'évaluation de l'équivalence écologique pour le dimensionnement des mesures de compensation du projet du Grand Paris Express", available [here](#) (in French only).

5.2 The Grand Paris Express project's social responsibility

5.2.1 Health & Safety

Safety at Grand Paris Express worksites is a **priority** and concerns all the **staff members of service providers working at Grand Paris Express worksites**. The approach is based on control, training, feedback and transparency. As the Grand Paris Express project owner, the Société des grands projets endeavours to establish a common language around **worksite safety** with all the **companies involved**, based on **4 core principles**: "prevent, support, value and sanction".

The Société des grands projets has drawn up a set of safety standards, the "Worksite safety charter and guidelines"⁹³ for the Grand Paris Express project. This document guarantees a single health and safety doctrine for the entire project. The approach is adaptable so it can factor in feedback from actual on-site operations, and it includes not only the project's regulatory requirements but also various industry recommendations⁹⁴.

A **systematic warning procedure** is set up at each worksite so that the project owner can be informed immediately in the event of a serious incident. In the event of an accident, a **special committee meeting**⁹⁵ of the worksite's various participants must be held.

A **specific worksite safety monitoring system** is deployed at each site, with an audit performed at least once a year and controlled during the annual campaigns carried out by AFNOR (France's association for standardisation).

In addition, each employee receives **safety training** as soon as they join the construction company and is given a **safety kit**. Ultimately, the aim is for each employee to be able to identify situations that they deem dangerous and, in this case, immediately put a halt to the works by taking the necessary action together with the company.

Various partnerships and alliances have been formed for this purpose: a partnership with the construction safety & prevention trade body (OPPBTB)⁹⁶ but also with the Building and Wood Worker's International (BWI)⁹⁷.

All temping workers must be holders of the **Passport Sécurité Intérim (PASI) BTP**⁹⁸ (a safety certificate for temping workers in the construction industry) since June 2023. A **worksite safety council** made up of renowned specialists has also been set up to analyse accident statistics. In addition, **worksite audits have been intensified**, in particular through tighter specific health & safety protection plans (PPSPS)⁹⁹ at each construction company.

The Société des grands projets also plans to introduce **exclusions in its future requests for proposals** targeting companies whose audit outcomes have unveiled frequent health & safety failings, subject to compatibility with French and European public contract regulations.

Finally, awareness has been stepped up since 2023 with the introduction of an annual worksite safety day. This awareness initiative concerns the entire Grand Paris Express community. It will cater to all

⁹³ Société des Grands Projets "Worksite safety charter and guidelines, Grand Paris Express", available [here](#) (in French only).

⁹⁴ Caisse nationale d'assurance maladie des travailleurs salariés (a national healthcare insurance body), Caisse régionale d'assurance maladie d'Île-de-France (a regional healthcare insurance body), Institut national de recherche et de sécurité (a national safety research body).

⁹⁵ This special committee is the Collège Interentreprises de Sécurité, de Santé et des Conditions de Travail (CISSCT, or intercompany board for health & safety and working conditions). See the French Labour Code: Section 8: Collège interentreprises de sécurité, de santé et des conditions de travail (Articles R238-46 à R238-56), available [here](#) (in French only).

⁹⁶ FFB, (10/2023) "Prévention dans le Bâtiment : la FFB Grand Paris IDF et l'OPPBTB IDF renouvellent leur partenariat", available [here](#) (in French only).

⁹⁷ Société des Grands Projets (2023), "Charter of safety commitments for the Grand Paris Express with the BWI", available [here](#) (in French only).

⁹⁸ The PASI BTP is a certificate issued to temping workers that have undergone two days of safety training.

⁹⁹ A PPSPS is a document that helps to prevent risks during building and engineering operations. It is drawn up by each company involved in a construction site where several companies are operating. It contains a great deal of information about the companies involved, an analysis of residual risks and preventive measures.

employees and partners working at Grand Paris Express worksites. The first worksite safety day was held on Wednesday 10th May 2023.

A number of health and safety indicators are measured at the worksites so that they can be monitored from one year to the next and any changes can be analysed:

Figure 10: Worksite safety and security, data at 30/06/2023

Worksite health and safety		Data at 30/06/2023 (excluding L14S)	
205 accidents with lost time*	13,483,462 hours worked*	2023 audit campaign*: 87 audits performed in 2023	
115 accidents without lost time*	Frequency rate*: 15.2	Severity rate*: 0.48	277 discrepancies identified at end-June 2023 (75% already resolved) In 2023, over 2,500 safety visits make to the 158 active worksites

* Data at end-June 2023 on a 12-month trailing basis

5.2.2 Consultation with and support from local residents

One of the top priorities for the Société des grands projets and construction companies is to ensure the safety of local residents and bring the Île-de-France region's residents on board.

The Société des grands projets makes every effort in the areas surrounding its worksites to **facilitate and secure traffic and pedestrian paths, and access to shops and building entrances** is ensured by means of clear signage and adequate arrangements. Pedestrian traffic around worksite barriers is secured at lorry entry and exit points.

The Société des grands projets has also set up "La Fabrique du Métro"¹⁰⁰ to raise awareness and

educate the general public about the issues and benefits of the Grand Paris Express; it is an innovative place to present the Grand Paris Express through its history, its execution and the types of professions involved, **with a view to creating transparency and a sense of mutual interest for its future users**. La Fabrique du Métro is also a venue for partnerships, with engineers, architects and students working side by side. Tests are carried out there on the furnishings to be included in the stations, on the passenger information systems to be fitted and on the materials to be used.

¹⁰⁰ Société des Grands Projets (2023), Découvrez le Grand Paris Express à la Fabrique du métro, available [here](#) (in French only).

6 Grand Paris Express: a pioneer and forerunner

An assessment of the Grand Paris Express project's avoided emissions is a significantly positive one, but the Société des grands projets strives to improve it further during the construction phase by testing out innovative solutions to reduce greenhouse gas emissions. The Société des grands projets is keen to place innovation at the very heart of its approach and organisation, so in 2022 it merged its environment and innovation teams in an executive department for Strategy, Environment and Innovation responsible for its CSR roadmap.

This approach and these efforts made it possible to set an ambitious new decarbonisation target for the construction phase, which accounts for two-thirds of the project's emissions. This target, which was set in 2021 based on the CarbOptimum® 2018 assessment, is to reduce emissions from infrastructure construction by 25%, that is 1.1 million tonnes of CO₂ less than the 4.4 million tonnes of CO₂ originally estimated (2018) on completion of the GPE works. Several levers have been activated to achieve this target.

6.1 Contract engineering and public contract clauses

The Société des grands projets began by including contractual clauses in its works contracts requiring **the use of low-emission concrete**¹⁰¹. These 'carbon' clauses stipulate a combination of **objectives, bonuses and penalties in contracts**, with applicants being able to propose various types of provisions including:

- Optimised structure volumes;
- Selection of lower-emission materials (including low-carbon concrete, recycled steel and bio-sourced materials);
- Lower-emission modes of spoil transportation (river, electric road vehicles).

