



## Verification Report for Post-Issuance Certification of the Green Bond issued by SNCF Réseau in Oct 2016

28 November 2017

### Scope

SNCF Réseau commissioned oekom research to compile a Verification Report for Post-Issuance Certification by the Climate Bond Initiative (CBI) of its Green Bond issued in October 2016. The Climate Bond Certification process includes verifying whether the provisions of the Climate Bond Standard issued by the CBI are met and obtaining evidence to support the verification.

The Green Bond issued SNCF Réseau in October 2016 is part of SNCF's Green Bond Programme.

### Criteria

Relevant CBI Standards for this Climate Bond Certification:

- Climate Bond Standard (Climate Bond Standard Version 2.1; status 01/2017)
- Low Carbon Land Transport – Eligibility & Guidance Document (Version 1.0; status 02/2016)

### SNCF Réseau's Responsibility

SNCF Réseau's responsibility was to provide information and documentation on:

- Part A: General Requirements
- Part B: Eligible Projects & Assets
- Part C: Requirements for Specific Bond Types

## Independence and Quality Control

oekom research is managerially and economically independent. Its independence is guaranteed through registered shares with restricted transferability, rigorous codes of conduct for every analyst and the fact that neither consulting services nor asset management services are offered. oekom research can thus guarantee a high degree of credibility and objectivity for its research findings.

Regular audits by an independent institution against the European voluntary quality standard for responsible investment ARISTA® attest oekom's extensive quality standards which are complemented by a comprehensive quality management system.

## oekom's Responsibility as a Verifier

oekom research reviewed the information and documentation provided by SNCF Réseau to assess the Green Bond's alignment with the CBI requirements:

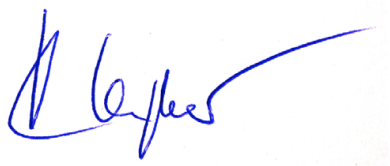
- Conformance with Part A, B and C of the CBI Standard

oekom research's approach to assess whether the issuer meets the criteria of the CBI standard was as follows. The issuer provided an overview over the projects included in the Green Bond asset pool and the relevant processes regarding the proceeds (e.g. use of proceeds, management of proceeds) to oekom research. Further, the issuer needed to fill in a questionnaire that covers all criteria of the Climate Bond Standard 2.1. Additionally, the issuer had to provide background documents that elaborate further on the information mentioned in the questionnaire. With the help of this questionnaire and the background documents, oekom research carried out a desk-based assessment of the CBI criteria. In case any answers were unclear, oekom research contacted the issuer for more details and clarification.

## Restriction on Distribution and Use of Report

This Verification Report for Post-Issuance Climate Bond Certification including all documentation provided alongside is intended for the use of SNCF Réseau and the Climate Bond Standard Board. The present document may be published by SNCF Réseau, CBI and oekom research. CBI and oekom research agree to publish the report with the consent of SNCF Réseau.

Based on the limited assurance procedures conducted on SNCF Réseau's Green Bond issued in October 2016, oekom research found no evidence for non-conformance with the Climate Bond Standard's post-issuance requirements.



Robert Haßler, CEO

oekom research AG

Munich, 28 November 2017

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#### Disclaimer

1. oekom research AG uses a scientifically based rating concept to analyse and evaluate the environmental and social performance of companies and countries. In doing so, we adhere to the highest quality standards which are customary in responsibility research worldwide. In addition we create a Second Party Opinion (SPO) on bonds based on data from the issuer.
2. We would, however, point out that we do not warrant that the information presented in this SPO is complete, accurate or up to date. Any liability on the part of oekom research AG in connection with the use of these SPO, the information provided in them and the use thereof shall be excluded. In particular, we point out that the verification of the compliance with the selection criteria is based solely on random samples and documents submitted by the issuer.
3. All statements of opinion and value judgements given by us do not in any way constitute purchase or investment recommendations. In particular, the SPO is no assessment of the economic profitability and credit worthiness of a bond, but refers exclusively to the social and environmental criteria mentioned above.
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#### About oekom research

oekom research is one of the world's leading rating agencies in the field of sustainable investment. The agency analyses companies and countries with regard to their environmental and social performance. oekom research has extensive experience as a partner to institutional investors and financial service providers, identifying issuers of securities and bonds which are distinguished by their responsible management of social and environmental issues. More than 100 asset managers and asset owners routinely draw on the rating agency's research in their investment decisionmaking. oekom research's analyses therefore currently influence the management of assets valued at over 600 billion euros.

As part of our Green Bond Services, we provide support for companies and institutions issuing sustainable bonds, advise them on the selection of categories of projects to be financed and help them to define ambitious criteria. We verify the compliance with the criteria in the selection of projects and draw up an independent second party opinion so that investors are as well informed as possible about the quality of the loan from a sustainability point of view.

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## Annex

- Annex 1: Detailed Findings
- Annex 2: SNCF Réseau's Green Bond Reporting 2016

## Annex 1: Detailed Findings

### 4. Nominated Projects and Assets

	Requirement	Factual Findings	Analysis against Requirements
4.1.	Decision-making process to determine the continuing eligibility of nominated projects and assets	SNCF Réseau has defined a set of environmental objectives (i.e. to promote eco-friendly modes of transportation and contribute to the fight against greenhouse gas emissions) and has implemented processes to determine the eligibility of nominated projects.	✓
4.2	Conformance with the Bond's documented objectives and requirements of Part B of the CBI Standard	SNCF Réseau assesses all nominated projects against its self-defined eligibility criteria, which meet the bond's objectives. All nominated projects are electrified rail infrastructure projects. Through the financing of these projects it will be possible to avoid emissions of approx. 2.9 million tCO <sub>2</sub> e over the next 40 years. The nominated projects are therefore compliant with the eligibility criteria under Part B of the Climate Bond Standard.	✓
4.3	No double nomination of projects and assets	By earmarking projects SNCF Réseau has designed a process to ensure that projects are not nominated twice.	✓

