

GREEN BONDS

REPORTING
2019



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01

INTRODUCTION TO SNCF RÉSEAU

As a creator of connections, SNCF Réseau is a service provider whose function is to manage railway infrastructure in France. It caters to maintenance requirements and allocates network capacity among the many rail sector players, working in the general interest and in response to the energy transition challenge.



Tram at Villetaneuse-Université station

SNCF RÉSEAU AND THE FRENCH RAILWAY NETWORK

SNCF Réseau owns and manages the French national rail network.

SNCF Réseau's main responsibilities:

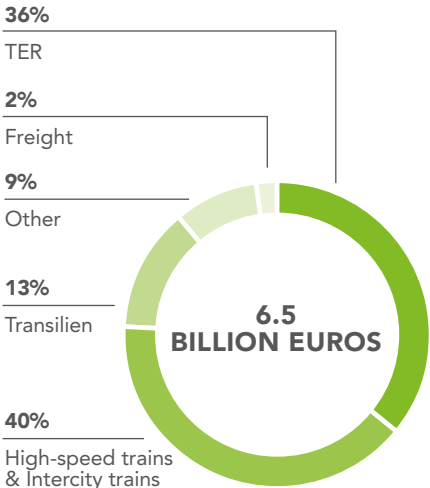
- ensuring fair access to the rail network for **29 rail transport companies** and 12 regional transport authorities;
- organising and developing rail traffic: **15,000 trains circulate daily**, transporting more than **5 million passengers per day**;
- ensuring the maintenance and enhancement of the network SNCF Réseau is one of the leading investors in France with **3.0 billion euros invested in 2019**;
- ensuring the **development of the network**.

With its **53,800 employees**, SNCF Réseau has generated a turnover of **6.5 billion euros** with an operating margin (EBITDA - earnings before interest, tax, depreciation and amortisation) of 1.9 billion euros and a net result of -0.6 billion euros in 2019.

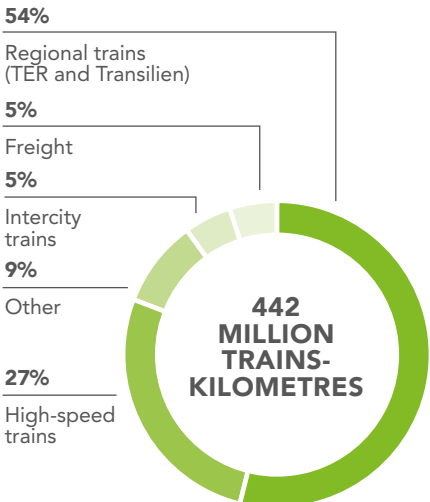


SNCF-Réseau learn more

TURNOVER PER BUSINESS LINE IN 2019



TRAFFIC IN 2019



A CREDIT RISK EQUIVALENT TO THAT OF THE FRENCH STATE

Until 31 December 2019, as a 100% State-owned public entity, SNCF Réseau benefits from the strong support of the French State based on its legal status (EPIC).

- As an EPIC, SNCF Réseau: is not subject to private-sector bankruptcy law;
- could only be dissolved by an amending law transferring its rights and obligations to another public entity.

As a result of the June 2018 railway reform, this situation changed with effect from 1 January 2020. For SNCF Réseau, the main changes are as follows:

- The transformation of SNCF Réseau into a public limited company (SA) with a **100% indirect State-owned and non-transferable shareholding (enshrined in the law)**.
- The transfer of the **Stations & Connections activity** (station management) to SNCF Réseau SA.

- An **opening-up to competition**, from 1/01/2020 on competitive activities (TAGV and intercity), and gradually between 2023 and 2039 on the activities covered by the agreements (TER, Transilien).
- The ending of EPIC status for that of SA with public capital.
- A debt assumption of **€35bn** divided into two tranches, the first on 1 January 2020 (**€25bn**), the second in 2022 (**€10bn**).
- Increased **productivity efforts** at the level of SNCF Réseau SA activity.

In any case, SNCF Réseau:

- performs a public sector mission and enjoys a **natural monopoly position with no risk of deregulation**;
- has been included on the **"Government Related Entity"** list by the European commission since 2002 and is eligible for the **ECB Public Sector Purchasing Programme**.
- SNCF Réseau has been considered as an **ODCA since 2019**. As such, its debt is consolidated in that of the French State in the terms of Maastricht's standards.

RATING AGENCIES

	LONG TERM	SHORT TERM
Standard & Poor's	AA	A-1+
Moody's	Aa2	P-1
Fitch	AA	F1+



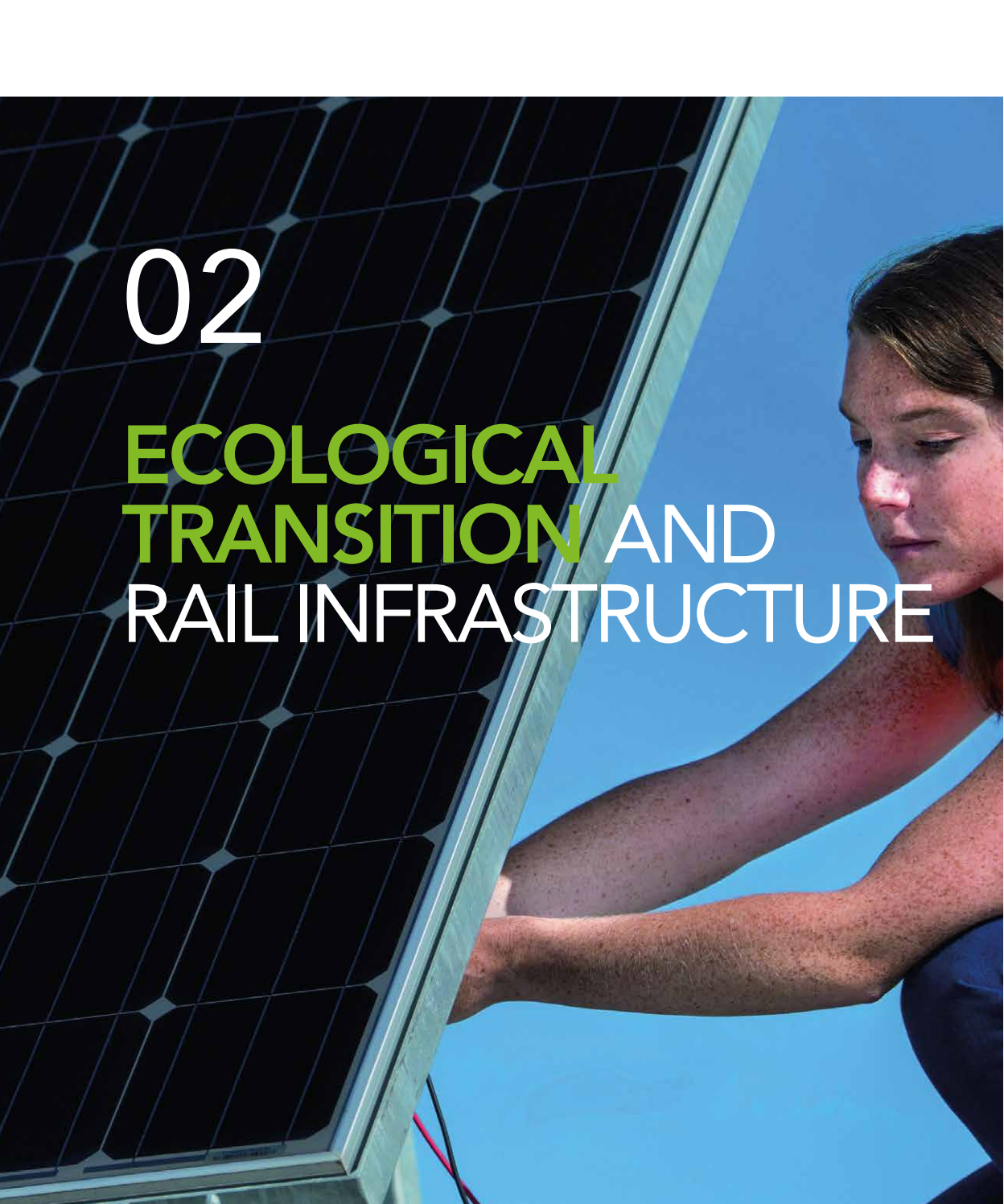
Standard & Poor's



Moody's



Fitch

A close-up photograph of a woman with freckles, wearing a dark blue shirt, working on a large solar panel. She is looking down at her work. The background is a clear blue sky.