The roll-out of the Reverse Carbon Initiative¹⁰² in 2021 made it possible to review ongoing contracts for companies already working with the Société des grands projets, in order to encourage them to propose **low-carbon solutions with a focus on innovation; these reviews included financial compensation per tCO₂eq avoided**. The initiative **made it possible to avoid about 35,000 tCO₂eq in 2022**, in particular by using low-carbon steel to manufacture the rail tracks¹⁰³. Under the Reverse Carbon Initiative, **the amount per tonne of CO₂ was set at €100/tCO₂eq avoided** in 2021, with the Société des grands projets having chosen to base this amount on the value of climate action (a shadow price for carbon set by the State) taken from the Quinet report¹⁰⁴.

¹⁰¹ IFPEB and Carbone 4 "Brief Filière Béton Les messages clés", available [here](#) (in French only). Concrete that emits at least 40% less carbon than conventional concretes, for the same category of strength and durability, i.e. about 174 kgCO₂e/m³ of concrete, versus average emissions for conventional concrete of about 210 kgCO₂e/m³ (CEMII, C25/30). The term 'low-carbon concrete' was defined by the French Institute for Building Performance in partnership with Carbone 4 using the trajectory set out in France's national low-carbon strategy (SNBC), in order to understand how the carbon intensity of concrete might trend between now and 2030 and then 2050.

¹⁰² La Société des Grands Projets (10/2021) "Une nouvelle stratégie pour consolider les bénéfices environnementaux du Grand Paris Express", available [here](#) (in French only).

¹⁰³ Manufacturing these low-carbon rail tracks generates 60% to 90% less CO₂ than rail tracks made using "historical" cast iron and saves about 1.5 tonnes of CO₂ per tonne of rail tracks delivered to worksites. Eventually, 75 km of low-carbon rail track will be laid on lines 15 South, 16, 17 and 18.

¹⁰⁴ Vie Publique, Secrétariat général du Gouvernement (2009) "Rapport Quinet - La valeur tutélaire du carbone", available [here](#) (in French only).

6.2 An incubator of sustainable innovations

The Société des grands projets strives to rise to this environmental challenge by innovating in all aspects of the project, from its **design** to its commercial operation. It does so thanks to a **dedicated environment budget line** that it has introduced, managed by its Strategy, Environment and Innovation (SEI) department; it is aimed at financing **schemes that encourage experimentation through requests for proposals or experimental contracts**. The aim is to enable companies, whether or not they are on

contract with the Société des grands projets, to experiment with projects promoting the environment as part of the construction of the Grand Paris Express.

The request for proposals launched on 7th February 2022, “*Le Grand Paris de l’Environnement*”, led to 10 companies (including start-ups) being selected for their projects focusing on biodiversity, climate, circular economy and water quality issues¹⁰⁵.

6.3 Technological breakthroughs and experiments

In particular, the Société des grands projets makes use of **low-carbon fibre-reinforced concrete** for the tunnel arch stones on line 18 with the company in charge of construction. Using these arch stones, which are based on cement-free alkali-activated slag, **reduces CO₂ emissions by about 70% compared with a “standard” concrete**, i.e. 62 kg of CO₂ per cubic metre of concrete. These incentives promoting sustainable innovation give the Société des grands projets an opportunity to finance several research and development projects, in particular with **the Institut des Mines Telecom (IMT) Nord**

Europe¹⁰⁶ (a grouping of engineering and management schools).

For instance, one of the innovations aims to transform spoil into low-carbon concrete for Grand Paris Express worksites by using a “flash calcination” system¹⁰⁷ that emits far less carbon and improves the properties of the soil excavated for Line 18. This means that **waste can be repurposed to create low-carbon concretes that emit up to 40% less CO₂**.

6.4 Involvement and support from academia

The Société des grands projets is keen to seek expert advice and is aware of the importance of research to a project on the scale of the Grand Paris Express, so it has also set up **partnerships with universities** (Université Paris-Saclay, Ecole des Ponts

Paris Tech) as well as with other project owners. Where research and innovation are concerned, it is also worth mentioning the partnership signed in 2021 with the EurAlpin Lyon-Turin tunnel.

¹⁰⁵ The projects selected included the following examples: development of a clinker-free binder for ultra-low-carbon concrete (Bouygues Travaux Publics), development of products for outdoor raw earth public works (Vinci Construction), transformation of spoil into fertile plant soil (Terre Utile). See Société des Grands Projets, press release dated 09/06/2022, available [here](#) (in French only).

¹⁰⁶ Objectif Grand Paris Magazine (04/2023), “Béton « bas carbone: Douai apporte sa pierre au Grand Paris Express”, available [here](#) (in French only).

¹⁰⁷ Flash-calcination is a rapid firing method that allows millstone clay to be transformed and used to manufacture concrete, which is then used in diaphragm walls, internet structures or for filler concrete.

Part 3.

Green bonds

A first framework on the green bonds issued by the Société des grands projets was published in October 2018 and then revised for the first time in 2021 in order to broaden the scope of eligible expenses by including current expenses, financial and ancillary costs, impact studies, audits and advisory services related to the Grand Paris Express project.

This framework is therefore in its **third version**. Its purpose is to:

- Reflect changes regarding the issuer, in particular its **change of corporate name and its extended geographical scope of intervention** pursuant to law n°2023-1269 of 27th December 2023 on metropolitan regional express services; and
- **Demonstrate the alignment of Société des grands projets activities with the European Union taxonomy of sustainable activities**¹⁰⁸.

This framework is also aligned with the 2021 version of the Green Bond Principles (GBP)¹⁰⁹ and the June 2022 Appendix published by the International Capital Market Association (ICMA).

In accordance with these principles, and for each green bond it issues, the Société des grands projets ensures it complies with the following four pillars:

- Justification of use of proceeds;
- Definition of processes for project evaluation and selection;
- Description of management of proceeds procedures;
- Reporting commitments.

The Société des grands projets has examined the eligible expenses relating to the Grand Paris Express project included in this framework with regard to the **objective of contributing substantially to climate change mitigation and climate change adaptation in the European Union taxonomy** (Regulation (EU) 2020/852¹¹⁰, climate delegated act defined in accordance with Regulation (EU) 2021/2139¹¹¹).

The Société des grands projets is eligible for the following economic activities:

- **Climate change mitigation objective:**
6.15. Infrastructure enabling low-carbon road transport and public transport¹¹²;
- **Climate change adaptation objective:**
6.15. Infrastructure enabling low-carbon road transport and public transport.

At the date of publication of this framework, the Société des grands projets considers that **the Grand Paris Express project's eligible expenses are aligned with each of the environmental sustainability criteria for the economic activities set out in article 3 of the European Union taxonomy**¹⁰⁶:

- Contributing substantially to one or more environmental objectives (climate change adaptation and climate change mitigation);
- Causing no significant harm to any of the environmental objectives;
- Performed in compliance with the minimum safeguards stipulated in the European Union taxonomy;
- Compliant with the technical screening criteria established by the Commission.