## 5. Use of Proceeds

	Requirement	Factual Findings	Analysis against Requirements
5.1	Allocation of net proceeds to nominated projects and assets.	All proceeds had been allocated to nominated assets by 1st March 2017.	✓
5.2	Allocation of funds within 24 months of issuance of the bond	All proceeds had been allocated to nominated assets by 1st March 2017.	✓
5.3	Share of financing and refinancing.	The net proceeds of the Green Bond were exclusively used to finance newly originated projects of SNCF Réseau.	✓
5.4	Tracking of proceeds	SNCF Réseau tracks the proceeds using an internal IT system. Allocation is reviewed annually.	✓
5.5	Net proceeds of the loan and investment to nominated projects and assets	SNCF Réseau has identified eligible projects significantly greater than the net proceeds of the bond. SNCF Réseau reviews allocation annually.	✓

## 6. Non-contamination of Proceeds

	Requirement	Factual Findings	Analysis against Requirements
6.1	Tracking of proceeds	SNCF Réseau confirms that proceeds are tracked using an internal IT system. Allocation is reviewed annually.	✓

	Requirement	Factual Findings	Analysis against Requirements
6.2	Non-contamination of proceeds	<p>SNCF Réseau invests temporarily unallocated proceeds in SRI mutual funds, bank deposits, cash, and/or cash equivalents.</p> <p>SNCF Réseau also states that by 1st March 2017 100% of the proceeds had been allocated to eligible assets which are earmarked in the internal IT system.</p>	✓
6.3	Cases of force majeure	n/a. All proceeds have been allocated.	n/a

## 7. Confidentiality

	Requirement	Factual Findings	Analysis against Requirements
7.1	Description of the projects	<p>All financed assets are electrified rail infrastructure projects (maintenance, upgrades and extensions of existing lines as well as construction of new lines). Through the financing of these projects it will be possible to avoid emissions of approx. 2.9 million tCO<sub>2</sub>e over the next 40 years.</p>	✓
7.2	Disclosure of information to the market	<p>Details on SNCF Réseau's Green Bond are available in SNCF Réseau's Green Bond Reporting 2016, available on a dedicated section of SNCF Réseau corporate website: <a href="https://www.sncf-reseau.fr/en/sri-green-bonds">https://www.sncf-reseau.fr/en/sri-green-bonds</a>.</p>	✓



## 8. Reporting

	Requirement	Factual Findings	Analysis against Requirements
8.1	Description of reporting	<p>Details on SNCF Réseau's Green Bond are available in SNCF Réseau's Green Bond Reporting 2016. The 2016 project report can be found in Annex 2.</p> <p>The quantitative performance indicators which include the following:</p> <ul style="list-style-type: none"> <li>• Aggregated information on financed projects</li> <li>• Greenhouse gases emitted and avoided</li> <li>• Resources protected</li> </ul>	✓

## 9. Climate Bond Taxonomy

	Requirement	Factual Findings	Analysis against Requirements
9.1	Matching of Climate Bond category	<p>All assets of the Green Bond are electrified rail infrastructure projects (maintenance, upgrades and extensions of existing lines as well as construction of new lines).</p> <p>Through the financing of these projects it will be possible to avoid emissions of approx. 2.9 million tCO<sub>2</sub>e over the next 40 years.</p>	✓

## 10. Technical Criteria

	Requirement	Factual Findings	Analysis against Requirements
10.1	Sector-specific eligibility criteria	All assets of the Green Bond are electrified rail infrastructure projects (maintenance, upgrades and extensions of existing lines as well as construction of new lines). Through the financing of these projects it will be possible to avoid emissions of approx. 2.9 million tCO <sub>2</sub> e over the next 40 years.	✓
10.2	Bonds covering several sector-specific criteria	n/a (low carbon rail transportation only)	n/a

## 11. Project Holding

	Requirement	Factual Findings	Analysis against Requirements
11.1	Holding of assets with a fair market value at least of the original amount at time of issuance	SNCF Réseau is financing own projects, which will be on their books for the long-run. The pool of underlying projects will remain the same over the term of the loan.	✓

## 12. Settlement Period

	Requirement	Factual Findings	Analysis against Requirements
12.1	Description of the process and timeline of distribution of proceeds	cf. 5.1	✓

	Requirement	Factual Findings	Analysis against Requirements
12.2	Description of process regarding unallocated proceeds after 24 months	n/a (cf. 5.1)	n/a

### 13. Earmarking

	Requirement	Factual Findings	Analysis against Requirements
13.1	Description of internal earmarking process	Every project that is being financed through the Green Bond is earmarked in SNCF Réseau's internal IT system. This system is managed by the Treasury and the Accounting Departments.	✓

**Annex 2: SNCF Réseau's Green Bond Reporting 2016**

# GREEN BONDS

REPORT  
2016

# EDITORIAL

Dear investors and partners,

With this Green Bonds programme, SNCF Réseau is seeking to demonstrate its commitment to ecological transition on a daily basis.

The interest of this programme, for a company such as ours, whose activity is naturally

at the heart of the fight against climate change, can be conveyed in a few essential messages:

- **encouraging modes of transport that are eco-friendly, safe, fast, and with low requirements** in terms of space and natural resources;
- contributing to the selection of projects that help in **the fight against greenhouse gas emissions**, the preservation of natural resources and the protection of biodiversity;
- **participating in the development of socially responsible financing** and supporting the effort initiated by the French authorities as part of COP 21.