02

ECOLOGICAL TRANSITION AND RAIL INFRASTRUCTURE

As the most eco-friendly mode of transport, railway transport has a critical role to play in the transition to a low carbon economy.

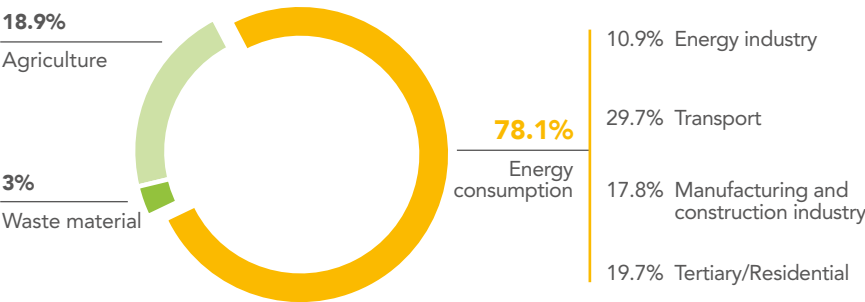


Maintenance engineer

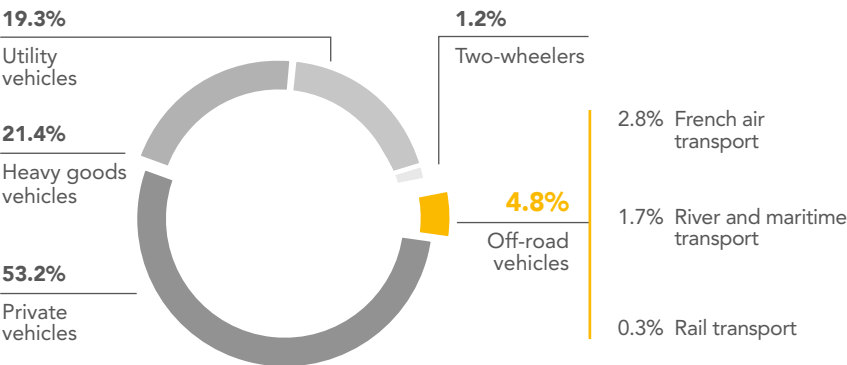
THE "CLIMATE" BENEFITS OF RAIL IN THE FIGHT AGAINST CLIMATE CHANGE

In France, rail transport, which accounts for **10% of traffic** (freight and passengers), emits **less than 1% of all GHG emissions from transport**.

BREAKDOWN PER SOURCE OF GHG EMISSIONS (EXCLUDING LULUCF¹) IN FRANCE IN 2017



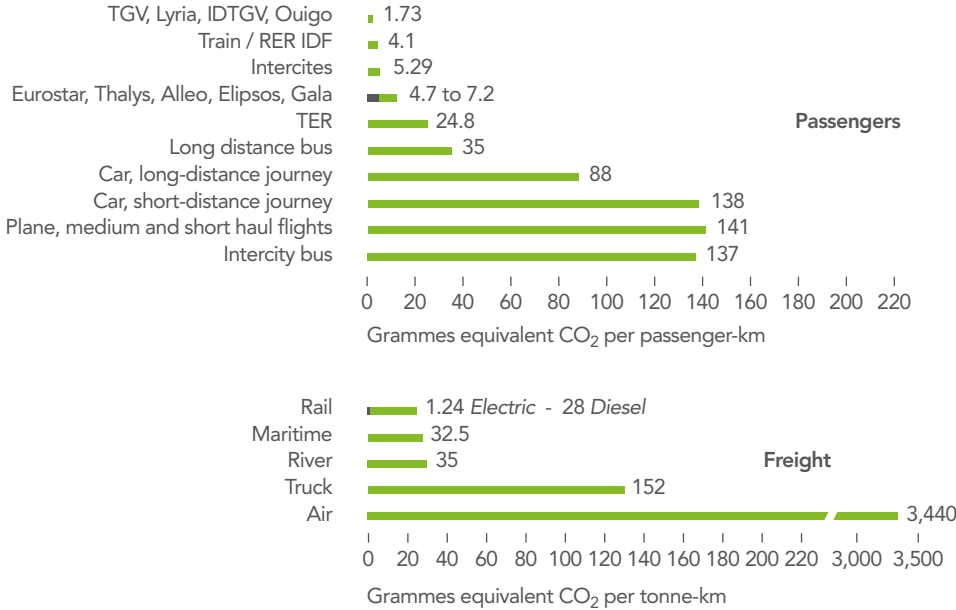
GHG EMISSIONS PER MODE OF TRANSPORT IN FRANCE AS A % (INCLUDING FOD)



1. LULUCF: Land use, Land Use Change and Forestry.

Source: Citepa, June 2017.

GHG EMISSIONS PER MODE OF TRANSPORT



Source :
Methodological note GHG information for transport services 2019, ADEME 2020 carbon base.

This can be explained by:

- the low amount of energy needed for rail traction (wheel-rail contact vs tyre-road);
- mass-transport;
- the high use of electricity (**78% of trains use electric traction**), only 8% of which is generated by fossil fuels in France.

Thus, any modal shift from air and road to rail is greatly beneficial to the GHG emissions balance sheet, given that **transport in France accounts for close to 30% of total GHG emissions of France (i.e. 134.1 MtCO₂eq).**

Moreover, the advantages of rail transport are not limited to low levels of CO₂ emissions. There are other benefits such as lower air pollution, fewer accidents, optimised use of space, less noise and a lower negative biodiversity impact.

THE SNCF RÉSEAU
CARBON APPROACH

Thanks to the emissions avoided by the modal shift, rail transport is an essential **contributor to the climate policies implemented in France**. The positive impact of its activity enables SNCF Réseau to guarantee a **«carbon return»** on its renovation investments **within about 5 years**.

Nevertheless, rail network maintenance is an industrial activity, with high CO₂eq emissions. SNCF Réseau's projects require materials whose production and transport are accompanied by significant carbon emissions.

To improve the environmental efficiency of the railway, SNCF Réseau has set itself **the target of reducing its energy consumption by 20% and its carbon emissions by 25% over the period 2015-2025**.

To achieve this, SNCF Réseau has carried out work to measure its CO₂eq emissions from all its activities.

This initial analysis made it possible to identify the company's main sources of GHG emissions:

- Manufacturing the materials needed to maintain and renovate the rail network ;
- Activities of the work providers;
- Energy consumption of buildings;
- Energy consumption of rail and road vehicle fleets, etc.

EMISSIONS
CALCULATION METHOD

To measure the carbon impact of projects eligible for Green Bond funding, SNCF Réseau uses extrapolation **values per million euros (m€) invested**.

The ratios used for this extrapolation are likely to change from one year to the next, depending on the studies carried out by SNCF Réseau.

