

**Société
des Grands
Projets**



2024
**Green
Bond
Report**

“The circular economy, or how to make informed choices with a long-term perspective.”

Editorial

Jean-François Monteils
Chairman of Société
des grands projets



For fifteen years, Société des grands projets has been fully committed not only to delivering Grand Paris Express – an automated metro system that will transport over 3 million people a day in the Greater Paris region – but also to using it as a springboard for testing innovations and helping drive the entire construction and transport sector towards more sustainable practices. The scale of this project, the only one of its kind in Europe, gives us a special responsibility, particularly in terms of environmental protection and the circular economy. And we are already seeing tangible results. Clay excavated from our Line 18 worksites is now being used to produce low-carbon concrete through flash calcination. This year marked the transition of this innovation from testing to full-scale production, benefiting the entire public works sector. While this is just one example, it clearly demonstrates our ambition to promote innovation and provide other project owners with tangible, promising results that can drive real change.

For us, the circular economy is far more than just an approach to reducing a project’s carbon footprint or preserving natural resources. It redefines how we think about infrastructure life cycle. It creates new economic opportunities and provides a framework for reuse and recycling channels, which are key to creating local long-term employment.

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Grand Paris Express: the circular economy at the heart of Europe’s largest infrastructure project

Through the Grand Paris Express, Société des grands projets has transformed circular economy principles into a platform for innovation and concrete action. Today, it serves as a catalyst for change across the entire construction industry, ushering in new approaches to design, construction and collaboration. Every aspect – from recycling excavated material and eco-design through to contractual requirements and knowledge sharing – paves the way towards a more resource-efficient and sustainable model. Over time, Société des grands projets has successfully positioned the Grand Paris Express as an accelerator of transition, proving that a major infrastructure project can transform an entire industry.



Normandie Niemen structure in Bobigny, diaphragm wall works.

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Overall conclusions

By building 200 km of new automated metro lines connected to existing infrastructure, along with 68 additional stations, Société des grands projets is helping to develop the Greater Paris region and boost its appeal.

A vital project for tomorrow

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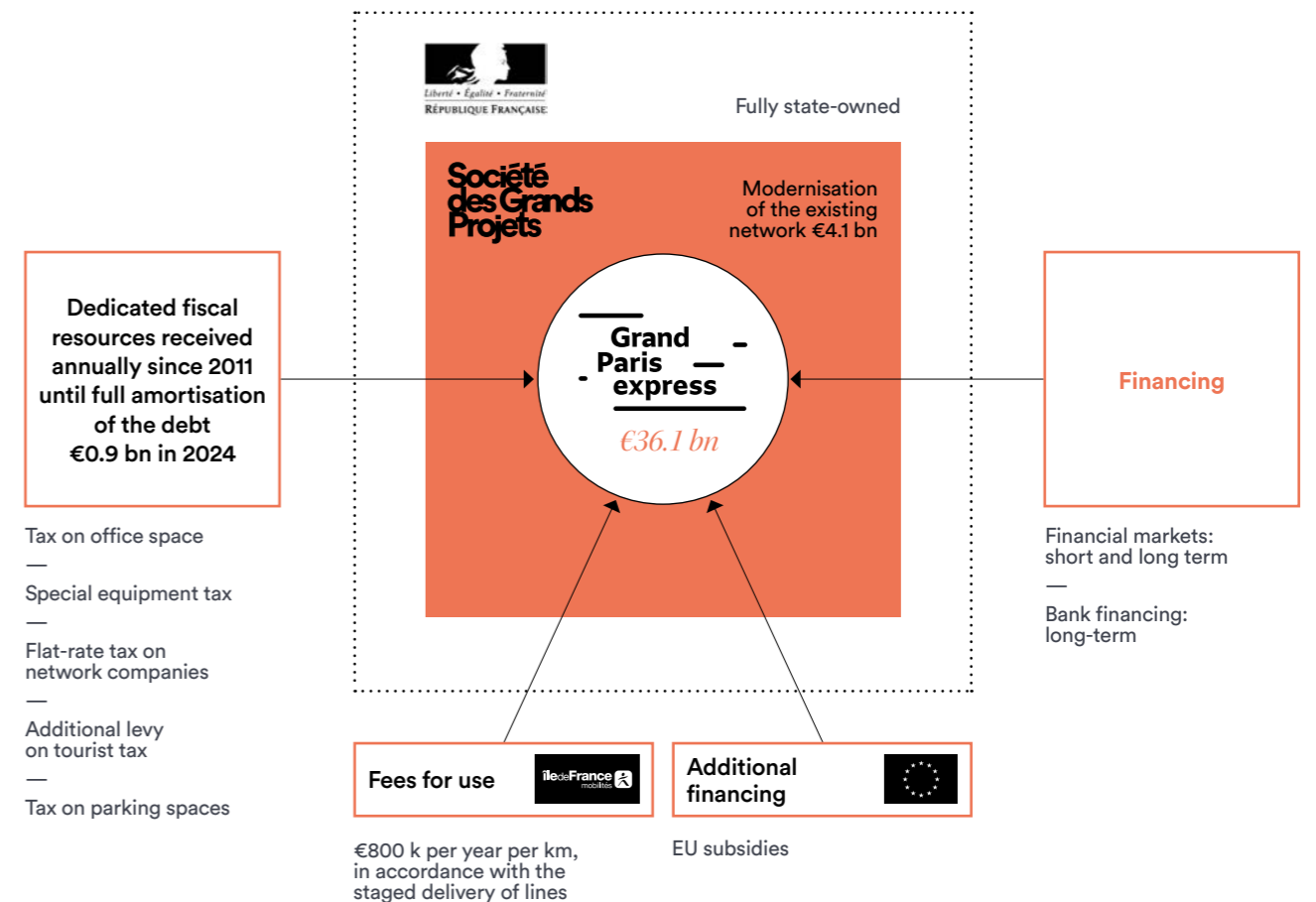
Société des grands projets is the industrial and commercial public agency, wholly owned by the French State, dedicated to the design, construction and financing of the Grand Paris Express and, potentially in the future, of Metropolitan Regional Express Services (SERM) at the request of the local authorities concerned, in partnership with SNCF Réseau.

The Grand Paris Act of 3 June states that its primary purpose is to “design and develop the overall plan for the set of infrastructure projects that make up the Grand Paris Express, and oversee the construction of the lines, fixed structures and facilities, the construction and development of stations and interchanges as well as the procurement of the rolling stock that will run on this infrastructure”.

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

interest” that aims to promote “sustainable and inclusive economic growth driving job opportunities in the Greater Paris region”, the Grand Paris Express will boost the region’s appeal and maintain its competitive edge on the world stage. With 200 km of new automated metro lines and 68 stations, it offers solutions to the challenges the region has been grappling with in recent years: increasing mobility for everyone, reducing social and geographical inequality, and improving quality of life while benefiting the environment. The new metro will also help reduce greenhouse gas emissions, with annual savings of between 755,000 to 1.3 million tonnes of CO₂ equivalent once it is completed. Thanks to the Grand Paris Express, the Paris region will be bigger, greener, and more united than ever.

Under the Act of 27 December 2023, Société des grands projets is also authorised to undertake SERM projects throughout France. **To date, all allocated tax revenues and green bonds have been assigned exclusively to the Grand Paris Express.**



Grand Paris Express: **the circular economy at the heart of Europe's largest infrastructure project**

Through the Grand Paris Express, Société des grands projets has transformed circular economy principles into a platform for innovation and concrete action. Today, it serves as a catalyst for change across the entire construction industry, ushering in new approaches to design, construction and collaboration. Every aspect – from recycling excavated material and eco-design through to contractual requirements and knowledge sharing – paves the way towards a more resource-efficient and sustainable model. Over time, Société des grands projets has successfully positioned the Grand Paris Express as an accelerator of transition, proving that a major infrastructure project can transform an entire industry.

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Tour of the STRADAL factory that manufactures voussoirs.

© Claire-Lise Havet

Expert interview

Emmanuelle Ledoux — Managing Director of the French National Institute for the Circular Economy (Inec)

“Being able to contribute to the emergence of new businesses and practices, and taking pride in doing so, is also a powerful driving force. This rewarding and inspiring aspect can play a key role in securing stakeholder buy-in and gradually scaling up these approaches.”



© Mathieu Delmestre

2.2 bn t/year
of waste is produced in Europe.

30%
of the waste produced each year comes from the construction industry.

800 M t/year
Resource consumption in France.

23%
of France's greenhouse gas emissions are linked to the construction and operation of buildings.

Source: Circle Economy Foundation's 2024 Circularity Gap report.

What is INEC's view on circular economy challenges for the Grand Paris Express construction works?

The Grand Paris Express worksites, with the sheer volume of materials they use and waste they produce,

are key to achieving both the broader transition to a circular economy and environmental transformation. Major infrastructure projects offer a unique opportunity: by creating stable, large-scale demand, they encourage the development of a tailored supply of

services and the creation of a robust ecosystem. Currently, one of the main obstacles to the circular economy is the mismatch between supply and demand. When a need arises, solutions are not always available, and vice versa. These major projects can therefore play a crucial role by providing predictability, thereby encouraging new players to enter the market and supporting sustainable development in the sector.

What are the main drivers for incorporating circular economy principles into projects of this scale?

Waste management, especially in terms of excavated soil and demolition materials, is arguably one of the biggest challenges. The goal is not only to prevent the generation of waste, but also to maximise its recovery and recycling. This requires careful planning of storage areas and material processing facilities. This type of approach can only be effective through close collaboration between all project stakeholders, including local authorities. Additionally, sharing and pooling resources, such as certain pieces of equipment, across worksites can contribute to more efficient resource use.

The eco-design of infrastructure and buildings is, of course, a key driver. Thinking about the sustainability of structures from the design phase helps maximise their longevity and adaptability. In a project of this scale, these choices have significant impact.

Lastly, training and skills development are also key drivers. Projects of this magnitude involve large numbers of professionals, and implementing circular practices allows them to develop expertise they can apply to other projects in the future. This helps to gradually build a more sustainable ecosystem for the construction industry.

Is there a governance model that is more effective for adopting circular economy concepts in major infrastructure projects like the Grand Paris Express?