Our commitment at the time this programme was launched in autumn 2016 was to become a leading player in the Green Bond market. In less than 12 months, SNCF Réseau has launched three Green Bonds issues (maturity periods of 15, 17 and 30 years) for a total amount of 2.65 billion euros, thus becoming one of the **world's top fifteen players in this domain**, and has received a Climate Bond Award.

We made a commitment to **set new high-level standards** for transport and railway industry infrastructures in particular: with the help of Carbone 4, SNCF Réseau has established a new method for assessing the environmental impact of its renovation and development projects which was used in the drafting of this report. A summary of this methodology can be found on page 33 of this report.

We were committed to adopting the **best certification standards**: the SNCF Réseau Green Bonds programme is one of the few programmes worldwide to have received double certification: Green Bond Principles and Climate Bonds Initiative, awarded by Oekom Research.

Lastly, we wanted to produce a report based on the **best practices** in this field:

- the allocation of funds raised as part of our Green Bonds issues has been verified and included in an assurance report by the firm KPMG;
- the assessment of the environmental impact of eligible projects, as defined in the SNCF Réseau programme, has been validated by a consulting firm specialising in the energy transition and climate change adaptation, Carbone 4.

As regards the environmental impact, one statistic in particular should be highlighted: the funds raised thanks to the SNCF Réseau Green Bond 2016 have made it possible to **avoid emission of 2.9 million tons equivalent of CO<sub>2</sub>** over the forty next years, i.e. an impact comparable to the carbon footprint of approximately 6,000 French residents over the same period.

We hope that you will take as much pleasure in reading this report as we did in preparing and embarking upon this Green Bond adventure, with all the SNCF Réseau business lines, over the past two years.

We are proud to be working alongside you in creating the conditions for the **responsible modernisation of our network**.



PATRICK JEANTET,  
DEPUTY CHAIRMAN OF THE SNCF  
EXECUTIVE BOARD  
AND CEO OF SNCF RÉSEAU



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# 01 INTRODUCTION TO SNCF RÉSEAU

## SNCF RÉSEAU AND THE FRENCH RAILWAY NETWORK

Created in January 2015 through the merger of the Réseau ferré de France (RFF), SNCF Infra and the Direction de la circulation ferroviaire (DCF), SNCF Réseau owns and manages the French national rail network.

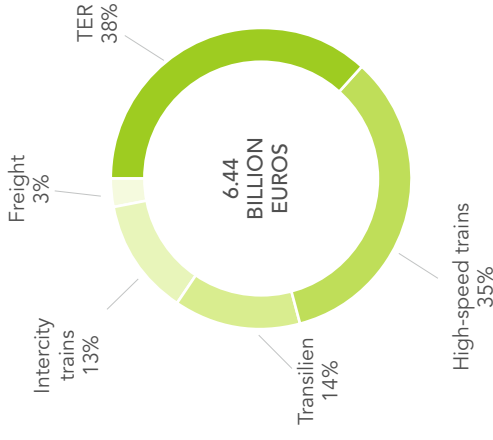
### SNCF Réseau's main responsibilities:

- ensuring fair access to the rail network for 26 rail transport companies and 12 regional transport authorities;

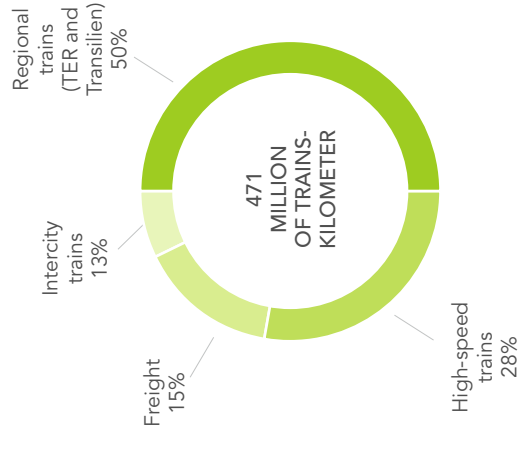
- organising and developing rail traffic: 15,000 trains circulate daily, transporting more than 5 million passengers per day;
- ensuring the maintenance and enhancement of the network, SNCF Réseau is one of the leading investors in France with 3.4 billion euros invested in 2016;
- ensuring the development of the network.

With its 54,000 employees, SNCF Réseau has generated a turnover of 6.4 billion euros with an operating margin (EBITDA - earnings before interest, tax, depreciation and amortisation) of 1.9 billion euros and a net result of - 0.1 billion euros in 2016.

## TURNOVER PER BUSINESS LINE IN 2016



## TRAFFIC IN 2016



## A CREDIT RISK EQUIVALENT TO THAT OF THE FRENCH STATE

As a 100% State-owned public entity, SNCF Réseau benefits from the strong support of the French State based on its legal status (EPC).

### As an EPIC, SNCF Réseau:

- is not subject to private-sector bankruptcy law;
- may only be dissolved by an amending law transferring its rights and obligations to another public entity.

### SNCF Réseau:

- performs a public sector mission and enjoys a natural monopoly position with no risk of deregulation;
- was included in the "Government Related Entity" list by the European Commission in 2002 and is eligible to the ECB Public Sector Purchasing Programme.
- SNCF Réseau debt is seen by credit rating agencies as **implicitly guaranteed by the French State**.

RATING AGENCIES	LONG TERM	SHORT TERM
<b>Fitch</b>	<b>AA</b>	<b>F1+</b>
<b>Moody's</b>	<b>Aa2</b>	<b>P-1</b>
<b>Standard &amp; Poor's</b>	<b>AA</b>	<b>A-1+</b>



# 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.

# REDUCING GHG EMISSIONS FOURFOLD BY 2050

Various scenarios of the progression of greenhouse gas emissions (GHG) and their consequences on the average global temperature are being studied by the IPCC<sup>1</sup>. They have predicted a rise in the temperature on a global scale of between 1.8 and 4°C on average by 2100, compared to the end of the 19<sup>th</sup> century.