Knowing the carbon impact of its activities enables SNCF Réseau to build a prioritised action programme to reduce direct and indirect emissions related to infrastructure works :

- **By systematically carrying out carbon assessments:** in 2020, SNCF Réseau introduced TUV^{ALU}, a carbon measurement tool adapted to rail projects;
- **By developing eco-design:** to reduce the costs and CO₂eq emissions of its projects, SNCF Réseau wants to scale its projects to meet its needs as closely as possible.
- **By developing the circular economy:** infrastructure materials account for the majority of the company's emissions. To reduce this impact, SNCF Réseau wants to reduce its supply of new products by reusing or recycling its removed products. From 2020, SNCF Réseau will set up a short loop to manufacture new rails from rails that have been removed.
- **By speeding up the energy transition of road and rail vehicle fleets:** SNCF Réseau is looking for alternatives to combustion engines.

As early as 2015, SNCF Réseau carried out an **initial Bilan Carbone®** of a **track renewal project (RVB)** using a «Suite Rapide» factory train (90 kms between Narbonne and Montpellier).

In 2017, a **second Bilan Carbone®** of RVB was carried out between Gevrey and Sennecey in «Suite Rapide».

This resulted in two new footprint ratios for the work carried out on the track and the catenary.

In 2018, SNCF Réseau carried out the **carbon balance sheet of a Rail Equipment Renewal operation at Austerlitz station**.

The results obtained from this analysis are used to refine the impact calculation methodology by establishing a specific emissions ratio for investments related to Rail Equipment Renewal operations.

SNCF RÉSEAU
EXTRA-FINANCIAL RATINGS

Reflecting this policy and CSR strategy, SNCF Réseau is monitored by two extra-financial rating agencies, Vigeo

and **ISS ESG**, which have awarded it the ratings given in the table below.

RATING AGENCIES	RATING	POSITION OF SNCF RÉSEAU
Vigeo	70/100	2 nd from a panel of 49 European companies in the logistics/transport sector.
ISS-ESG	B-	2 nd from a panel of 45 Global companies in the transport infrastructure management sector.

The rating obtained from Vigeo for the **environmental aspect (73/100)** is accompanied by the following comment:

"SNCF Réseau's absolute performance in the Environment domain is advanced, in line with the previous review. The Company's environmental strategy covers all its responsibilities in terms of environmental protection and comprehensive resources are allocated to environmental management, including ISO 14001 certification covering all its production sites (...). The Company's energy consumption and CO₂ emissions normalised to sales have decreased in the 2016-2018 period (...). Lastly, concerning local pollution, the Company engages with external bodies and

developed comprehensive measures such as programmes to reduce local pollution, in order to uphold its commitment to this issue"

The latest ratings reports from these two agencies are available on the SNCF Réseau website.



Vigeo



ISS-ESG



03

SNCF RÉSEAU'S "GREEN BONDS FUNDING"

A record year:
3 billion «Green» euros raised
on markets including the first
centenary Green Bond
issue in the world



Pont de la Corde in Plouénan, Bretagne - Finistère - Morlaix
Morlaix Roscoff line

A "CLIMATE BONDS INITIATIVE" CERTIFIED ISSUE

In 2019, SNCF Réseau, owner and manager of the French rail network, rated **AA (S&P) / Aa2 (Moody's) / AA (Fitch)**, launched two public issues of green bonds for a total of **€2 billion** with:

- In January, a **€500m** issue with a **10-year** maturity;
- In June, a **€1.5 billion** issue with a **17-year** maturity.

In addition, in August 2019, SNCF Réseau issued **the market's first centenary Green Bond**. It is a private placement of **€100m** and matures in **2119**.

Finally, in 2019, SNCF Réseau issued **several** of its Green Bonds to the amount of **€950m**.

These include the following operations in particular:

- In April, the **'2047'** bond was issued twice for **€250m** and **€100m**, followed in September by a **€250m** subscription;
- In May, June and August, three issues of the **'2029'** bond for **€100m** each, followed in August by a fourth issue of **€50m**.

In line with its commitment to becoming a benchmark on the Green Bonds market, **SNCF Réseau has carried out, in less than a year, 10 debt transactions in Green Bond format, for a total amount of €3.05 billion, making it one of the largest 2019 issuers on the Green Bond market in France and worldwide.** This is also a record for the company.

In order to define the most stringent standards in terms of green financing and to thus become a global point of reference in the transport sector, the bond issue launched by SNCF Réseau is in line with the **Green Bond Principles 2018 (GBP)** and has also been awarded **Climate Bonds Initiative (CBI) certification, by ISS-ESG**.

To reward the exceptional quality of its impact reporting, SNCF Réseau was awarded a **Green Bond Pioneer award by the Climate Bonds Initiative (CBI)** in March 2019. This award recognises the transparency and clarity with which SNCF Réseau communicates with its investors. Already rewarded for its 2016 issue, **this is the second award that SNCF Réseau has received for the publication of a Green Bond impact report.**

Lastly, SNCF Réseau, as a member of the GBP and the Finance for Tomorrow initiative, by **Paris Europlace** fully participates in the discussions and market developments of Green Bonds.

SNCF Réseau is also a founding member of the Corporate Forum for Sustainable Business.

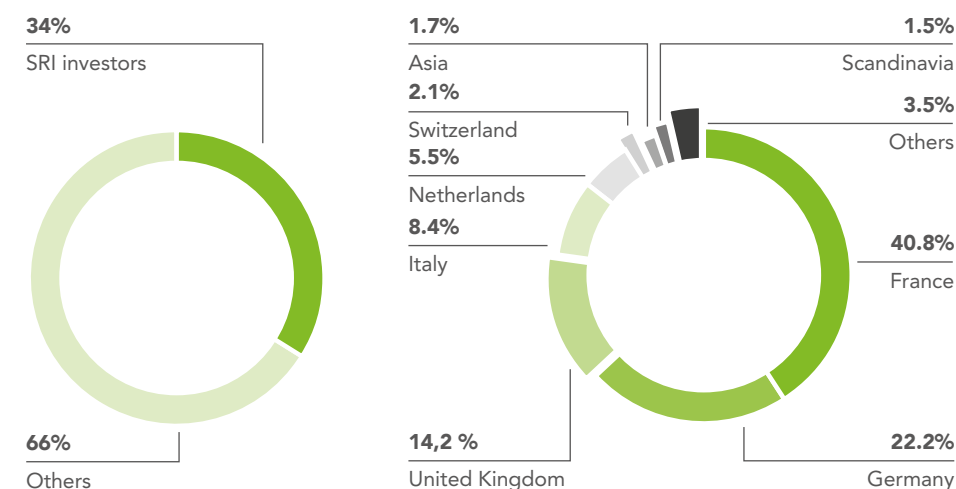
The proceeds from this green bond have been used to finance **the renovation of the structural network and develop new projects.**

Due to their extreme granularity, no projects eligible for Green Bonds in category 3 (biodiversity and natural resources) were selected. Nevertheless, SNCF Réseau funds a very large number of projects every year to protect biodiversity and natural resources.