¹⁰⁸ Official Journal of the European Union (06/2020), "Regulation (EU) 2020/852 of the European Parliament and of the Council", available [here](#).

¹⁰⁹ ICMA (06/2022), "Green Bond Principles", available [here](#).

¹¹⁰ Official Journal of the European Union (06/2020), "Regulation (EU) 2020/852 of the European Parliament and of the Council", available [here](#).

¹¹¹ Official Journal of the European Union (06/2021), "Commission Delegated Regulation (EU) 2021/2139", available [here](#).

¹¹² Economic activity 6.15 explicitly mentions the eligibility of infrastructure and installations for metros and trams. Activity 6.14, meanwhile, refers several times to Directive 2016/797[1]. This directive on the interoperability of the rail system within the European Union points out in the preface that "Metros, trams and other light rail systems [...] should be excluded from the scope of this Directive".

Part 1.
A national issuer
dedicated to low-carbon

Part 2.
The Grand Paris Express,
a unique project and

Part 3.
Green bonds

**Société
des Grands
Projets**

This alignment is achieved as a result of **the types of activities carried out for the Grand Paris Express project, the legal environmental and social requirements applicable and applied to the project, the many commitments made voluntarily, and the control and monitoring procedures deployed**, all as described in the “Alignment with the European Union taxonomy” section (Part 3.2 – Alignment with the European Union taxonomy, pages 49 *et seq.*) and described in detail in Part II, section IV & section V).

In addition, as recommended by the ICMA’s Green Bond Principles, the framework is subject to an external review by an independent third party. Under this review, the Second-Party Opinion provided by Sustainable Fitch has concluded that this framework is aligned with the taxonomy.

Furthermore, the framework is aligned with the “Low Carbon Transport” appendix¹¹³ of the “Climate Bond Initiative” (CBI), as evidenced by the post-issuance certification granted to the Green Bond Programme on 30th March 2023¹¹⁴.

All in all, thanks to the various measures introduced so far since works began to mitigate the main environmental risks concerning adaptation, pollution, water protection and biodiversity, and according to the information available and specifications stipulated, **the projects financed by the Société des grands projets comply with the most demanding sustainability standards.**

¹¹³ Climate Bonds Initiative - Low Carbon Transport, available [here](#)

¹¹⁴ Climate Bonds Initiative (03/2023), “Confirmation of Post-Issuance Certification under the Climate Bond Standards”, available [here](#).

1 Use of Proceeds

The purpose of this framework is to finance the Grand Paris Express project's immediate and future needs (including pre-financing and refinancing) until the associated debt is fully amortised.

The information contained in this new version of the framework dated January 2024 also concerns all **bonds issued by the Société des grands projets** (formerly Société du Grand Paris) **prior to this version**.

An amount equivalent to the net proceeds from the green bond issued will be used to finance and/or re-finance expenses that contribute to the present or future value of the Grand Paris Express project, together representing the “eligible assets”.

Each annual allocation report specifically discloses the amount, if any, awaiting allocation to pre-finance the project's future needs, within the limit of the debt ceiling.

All infrastructure expenditure and associated project management costs for the Grand Paris Express project are therefore eligible:

- **Construction of new lines and line extensions:** almost 200 km of new automated metro lines in addition to the existing 400 km in the Île-de-France region;
- **Construction and development of new stations and technical centres:** 68 stations and 7 technical centres planned.

This eligibility scope includes expenditure **on acquiring land, building line sections, maintenance sites and ancillary structures, and building and developing stations and station districts**. Lastly, **salaries, financial and ancillary costs, impact studies, audits and advisory services** also count as eligible expenses¹¹⁵.

This framework allows the Société des grands projets to issue green bonds, including in the form of private placements.

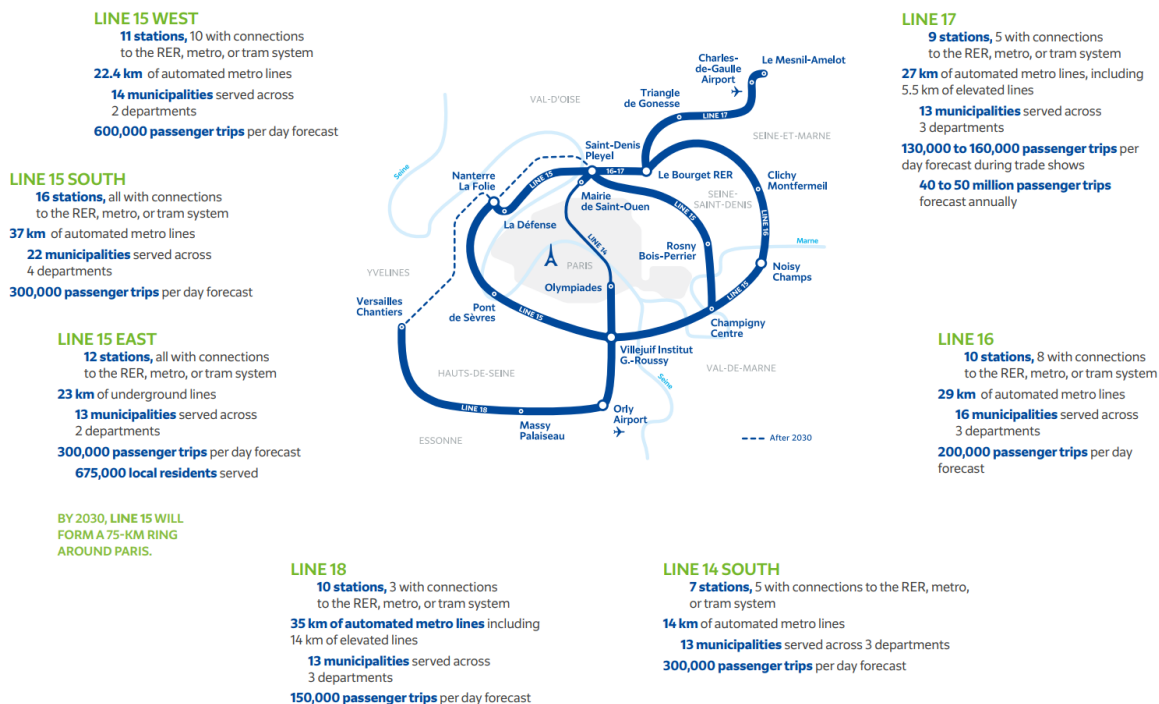
¹¹⁵ Note that funds allocated to the Grand Paris Express and to each SERM are ring-fenced, as the latter are not eligible (see box on page 5).

Part 1.
A national issuer
dedicated to low-carbon

Part 2.
The Grand Paris Express,
a unique project and

Part 3.
Green bonds

Figure 7 - Description of eligible assets



Source: Société des grands projets

1.1 Scope of use of proceeds

The Société des grands projets will not use the funds raised through green bond issuances to finance or refinance the share of assets already financed by another financial sponsor or operator (European Investment Bank, *Caisse des dépôts et consignations*, etc.).