The objective set by decision-makers at global level and reaffirmed in the Paris Agreement, resulting from the 21<sup>st</sup> Conference of the Parties (COP 21) in December 2015,

is to limit the temperature increase to 2°C between now and 2100. To do so, we must reduce global GHG emissions twofold by 2050 compared to 1990 levels in order to achieve the most optimistic scenarios and limit the consequences of climate change.

The SNCF Réseau energy and carbon performance approach is part of a global framework to reduce GHG emissions at world, European and national levels, summarised in the table below.

## GHG EMISSIONS REDUCTION TARGETS (vs 1990)

GLOBAL	EUROPE	FRANCE
<b>Kyoto Protocol</b>	<b>2020 Climate and Energy Package</b>	<b>Factor 4 (-3% per year)</b>
<b>Reducing GHG by 5.2%</b> between 2008-2012.	<b>Reducing GHG by 20% by 2020.</b> Through a combination of renewable energy (20%) and greater energy efficiency (20%).	<b>Reducing GHG emissions fourfold by 2050</b> (POPE2 law <sup>2</sup> ).
	<b>Reducing GHG by 40% by 2030.</b> Through a combination of renewable energy (27%) and greater energy efficiency (27%).	

1. The Intergovernmental Panel on Climate Change (IPCC) is an intergovernmental organisation assigned "to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation."  
2. POPE law (Energy Policy Orientation Programme).

## THE OBJECTIVES OF THE ECOLOGICAL TRANSITION

### AT EUROPEAN LEVEL

The European Union has made a strong commitment to the fight against climate change by anticipating the "post-Kyoto" period through the **Climate and Energy Package**, adopted in 2008, which sets the objective of "3 x 20" (20% GHG emissions saved, 20% more renewable energy, 20% more energy efficiency).

During 2014, European discussions focused on the definition of a **new Climate and Energy Package for 2030**. This constituted the basis for the European commitment to the global agreement reached in Paris during COP 21.

### AT NATIONAL LEVEL

In order to strengthen the **Climate Plan** by incorporating long-term national measures, France has undertaken a major commitment to reducing its GHG emissions fourfold by 2050: the "Factor 4" objective. The goal is to achieve a level of approximately 2 tCO<sub>2</sub>eq<sup>3</sup> per inhabitant, which corresponds to the recommended

level for limiting global warming to 2°C. Lastly, the **Law on Energy Transition for Green Growth (LTECV)**, published in the *Journal Officiel* dated 18 August 2015, as well as its accompanying action plans, are designed to help France contribute more effectively to the fight against climate change and the protection of the environment, and to improve its energy independence while offering its companies and citizens access to energy at competitive costs.

### The targets set by the law

To provide a framework for the joint action of citizens, companies, territories and the State, the law has set medium- and long-term targets:

- reducing greenhouse gas emissions by 40% between 1990 and 2030, and by 75% between 1990 and 2050 (Factor 4);
- reducing final energy consumption by 50% in 2050 compared to 2012, with an intermediate target of 20% in 2030;
- reducing primary energy consumption of fossil fuels by 30% in 2030 compared to 2012;
- bringing the share of renewable energies to 23% of gross final energy consumption in 2020, and to 32% in 2030;
- bringing the share of nuclear energy in electricity generation to 50% by 2025.

3. Tons equivalent CO<sub>2</sub>.

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

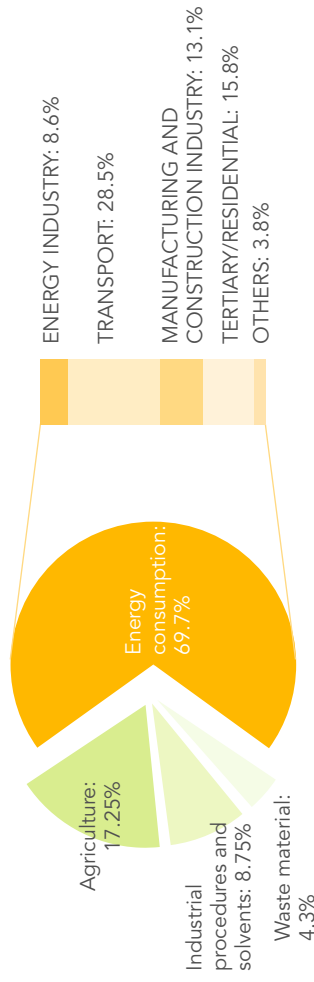
(freight and passengers), emits less than 1% of all GHG emissions from transport.

This can be explained by:

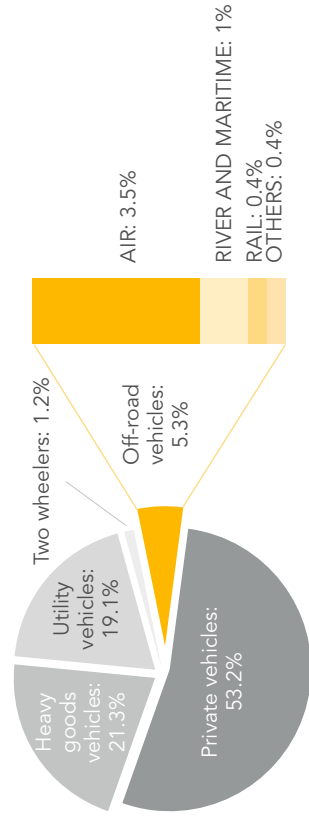
- the low amount of energy needed for rail traction (wheel-rail contact vs tyre-road);
- mass-transport;
- the high use of electricity (78% of trains use electric traction), only 4% of which is generated by fossil fuels in France.