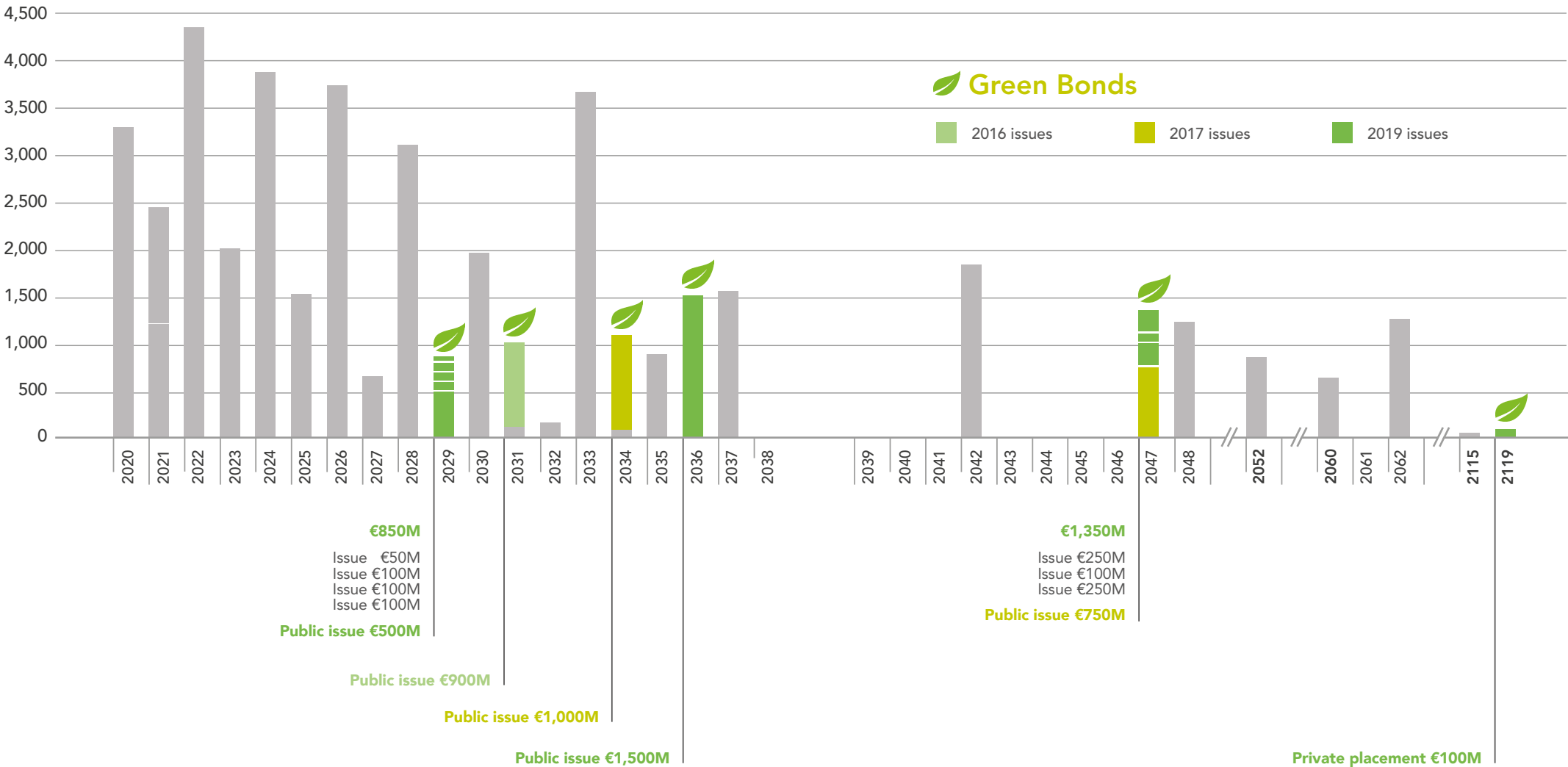
Moreover, eligible projects in the first two categories generally include provisions for the protection of biodiversity and natural resources.

In 2019, **approximately 55% of SNCF Réseau's debt issues on the financial markets were in Green Bond format.** SNCF Réseau Green Bonds are included in the Barclays **MSCI Green Bonds Index**.

TYOLOGY AND GEOGRAPHICAL DISTRIBUTION OF 2019 INVESTORS



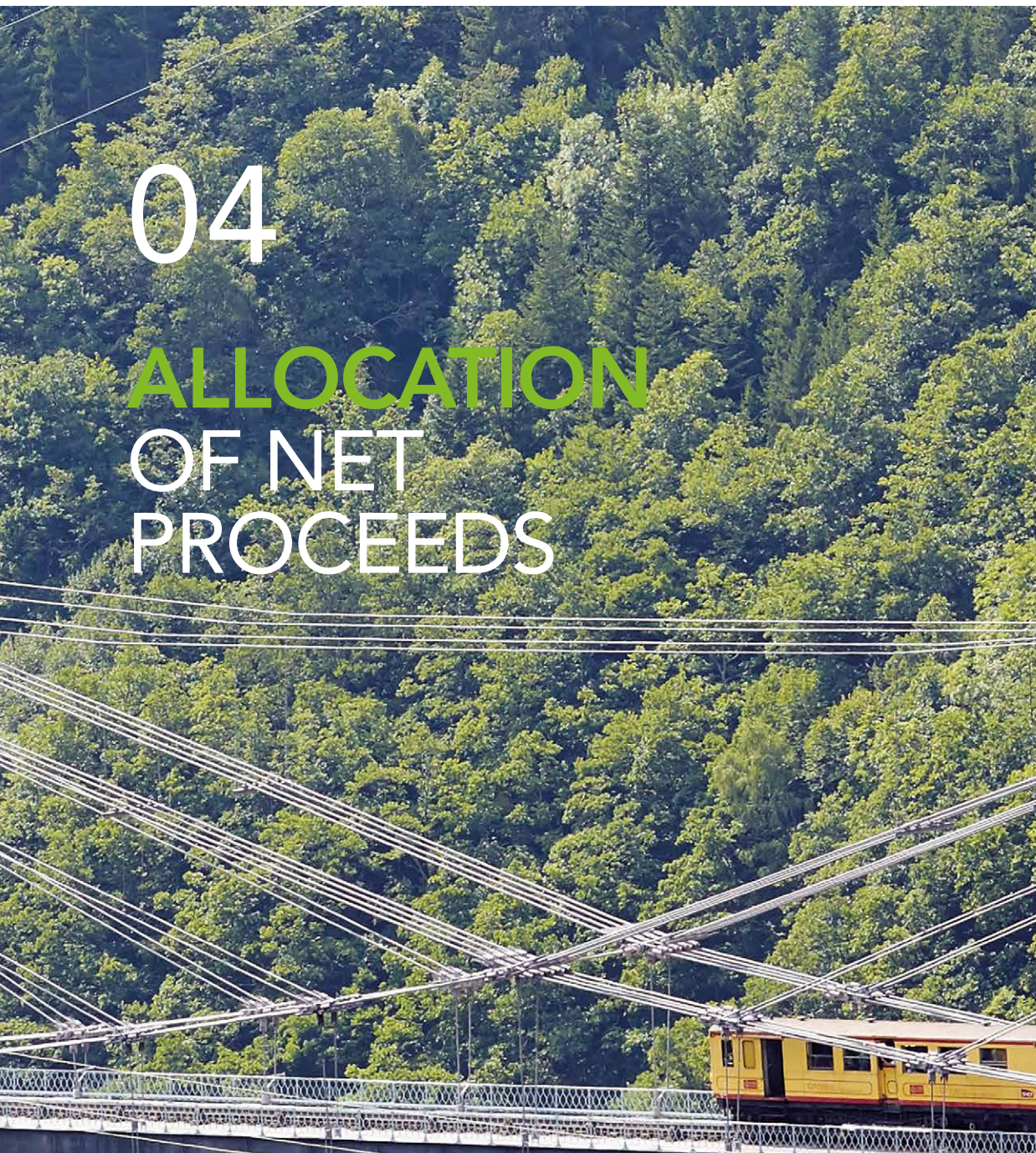
SNCF RÉSEAU'S GREEN BONDS ISSUES **IN MILLIONS OF EUROS** (on 31 December 2019)



04

ALLOCATION OF NET PROCEEDS

The revenue from Green Bond issues was allocated to projects to renew and modernise the structural network.



Between Villefranche-de-Conflent and Latour-Carol, the Gisclard Bridge, on the Yellow Train line

STRUCTURE OF THE SNCF RÉSEAU GREEN BONDS PROGRAMME

The green bonds issued by SNCF Réseau have the same characteristics as conventional bonds in terms of credit risk.