Effective governance depends above all on incorporating circular economy principles from the very beginning. It is not simply a question of adding a “waste management” component once procurement and construction decisions have been made, but rather of making resource management a core consideration right from the project's design phase. In some projects, we are seeing the introduction of “Lot 0” packages geared to the circular economy, which establishes circularity initiatives as project pillars rather than treating them as secondary considerations. This is changing the way projects approach procurement and resource management, integrating them into initial planning rather than limiting them to downstream flow management. It is also crucial that all stakeholders are involved from the outset. This includes project owners, construction companies, local authorities and public bodies responsible for regulations.

We have talked about the economic, regulatory and technical drivers, but what about people?

People are clearly essential for promoting best practices and innovations. We need to be good at inspiring, convincing and engaging people, and this requires extensive communication, education and experience sharing. This is precisely what Société des grands projets is doing by capitalising on lessons learned and developing frameworks aligned with the circular economy. Making these resources available helps create a shared momentum and ensures that everyone in the sector gradually becomes more skilled.

“One solution for promoting circular economy practices could be to develop circular-economy-specific frameworks and standard clauses. This could make it easier to always include these criteria in specifications and help standardise practices. The selection criteria used in tenders are also crucial. Currently, price remains the dominant factor, whereas more robust environmental criteria would help drive the adoption of circular solutions.”

Grand Paris Express, the circular economy strategy

The circular economy is based on resource efficiency, needs optimisation and the reuse of resources, products and waste, offering an alternative to the “take-make-dispose” model. It helps to limit resource consumption, reduce waste and prevent resource depletion while maintaining economic growth, thereby reconciling economic and environmental interests. But why and how should we apply these principles to the Grand Paris Express construction works?

In response to the urgent need to protect the environment and radically transform the way we build, Société des grands projets has made the circular economy a central focus of its 2030 Strategic Plan and is resolutely applying its principles across the Grand Paris Express worksites. The circular economy is a strategic driver for the ecological transition and environmental performance on worksites, while also advancing development across the construction sector.

What framework governs Société des grands projets' circular economy approach?

The implementation of a strategic framework in 2024 marked a turning point for the circular economy at Société des grands projets. The organisation moved from targeted actions to a systemic approach to the circular economy, embedding it within procurement processes. Beyond waste recycling,

this procurement strategy aims to optimise material and energy flows by rethinking production methods, extending material lifespans and developing local synergies. This important step coincides with the launch of our 2030 Strategic Plan. Circular economy principles are fully integrated into this strategy through our commitment to “drive ecological transition and social cohesion” and supports two major objectives: to design projects that maximise environmental and socio-economic performance, and to transform construction and development sector practices in partnership with industry stakeholders.

A hierarchy of practices embedded in contracts

In accordance with the French Environmental Code, Société des grands projets rigorously implements the waste treatment hierarchy, prioritizing reduction at source, then reuse, followed by repurposing and finally recycling. This hierarchy

Ademe's 7 Pillars of the Circular Economy

While tailored to the specific characteristics of worksites, Société des grands projets' circular economy framework is based on a systemic and widely-recognised approach devised by France's Environment and Energy Management Agency (Ademe). Its seven circular economy pillars are:

- Sustainable procurement
- Eco-design
- Industrial and territorial ecology
- Functional economy
- Responsible consumption
- Extended useful life
- Recycling



Transforming excavated soil from the Grand Paris Express into low-carbon concrete.

is now embedded as measurable objectives in the specifications for Grand Paris Express public procurement contracts. Contractors are assessed on their adherence to this approach, with particular emphasis on prioritising reuse. In demolition work, for example, some Société des grands projets contracts have achieved 100% reuse of demolition concrete as recycled aggregate, using proven technical processes. This success builds on complex building projects where recycling requirements were incorporated into the design phase of the tender process.

Methodological and contractual innovations

To provide an operational framework for facilitating integration of the circular economy at every stage of a project, Société des grands projets has developed the Circulence® method. This introduces a structured classification of circularity indicators, compatible with the requirements of the Corporate Sustainability Reporting Directive (Directive (EU) 2022/2464).

This technical and contractual approach is available to design and tender teams. With three categories

of indicators (macro, micro and nano), it can be used to assess circular practices at all stages of a project. The method is incorporated into contracts from the consultation phase, committing contractors to specific targets for reuse, recycling and reducing the impact of transport and materials.

This commitment goes beyond mere window dressing. It is underpinned by structured governance, with a dedicated directorate, represented on Société des grands projets' executive committee, steering the circular economy approach across the organisation. This is reinforced by proprietary tools such as T-Rex, which tracks and traces excavated material at the programme management level.

An approach implemented at every stage of projects

This strategy is being deployed in highly practical ways across all Grand Paris Express worksites. It all starts with an assessment of resources before operations commence.

47 million tonnes will be excavated to complete the Grand Paris Express.

In 2024:
– **976,122 tonnes** of soil excavated
– **70.3%** recycled.

502,126 tonnes of demolition rubble from Grand Paris Express preparatory work, once completed.

Source: Grand Paris Express circular economy strategy framework



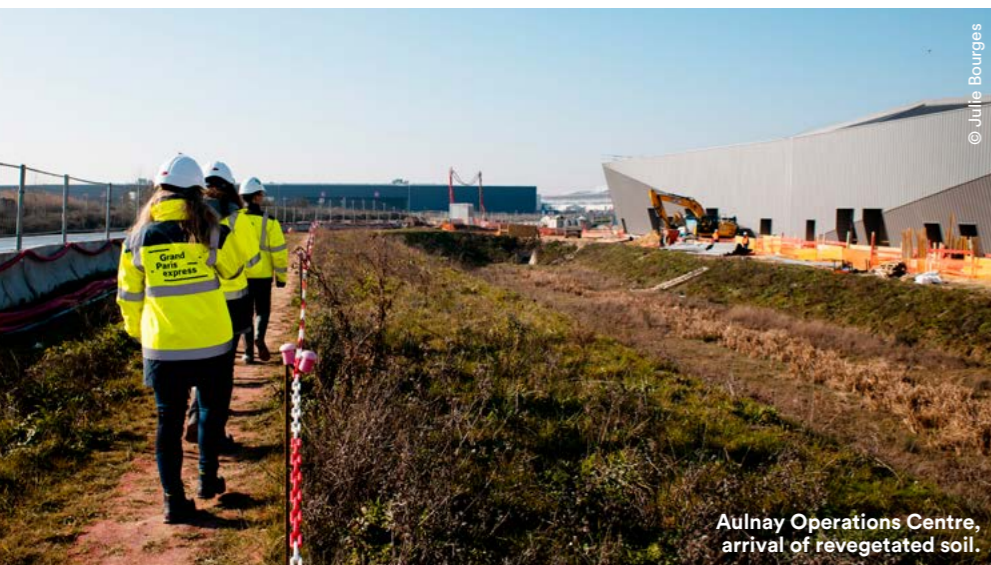
Aulnay Operations Centre, arrival of revegetated soil.

While this assessment became mandatory under France's 2020 Anti-Waste and Circular Economy Act (Agec), Société des grands projets had already anticipated this requirement and has now fully integrated it into its processes. Excavated soil is recycled and tracked using an internal traceability tool (T-Rex) with dedicated indicators. This approach has since been extended to demolition waste from preparatory work. Other examples include optimising the transportation of excavated material and other materials to limit negative external impacts, and managing rainwater on site to reduce the consumption of drinking water. As well as ensuring that construction site flows are managed in a circular way, the circular economy is built into the design of infrastructure through eco-design, making each structure scalable and sustainable. This is what we refer to as Design to Planet. We also encourage the use of recycled, reused or bio-based materials in construction, through clauses in our specifications.

The circular economy, driving environmental ambition

The circular economy framework is applied not only on Société des grands projets' worksites, but also

across its various operational guidelines. The goal is to establish circular economy as both the driving force behind the organisation's environmental ambition and the safeguard for its carbon reduction targets. These principles extend to its digital infrastructure, with the development of a responsible digital roadmap aligned with sustainability and efficiency objectives. The organisation has also implemented the scheme to promote socially and economically responsible public procurement (Spaser), which incorporates circular economy principles into Société des grands projets' procurement policy. This comprehensive and coherent strategy enables it to create synergies and maximise the positive impact on both the environment and local economy.



Aulnay Operations Centre, arrival of revegetated soil.

© Julie Bourges

Focus Design to Planet

With Design to Planet, Société des grands projets has developed a unique management approach that addresses environmental challenges across all stages of a project. Design to Planet manages projects based on environmental performance targets that often exceed regulatory requirements.

Indicators and incentives: levers for sharing our ambitions

The inclusion of environmental performance clauses in civil engineering contracts, such as rating criteria designed for procurement in the reuse and recycling sectors and the requirement to use 100% low-carbon concrete in design-and-build contracts, are clear examples of how sustainable procurement principles can be applied to reduce a project's carbon footprint. Société des grands projets has introduced new indicators into its contracts, such as I3R, which recognises circular and sustainable procurement. This indicator has become a key criterion in selecting Grand Paris Express contractors, promoting short, local supply chains and low-impact materials. Additionally, the Reverse Carbon Initiative provides financial incentives to companies reducing their carbon emissions, demonstrating Société des grands projets' commitment to innovative and sustainable solutions.



Interview Abdelfeteh Sadok – Circular Economy Strategy Manager, Société des grands projets Turning constraints into drivers of ecological transition with the circular economy

Abdelfeteh Sadok is Circular Economy Strategy Manager at Société des grands projets and creator of the Circulence method. An engineer with a doctorate in civil and environmental engineering from IMTNE (formerly Mines Douai), he joined Société des grands projets in 2020 as project manager for excavated material recycling.

What are the main challenges you face in implementing the circular economy across the Grand Paris Express project?

We face a number of challenges, especially those of a regulatory, economic or technical nature. From a regulatory standpoint, the situation is generally favourable, thanks in particular to France's Anti-Waste and Circular Economy Act (Agec). However, there are still obstacles, particularly when it comes to supply chain traceability. Currently, many resources coming from worksites have no environmental data sheets, making it difficult to assess the circular performance of supplies. The product passport introduced by the EU ESPR regulation will likely remove this barrier. On the economic front, we are finding that there is still insufficient process automation. The circular economy relies heavily on experimental projects requiring significant resources. To achieve scale, we need to develop tools to automate these processes. The advent of artificial intelligence could help here. Without it, the need to bring in a wide range of experts increases costs and undermines economic stability. The circular economy must become a cross-functional skill for all employees and stakeholders across the value chain. Finally, on the technical side, it is crucial to improve how reusable resources are identified and catalogued. For example, we have launched an in-house platform,

the Circular Economy Hub – a sort of eBay for the Grand Paris Express – where we list recyclable materials recovered from our worksites.