In France, rail transport, which accounts for 10% of traffic

## BREAKDOWN PER SOURCE OF GHG EMISSIONS (EXCLUDING LULUCF<sup>1</sup>) IN FRANCE IN 2014



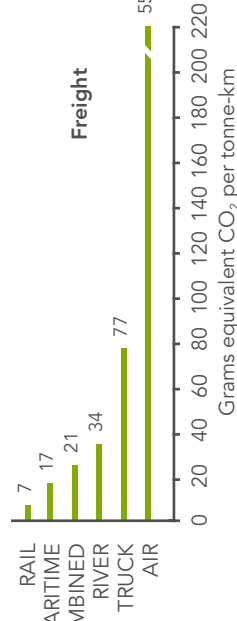
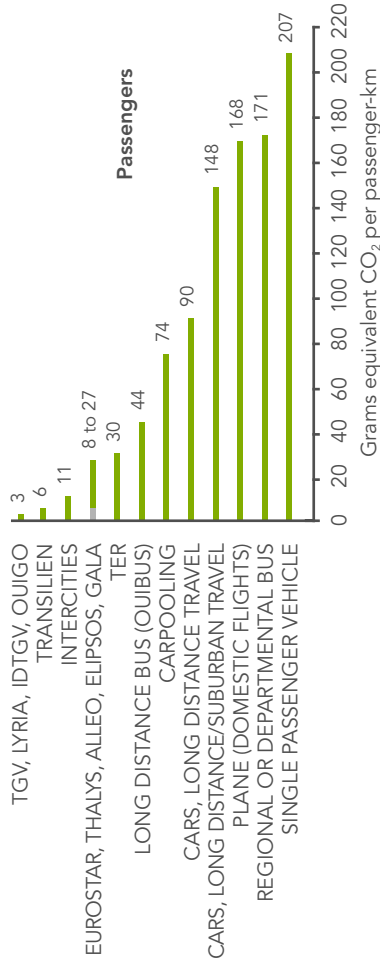
## GHG EMISSIONS PER MODES OF TRANSPORT IN FRANCE AS A % (INCLUDING FOD)



Source: Citepa, June 2016

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

## GHG EMISSIONS PER MODE OF TRANSPORT



Sources:  
 - Passengers: methodology note on CO<sub>2</sub> information for transport services (2016, statistics obtained from SNCF, MEDDE, ADEME).  
 - Freight: SNCF Cargo (2014), SNCF Logistics (2011), ADEME.

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 30% of total GHG emissions of France (i.e. 133 MtCO<sub>2</sub>eq).**

Moreover, the advantages of rail transport are not limited to low levels of CO<sub>2</sub> 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

Although rail transport is a key contributor to France's low carbon transition, SNCF Réseau nonetheless strike for greater energy efficiency and reducing it's own GHG emissions.

**SNCF Réseau has thus made a commitment to reduce its energy consumption and its GHG emissions by 20% between 2015 and 2025.**

To achieve this, actions have been identified and initiated.

- For all our activities: tertiary, operational activities, projects (related to the Green Bonds programme);
- For the primary sources of GHG emissions: energy required for construction, service vehicles, train engines, materials used, etc.

Knowing the carbon weight of SNCF Réseau activities is the starting point for actions for improvement and commitment as part of a sustainable development approach. It helps identify priorities for optimisation and improves our operational methods.

In order to industrialise the approach, SNCF Réseau is currently preparing an operational tool to calculate and report the GHG emissions

of the company's main activity, i.e. maintenance and modernisation of the national rail network.

Since 2015, SNCF Réseau has produced a first *Bilan Carbone*<sup>®</sup> (Carbon Balance sheet) for track renewal projects using a mobile workshop known as a "Suite Rapide" (90 km between Narbonne and Montpellier), identified actions to reduce GHG emissions and created a tool to assess the emissions of similar projects.

Other *Bilans Carbone*<sup>®</sup> (Carbon Balance sheets) will be produced for other types of projects to consolidate our knowledge as part of a continuous improvement approach.

## SNCF RÉSEAU'S CSR POLICY

This carbon approach is part of a global CSR policy for the sustainable modernisation of the network, defined and implemented by SNCF Réseau over the past few years.

The French railway network must transform itself to keep pace with a constantly changing world. SNCF Réseau has thus adopted a corporate strategy with three major commitments<sup>1</sup>:

- accelerating the renewal of the network;

- shifting from a 19<sup>th</sup> century industry model to a 21<sup>st</sup> century industry model;
- successfully opening up internal passenger transport to competition and ensuring that the customer is at the core of our service offer.

This CSR policy was created in collaboration with all of the company's internal stakeholders, in accordance with the sustainable development policy of the SNCF Group, so as to support the business project and provide better transparency of our activities for all our stakeholders. SNCF Réseau is thus creating the conditions for the responsible modernisation of the French rail network.

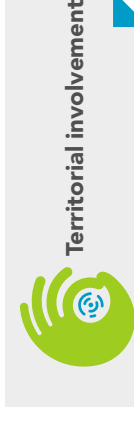
## FOUR MAIN PRIORITIES<sup>1</sup> FORM THE BASIS OF THE COMPANY'S CSR POLICY



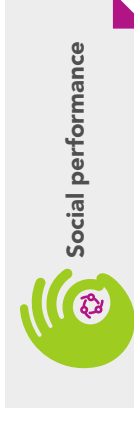
Level of safety



Ecological footprint



Territorial involvement



Social performance

These main priorities are broken down, throughout the company, into sixteen commitments<sup>1</sup>, the importance of which was confirmed by a survey carried out among over 1,500 people<sup>2</sup> (employees, customers, suppliers, regional and departmental board officials, associations, communities affected by the rail network,

etc.). Within priority no. 2

- "reducing our ecological footprint and consolidating our environmental assets" –, **commitment no. 7 is directly connected to the Green Bonds programme since it consists of "reducing our greenhouse gas emissions and improving energy efficiency"**.