Nevertheless, they have **some additional characteristics in terms of reporting obligations, monitoring the correct allocation of funds to eligible projects and assessment of the environmental impact of eligible projects.**

PREPARATION OF THE SNCF RÉSEAU GREEN BONDS PROGRAMME

CLIMATE BONDS CERTIFIED BOND "ISSUE"

Drawing on best market practices, the framework developed by SNCF Réseau is also based on the 4 pillars structure developed in 2016 by the *ICMA Green Bond Principles*.

The 2016 version of the Green Bonds programme (**Green Bond Framework**) is available on the SNCF Réseau website.

The Second Party Opinion, issued by ISS-ESG, **confirms the compliance of the SNCF Réseau Green Bonds framework with the ICMA Green Bond Principles (2018).**

The 2019 version of this **Second Party Opinion (SPO)** is available on the SNCF Réseau website.

Lastly, the SNCF Réseau Green Bonds programme **complies with with Low Carbon Transport Eligibility Criteria (V1.0)**, established by the CBI. Oekom Research is also responsible for verifying the compliance of this alignment on behalf of the CBI. The 2017 version of this certification awarded by ISS-ESG is available on the SNCF Réseau website.



SNCF-Réseau Green Bonds

CATEGORIES OF ELIGIBLE PROJECTS

The proceeds of the Green Bond were allocated to investments corresponding to one of the following three categories.

Category 1	INVESTMENTS RELATED TO MAINTENANCE, UPGRADE AND ENERGY EFFICIENCY OF THE RAIL SYSTEM	Projects to renovate tracks and traction power supply infrastructure, and signalling system upgrades. The projects eligible for this category necessarily concern investments for the renovation of the core network, consisting of the most used and 100% electrified part of the network (lines in UIC groups 1 à 4 ¹).
Category 2	INVESTMENTS RELATED TO NEW LINES AND LINES EXTENSIONS	Projects related to new lines and line extensions, improving access to the network for passengers and freight mobility. For example LGV Est européenne, LGV SEA, LGV BPL, LGV CNM...
Category 3	OTHER INVESTMENTS LINKED TO GLOBAL CLIMATE CHANGE CHALLENGES, PROTECTION OF BIODIVERSITY AND NATURAL RESOURCES	Projects related to the protection of biodiversity and natural resources surrounding SNCF's existing network.

1. The International Union of Railways (UIC) has established a method to classify lines depending on the traffic loads supported by the infrastructure as well as the type of traffic. Group UIC 1 corresponds to lines with very heavy loads, and at the opposite end of the scale, group UIC 9 corresponds to lines with very light loads. The main lines of the French railway network are in UIC groups 1 to 4. The major lines with lighter loads fall under UIC groups 5 and 6. The lines with low loads in the UIC groups 7 to 9 correspond to the regional network in general.

THE ALLOCATION IN DETAIL

The following table shows the allocation of the issuance of Green Bonds for 2019 according to the three eligible investment categories.

Définitions

- **«Real»:**
all of the group's equity investments.
- **The «Real Green Bonds» scope:**
amount of investments actually made.
- **«Green Bonds Allocation»:**
allocation by category of revenues from the year's issues.
- **«To be allocated»:**
amount of eligible investments not yet financed in 2020.

In 2017, SNCF Réseau reviewed the rules for selecting assets eligible to be financed in the second category of the Green Bonds Programme: "investments related to new lines and line extensions".

From 2018, SNCF Réseau will take into consideration a project's investments without taking into account any delays in settlement of its grants (acquired grants vs collected grants) to facilitate tracking of net investments over time.

DESCRIPTION OF THE FUND MANAGEMENT POLICY

SNCF Réseau has a **very large portfolio of projects eligible** to be financed by its Green Bonds in 2019 (€3.4bn of projects), so it has not been necessary for **SNCF Réseau to invest all the funds raised in 2019 in SRI vehicles** (FCPs, SRI SICAVs, bank deposit certificates or bank balances).

This situation can be explained by the absence of Green Bonds funding raised on the markets during 2018.

TEMPORARY MANAGEMENT OF PROCEEDS (IN M€) & VALUE DATE

Date	7/4/19	8/13/19	8/14/19	10/2/19	10/7/19	12/24/19	12/31/19
SICAV ISR		120	180	360	-240	-420	
Investments CC	6	-6					
SOUS-TOTAL	6	120	300	660	420	0.44	0.44

INVESTMENTS IN M€

	2016			2017			2018			2019			
	Green bond scope	Allocation	To be allocated	Green bond scope	Allocation	To be allocated	Green bond scope	Allocation	To be allocated	Investments	Green bond scope	Allocation	To be allocated
Maintenance and upgrade	1,303	710	593	1,366	1,508	451	1,424	0	1,875	2,714	1,528	3,181	222
Tracks & switches	1,084	590	494	1,025	1,170	349	961	0	1,310	1,663	1,068	2,223	155
Signalling	183	100	83	197	215	65	233	0	298	362	269	530	37
Traction power supply infrastructure	36	20	16	36	40	12	151	0	163	165	126	271	19
Tunnels, bridges and Earthworks (Engineering)	0	0	0	108	83	25	79	0	104	171	64	157	11
Others	0	0	0	0	0	0	0	0	0	351	0	0	0
New lines and line extensions	176	176	0	225	226	-	-	0	-	55	-	0	-
LGV Est Phase 2	14	14	0	6	6	0	0	0	0	2	0	0	0
SEA	73	73	0	23	23	0	0	0	0	7	0	0	0
BPL	53	53	0	147	147	0	0	0	0	3	0	0	0
CNM	36	36	0	50	50	0	0	0	0	43	0	0	0
TOTAL	1,479	886	593	1,591	1,734	451	1,424	0	1,875	2,769	1,528	3,181	222

AUDITORS ASSURANCE REPORT

SNCF Réseau appointed KPMG to give a independent assurance on selected information disclosed in the green bond report.

Extract from the conclusion of the KPMG assurance report:

In compliance with the engagement entrusted to us, we hereby provide a limited assurance conclusion on whether the information (hereinafter “the Verified Information”) published in the Green Bonds Report 2019 relating to the Green Bonds issued by SNCF Réseau (hereinafter “the Annual Report”) has been presented, in all material respects, in accordance with the Guidelines defined below.

The Guidelines comprise the following documents:

- the Green Bond Framework prepared by SNCF Réseau and included in the Second Party Opinion issued by the non-financial rating agency ISS-oekom prior to, and after the Green Bond issue; and
- the methodological guide for the Green Bonds program “Evaluer l’impact carbone des investissements d’infrastructures ferroviaires - Septembre 2017” (hereinafter “the Methodological Note”) prepared by SNCF Réseau with the consulting firm Carbone 4 which are available on SNCF Réseau’s website.

Independence and quality control

We apply International Standard on Quality Control 1 and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants.