How do you encourage partner companies to integrate the circular economy into their practices?

We use several approaches. First, consultation. We have set up forums for direct dialogue with contractors and industry stakeholders. Second, we focus on innovation through calls for projects aimed at identifying and supporting the most promising solutions for carbon reduction and material reuse. Another important factor is making criteria more objective. We have developed performance indicators that we have incorporated into our tender evaluation criteria. This approach, which we call Design to Planet, puts environmental considerations on an equal footing with technical and financial criteria when selecting contractors. After all, not all efforts made by stakeholders and solutions proposed deliver the same results. They deserve to be assessed fairly on their own merits to provide a competitive advantage to those who are genuinely committed and encourage widespread adoption of best practices.

Today, the circular economy still operates largely through prototypes and experimental projects. How do we scale up from experimental to widespread deployment?

The circular economy still relies heavily on pilot projects that require significant human and financial resources. One of the main barriers to widespread deployment is the lack of tools for process automation. To move from pilot projects to full-scale implementation, we need to develop robust, automated digital processes. We have developed clear indicators and evaluation criteria integrated into

tender specifications to objectively measure contractors' environmental performance across the board, rather than on a case by case basis. Automation and standardisation are essential to ensure an economically viable model that can be reproduced at scale.

What advice would you give to other project owners looking to put the circular economy at the heart of their worksite management?

First, broaden your vision beyond simple recycling to embrace strong circularity, combining reduction, reuse and recycling in ways that fundamentally transform practices. Next, set objective performance expectations with clear indicators integrated into procurement criteria. Lastly, scale up and automate processes to make the circular economy economically viable and sustainable over time. Looking ahead, it is essential to encourage and support contractors in their transition by gradually integrating new business models. One of the key enablers is supporting the development of the functional economy, which focuses on selling usage rather than on owning physical goods. This fundamental change requires not only a transformation of industrial practices, but also the development of an appropriate contractual and legal framework – something that needs to be created specifically for the construction sector.

Grand Paris Express, the circular economy in action

From recycling excavated soil and reusing construction materials to optimising water usage, the Grand Paris Express has adopted an ambitious circular economy approach, implemented at every stage of construction. This approach applies equally to spoil from tunnel boring, finishing materials, technical equipment and street furniture. Here is how it works in practice.

With its 200 kilometres of new lines and 68 stations, the Grand Paris Express is Europe's largest infrastructure project. But it is also a real-world laboratory for applying the circular economy to major construction projects. At every stage of construction, Société des grands projets is pursuing an ambitious strategy to reduce, reuse and transform waste, with one overriding priority: treating excavated soil and construction equipment as resources, not waste.

The goal: to avoid disposing of 47 million tonnes of spoil

Once completed, Grand Paris Express worksites will have generated approximately 47 million tonnes of excavated material, primarily from tunnel boring. To turn this into an opportunity, Société des grands projets has set itself the ambitious target of recycling at least 70% of this material. To achieve this,

it is implementing several approaches, with the emphasis on direct reuse followed by recycling. In terms of direct reuse, suitable inert soils are being used to backfill quarries, regenerate brownfield sites and support urban development projects such as Sempin Park in Chelles and Montfermeil. This former abandoned quarry has received 500,000 cubic metres of soil excavated during the construction of Line 16 and used to remodel the site, which is now open to the public.

Recycling construction waste

Recycling is the second preferred recovery route. Resources extracted from worksites can be reused in innovative projects such as Cycle Terre, which transforms uncontaminated excavated soil into raw earth materials, or Terre Utile, which uses the excavated soil to produce topsoil. Lastly, the disposal of non-reusable or non-recyclable excavated material is strictly controlled. Only 4.4% of excavated soil is sent to hazardous and non-hazardous waste disposal

Circular economy: which resources and equipment are included?

Materials and resources

- Excavated material (spoil): soil excavated from tunnel digging and earthworks.
- Construction and hardscaping materials: recycled concrete and aggregates: use of alternative materials from reuse and recycling.
- Steel and metals: optimal use of recycled steel.
- Wood: use of woods from sustainable, bio-based sources.
- Plastics and composites: preference for materials with low environmental impact that can be recycled.

Construction products and equipment

- Finishing materials: partitions, false ceilings, floor coverings.
- Insulation materials: use of bio-based or recycled insulation.
- Technical equipment: electrical installations, lighting and ventilation equipment, with durability and reparability criteria.
- Street furniture and signage in stations and public spaces.

Water and natural resources

- Reuse of rainwater and worksite water via the i_RecyEau indicator.
- Optimisation of water and energy consumption in infrastructure.

facilities, following strict procedures. In addition to excavated soil, the construction phase also produces demolition waste and end-of-life equipment that needs replacing. In 2024, on the worksites for Line 15 (South, East and West sections), 99.7% of this waste was repurposed, either directly reused on other sites or recycled to produce new materials, all covered by a contractual commitment to reuse in several areas. Société des grands projets is also encouraging the development of an eco-materials industry that makes use of these resources, and it hopes to increase demand for these products.

Infrastructure designed to last and adapt

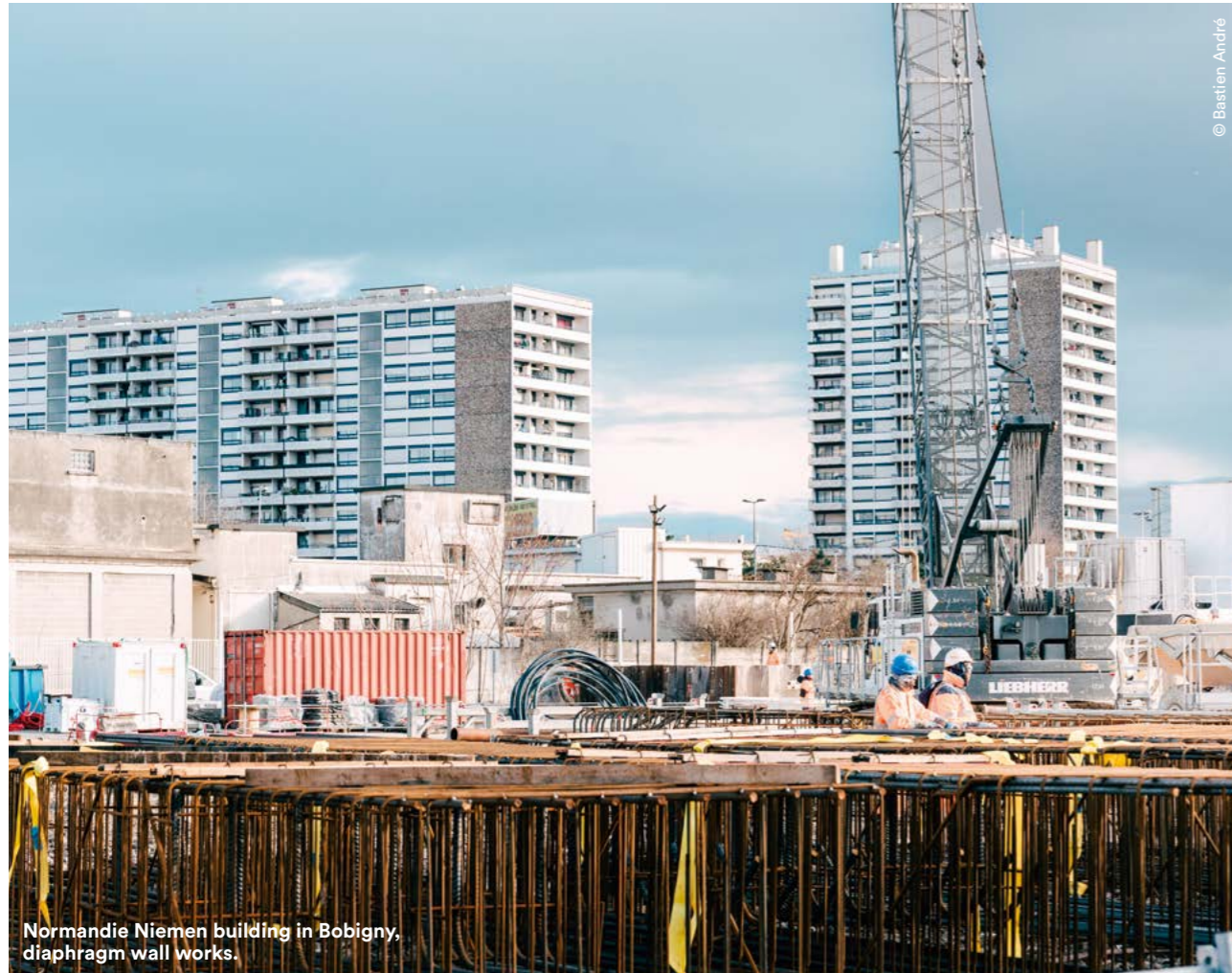
The circular economy does not stop at the worksite gates: it is woven into the very fabric of the project. Eco-design means that the Grand Paris Express can be developed in a way that allows it to evolve and adapt to the uses and equipment of tomorrow. The entire life cycle of materials and

equipment is considered, including their end of life. This forward-thinking approach guides construction choices and techniques towards eco-designed materials that are recycled and recyclable, durable and energy-efficient. Examples include modular station equipment and bio-based and geo-based materials such as calcined clay from Grand Paris Express excavated soil. It also guides material and technical choices towards energy-efficient operational solutions, such as LED lighting, energy recovery systems, steel-wheeled rolling stock that uses less energy than rubber tyres. This approach also relies on the use of construction techniques that make the infrastructure easy to dismantle. By considering the entire infrastructure life cycle from the design stage onwards, the Grand Paris Express is laying the foundations for a new way of building, one that is more responsible, circular and forward-looking.

Société des grands projets goes beyond the European Union taxonomy⁽¹⁾ by making an important distinction: excavated soil, which is primarily inert material, is treated as a resource in its own right, and should not be confused with demolition waste. This interpretation, which reflects the specific nature of the Grand Paris Express, provides a basis for a more refined reuse and recovery policy that is in tune with environmental challenges and the realities on the ground.

(1) Regulation (EU) 2020/852, the Taxonomy Climate Delegated Act defined in accordance with Regulation (EU) 2021/2139111.





© Bastien André

Normandie Niemen building in Bobigny, diaphragm wall works.