Any financing for metropolitan regional express services (SERM, see Part 1, page 6) falls outside the scope of

this framework. Hence, neither the funds raised from bonds issued prior to the update of this framework dated January 2024 nor the funds raised under subsequent bond issues will be earmarked for SERM projects.

1.2 Eligible project categories

The table below presents the eligible project category applicable to the Société des grands projets, the corresponding European Union taxonomy categories, a description of the activities involved, and the most material Sustainable Development Goals considering the activities carried out.

Table 2: Eligible activity categories

Eligible project category	Green Bond Principles category	Classification of economic activities in the European Union	Description of the activity	Contribution to the Sustainable Development Goals (SDGs)
Infrastructure enabling low-carbon public transport	Clean transportation	<p>CLIMATE CHANGE MITIGATION</p> <p>6.15. Infrastructure enabling low-carbon road transport and public transport</p> <p>CLIMATE CHANGE ADAPTATION</p> <p>6.15. Infrastructure enabling road transport and public transport</p>	<p>Construction of the infrastructure needed to operate urban public transport with zero tailpipe CO₂ emissions, as well as the infrastructure needed to operate urban transport.</p> <p>Where Grand Paris Express is concerned (the only eligible project/asset at the date of this framework), the following are included:</p> <ul style="list-style-type: none"> - expenditure on acquiring land, - expenditure to build line sections, maintenance sites and ancillary structures, - expenditure to build and develop stations and station districts, - expenditure on salaries, - expenditure on financial and ancillary costs, impact studies, audits and advisory services. 	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="display: flex; align-items: center; margin-bottom: 10px;">  <div style="margin-left: 10px;"> <p>11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.</p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>13.2: Integrate climate change measures into national policies, strategies and planning.</p> </div> </div> </div>

2 Alignment with the European Union taxonomy

This section examines each different criterion for alignment with the European Union taxonomy for the activity covered by section 6.15 “**Infrastructure enabling low-carbon road transport and public transport**” of European Regulation 2021/2139¹¹⁶. It shows that the Grand Paris Express project (“the eligible asset”, cf. Section A. Eligible project categories) is aligned with **two of the substantial contribution objectives set out in the European Union taxonomy**: “climate change mitigation and climate change adaptation”.

References are made to the detailed explanations given in Part 2 “The Grand Paris Express, a unique project and financing model” and in Appendix 2 “Minimum safeguards”.

Table 3: Key information about the Grand Paris Express project demonstrating its alignment with European Union taxonomy criteria

		Sections of the framework describing the commitments, due diligence and outcomes of the Grand Paris Express project with regard to its compliance with European Union taxonomy criteria	Pages
Substantial contribution to climate change mitigation		PART 2: 1. An unprecedented public transport and urban planning project	8 - 12
		PART 2: 4.1. The Grand Paris Express network’s climate contribution: modal shift and urban densification	18 - 22
		PART 2: 6. Grand Paris Express: a pioneer and forerunner	41 - 42
Substantial contribution to climate change adaptation		PART 2: 4.2. Climate change resilience factored in from the design phase	23 - 25
Do no significant harm	1) Climate change mitigation	PART 2: 1. An unprecedented public transport and urban planning project	8 - 12
		PART 2: 4.1. The Grand Paris Express network’s climate contribution: modal shift and urban densification	18 - 22
		PART 2: 6. Grand Paris Express: a pioneer and forerunner	41 - 42
	2) Climate change adaptation	PART 2: 4.2. Climate change resilience factored in from the design phase	23 - 25
	3) Sustainable use and protection of water and marine resources	PART 2: 5.1.2. Protection of water resources	31
4) Transition to a circular economy	PART 2: 5.1.3 Recovery of waste from worksites	33 - 35	

¹¹⁶ Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021, available [here](#).

	5) Pollution prevention and control	PART 2: 5.1.4.A. Noise pollution	35
		PART 2: 5.1.4.B. Air pollution	36
	6) Protection and restoration of biodiversity and ecosystems	PART 2: 5.1.5. Biodiversity conservation central to the project	37
Minimum social safeguards	Due diligence on human rights	Appendix 2.1.1. Engagement	67
		Appendix 2.1.1 Identifying and assessing adverse impacts	67
		Appendix 2.1.2 Taking measures to eliminate, prevent, mitigate and remedy adverse impacts	69
		PART 2: 5.2.1. Health & Safety	39
		Appendix 2.1.3. Monitoring implementation of the measures put in place and the outcomes	68
		Appendix 2.1.4. Publicly disclosing the due diligence approach and measures taken	69
		Appendix 2.1.5. Providing for remediation measures or cooperating in remediation	69
	Implementing anti-corruption procedures	PART 2 :3.3.2. Ethics, anti-corruption and accountability	17
	Implementing tax procedures	Appendix 2.2. Taxation	70
	Implementing competition procedures	Appendix 2.3. Competition	70

2.1 Criteria for contributing to climate objectives

2.1.1 Criteria for contributing substantially to climate change mitigation

Taxonomy criterion:

In order to contribute substantially to the Climate Change Mitigation (CCM) objective of economic activity **6.15 “Infrastructure enabling road transport and public transport”**, the infrastructure and installations must be intended for urban and suburban public transport of passengers by metro.

The Société des grands projets’ approach:

The Société des grands projets fulfils this criterion as it is the very purpose behind the Grand Paris Express, which is a direct zero-emission public rail transit project. Details or explanations are available in the sections mentioned in the table below.

Sections of the framework detailing the purpose of the Grand Paris Express project	Pages
PART 2: 1. An unprecedented public transport and urban planning project	8 -12
PART 2: 4.1. The Grand Paris Express network’s climate contribution: modal shift and urban densification	18 - 22
PART 2: 6. Grand Paris Express: a pioneer and forerunner	41 - 42

2.1.2 Criteria for contributing substantially to climate change adaptation

Taxonomy criterion:

In order to contribute substantially to the Climate Change Adaptation (CCA) objective of economic activity **(6.15) "Infrastructure enabling road transport and public transport"**, the Société des grands projets must have implemented **physical and non-physical solutions** that substantially reduce the most important physical climate risks that are material to the Grand Paris Express. Risks must be identified by way of **a robust climate risk and vulnerability assessment** conducted in three stages. (1) screening of the activity to identify which physical climate risks may affect the performance of the economic activity during its expected lifetime, (2) a physical climate risk and vulnerability assessment to assess the materiality of the physical climate risks to the economic activity, (3) an assessment of adaptation solutions that can reduce the identified physical climate risk.