1. Details can be found in the "2016 responsible activity report". 2. Online survey carried out by SNCF Réseau between June and November 2016 with a representative sample of all of its stakeholders.

## SNCF RÉSEAU EXTRA-FINANCIAL RATINGS

extra-financial rating agencies, Vigeo and Oekom Research, which have awarded it the ratings given in the table below.

Reflecting this policy and CSR strategy, SNCF Réseau is monitored by two

RATING AGENCIES	RATING	POSITION OF SNCF RÉSEAU
<b>Vigeo</b>	<b>64/100</b>	2 <sup>nd</sup> from a panel of 38 European companies in the logistics/transport sector.
<b>Oekom Research</b>	<b>C+</b>	5 <sup>th</sup> from a panel of 45 Global companies in the transport infrastructure management sector.

The rating obtained from Vigeo for the environmental aspect (77/100) is accompanied by the following comment:

“SNCF Réseau absolute performance in the Environment domain is advanced, which is an increase compared to the previous review.  
- This improvement is mainly due to the Company’s highly relevant commitment to environmental issues, supported by comprehensive resources to environmental

management that covers all of SNCF Réseau’s production sites. Concerning its energy use the company has set quantified target and comprehensive measures, such as fleet and building optimisation. In addition, the Company appears to have developed measures to preventing local pollution.”

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

# 03

## SNCF RÉSEAU'S "GREEN BONDS FUNDING"

In October 2016, SNCF Réseau became the first railway infrastructure management operator in the world and the first transport company in Europe to issue a Green Bond.

# A "CLIMATE BONDS INITIATIVE" CERTIFIED ISSUE

On 27 October 2016, SNCF Réseau, the owner and operator of the French railway network, rated Aa2 (Moody's), AA (S&P), AA (Fitch), launched an inaugural issuance of Green Bonds amounting to 900 million euros with a maturity period of 15 years.

**SNCF Réseau was the first railway infrastructure management operator in the world and the first transport company in Europe to issue a Green Bond.**

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 2016 (GBP)** and has also been awarded **Climate Bonds Initiative (CBI) certification**, by Oekom Research.

Lastly, SNCF Réseau, as a member of the GBP and the Finance for Tomorrow<sup>1</sup>



initiative, fully participates in the discussions and market developments of Green Bonds.

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

No eligible projects in category 3 ("Other investments linked to the global climate change challenges, the protection of biodiversity and natural resources") were identified in 2016. However, the eligible projects from the first two categories generally include provisions for protection of biodiversity and natural resources. The impact indicators reflecting the policy of preserving resources are given in part 5 of this report.

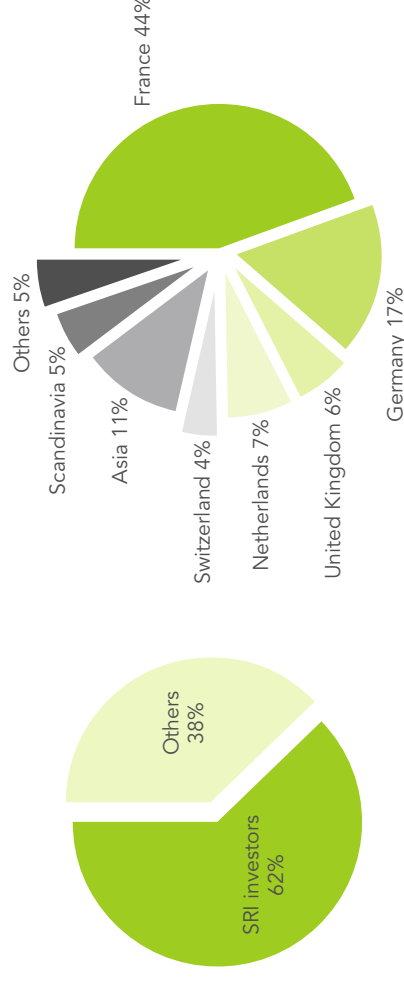
In 2016, approximately 20% of the annual issuances of the SNCF Réseau in the financial markets were in the form of Green Bonds.

## MAIN CHARACTERISTICS OF THE GREEN BONDS 2016 OPERATION

<b>ISSUER</b>	SNCF Réseau
<b>RATING</b>	Aa2 (Moody's) / AA (S&P) / AA (Fitch)
<b>ORDER BOOKS</b>	1.4 billion euros
<b>FINAL SIZE</b>	900 million euros
<b>ISSUE DATE</b>	27 October 2016
<b>SETTLEMENT DATE</b>	9 November 2016
<b>MATURITY DATE</b>	9 November 2031
<b>PRICE/ REOFFER YIELD</b>	98.570% / 1.104%
<b>COUPON</b>	1% annual
<b>SPREAD</b>	OATs + 31 bp

The SNCF Réseau 1% November 2031 is included in the Barclays MSCI Green Bonds Index.  
Source: SNCF Réseau.

## TYPOLOGY AND GEOGRAPHICAL DISTRIBUTION OF INVESTORS



Source: SNCF Réseau.

1. Finance for Tomorrow is an initiative led by the players of the Paris Financial Centre to promote sustainable finance in France and internationally. It contributes to reorienting financial flows towards a low carbon and inclusive economy, in line with the Paris Agreement and the Sustainable Development Goals (SDG).