Focus
GEME contract: ambitious spoil management for more sustainable construction

In building Line 15 East of the Grand Paris Express, Société des grands projets is breaking new ground with an unprecedented spoil management contract. The goal is to recover up to 99% of the 7.5 million tonnes of excavated soil, with a particular emphasis on recycling it into new materials. This ambitious goal is supported by innovative solutions developed by a consortium comprising Eiffage Génie Civil, SARPI/Veolia and CEMEX. The options being explored include transforming the excavated material into aggregates

for concrete, raw earth bricks or fertile soil, marking a major step forward for the circular economy. Beyond the environmental challenge, this €200 million contract demonstrates a forward-thinking approach, giving contractors the time they need to optimise their processes. Incorporating low-carbon logistics, especially through river transport, is helping to keep this positive momentum going.

99%
 Maximum target for recycling of the 7.5 million tonnes of excavated material from Line 15 East.

€200 million
 Value of the contract awarded for spoil management.

Focus
Terre Utile: a sustainable solution for urban greening

Terre Utile provides an innovative solution for greening cities while preserving natural resources. This start-up collects excavated material from worksites, transforms it into fertile soil and redistributes it through short, local supply chains for the development of green spaces.

Terre Utile demonstrated its model's effectiveness at the Aulnay-sous-Bois Grand Paris Express worksite. On 14 February 2022, 2,700 cubic metres of recycled topsoil was delivered to landscape a retention basin at the Operations Centre for future Lines 16 and 17. This initiative avoided over 13 tonnes of CO₂ emissions by cutting down on HGV transport. Terre Utile processes and recycles soil as close as possible to worksites, reducing transport costs, limiting agricultural land loss and helping restore biodiversity.

Its founder, Guillaume Mizon, is focusing on expanding this model to make it economically viable at scale. "To ensure this solution is profitable, we really need to increase the volumes we process," he explains. This ambition forms part of a broader approach to sustainable development and the ecological transition of our regions.

220 Mt
 of soil generated by the public works sector every year in France.

1 to 2 million m²
 of topsoil sold each year in the Greater Paris region for use in green spaces.



© Bruno Fert

Aulnay Operations Centre, retention basin landscaped with revegetated soil.

The circular economy, driving a new ecosystem

Société des grands projets has positioned the Grand Paris Express project as a catalyst for an ambitious and transformative circular economy. This approach is embodied in the Circulence® methodology and based on a rigorous, well-equipped and cross-functional management process. By bringing together public stakeholders, contractors and researchers, it is fostering an innovation ecosystem that will benefit local communities and support the environmental transition.

The Grand Paris Express tunnels are helping shape an entire sector. While the scale of this project is impressive, it also stands out for its ambitious approach to design and delivery, which aims to make the circular economy its strategic, contractual and operational backbone. This vision is shared by the Société des grands projets as project owner, which sees each worksite as a transition laboratory for all stakeholders, whether public and private.

Showcasing the circular economy

Yet this rigorous methodology is also intended to be open and shared. As a leading project owner, Société des grands projets makes technical and scientific resources designed to be reusable available to the entire ecosystem, including toolkits, guides and lessons learned. One example is the Making Materials Matter

("Matières à faire" in French) toolkit, which supports public and private project owners in incorporating excavated soil into their development projects. A real sector-wide effect is emerging around this strategy. Société des grands projets is working alongside local authorities, businesses, researchers and universities. Together, they set realistic targets, test innovative solutions and outline what a large-scale circular economy could look like. Société des grands projets also collaborates with organisations such as the International Centre for Resources and Innovation for Sustainable Development (Ciridd), a recognised public-interest body, to promote sustainable society models. It is also the driving force behind the creation of the Circular Economy Hub, which organises the transfer of resources between worksites, demonstrating this systemic approach. Here, individual performance matters less than the ability to create collective, sustainable momentum aligned with local community needs.

Circularity, an inherently collective approach

Through the Grand Paris Express, Société des grands projets is developing a methodology, bringing stakeholders together, and laying the foundations for a new business model based on resource efficiency, cooperation and traceability. This is because the circular economy cannot be confined to a single project. It relies on a network of interconnected stakeholders and a region-wide approach. As Abdelfeteh Sadok, Circular Economy Strategy Manager, sums it up: "The circular economy is inherently a collective approach. It may not be perfect, but it must be local, consistent and ambitious."



Making Materials Matter
Circular Economy toolkit
(French content)



“NeoCem perfectly illustrates our approach: explore, test and pass on to industry.”

John Tanguy, Director of Strategy, Environment and Innovation, Société des grands projets.

Focus NeoCem: from testing to industrial scale

NeoCem's first low-carbon concrete binder plant, due to open in early 2025, is set to revolutionise construction. Developed through experiments carried out on Grand Paris Express worksites, this process involves the flash calcination of clay, an innovative method that reduces CO₂ emissions by up to 90% compared with conventional cement.

This technology, developed with Institut Mines-Télécom Nord Europe and supported by Société des grands projets, briefly heats clay extracted from worksites to 750 °C. By contrast, Portland cement is heated to approximately 1,400 °C for one hour in a kiln. By recycling the spoil from Line 18, NeoCem is transforming waste into a local resource for producing low-carbon concrete with reduced environmental impact.

This circular approach is more than just a technical innovation: it lays the groundwork for a new industrial sector, with a plant capable of producing 100,000 tonnes of low-carbon binder annually. Its model, which can be replicated both in France and internationally, represents a new way of thinking about construction, one that is more sustainable, more local and with lower emissions.

Since the Grand Paris Express began seeking financing, Société des grands projets has been able to raise €30.75 billion in investments, including €28.25 billion under its 100% green EMTN (Euro Medium Term Notes) programme.

Ongoing strategies to secure financing

3

“Société des grands projets must follow best market practices.”

Since Société des grands projets started raising funds for the Grand Paris Express project, €30.75 billion of debt has been raised, including €28.25 billion under its 100% green EMTN programme. In six years, it has issued 23 bonds. All financing under the EMTN programme comply with the 2021 Green Bond Principles and are certified by the Climate Bond Initiative (CBI).

In 2024, Société des grands projets continued to deploy its strategy with a view to securing the costs and risks associated with project financing. It used the bond market in two transactions to raise €1 billion of investment under its 100% green EMTN programme, thanks to its sound financing model, solid reputation, Aa3 Moody's rating, AA- Fitch rating and AA (High) DBRS Morningstar rating, as well as investor trust.

- February 2024: €1 billion issue of 25-year maturity (2049).
- September 2024: €1 billion issue of 21-year maturity (2045).

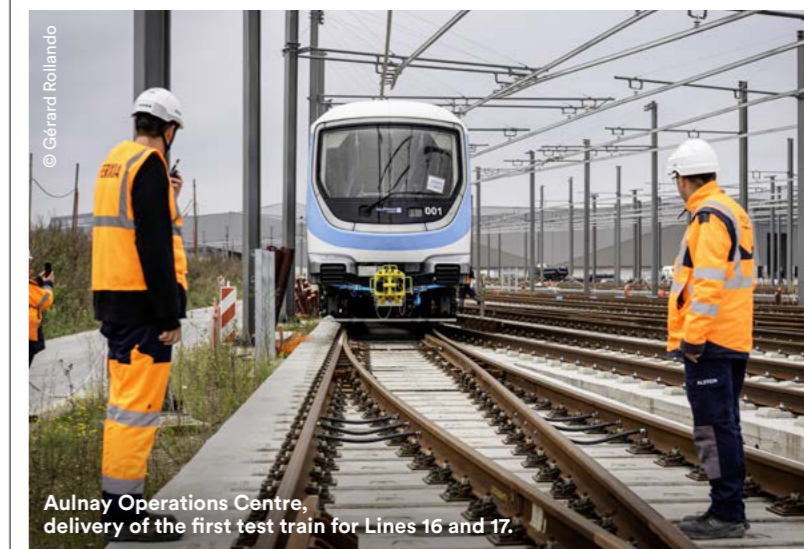
Société des grands projets also received backing through bilateral financing from the European Investment Bank, enabling it to diversify its funding and respond to its requirements. Since 2017, €2.5 billion of the construction costs for Line 15 South came from amortising loans.

Société des grands projets is once again honouring the commitments it made when allocating the funds raised to the Grand Paris Express project, by regularly informing investors about the progress of the project and its environmental benefits. The positioning of its 100% green commitment on the long end of the yield curve makes it a unique and recognised player in the impact bond market. Société des grands projets must therefore follow best market practices.

2024:
two issues
for €2 billion

To this end, it complies with the 2021 Green Bond Principles (GBPs) and has its bond issues certified by the Climate Bond Initiative (CBI) via Sustainalytics. It has also successfully demonstrated its alignment with the requirements of the European Union Taxonomy.

Société des grands projets continues to contribute to the development of green finance through its participation in debates and discussions on this topic. It is also still a leading player and heavily involved in events on regional planning, transport expansion and urban development.



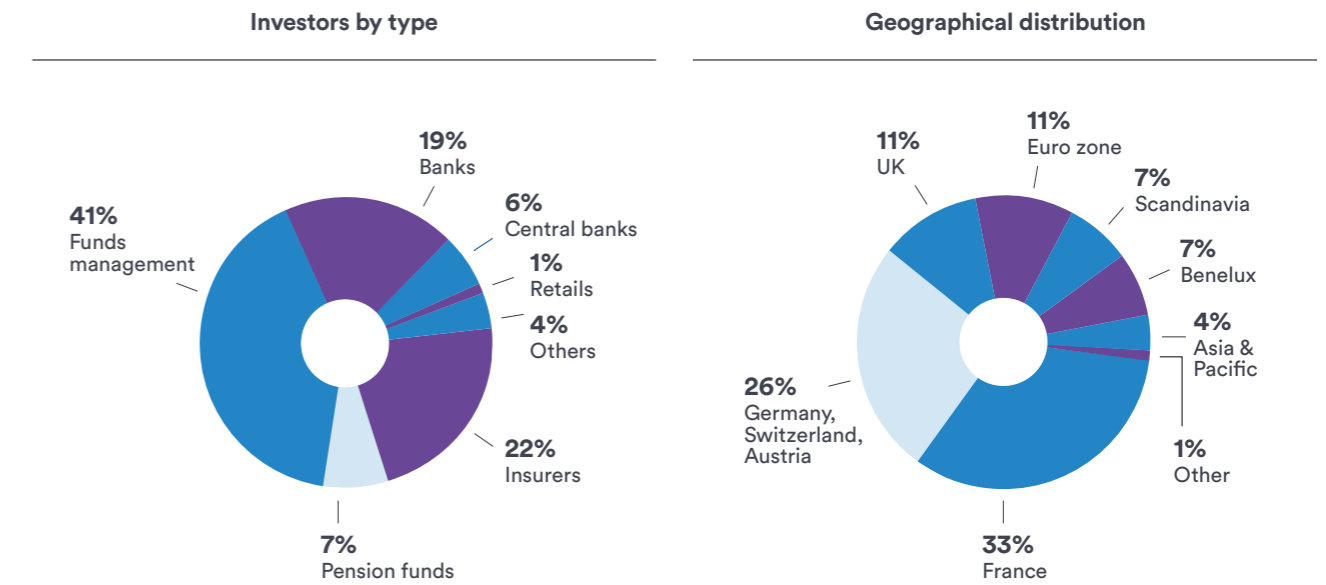
Aulnay Operations Centre, delivery of the first test train for Lines 16 and 17.