Conclusion

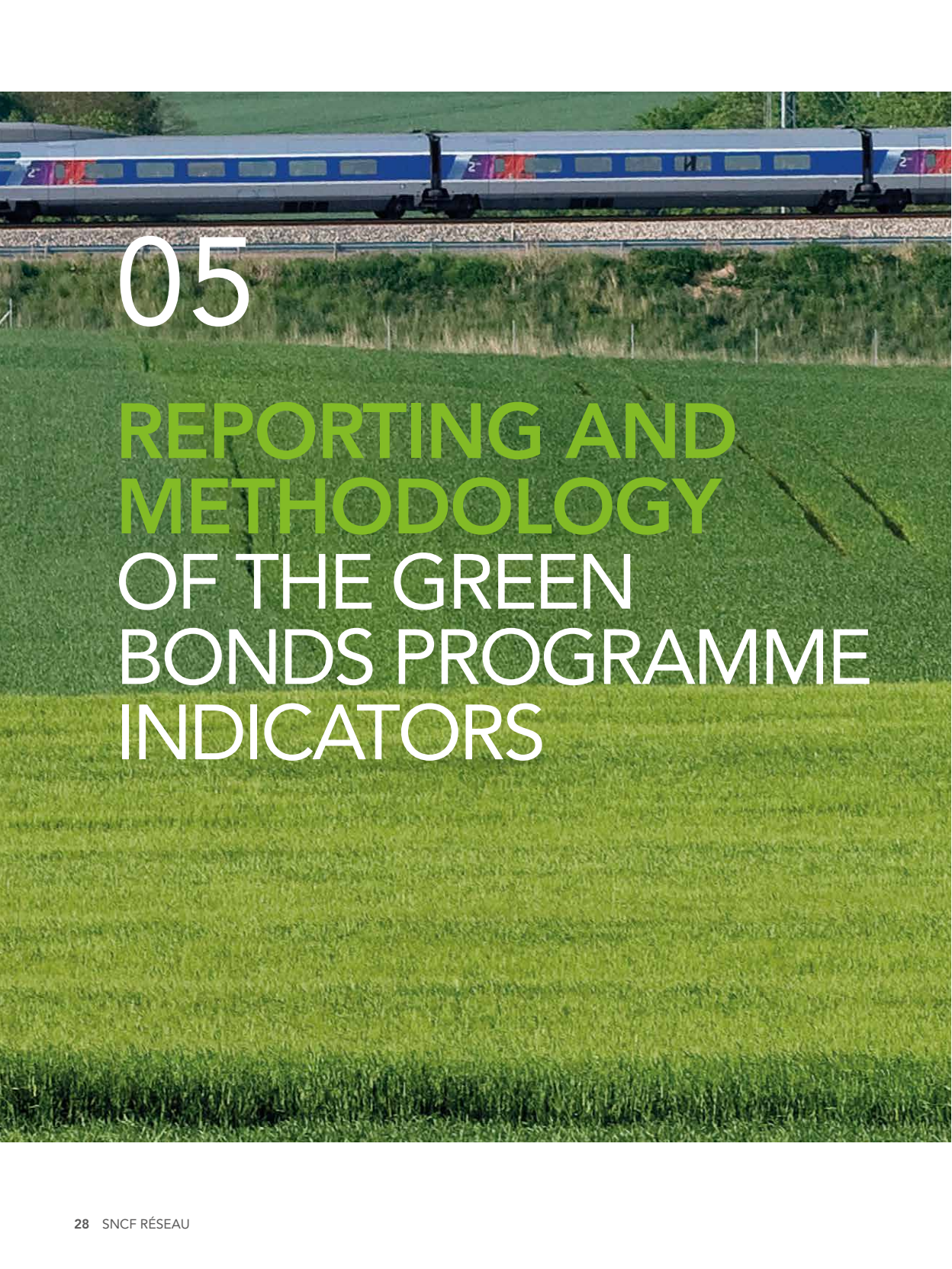
We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Based on the procedures performed, nothing has come to our attention that causes us to believe that the Verified Information is not presented fairly in the Annual Report, in all material respects, in accordance with the Guidelines, including with regard to:

- compliance of the projects mentioned in paragraph “Table of Allocations” on page 25 with the eligibility criteria defined by SNCF Réseau in its Green Bond Framework which comply with the criteria of the Climate Bond Standard;
- allocation of proceeds from the Green Bonds to the eligible projects mentioned in paragraph “Table of Allocations” on page 25;
- the description of the proceeds management policy mentioned in paragraph “Description of the fund management policy” on page 25;
- the “Total carbon impact of the expenses financed by Green Bonds as of December 31st 2019” indicator mentioned in paragraph “Global overview” on page 35.

MANAGEMENT’ RESPONSIBILITY WITH REGARD TO THE VERIFIED INFORMATION

VERIFIED INFORMATION	RELEVANT SECTION OF THE ANNUAL REPORT	RELEVANT SECTION OF THE GUIDELINES
Project compliance with the Green Bonds eligibility criteria which comply with the criteria of the Climate Bond Standard	§ “Allocation Table” on part “04/ Allocation of net proceeds”, on page 25	Green Bond Framework - § “2.1 Use of Proceeds”
Allocation of proceeds from the Green Bonds to eligible projects	§ “Allocation Table” on part “04/ Allocation of net proceeds”, on page 25	Green Bond Framework - § “2.1 Use of Proceeds” and § “2.3 Selection Process”
Description of proceeds management policy	§ “Description of the fund management policy” on part “04/ Allocation of net proceeds”, on page 25	Green Bond Framework - § “2.4 Management of Proceeds”
Total carbon impact of the expenses financed by Green Bonds” indicator	Table of § “Global overview” on part “05/ Reporting and methodology of the Green Bonds programme indicators”, on page 35	Methodological Note

A high-speed train (TGV) is shown traveling on a track through a green field. The train is blue and white with red accents. The background is a lush green field with some trees in the distance.