# 04

## ALLOCATION OF NET PROCEEDS

The resources from the issuance of Green Bonds are allocated to projects for the renovation and modernisation on the core network as well as the completion of new lines.



# 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.

the framework developed by SNCF Réseau is also based on the 4 pillars structure developed in 2016 by the ICMA<sup>2</sup> Green Bond Principles. The 2016 version of the Green Bonds programme (Green Bond Framework) is available on the SNCF Réseau website<sup>3</sup>.

The Second Opinion, issued by Oekom Research, confirms the compliance of the SNCF Réseau Green Bonds framework with the ICMA Green Bond Principles (2016). The 2016 version of this Second Party Opinion (SPO) is available on the SNCF Réseau website<sup>4</sup>.

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 2016 version of this certification awarded by Oekom Research is available on the SNCF Réseau website<sup>5</sup>.

SNCF Réseau has complied with the principles laid out by the Climate Bonds Initiative (CBI), and particularly with Low Carbon Transport Eligibility Criteria (V1.0)<sup>1</sup>. Drawing on best market practices,

## PREPARATION OF THE SNCF RÉSEAU GREEN BONDS PROGRAMME

### CLIMATE BONDS CERTIFIED BOND "ISSUE"

### CATEGORIES OF ELIGIBLE PROJECTS

The proceeds of the 2016 Green Bond were allocated to investments corresponding to one of the following three categories.

<b>Category 1</b>	<b>INVESTMENTS RELATED TO MAINTENANCE, UPGRADE AND ENERGY EFFICIENCY OF THE RAIL SYSTEM</b>	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, <b>consisting of the most used and 100% electrified part of the network (lines in UIC groups 1 to 4<sup>6</sup>).</b>
<b>Category 2</b>	<b>INVESTMENTS RELATED TO NEW LINES AND LINES EXTENSIONS</b>	Projects related to new lines and line extensions, improving access to the network for passengers and freight mobility. For example <b>LGV Est, LGV SEA, LGV BPL, LGV CNM high-speed lines etc.</b>
<b>Category 3</b>	<b>OTHER INVESTMENTS LINKED TO GLOBAL CLIMATE CHANGE CHALLENGES, PROTECTION OF BIODIVERSITY AND NATURAL RESOURCES</b>	Projects related to the protection of biodiversity and natural resources surrounding SNCF's existing network.

6. 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.  
7. More details page 40/41.

1. The annexe Low Carbon Transportation is available at [www.climatebonds.net](http://www.climatebonds.net)  
2. ICMA: International Capital Market Association.  
3. [bit.ly/GBond2016](http://bit.ly/GBond2016)  
4. [bit.ly/GBondSPO](http://bit.ly/GBondSPO)  
5. [bit.ly/GBondOekom](http://bit.ly/GBondOekom)

## THE ALLOCATION IN DETAIL

budget and presented to investors during the inaugural Green Roadshow in October 2016.

– “Green Bonds scope”: amounts of investments actually made by SNCF Réseau in each of the categories as on 31/12/2016.

– “Green Bonds allocation”: allocation per categories of the net resources obtained from the issuance of Green Bonds from November 2016 to 31/12/2016.

– “Yet to be allocated”: amounts of eligible investments in 2016 not allocated to a Green Bonds issuance and which may consequently be reused in 2017.

The following table shows the allocation of the issuance of Green Bonds for 2016 according to the three eligible investment categories.

### Definitions

– “Theoretical allocation”: amount of the projected investments for 2016 for each of the categories as given in the SNCF Réseau 2016

## DESCRIPTION OF THE FUND MANAGEMENT POLICY

traceability of the fund management policy.

The full allocation for the 2016 operation was carried out on 1<sup>st</sup> March 2017.

For proceeds yet to be allocated these amounts could be placed on SRI mutual funds, bank deposit or cash in bank in order to ensure

INVESTMENTS IN MILLION EUROS	THEORETICAL ALLOCATION		GREEN BONDS SCOPE		GREEN BONDS 2016 ALLOCATION		TO BE ALLOCATED IN 2017
	2016 projection	Break-down	On 31 Dec 2016	Break-down	Allocation	Break-down	
<b>MAINTENANCE AND UPGRADE</b>	<b>1,306</b>	<b>76%</b>	<b>1,303</b>	<b>88%</b>	<b>710</b>	<b>80%</b>	<b>593</b>
Tracks, ballast and sleepers, etc.	855		889	68%	484		
Switches	357		195	15%	106		
Signalling	94		183	14%	100		
Traction power supply infrastructure			36	3%	20		
<b>NEW LINES AND LINES EXTENSIONS</b>	<b>414</b>	<b>24%</b>	<b>175</b>	<b>12%</b>	<b>175</b>	<b>20%</b>	<b>0</b>
EST 2			14	8%	14		
SEA			73	42%	73		
BPL			53	30%	53		
CNM			36	20%	36		
<b>OTHERS PROJECTS</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>TOTAL</b>	<b>1,720</b>		<b>1,479</b>		<b>885</b>		<b>593</b>

Source: SNCF Réseau.

GREEN BOND 2016						
ALLOCATION - MONITORING OF FUNDS (IN €M)						
Settlement date	9 Nov 2016	9 Nov 2016	01 Dec 2016	30 Dec 2016	01 March 2017	
Net Proceeds	885.33					
SICAV ISR		385.33	0	0	- 384.99	
Unsecured deposit		300	0	- 300	0	
Bank accounts		200	- 200	0	0	
Sub-total		885.33	- 200	- 300	- 384.99	
<b>TOTAL</b>	<b>885.33</b>	<b>885.33</b>	<b>685.33</b>	<b>385.33</b>	<b>0.34</b>	Full allocation

Source: SNCF Réseau.