The two bonds issued in 2024 were used to finance eligible projects that qualify for green bonds. All the bonds issued by Société des grands projets on the financial markets have been Green Bonds.

Transactions in 2024

TRANSACTION SUMMARY		
Issuer	Société des grands projets	
Rating	Aa3 (Moody's)	Aa3 (Moody's)
Date	13 February 2024	18 September 2024
Maturity date	25 June 2049	25 May 2045
Amount (€ bn)	1.00	1.00
Coupon (%)	3.50	3.375
Issue spread (bp)	OAT +38	OAT +24

Type of investors and geographical distribution for all bond issues



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

Investments
**entirely
 earmarked for
 the project**

4

“The bonds issued by Société des grands projets require it to demonstrate the environmental impact of the Grand Paris Express.”

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

Use of funds

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

An amount equivalent to the net earnings of the green bonds issued is used to finance and/or refinance expenditure that enhances the current or future value of the Grand Paris Express project, together referred to as the “eligible assets”.

This allocation report specifically reports on the amount pending allocation to pre-finance future needs within the debt ceiling.

All expenditure incurred in connection with the infrastructure and certain associated project management costs of the Grand Paris Express are therefore eligible:

- construction of new lines and extensions: close to 200 km of new automated metro lines in addition to the existing 245 km in Île-de-France; expenditure on land acquisition, construction of line sections, etc;
- construction and development of new stations and technical centres (68 stations and 7 technical centres planned): expenditure relating to maintenance sites and associated structures, the construction and development of stations and areas around the station;
- project management costs: payroll, financial and ancillary costs, expenditure on impact studies, audits and consultancy services.



© Cyrus Cornut
 Champigny Operations Centre, static testing of the first Alstom train.

200 km

of new metro lines in addition to the existing 245 km in Île-de-France

Principles of the programme

High-quality transport and major infrastructure drive economic growth. A major transport infrastructure project such as the Grand Paris Express does more than just transform mobility; it also changes urban development and the structure of the city itself.

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

The Société des grands projets green bond programme is also based on a framework document first published in October 2018, revised for the first time in 2021, which sets out the nature of eligible expenditure including current expenditure, financial and ancillary costs, impact studies, audits and consultancy services relating to the Grand Paris Express.

This green financing framework, updated in January 2024, is the second revision after the 2021 version and is intended to provide investors with more transparency, insight and information. Its purpose is to:

- reflect modifications regarding the issuer, in particular the change of its corporate name and the extension of its geographical scope, pursuant to Act 2023-1269 of 27 December 2023 relating to metropolitan regional express services and;
- demonstrate the alignment of the activity of Société des grands projets with the European Union's taxonomy of sustainable activities.

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

Société des grands projets has examined the eligible expenditure relating to the Grand Paris Express included in its Green Finance Framework Document in the light of the objectives of making a substantial contribution to mitigating and adapting to climate change in the European Union's taxonomy (Regulation (EU) 2020/852, Climate Delegated Act set out in Regulation (EU) 2021/2139).

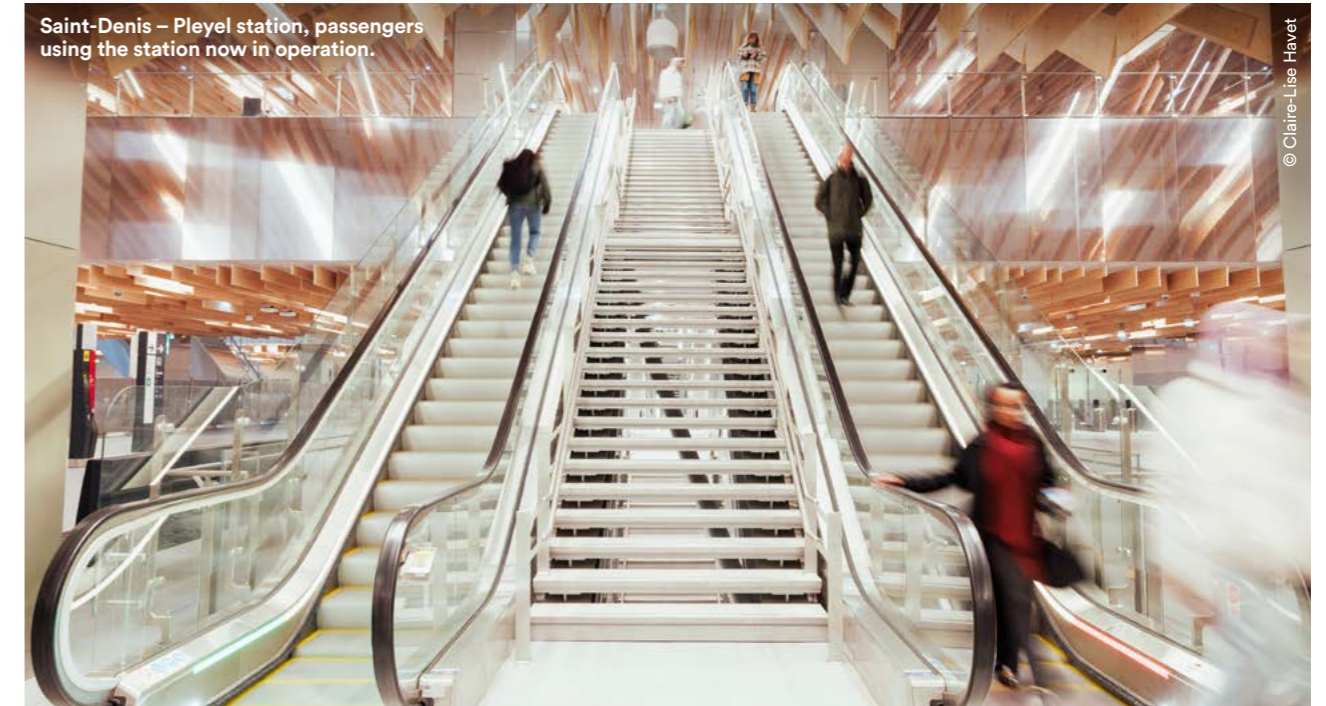
Société des grands projets is eligible for the following economic activities:

- climate change mitigation goal: 6.15.Infrastructure enabling low-carbon road transport and public transport;
- climate change adaptation goal: 6.15.Infrastructure enabling low-carbon road transport and public transport.

Société des grands projets considers that, at the date of publication of the framework document (January 2024), the eligible expenditure of the Grand Paris Express meets each of the environmental sustainability criteria for economic activities set out in Article 3 of the European Union's taxonomy:

- it contributes substantially to one or more of the environmental objectives (adapts to and mitigates climate change);
- it does not significantly impede any of these environmental objectives;
- it is carried out in compliance with the minimum safeguards set out in the European Union's taxonomy;
- it complies with the technical screening criteria established by the European Commission.

This alignment stems from the nature of Grand Paris Express operations, the environmental and social requirements applicable and applied to the project, the many voluntary undertakings made, the oversight and monitoring procedures employed, the whole



Saint-Denis – Pleyel station, passengers using the station now in operation.

© Claire-Lise Havet



Villejuif – Gustave Roussy station, view of the station and its architecture.

© Laurent Villeret

as described in the dedicated section “Alignment with the European Union Taxonomy” (Part 3.2 – Alignment with the European Union Taxonomy, pages 49 et seq.) and as detailed in Part II, Section IV and Section V of the Green Financing Framework document of January 2024.

In addition, as recommended by ICMA's Green Bond Principles, the framework document underwent an external review by an independent third party. As part of this review, the Second party opinion provided by Sustainable Fitch concluded that the Grand Paris Express green financing framework document is aligned with the EU taxonomy.

In addition, the framework document is aligned with the “Low Carbon Transportation 113” appendix of the Climate Bond Initiative (CBI), as evidenced by the post-issuance certification of the green bond programme on 15 August 2024.

In conclusion, thanks to the various measures introduced to date to mitigate the main environmental risks relating to adaptation, pollution, water protection and biodiversity, and according to the information available and the planned specifications, the projects financed by Société des grands projets comply with the most demanding sustainability standards.

“The Second party opinion provided by Sustainable Fitch concluded that the Grand Paris Express green financing framework document is aligned with the EU taxonomy.”

The 2024 version of the Green Bond Framework is available on the Société des grands projets website, together with all financial publications. <https://www.societedesgrandsprojets.fr/home-page>.