The Société des grands projets' approach:

An analysis was carried out to identify and assess the physical climate risks faced by the Société des grands projets's projects based on the **IPCC's worst-case scenarios to date** (RCP 8.5 (+3.2 to 5.4°C in 2100)), for 2050 and for 2080, including:

- Identification of the Grand Paris Express project's physical climate risks, taken from among those listed in the European Union taxonomy document,
- Mapping of physical climate risks according to their **intensity, frequency and materiality** to the Grand Paris Express project's activity, taking into account the IPCC's worst-case scenarios (scenarios including the **risks of flooding, heatwaves, forest fires**, etc.)
- Assessment of adaptation solutions to reduce physical climate risks which (i) do not adversely affect the resilience to climate risks of other people, (ii) favour nature-based solutions, (iii) are consistent with national adaptation plans, and (iv) are monitored against pre-defined indicators.

As a result of this analysis, it was confirmed that the infrastructure being designed is sufficiently resilient to the least optimistic IPCC scenarios to date, and that the Société des grands projets is systematically taking steps to reduce the risks identified. A detailed demonstration is available in Part 2: 4.2. (p.23-24).

Commitments, due diligence and outcomes relating to the climate change adaptation criterion	Pages
PART 2: 4.2. Climate change resilience factored in from the design phase	23 - 25

2.2 Criteria for doing no significant harm to other environmental objectives (DNSH)

Because of its dual substantial contribution to both climate change adaptation and climate change mitigation, the Société des grands projets must meet the criteria of DNSH to both these environmental climate objectives.

2.2.1 Climate change mitigation

Taxonomy criterion:

In cases of new infrastructure or major renovation, the infrastructure has been climate proofed in accordance with the appropriate **climate proofing practice that includes carbon footprinting and a clearly defined shadow cost of carbon**. Such carbon footprinting covers scope 1-3 emissions and demonstrates that the infrastructure does not lead to additional relative greenhouse gas emissions, calculated on the basis of conservative assumptions, values and procedures.

The Société des grands projets' approach:

Avoided emissions are calculated using the CarbOptimum® methodology as well as the carbon price set by the Reverse Carbon Initiative, enabling the Société des grands projets to fulfil these criteria. In addition, none of the Grand Paris Express network's lines are intended for the transport or storage of fossil fuels. This DNSH criterion is therefore satisfied. A detailed demonstration is shown in Part 2: 1. (p. 9 and 10), 4.1. (p.18-21) and 6 (p. 41-42).

Sections of the framework describing the commitments, due diligence and outcomes with regard to the DNSH to climate change mitigation criterion	Pages
PART 2: 1. An unprecedented public transport and urban planning project	8 -12
PART 2: 4.1. The Grand Paris Express network's climate contribution: modal shift and urban densification	18 - 22
PART 2: 6. Grand Paris Express: a pioneer and forerunner	41 - 42

2.2.2 Climate change adaptation

Taxonomy criterion:

Important climate risks that are material to the activity are identified and an adaptation plan for the infrastructures is developed accordingly.

The Société des grands projets' approach:

The demonstration carried out above to fulfil the criterion of contributing substantially to climate change adaptation confirms that the infrastructures being designed are sufficiently robust in the face of the IPCC's least optimistic scenarios to date. Therefore this DNSH criterion is met. Detailed explanations are available in Part 2: 4.2. (p.23 -24).

Commitments, due diligence and outcomes with regard to the DNSH to climate change adaptation criterion	Pages
PART 2: 4.2. Climate change resilience factored in from the design phase	23 - 25

2.2.3 Sustainable use and protection of water and marine resources

Taxonomy criterion:

Environmental degradation risks related to preserving water quality and avoiding water stress are identified and addressed, in accordance with a water use and protection management plan developed in consultation with relevant stakeholders.

The Société des grands projets' approach:

This DNSH criterion is met thanks to the measures taken by the Société des grands projets to fulfil the requirements of the Water Framework Directive¹¹⁷, such as water risk analyses included in each environmental authorisation procedure and safety measures implemented at worksites to prevent any form of pollution. Detailed explanations or examples are available in Part 2: 5.1.2. (p.32).

Commitments, due diligence and outcomes with regard to the criteria of DNSH to the sustainable use and protection of water and marine resources	Page
PART 2: 5.1.2. Protection of water resources	31

¹¹⁷ Directive transposed into French law by law n° 2004-338 of 21 April 2004 transposing Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

2.2.4 Transition to a circular economy

Taxonomy criterion:

At least 70% (by weight) of non-hazardous construction and demolition waste (excluding excavated soil and rubble)¹¹⁸ generated on the construction site is prepared for reuse, recycling and other material recovery, including backfilling operations using waste to substitute other materials, in accordance with the waste hierarchy and the EU Construction and Demolition Waste Management Protocol¹¹⁹.

The Société des grands projets' approach:

To date, the recovery rate of demolition debris from the Grand Paris Express project is estimated at 82% for the entire project. This recovery rate will be updated based on information collected from ongoing and future demolitions. This waste has been fully monitored since 2023 as the data is now incorporated into the T-Rex tool. In addition, targets have been set for 2025 and 2031, in line with the objectives stipulated in the Île-de-France region's Regional Plan for the Prevention and Management of Waste (*PRPGD*).

Detailed explanations are available in Part 2: 5.1.3. (p.33-35).

Commitments, due diligence and outcomes with regard to the criterion of DNSH to the transition to a circular economy	Pages
PART 2: 5.1.3 Recovery of waste from worksites	33 - 35

¹¹⁸ Naturally occurring material referred to in category 17 05 04 of the European List of Waste established by [Decision 2000/532/EC](#)

¹¹⁹ EU Construction and Demolition Waste Protocol (version dated 04.06.2021), available [here](#)

2.2.5 Pollution prevention and control

Taxonomy criterion:

Noise and vibrations from use of infrastructure are mitigated by introducing open trenches, wall barriers or other measures and comply with Directive 2002/49/EC¹²⁰.

Measures are taken to reduce noise, dust and pollutant emissions during construction or maintenance works.

The Société des grands projets' approach:

All the procedures put in place during the construction phase comply with French regulations, and therefore with Directive 2002/49/EC, in particular thanks to measures adopted and applied to reduce the noise emitted by the project's worksites (e.g. with the "Silence Chantier" approach devised by "Météo des Chantiers" becoming more widespread and the installation of noise barriers).

Once the metro is up and running, the depth of the tunnel (up to more than 50 metres below ground) will mitigate the transmission of train vibrations to the ground. To avoid the transmission of train vibrations, an anti-vibration buffer will be installed between the ground and the rail track across the entire iron track alignment. To limit noise pollution during commercial operation, especially at sensitive sites, soundproofing systems are to be installed inside safety structures.

Detailed examples and explanations are available in Part 2: 5.1.4. (p.35-36).

Commitments, due diligence and outcomes with regard to the criteria of DNSH to pollution prevention and control	Pages
PART 2: 5.1.4.A. Noise pollution	35
PART 2: 5.1.4.B. Air pollution	36

¹²⁰ Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise.

2.2.6 Protection and restoration of biodiversity and ecosystems

Taxonomy criterion:

An Environmental Impact Assessment (EIA) has been completed in accordance with Directive 2011/92/EU¹²¹. Where an EIA has been carried out, the required mitigation and compensation measures for protecting the environment are implemented. For sites/operations located in or near biodiversity-sensitive areas, an appropriate assessment, where applicable, has been conducted and based on its conclusions the necessary mitigation measures are implemented.