05

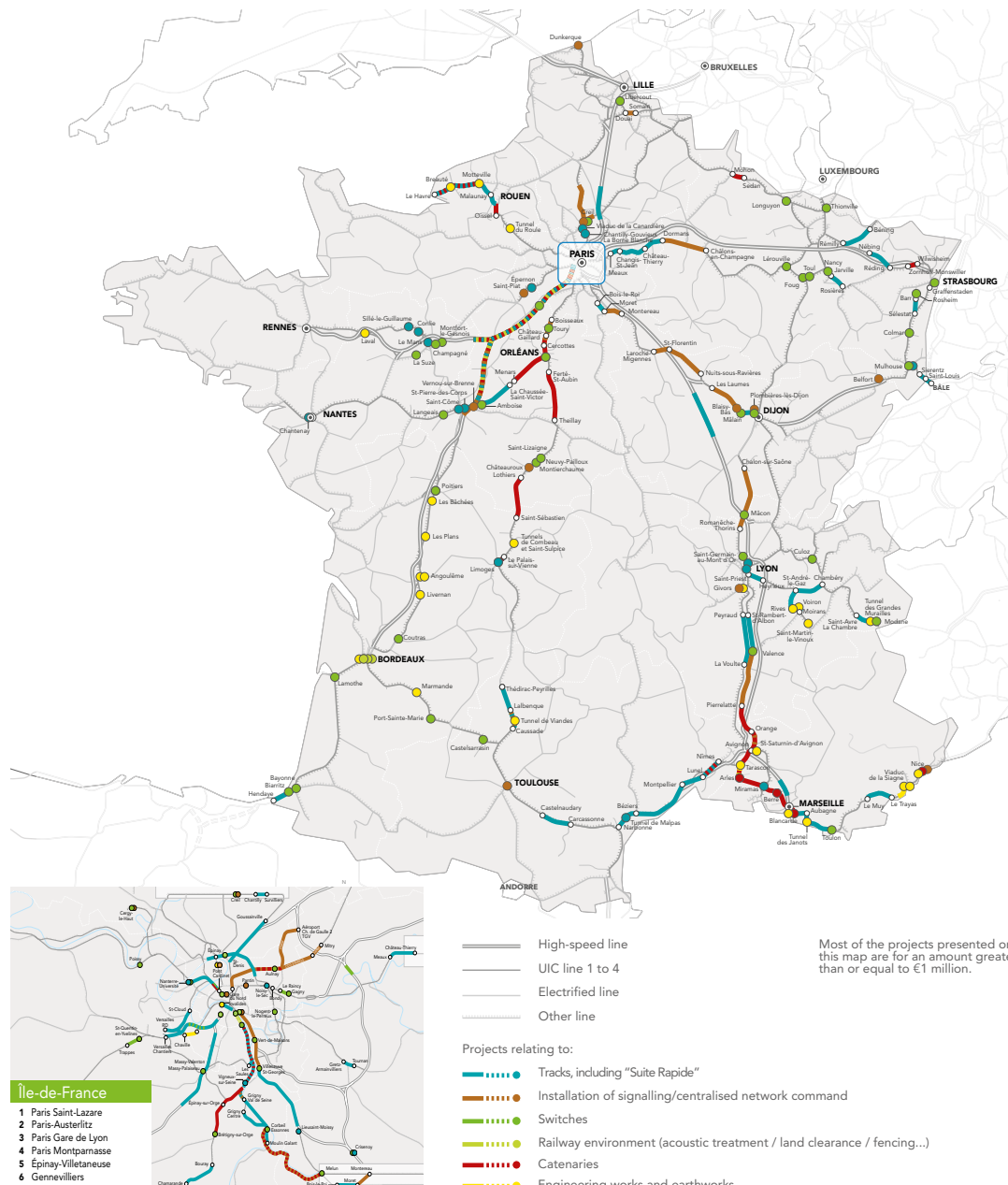
REPORTING AND METHODOLOGY OF THE GREEN BONDS PROGRAMME INDICATORS

SNCF Réseau has developed a specific method for measuring the impact of its rail network renewal and line creation policy, in terms of greenhouse gas emissions and protection of resources.

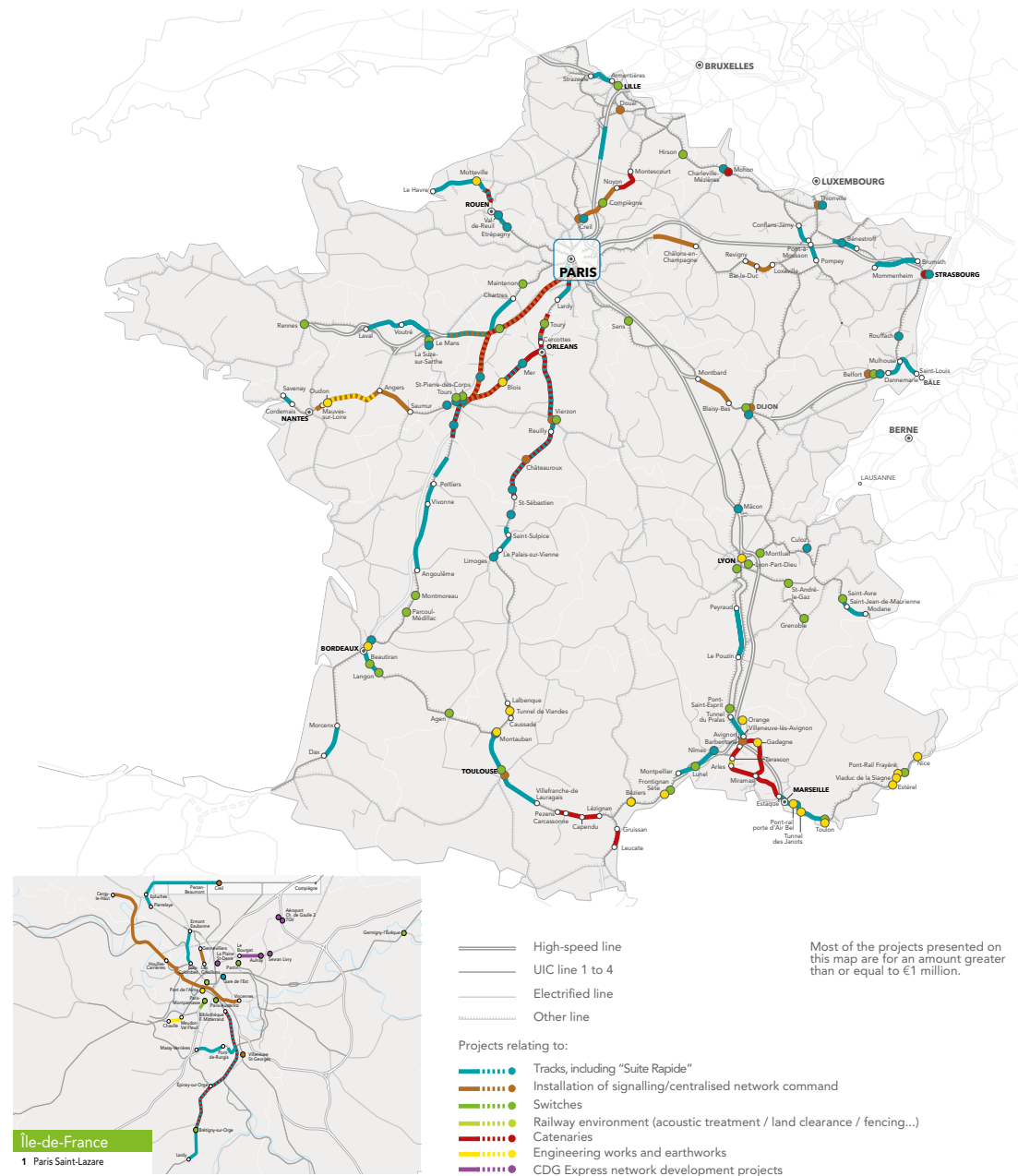


TGV Est high-speed line

MAP OF PROJECTS 2018 FINANCED BY THE GREEN BOND 2019 ISSUE



MAP OF PROJECTS 2019 FINANCED BY THE GREEN BOND 2019 ISSUE



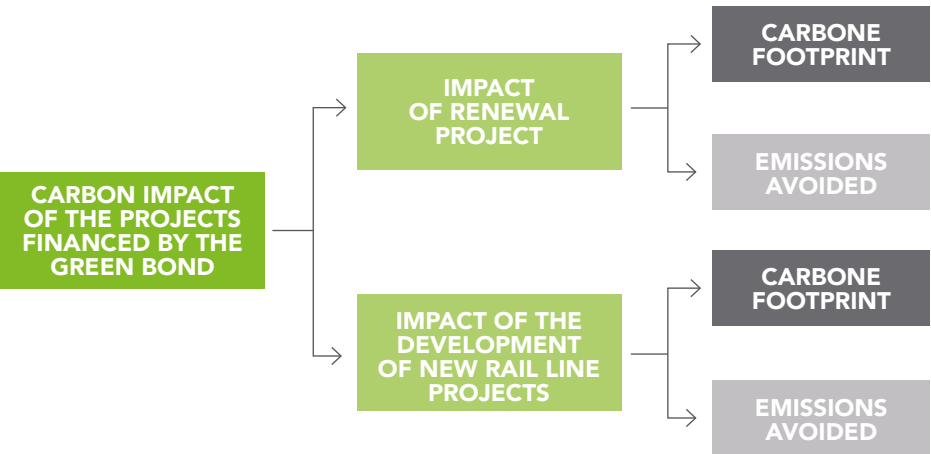
DETAILED REPORT PER CATEGORY

In order to highlight the positive consequences of the projects financed by its issuance of Green Bonds, SNCF Réseau wished to quantify the impact of these projects in the fight against greenhouse gas emissions. To achieve this, SNCF Réseau, in collaboration with Carbone 4¹, has drafted a **specific methodology**² that establishes the principles and method used to calculate the **carbon impact** of these projects.

The carbon impact is obtained by comparing the **carbon footprint** (emissions resulting from the project) with the emissions avoided (during the project operation phase):

- the calculation of the **carbon footprint** consists of establishing a **summary of Greenhouse Gas emissions resulting from a line renewal or creation project**³, according to existing carbon analysis methods.
- the calculation of the **emissions avoided** by a line renewal or creation project **consists of comparing the emissions from the transport system in both scenarios, one without the execution of the project, and the other with it.**

As defined in the methodology, the **carbon impact of projects financed by Green Bonds** is calculated by subtracting avoided emissions from emissions generated by projects.