Details of eligible assets

Line 15 West

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

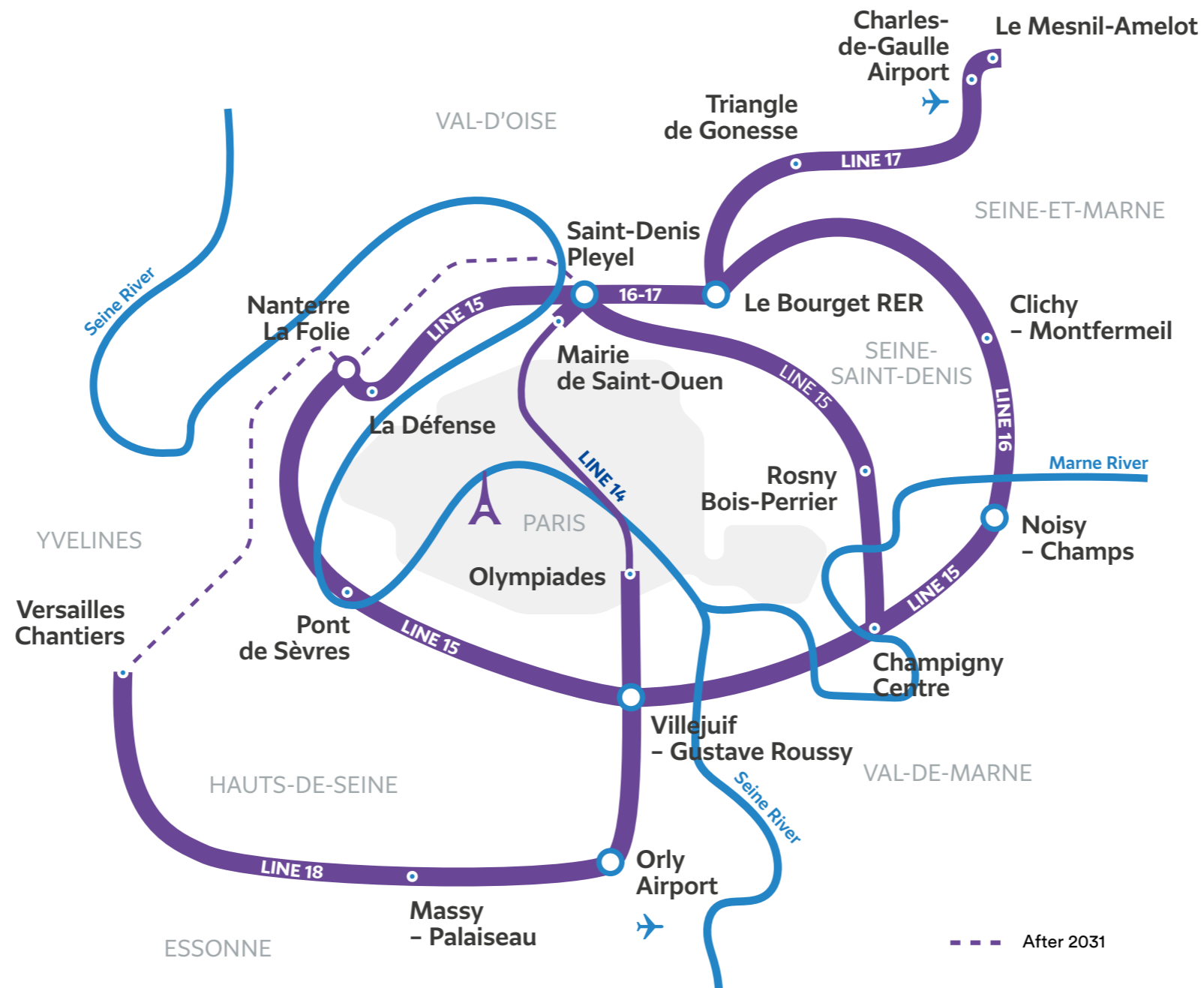
Line 15 South

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

Line 15 East

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

**By 2031,
Line 15 will form
a 75 km ring
around Paris.**



Line 18

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

Line 17

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

Line 16

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

Line 14 South

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

2024 allocation

As at 31 December 2024, the allocation capacity is €11.5 billion and breaks down as follows:

- unallocated balance from previous years, totalling €9.5 billion (A);
- net 2024 issues from the 100% green EMTN programme, totalling €2 billion (B).

2024 ALLOCATION	IN €
Unallocated balance on 31 December 2023 (A)	9,541,363,052
Total raised in 2024 (B)	2,000,000,000
2024 TOTAL TO ALLOCATE (C)	11,541,363,052

For 2024, the scope of eligible assets is €4.3 billion (D). The table below details the 2024 allocation based on eligible investments for the new eligible asset scopes in compliance with the latest applicable framework document.

2024 ALLOCATION	IN €			
	Wages	Operation	Investment	Total
Pont de Sèvres / Noisy-Champs (Line 15 South)		28,540,242	749,690,785	778,231,027
Noisy – Champs / Le Bourget RER / Saint-Denis – Pleyel / Mairie de Saint-Ouen (Lines 14 North, 16 and 17)		47,948,522	642,295,234	690,243,756
Le Bourget / Le Mesnil-Amelot (Line 17 North)		4,950,056	335,794,683	340,744,740
Pont de Sèvres / Saint-Denis – Pleyel (Line 15 West)		15,045,616	503,294,776	518,340,393
Orly / Versailles Chantiers (Line 18)		21,158,771	599,823,135	620,981,906
Saint-Denis – Pleyel / Champigny (Line 15 East)		16,346,208	464,187,197	480,533,406
Olympiades / Aéroport d'Orly (Line 14 South)		47,926,592	250,671,760	298,598,352
Land management		61,566,266	50,161,377	111,727,643
Non-distributable expenditures	136,978,053	326,813,375	14,187,377	477,978,805
TOTAL	136,978,053	570,295,648	3,610,106,325	4,317,380,026

The table below details the 2024 allocation based on bonds issued since the start of the financing programme in 2018, according to the first issued, first allocated principle.

SECURITY ISSUED							EN €								
ISN	Series	Tranche	Date of issue	Maturity	Coupon	Nominal	2018	2019	2020	2021	2022	2023	2024	Total	% Allocated
FR0013372299	S1	1	22 October 2018	22 October 2028	1.125	1,750,000,000	1,750,000,000							1,750,000,000	100
FR0013383320	S2	1	26 November 2018	26 November 2068	2.145	20,000,000	20,000,000							20,000,000	100
FR0013401593	S3	1	14 February 2019	14 February 2069	2.1	50,000,000		50,000,000						50,000,000	100
FR0013409679	S4	1	19 March 2019	19 March 2070	2.062	50,000,000		50,000,000						50,000,000	100
FR0013409612	S5	1	20 March 2019	25 May 2034	1.125	2,000,000,000		2,000,000,000						2,000,000,000	100
FR0013414398	S6	1	16 April 2019	16 April 2069	1.955	55,000,000		55,000,000						55,000,000	100
FR0013414950	S7	1	16 April 2019	25 May 2066	1.923	70,000,000		70,000,000						70,000,000	100
FR0013422383	S8	1	3 June 2019	25 May 2050	1.7	1,000,000,000		575,381,869	424,618,131					1,000,000,000	100
FR0013483914	S9	1	18 February 2020	18 February 2070	1	2,500,000,000			2,146,999,439	353,000,561				2,500,000,000	100
FR0013506664	S10	1	8 April 2020	8 April 2069	1.149	50,000,000				50,000,000				50,000,000	100
FR0013422383	S8	2	7 May 2020	25 May 2050	1.7	1,500,000,000				1,500,000,000				1,500,000,000	100
FR0013483914	S9	2	29 June 2020	18 February 2070	1	750,000,000				641,398,894	108,601,106			750,000,000	100
FR00140005B8	S11	1	15 October 2020	25 November 2030	0	3,000,000,000				2,803,528,662		196,471,338		3,000,000,000	100
FR00140005R4	S12	1	15 October 2020	15 October 2060	0.7	3,000,000,000					3,000,000,000			3,000,000,000	100
FR0014000D80	S13	1	29 October 2020	29 October 2052	0.5755	200,000,000						200,000,000		200,000,000	100
FR0014003CJ5	S14	1	10 May 2021	10 May 2046	0.875	2,000,000,000						708,636,948	1,291,363,052	2,000,000,000	100
FR00140058G6	S15	1	2 September 2021	2 September 2036	0.3	1,500,000,000							1,500,000,000	1,500,000,000	100
FR0014006NV0	S16	1	26 November 2021	25 November 2031	0.3	1,750,000,000							1,526,016,974	1,526,016,974	87
FR0014006OB0	S17	1	26 November 2021	25 November 2051	1	1,250,000,000								–	–
FR0014009KL1	S18	1	7 April 2022	8 April 2042	1.625	1,750,000,000								–	–
FR001400F6X7	S19	1	17 January 2023	25 May 2043	3.5	1,000,000,000								–	–
FR001400H4K7	S20	1	5 April 2023	25 May 2053	3.7	1,000,000,000								–	–
FR001400NUQ6	S21	1	13 February 2024	25 June 2049	3.5	1,000,000,000								–	–
FR001400SNH9	S22	1	18 September 2024	25 May 2045	3.375	1,000,000,000								–	–
TOTAL						28,245,000,000	1,770,000,000	2,800,381,869	2,571,617,569	2,544,399,455	2,912,129,768	4,105,108,287	4,317,380,027	21,021,016,974	74

The total unallocated amount on 31 December 2024, the proceeds of bonds issued under the EMTN programme, amounts to €7.2 billion (E) and is prioritised for allocation in 2025 and beyond. It is the difference between the total amount to be allocated on 31 December 2024 (€11.5 billion) less allocation for 2024 (€4.3 billion).

The allocations reported in this document are based on the payments actually disbursed by Société des grands projets.

IN €	
2024 total to allocate (C)	11,541,363,052
2024 allocated scope (D)	4,317,380,026
UNALLOCATED BALANCE ON 31 DECEMBER 2024 (E = C – D)	7,223,983,025

Essential monitoring for alignment with the European Green Taxonomy

This section individually sets out a number of key indicators with regard to the criteria for alignment with the European Union’s taxonomy for the activity covered by section 6.15 “Infrastructure enabling low-carbon road transport and public transport” of European Regulation 2021/2139. **These indicators further demonstrate the alignment of the Grand Paris Express project with two of the**

substantial contribution objectives set out in the European Union’s green taxonomy, namely “climate change mitigation and climate change adaptation”. Particular emphasis is also placed on the indicators relating to the “Do No Significant Harm” criteria concerning the protection and restoration of biodiversity, and minimum social safeguards.

ENVIRONMENT			
	2023	2024	DO NO SIGNIFICANT HARM
Share of underground infrastructure	90%		Climate change adaptation Climate change mitigation
Level of development of mobile flood defences	115% of the reference flood of 1919		Climate change adaptation
Environmental audits performed during the year	98	122	Climate change adaptation Sustainable use and protection of water and marine resources Prevention and control of pollution Protection and restoration of biodiversity and ecosystems
Percentage of compliant points in the audits conducted, as per the environmental auditing guidelines	80%	78.3%	
Percentage of GPE excavated material recycled over the year	67%	70%	
Recycling rate of non-hazardous waste ⁽¹⁾	96%	61%	Transition to the circular economy
Innovative projects supported as part of the circular economy	3	1	
Surfaces restored (forest and environmental offsets)	11.58 ha	18.38 ha	Protection and restoration of biodiversity and ecosystems
Hub studies launched	63	64	Climate change mitigation
Hub studies approved	31	39	
Percentage of the total amount of the GPE-notified contracts including an environmental consideration	93.4%	93.5%	Climate change mitigation Sustainable use and protection of water and marine resources Prevention and control of pollution Protection and restoration of biodiversity and ecosystems Implementation of competition procedures

(1) Cumulative recycling rate of non-hazardous construction and demolition waste, excluding soil and excavated material: 76% at the end of 2024 (exceeding EU Taxonomy requirement of 70%).