The Société des grands projets' approach:

The construction of each section of the project has been the subject of a declaration of public utility imposing specific environmental requirements and inquiries. These studies are publicly available. Most of the infrastructure is underground, which limits surface impacts. Where possible, aboveground structures (stations, operating centres) are located within brownfield sites, urbanised areas & roadways. In addition, and going beyond its legal obligations, a specific compensation method adapted to the features of the Grand Paris Express project has been developed by CDC Biodiversité to identify suitable environmental offset measures. Detailed examples and explanations are available in Part 2: 5.1.5. (p.37).

Commitments, due diligence and outcomes with regard to the criterion of DNSH to the protection and restoration of biodiversity and ecosystems	Page
PART 2: 5.1.5. Biodiversity conservation central to the project	37

¹²¹ Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment.

2.2.7 Minimum social safeguards

Taxonomy criterion:

The minimum social safeguards set out in the European Union taxonomy are procedures that a company carrying out an economic activity implements to comply with the OECD Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights, including the principles and rights set out in the eight fundamental conventions identified in the Declaration of the International Labour Organization on Fundamental Principles and Rights at Work and in the International Bill of Human Rights.

The Société des grands projets' approach:

The Société des grands projets has drawn up a body of procedures that adhere to the OECD Guidelines and is a signatory to the United Nations Global Compact. A package of measures to eliminate, prevent, mitigate and remedy adverse impacts is in place and ensures minimum social safeguards. Detailed examples and explanations are available in Part 2 :5.2.1. (page 39) and Appendix n°2 (pages 67 - 70).

Commitments, due diligence and outcomes with regard to the minimum safeguard criterion	Pages
Appendix 2.1.1. Engagement	67
Appendix 2.1.1 Identifying and assessing adverse impacts	67
Appendix 2.1.2 Taking measures to eliminate, prevent, mitigate and remedy adverse impacts	69
PART 2: 5.2.1. Health & Safety	39
Appendix 2.1.3. Monitoring implementation of the measures put in place and the outcomes	68
Appendix 2.1.4. Publicly disclosing the due diligence approach and measures taken	69
Appendix 2.1.5. Providing for remediation measures or cooperating in remediation	69
Implementing anti-corruption procedures	Page
PART 2 :3.3.2. Ethics, anti-corruption and accountability	17
Implementing tax procedures	Page
Appendix 2.2. Taxation	70
Implementing competition procedures	Page
Appendix 2.3. Competition	70

3 Process for project selection and evaluation

One of the distinctive features of the Grand Paris Express project is that its scope of investments is stable. In addition, the Société des grands projets has set up a **Green Bond Committee** made up of members of its Management Board, Finance department, Environmental Engineering department and Economic Studies department.

The Green Bond Committee verifies the eligibility **and traceability of projects eligible** for the green bond programme and the **proper allocation of net proceeds raised** by the Société des grands projets to eligible assets, in accordance with the eligibility criteria as described in the “Use of proceeds” section of this framework. **The Committee meets at least once a year and whenever necessary.** It also prepares and approves annual reports and proposes a revised allocation of funds in the event of loss of eligibility.

Furthermore, the Société des grands projets ensures that each project is implemented in accordance with current European regulations, the French Public

Procurement Code and its own internal purchasing processes.

In all cases, the Société des grands projets must first obtain an environmental permit which will be delivered based on an impact study carried out in accordance with the provisions set out in the French Environmental Code.

Similarly, it is required to perform specific environmental controls during the construction and commercial operation phases; these are mandatory and governed by France’s national transport framework law (*Loi d’Orientation sur les Transports Intérieurs (LOTI) n°82-1153*) of 30th December 1982.

Each operation carried out under the Grand Paris Express project has been declared of public utility. This label is issued after a prior public inquiry and includes a socio-economic assessment¹²².

The Green Bond Committee approved the updated version of this framework on 9th January 2024.

4 Management of proceeds

An amount equal to the net proceeds raised from the green bonds issued by the Société des grands projets will be used to **finance (including pre-finance) and/or refinance all or part of the expenses linked to the Grand Paris Express project.** Proceeds not yet allocated will be exclusively placed with the French Treasury, in accordance with the provisions set out in article 47 of decree No. 2012-1246¹²³ on budgetary and public accounting management of 2012. The amounts on deposit do not generate any return¹²⁴ (article 197 of this same decree).

The net proceeds of a green bond will be allocated to cover all expenses contributing to the present or

future value of Grand Paris Express assets, representing the “eligible assets”.

Each annual allocation report specifically reports the amount, if any, awaiting allocation to pre-finance the project’s future needs, within the limit of the debt ceiling. The Société des grands projets will endeavour to inform investors of the breakdown between financing and refinancing prior to each financing operation.

In case of cancellation, sale, non-respect of eligibility criteria or major controversy, the Société des grands projets will seek to reallocate the proceeds to finance other eligible assets as promptly as possible. Any reallocation of proceeds will be documented in the subsequent allocation and impact report.

¹²² Example of a public inquiry for the Grand Paris Express: [Line 15 \(South\)](#); [Line 15 \(East\)](#); [Line 16](#); [Line 17](#); [Line 18](#) (in French only).

¹²³ Decree No. 2012-1246 on budgetary and public accounting management of 7th November 2012, article 47, available [here](#) (in French only).

¹²⁴ Decree No. 2012-1246 of 7th November 2012, article 47, available [here](#) in French only (see article 197 for the zero-return provisions).

5 Allocation and impact report

The Société des grands projets' reporting commitments adhere to the recommendations issued under the ICMA's Green Bond Principles.

In the year following each issue, the Société des grands projets will provide investors with (i) an update of the amounts allocated to the Grand Paris Express project's eligible assets, (ii) relevant impact metrics and (iii) the publication of an external third-party assurance on the proper allocation of the

proceeds raised and on the institution's reporting compliance with the eligibility criteria.

This information will be published on the Société des grands projets:

- Annually until full proceeds allocation for the allocation report;
- Annually until bonds maturity for impact reporting¹²⁵.

5.1 Allocation report

The Société des grands projets will provide investors each year with a report describing how the proceeds raised have been allocated to eligible assets.

This allocation report will include, in particular, the amounts invested in the eligible assets (in €m), a breakdown by Grand Paris Express line (in €m), progress on the project and project illustrations.

This allocation report will therefore indicate the amounts allocated to eligible assets and the amounts yet to be allocated for pre-financing purposes, with the latter remaining deposited with the French Treasury (cf. Section 3 "Management of proceeds").

The allocation report will be published annually on the Société des grands projets website until full proceeds allocation, and in case of reallocation.

¹²⁵ Société des Grands Projets (2023), "Investing in the Grand Paris Express", available [here](#).

5.2 Impact report

The Société des grands projets models its reporting on the ICMA's recommendations, in particular those issued for impact reporting, and refers to the "Harmonised Framework for Impact Reporting" of June 2023¹²⁶.