1. Carbone 4 is an independent consulting firm specialised in low carbon strategy and adaptation to climate change.
2. This methodology is available at snf-reseau.fr/fr/finance-durable.
3. The scope of this summary covers all direct and indirect emissions upstream and downstream of the works carried out, but does not cover the operation and maintenance of the infrastructure in question.

To measure the carbon impact of projects eligible for Green Bond funding, **SNCF Réseau uses extrapolation values per million euros (€M) invested.** The large number of projects carried out each year does not allow the company to deal with the impact of each project on a case-by-case basis.

Several extrapolation ratios per million euros invested are established to calculate the carbon footprint and carbon avoidance of renewal projects as well as new line projects.

The ratios used for this extrapolation are likely to change from one year to the next, depending on the studies carried out by SNCF Réseau.

Changes in ratios related to the carbon footprint

Green Bonds financing for renewal projects is divided between track, catenary and signalling works.

In 2016, SNCF Réseau produced a **first extrapolation ratio** for its work, based on the Bilan Carbone® of a **track renewal project (RVB)** by a «Suite Rapide» factory train (90 kms between Narbonne and Montpellier).

In 2017, the value of the Track ratio was modified compared to 2016, by taking into account the results of the Bilan Carbone® of an RVB operation carried out between Gevrey and Sennecey. The Track ratio has increased from 361 tCO₂eq/€M to 456 tCO₂eq/€M. This difference of 95 tCO₂eq/€M can be explained by a more precise measurement of certain RBV phases.

The carbon assessment carried out in 2018 on the Austerlitz Rail Equipment Renewal operation enabled SNCF Réseau to produce a new emissions ratio and to specify its method for calculating the carbon footprint. **This new ratio has a value of 88 tCO₂eq/€M invested.**

In 2019, the FETI* ratio has not changed. The calculation of this ratio is mainly based on a catenary life cycle analysis (LCA) carried out by SNCF Réseau. In order to take into account the CO₂ emissions linked to the energy used, the organisation of the worksite and the transport of the materials needed to replace the catenaries, the Catenary ratio uses the data from the RVB reference carbon balance. The modification of the reference RGB carbon balance between 2017 and 2016 **has therefore changed the IFTE catenary ratio. The latter increased in 2017 from 86 tCO₂eq/€M to 90 tCO₂eq/€M.**

In 2019, the signalling ratio did not change. The calculation of this ratio is based on monetary emission factors, available on the ADEME carbon base.

Evolution of the avoided emissions ratio

The avoided emissions extrapolation ratio is based on the analysis of the modal shift of financially representative renewal projects.

In 2017, 10 renewal projects were analyzed to construct this ratio. The calculation used an average value for the consistency of the projects analysed. **The value of the ratio was 108 tCO₂eq avoided/€M.** The CO₂eq impact of these 10 projects was re-evaluated in 2019 to integrate the real value of the consistency of the operations. **In addition, SNCF Réseau expanded its calculation base in 2019 with 16 additional projects.** The new extrapolation ratio is therefore calculated on 26 renewal projects. The cumulative amount of these 26 projects is approximately €1.2 billion. The extrapolation value used in 2019 has therefore evolved from 108 to 141 tCO₂eq avoided/€M.

In 2020, SNCF Réseau wants to consolidate this ratio by analysing 10 additional projects.

* The FETI ratio: Fixed Electric Traction Installations.

CATEGORY 1 INVESTMENTS IN MAINTENANCE, MODERNISATION AND ENERGY EFFICIENCY PROJECTS OF THE RAIL SYSTEM

CARBON IMPACT OF THE RENEWAL EXPENSES FINANCED BY GREEN BONDS

	Tracks	Switches	Traction	Signalling	Engineering	TOTAL
EXPENSES FINANCED BY GREEN BONDS 2019 (m€)	1 805	418	271	530	157	3,181
CARBON FOOTPRINT (in thousand tonnes of tCO₂eq)						
... ALLOCATED TO EXPENSES FINANCED BY THE GREEN BONDS	823	37	24	201	72	1,157
AVOIDED EMISSIONS (in thousand tonnes of tCO₂eq)						
... ALLOCATED TO EXPENSES FINANCED BY THE GREEN BONDS	10,464	2,468	1,525	2,986	888	18,331
CARBON IMPACT (footprint - avoided emissions) (in thousand tonnes of tCO₂eq)						
... ALLOCATED TO EXPENSES FINANCED BY THE GREEN BONDS	-9,641	-2,431	-1,501	-2,785	-816	-17,174
AVERAGE CARBON NEUTRALITY TIME OF REPAIR PROJECTS	2.7 YEARS					

GLOBAL OVERVIEW

The total carbon impact allocated to expenses financed by the Green Bonds 2019 is obtained by adding:

- the carbon footprint of construction projects;
- the total emissions avoided by the projects financed by the 2019 Green Bonds.

Therefore, in total, the expenses financed by the Green Bonds 2019 reduce the GHG emissions of the transport system by 16.5 million tonnes equivalent CO₂.

The carbon impact of the SNCF Réseau **Green Bonds 2019** is **equivalent to the carbon footprint of approximately 12,000 French citizens over forty years.**

TOTAL CARBON IMPACT OF THE EXPENSES FINANCED BY THE GREEN BONDS 2019 (OVER FORTY YEARS)

Project carbon footprint	1,157,386 tCO ₂ eq
Emissions avoided by Green Bonds financing	– 18,331,293 tCO ₂ eq
Carbon impact (Footprint - Emissions avoided) of Green Bonds financing	– 17,173,907 tCO₂eq

OTHER IMPACTS OF EXPENDITURE FINANCED BY THE 2019 GREEN BONDS

Category	Indicators	Results
Investments in railway maintenance, modernisation and energy efficiency projects	Resource protection	
	Percentage of recycled and reused rails	100%
	Percentage of ballast reused in «Suite Rapide»	30 à 50%
	Volume of wooden sleepers recovered (tonnes)	65,000

Details of calculations, assumptions, estimations and extrapolations, as well as source data with their years, are available in the SNCF Methodological Guide "Evaluating the carbon impact of a Green Bonds programme dedicated to investors in railway infrastructure" available at www.sncf-reseau.fr

ONE STEP FURTHER

Find all the «Sustainable Finance» documentation on the SNCF Réseau website

All of the documents related to this Green Bonds programme (Green Bonds Framework, Second Party Opinion, etc.) are available on the SNCF Réseau website, in the section “SRI/Green Bonds”



Documentation related to our Green Bond Programme

[sncf-reseau.com/en/entreprise/
newsroom/sujet/green-bonds-
sncf-reseau-pioneers](https://sncf-reseau.com/en/entreprise/newsroom/sujet/green-bonds-sncf-reseau-pioneers)

All the information concerning the SNCF Réseau CSR policy is available on the dedicated pages of the SNCF Réseau website



The SNCF Réseau CSR policy

sncf-reseau.com/en/promises

The SNCF Réseau CSR report (2018)



The SNCF Réseau responsible activity report

[sncf-reseau.com/fr/plaquette/
rapport-activite-responsable-2018](https://sncf-reseau.com/fr/plaquette/rapport-activite-responsable-2018)

The SNCF Réseau Green Bonds
programme methodology



The Green Bonds methodology

[sncf-reseau.com/en/entreprise/
newsroom/sujet/green-bonds-
sncf-reseau-pioneers](https://sncf-reseau.com/en/entreprise/newsroom/sujet/green-bonds-sncf-reseau-pioneers)

All CSR reports, indicators,
and methodologies can be accessed
on the dedicated page “Reports
and indicators”



All CSR reports

sncf-reseau.com/en/promises

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