SOCIAL AND ETHICS			
	2023	2024	DO NO SIGNIFICANT HARM
Percentage of employees in an at-risk position, trained in preventing corruption	43%	55%	
Instances of corruption reported / of ethical breaches based on the values of Société des grands projets	–	–	Implementation of anti-corruption procedures
Percentage of conflict-of-interest situations handled (based on the total number of conflict-of-interest situations reported)	100%	100%	
Percentage of worksites that underwent a safety audit within the last year	83%	82%	
Percentage of audited worksites rated Satisfactory or Very Satisfactory (level B or A) as per the safety auditing guidelines	54%	40%	
Société des grands projets’ gender equality index score for the year	93/100	92/100	
People on work integration on worksites (declared number)	4,548	5,335	Human rights due diligence
Independent VSEs/SMEs involved on the worksites since the beginning of the project ⁽¹⁾	5,076	6,349	
Social economy enterprises (SSEs) used by our contract awardees and Société des grands projets	457	392	
Percentage of the total amount of the GPE-notified contracts including a social consideration	98.4%	95.5%	Implementation of anti-corruption procedures Human rights due diligence

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

Found management policy

Société des grands projets is subject to the Public Budget and Accounting Management System (GBCP, decree 2012-1246 of 7 November 2012), which requires it to deposit its cash in the Treasury's Single Account. The funds raised through its green issues therefore remain in the Treasury account until they are allocated. On 31 December 2024, the cash flow balance in the Treasury account was €10.4 billion (including the 2024 unallocated amount: €7.2 billion).

KPMG assurance report

Below is an extract of the KPMG assurance report. The full report is available on the Société des grands projets website.

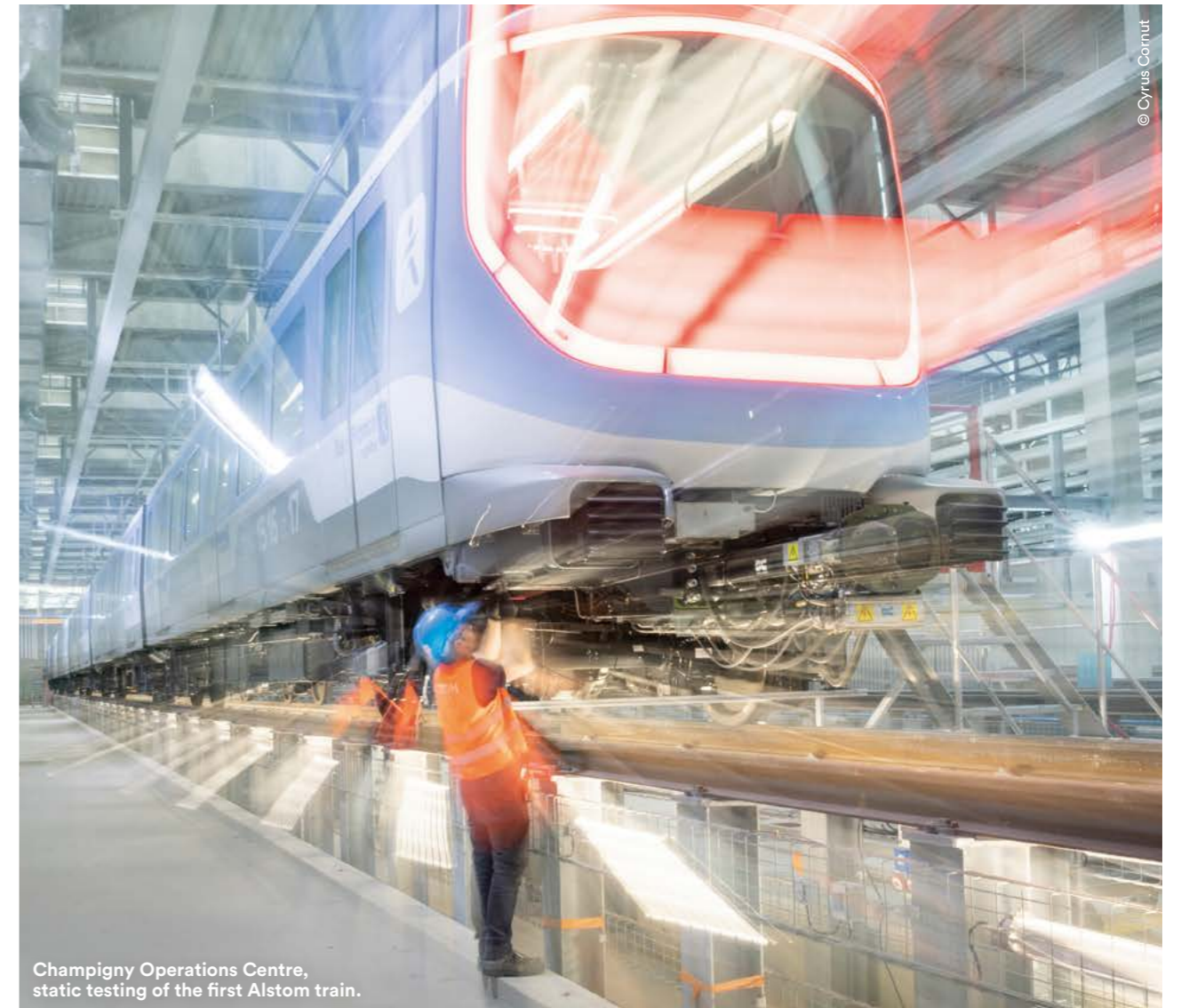
Conclusion

Based on the procedures we performed, as described in the "Nature and scope of our work" section, and on the information we collected, nothing has come to our attention that causes us to believe that the Information has not been prepared, in all material respects, in accordance with the Framework available on the Company's website.

CSR at the core of Société des grands projets leadership

Société des grands projets has made a number of environmental, social and economic commitments to design and deliver the Grand Paris Express and ensure the project contributes to the ecological and energy transition. Integrity, exemplary behaviour and dialogue with stakeholders are also the three pillars on which its actions are based, in all circumstances.

The full CSR roadmap and related documentation are available at <https://www.societedesgrandsprojets.fr/csr-programme>



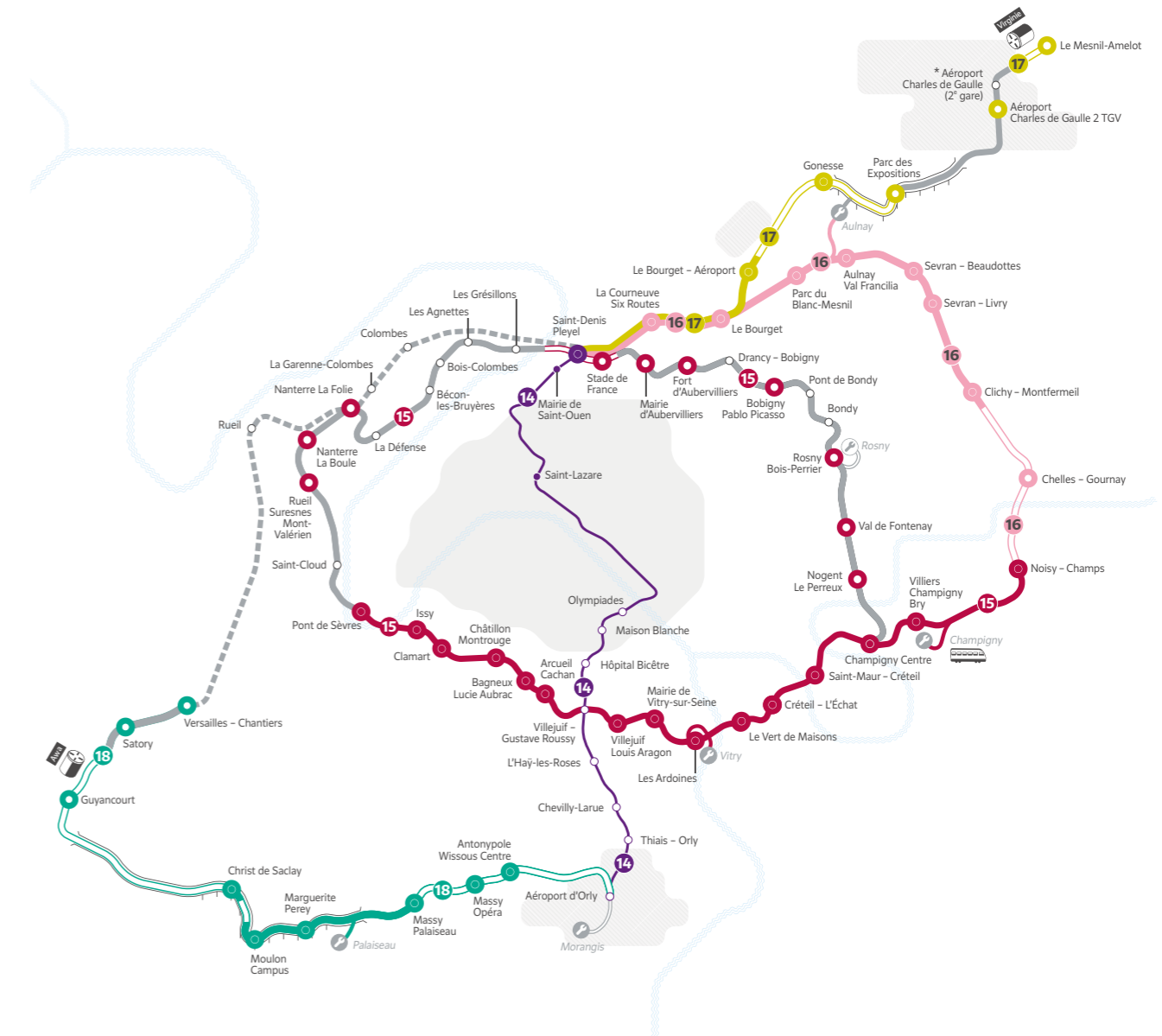
Champigny Operations Centre, static testing of the first Alstom train.