The Société des grands projets particularly follows the recommendations issued by the ICMA in this document for waste management ("Waste Management and Resource Efficiency") and for clean transport ("Clean Transportation").

The impact report will provide **information about the monitoring of compliance with the metrics set out in the European Union taxonomy's technical screening criteria applicable to the eligible economic activities.**

By way of example, the table below presents the performance and impact indicators selected by the Société des grands projets.

The performance indicators track the results of activities carried out as part of the Grand Paris Express project.

The impact indicators measure the estimated impact of the Grand Paris Express project on the climate, environment and society.

In addition, the Société des grands projets pledges to publish the following on its website:

- Impact reports providing construction related metrics during the project execution period;
- An impact report providing commercial operation impact indicators after the lines

have been brought into service referring to the *ex-post* review requirements under the national transport framework law (LOTI)¹²⁷.

Any material change affecting the projects financed (e.g. an ESG controversy) and resulting in a change to the green spending portfolio will be described in detail in the impact report.

Impact reports will describe **environmental outcomes and social co-benefits** (CO₂ avoided, energy saved, travel time reduced for users, increased access to employment basins) and **include the calculation methods used and underlying assumptions adopted.**

The Société des grands projets takes the opportunity to include in-depth thematic information in its allocation and impact reports.

It has addressed **5 themes in its reports since its inaugural green bond issue back in 2018:**

- 2018 impact report: "The environmental transition and urban transport"¹²⁸
- 2019 impact report: "The Grand Paris Express: an investment for the 21st century"¹²⁹
- 2020 impact report: "Protecting bio-diversity, central to the project"¹³⁰
- 2021 impact report: "A project designed for resilience to climate change"¹³¹
- 2022 impact report: "Innovation for a responsible Grand Paris Express"¹³²

¹²⁶ ICMA (2023), "Harmonised Framework for impact Reporting", available [here](#).

¹²⁷ The LOTI law is the fundamental law governing the organisation of public transport services in France.

¹²⁸ Société des Grands Projets (2018), "2018 Green Bond Report", available [here](#).

¹²⁹ Société des Grands Projets (2019), "2019 Green Bond Report", available [here](#).

¹³⁰ Société des Grands Projets (2020), "2020 Green Bond Report", available [here](#).

¹³¹ Société des Grands Projets (2021), "2021 Green Bond Report", available [here](#).

¹³² Société des Grands Projets (2022), "Green Bond Reporting 2022", available [here](#).

Table 4: examples of reporting metrics

Eligible project category	Examples of outcome and impact indicators for the <u>construction phase</u>
<p>Infrastructure enabling low-carbon public transport</p>	<ul style="list-style-type: none"> — Progress on the project: <ul style="list-style-type: none"> - Number of kilometres of rail track laid - Number of kilometres of tunnels dug - Number of newly built stations — Environmental indicators: <ul style="list-style-type: none"> - <i>Ex-ante</i> estimates of greenhouse gas reductions (tCO₂eq/year) - Carbon footprint for the construction phase: <ul style="list-style-type: none"> o Scope 1 o Scope 2 o Scope 3 - Millions of tonnes of soil excavated - Percentage of spoil recovered - Offsets in terms of surface area restored since the beginning of the project - Percentage of active worksites subjected to an environmental audit — Social co-benefits: <ul style="list-style-type: none"> - Jobs on construction sites - Number of neighbourhood agents deployed - Number of people on back-to-work schemes at worksites - Number of economic activities compensated
Eligible project category	Examples of outcome and impact indicators for the <u>commercial operation phase</u>
<p>Infrastructure enabling low-carbon public transport</p>	<ul style="list-style-type: none"> — Environmental indicators: <ul style="list-style-type: none"> - Number of kilometres of additional rail tracks brought into service - GHG emissions avoided — Social co-benefits: <ul style="list-style-type: none"> - Number of additional passengers carried - Time saved for users - Number of jobs created or preserved - Number of infrastructures accessible to persons with reduced mobility

6 External review

6.1 Second-Party Opinion

As with each revision of its framework document, the Société des grands projets selected an external third party to assess the contribution to sustainable development made by its EMTN green bond programme and its alignment with the “2021 Green Bond Principles”. This Second-Party Opinion was delivered and published by Sustainable Fitch in January 2024 and is available in the “Investing” section of the Société des grands projets website⁴⁶. It concludes that this framework complies with the ICMA’s principles and

has demonstrated its full alignment with the European Union taxonomy (the use of proceeds’ compliance with the EU taxonomy technical screening criteria, do no significant harm criteria, and minimum safeguards for the environmental objectives of climate change mitigation and adaptation).

La Société des grands projets undertakes to obtain a revised Second-Party Opinion in the event of any significant changes to this framework.

6.2 Climate Bond Initiative certification

The Société des grands projets selected a third party approved by the Climate Bond Initiative (CBI) to obtain Climate Bond Standard certification. This certification is handled by Sustainalytics.

The latest confirmation of approval for post-issuance certification is available in the “Investing” section of the Société des grands projets website¹³³.

6.3 Audit report

Each year the Société des grands projets publishes on its website a moderate assurance report on the proper allocation of the funds raised and on the compliance of its reporting with the eligibility criteria defined in the framework, and so until full proceeds allocation or in case of reallocation.

¹³³ Société des Grands Projets (2023) “Investing in the Grand Paris Express”, available [here](#)

Appendices

Appendix n°1: Library of green bond, ESG and CSR documentation

Documents pertaining to the CSR roadmap available [here](#)

1.1 Green finance:

- CBI certifications, available [here](#)
- Confirmation letter for Climate Bond certification, available [here](#)
- SPO, available [here](#)
- Impact reports:
 - 2018 - The environmental transition and urban transport, [2018 Green Bond Report](#)
 - 2019 – The Grand Paris Express: an investment for the 21st century, [2019 Green Bond Report](#)
 - 2020 - Protecting bio-diversity, central to the project, [2020 Green Bond Report](#)
 - 2021 – A project designed for resilience to climate change, [2021 Green Bond Report](#)
 - 2022 - Innovation for a responsible Grand Paris Express, [Green Bond Reporting 2022](#))

1.2 Awards in recognition of our EMTN green bond programme and green bond issues:

- 2021 Green Bond of the year, supranational, sub-sovereign and agency (SSA) by Environmental Finance SOCIÉTÉ DES GRANDS PROJETS EUR 6bn 0%/10 years, 0.7%/40 years
- 2020 Green Bond of the year, supranational, sub-sovereign and agency (SSA) by Environmental Finance SOCIÉTÉ DES GRANDS PROJETS EUR 1bn 1.70% 30 years
- 2022 Largest Non-Financial Corporate Green Bond in 2022 award by Climate Bonds Initiative
- 2020 Largest Certified Climate Bond & Largest Subnational Green Bond by Climate Bonds Initiative
- 2020 Euro Rising Star Issuer by MTN-i