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

The Grand Paris Express at the half-way mark

5

2024 worksites



Datas as at January 2025

- Tunnel excavated / overhead section completed
 - Tracks laid
 - Station in civil engineering works phase
 - Station under development
 - Grand Paris Express station
 - Other station
 - Tunnel boring machine currently in service
 - Name of the tunnel boring machine
 - Testing
 - Overhead sections:
 - Railway overground
 - Railway bridge
 - Commissioned post-2031
 - Operations Center in civil engineering works phase
 - Operations Center under development
 - Line 14: extensions to Saint-Denis – Pleyel and Aéroport d'Orly opening in June 2024
 - * Temporary railway station
- 2 km

Milestones *2024*

Since the Grand Paris Express broke ground in 2016, each year has seen the project reach new milestones towards the ultimate goal of opening for initial service, which took place in 2024 with the extension of Line 14. Below are a selection of milestones the project reached in 2024.

26 February

Line 16 tunnelling completed.

3 April

Final rail welding on Line 15 South.

7 May

Award of second and final design-and-build contract for Line 15 East.

29 May

Award of second and final design-and-build contract for Line 15 West.

29 May

Awa, the last tunnel boring machine on Line 18, is christened in Guyancourt.

24 June

Line 14 extension opens to passengers, connecting Saint-Denis – Pleyel in the north and Aéroport d'Orly in the south.

September

Testing phase begins on the southern section of Line 15.

21 September

Eight Grand Paris Express stations unveiled to the public during the European Heritage Days.

2 October

First train on Lines 16 and 17 arrives at Aulnay operations centre.

2 October

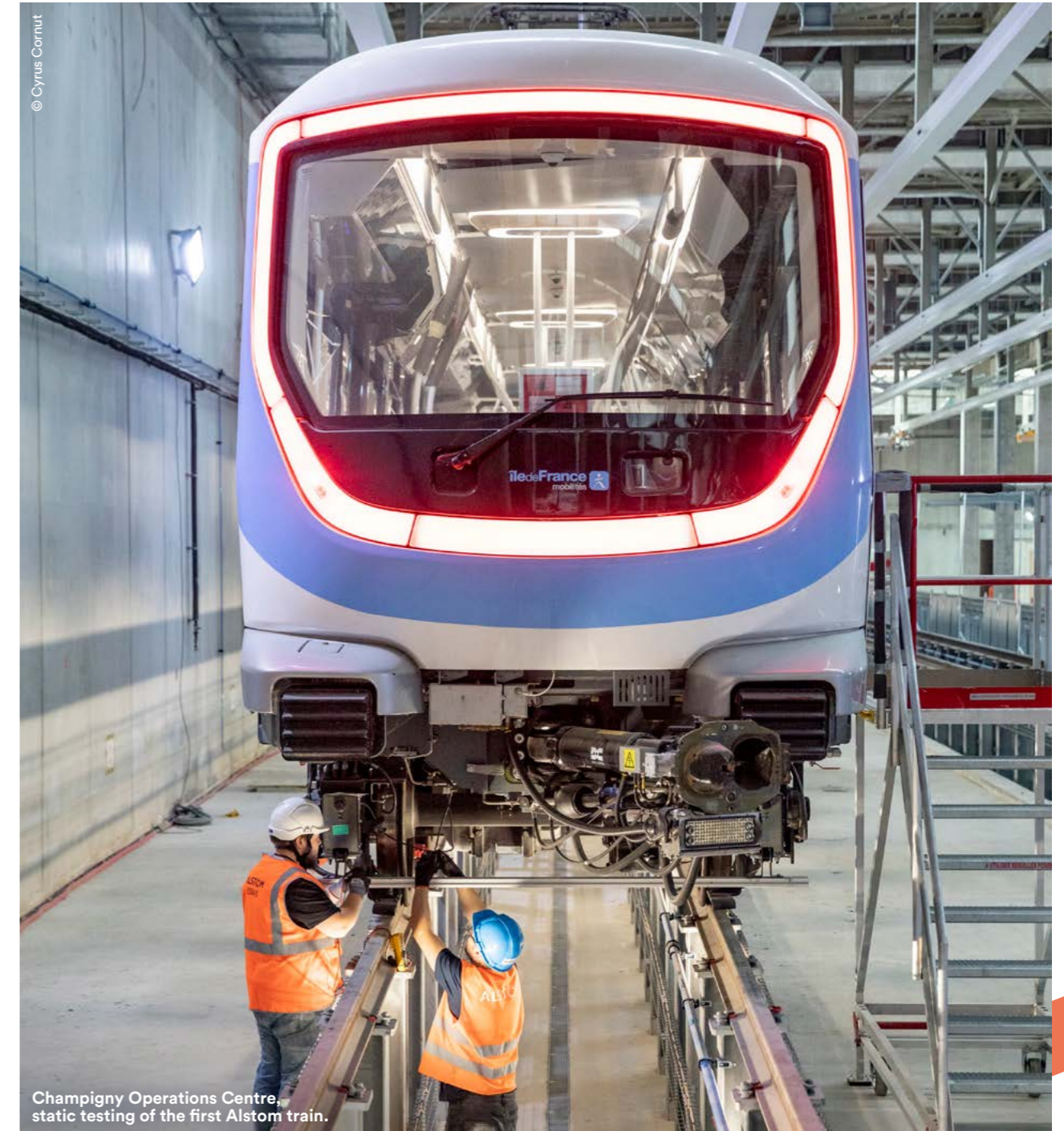
Second annual worksite shutdown day: 350 Société des grands projets employees join forces with Grand Paris Express construction workers.

15 October

Virginie, the last tunnel boring machine on Line 17, is christened in Le Mesnil-Amelot.

19 December

Completion of works at Villejuif – Gustave Roussy station and handover to Île-de-France Mobilités.



Champigny Operations Centre, static testing of the first Alstom train.

Overall conclusions

6

Financing the Grand Paris Express involves financing more than just infrastructure

Since 2018, Stratec has developed the CarbOptimum® tool for Société des grands projets to quantify the carbon impact of the Grand Paris Express and define its carbon trajectory.

In 2024, Société des grands projets used this tool to reassess the greenhouse gas emissions generated and avoided by the Grand Paris Express.

This new assessment, following the one produced in 2018, aimed to take into account updated knowledge regarding material emission factors, a deeper understanding of construction works and techniques, the new traffic forecasts for the Grand Paris Express, the deployment of electric vehicles, and changes to government policies to reduce carbon emissions in the transport and construction sectors.

The results of the Grand Paris Express carbon assessment confirm that the project will significantly reduce carbon emissions across the Paris region, in line with the National Low-Carbon Strategy (SNBC).

By 2070

IN MILLIONS OF TONNES OF CO ₂ EQUIVALENT		2018	2024
Direct effects	Studies and pre-construction works	0.4	0.4
	Infrastructure construction	4.8	4.4
	Operation	5.2	4.1
	Mobility	-13.4	-16.6
Total carbon footprint excluding regional development		-3.0	-7.7
Indirect effects	Regional development	-24.4	-16.4
Total carbon footprint		-27.4	-24.0

By 2070, according to the forecasting scenario, the finding is positive, with a reduction in CO₂ emissions of 24 million tonnes of CO₂ equivalent according to the 2024 CarbOptimum® update.

The overall assessment (direct and indirect effects) is certainly less favourable than in 2018, but this 2024 reassessment is more realistic and demonstrates the effectiveness of the environmental policies implemented by Société des grands projets, with a very clear improvement in direct effects (-4.7 M teq). In particular, it includes new estimates of the impact of urban renewal on carbon emissions from residential and commercial buildings, taking into account the new environmental regulations for buildings, known as RE2020.

The 2018 assessment of carbon emissions from the construction of residential and commercial buildings, based on data from Ademe, was significantly underestimated.

The Scientific Council of the Société des grands projets has approved this reassessment, highlighting the thoroughness of the work and its cautious assumptions. The report notes that constantly evolving carbon reduction policies require regular adjustments to assessments.

In 2024, a total of €4,317,380,026 was allocated, representing 11.1% of a total debt estimated at €39 billion.

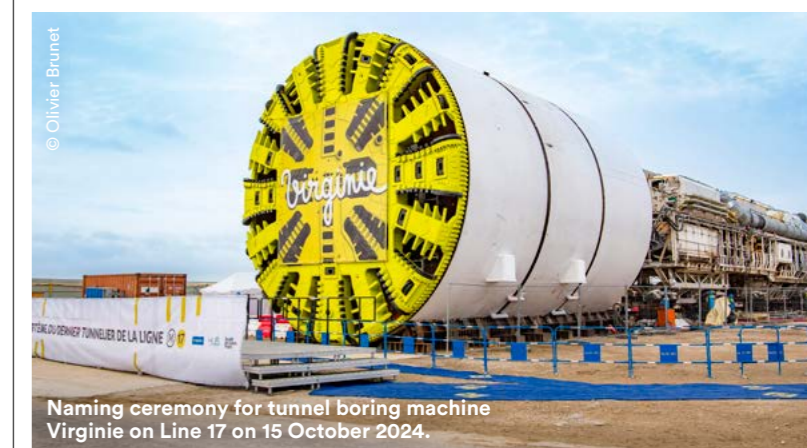
Applying this percentage to the figures from the 2024 CarbOptimum® update, gives the following impact assessment⁽¹⁾:

	IN MILLIONS OF TONNES OF CO ₂ EQUIVALENT	SHARE	
		2024	Total allocations
By 2070			
Central assumption 2024	-24.0	-2.7	-12.9
Hypothesis excluding regional development	-7.6	-0.9	-4.1

For more details on the 2024 update to the greenhouse gas emissions assessment for the Grand Paris Express, please visit the Société des grands projets website.

Read the [full report](#)

Read the [report summary](#)



Naming ceremony for tunnel boring machine Virginie on Line 17 on 15 October 2024.

CarbOptimum® methodology

Société des grands projets has developed CarbOptimum®, a propriety tool to assess the reduction in greenhouse gas emissions.

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

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

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

Find out more

All the documentation on this Green Bond programme (Green Bond Framework, Second-Party Opinion, Climate Bond Initiative Certification, Green Bond Investor Presentation, etc.) is available on the Société des grands projets website on the “Invest in the Grand Paris Express” page.

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

[Green Bond Framework](#)

[Second-Party Opinion](#)

[CBI](#)

[KPMG assurance report](#)

[Société des grands projets Integrated Report 2024](#)

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

[Sign up for the financial newsletter](#)

The 2024 version of the Green Bond Framework is available on the Société des grands projets website, together with all financial publications.

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

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