1.3 Key ESG documentation:

- GHG emissions report - CarbOptimum®, available [here](#)
- Ecological equivalence method – with CDC Biodiversité, available [here](#) (in French only)
- Responsible purchasing and supplier relationship charter, available [here](#) (in French only)
- Spoil management and recycling plan, available [here](#) (in French only)
- Charter of good spoil management practices for the Grand Paris Express, available [here](#) (in French only)
- Worksite safety charter and guidelines, available [here](#) (in French only)
- Charter of safety commitments for the Grand Paris Express with the BWI, available [here](#) (in French only)
- Code of conduct, available [here](#) (in French only)
- Materiality matrix, available [here](#) (in French only)
- CSR governance model, available [here](#) (in French only)
- 2022 CSR indicators chart, available [here](#) (in French only)

1.3.1 Latest reports:

- 2022 carbon footprint, available [here](#) (in French only)
- Gender equality index 2022, available [here](#) (in French only)

1.3.2 Alignment

- Global Compact, available [here](#) (in French only)
- SDGs, available [here](#)
- OsmoZ label, available [here](#) (in French only)

Appendix n°2: Minimum safeguards

2.1 Due diligence on human rights

The Société des grands projets has been a signatory to the United Nations Global Compact¹³⁴ since 26th June 2020. This lays the foundations for its approach and commits it to act in accordance with the universally recognised principles of respect for human rights and labour law.

2.1.1 Identifying and assessing adverse impacts, including through stakeholder engagement

The Société des grands projets has drawn up a high-level risk map which is updated annually and includes non-financial risks. Where non-financial risks are concerned, **a map of stakeholders** and non-financial issues is presented in the 2020 integrated report. It was prepared on the basis of the expertise provided by the consultancy “Des Enjeux et des Hommes”. Issues were classified according to their degree of materiality to internal and external stakeholders. An online questionnaire was drawn up for this purpose and sent to 800 internal employees and 2,200 contacts identified from among our external stakeholders. Some 1,054 responded, including 754 external stakeholders.

The map will be updated in 2024 to incorporate more granular data on human rights risks, particularly with regard to health and safety in the value chain, starting from the risk assessment phase carried out upstream and to support current monitoring and steering processes.

The safety aspects of stakeholder engagement are upheld by the creation of a “Worksite safety council”, which met for the first time on 30th November 2023. It includes representatives from trade organisations and trade unions, as well as from public authorities (DRIEETS - a regional economic and employment authority, and CRAMIF - a social security body), with the aim of discussing strategic safety issues and jointly proposing reinforcement measures to take.

¹³⁴ Société des Grands Projets “Letter of commitment to the Global Compact – June 2021”, available [here](#) (in French only)
Green financing framework for the Grand Paris Express project

2.1.2 Taking measures to eliminate, prevent, mitigate and remedy adverse impacts

Measures to prevent and mitigate the risk of failing to respect human rights are presented in the Société des grands projets's integrated report and summarised¹³⁵ below:

- **Measures to tackle discrimination and sexism** (*Commission à l'égalité professionnelle*, collective agreement signed);
- **Measures to ensure the safety and security of structures during construction work and commercial operation** (preparation of a worksite safety audit contract, a works safety and security charter, a plan to reinforce worksite safety including immediate measures such as an annual safety awareness day

at all worksites and the creation of a worksite safety council, and operational safety decentralised as close to the operational level as possible);

- **Commitments with regard to service providers** (the administrative clauses of contracts signed with service providers include requirements in terms of human rights and working conditions, particularly on the topics of forced labour, child labour and trade union rights);
- **Local action set up with associations** (Capital Filles) and 5% to 10% of hourly volumes at worksites allocated to people on back-to-work schemes.

2.1.3 Monitoring implementation of the measures put in place and outcomes

The Strategy, Environment and Innovation department runs and oversees the CSR roadmap. It is also in charge of rolling out measures and monitoring CSR performance targets.

The indicators tracked relate in particular to the key themes of safety and security in the workplace at service providers, and diversity and non-discrimination issues (share of women in the

workforce, equality index score). Safety audits have also been performed.

A whistleblowing system for unethical conduct has been set up. No cases of ethics violations have been reported since 2020. The system also makes it possible to track any measures taken by identifying the alerts raised.

¹³⁵ Société des Grands Projets 2022 Integrated Report, available [here](#) (see also [Social balance sheet 2022](#), [Worksite safety charter and guidelines](#), [Code of conduct](#) (in French only)

2.1.4 Publicly disclosing the due diligence approach and measures taken to avoid and handle adverse impacts

The Société des grands projets's 2022 integrated report addresses the topics mentioned as part of its duty of vigilance¹³⁶, and it also publishes its CSR report on its website. Information on human rights may be addressed more specifically in its next CSR report. Above and beyond its French and European legal obligations, where relevant the Société des grands projets also reports on measures taken to avoid and handle adverse impacts, for instance on Grand Paris Express worksite safety.

Reporting procedures are in the process of being reinforced so that operating information can be shared more effectively

with the entire chain of health & safety coordinating project managers on contract (feedback, near misses with high potential for severity, best practices, safety alerts, etc.).

The resources of the health & safety coordinators have been increased in order to track measures more effectively (through amendments that were made to their contractual terms and conditions when the assignment contracts for L16-17 and L15 South were reviewed, effective since September 2023; and amendments that are in the process of being drafted with regard to L18 and L15E/W).

2.1.5 Providing for remediation measures or cooperating in remediation

Possible improvements are being considered in relation to worksite safety, in particular to **encourage feedback, exclude non-compliant companies from public contracts** (subject to compatibility with public contract rules), **and improve reporting and sharing of best practices with all construction firms.**

A whistleblowing system for unethical conduct has been set up, as has an internal whistleblowing system¹³⁷. No ethics violations have been reported since 2020.

¹³⁶ Law No. 2017-399 of 27th March 2017 on the duty of vigilance of parent companies and contracting companies, available [here](#) (in French only).

¹³⁷ See the Code of Conduct, available [here](#) (in French only) to understand how the whistleblowing system works.

2.2 Taxation

The Société des grands projets complies with the various tax laws and pays the taxes and duties to which it is subject. Its internal processes include **internal financial control guidelines developed for tax receipts and a tax declaration process**. These guidelines describe the processes applicable to both these elements, including the departments concerned

2.3 Competition

As a publicly-funded project company, the Société des grands projets does not operate in the bidding market. It is, however, subject to **public contract law when selecting its service providers**, which are chosen by way of **competitive requests for proposals**; an official public procurement

and **risks identified in relation to these processes, the representatives identified as carrying these risks, the mechanisms in place to limit them, and the associated action plans**. Guidebooks have been prepared and distributed to the employees involved in aspects regarding the group's tax policy.

handbook covering all bidding principles and rules has been drawn up. Measures to prevent conflicts of interest, described in Part 2, 3,3.3 "Governance, ethics and accountability", apply to such requests for proposals and seek to avoid any competitive bias.