## KPMG ASSURANCE REPORT

SNCF Réseau appointed KPMG to give a independent assurance on the green bond report.

### Extract from the conclusion of the KPMG assurance report

"We consider that the evidence gathered is sufficient and appropriate to base our conclusion on.

On the basis of this works, we have not found any significant anomaly which may cast doubt upon the Verified Information, namely:

- the compliance of the projects appearing in the paragraph "Table of allocations" on page 26 with the eligibility criteria defined by SNCF Réseau in the "Green Bond Framework";

– the allocation of the funds raised during the Green Bond issuance for eligible projects given in the paragraph "Table of allocations" on page 26;

– the description of the fund management policy given in the paragraph "Description of the fund management policy" on page 27;

– the "total carbon impact of the expenses financed by Green Bonds" indicator given in the table of the paragraph "Global overview" on page 44;

are presented in the annual Report, in all their significant aspects, in compliance with the Reference document."

The KPMG assurance report must be read in its entirety. It is available on the SNCF Réseau website.

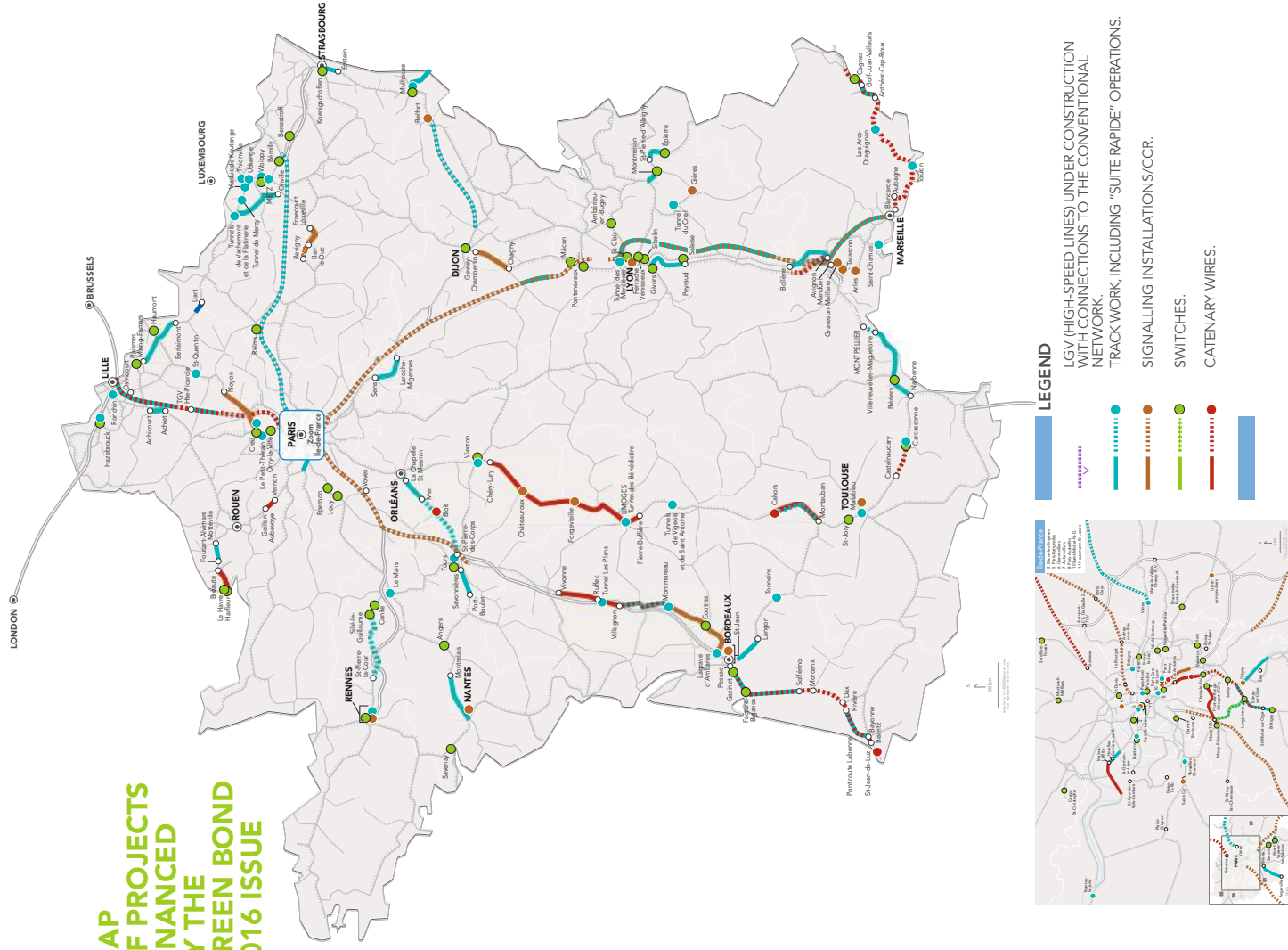
# 05

## 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.

## 2016 ALLOCATION INDICATOR TABLE

## MAP OF PROJECTS OF FINANCED BY THE GREEN BOND 2016 ISSUE



### CATEGORIES

### INDICATORS

### RESULTS

**INVESTMENTS IN MAINTENANCE, MODERNISATION AND ENERGY EFFICIENCY PROJECTS CONCERNING THE RAIL SYSTEM**

#### GREENHOUSE GASES (GHG) EMITTED AND AVOIDED EMISSIONS

- Greenhouse Gas emissions due to the renewal project
- Greenhouse Gas emissions avoided thanks to the renewal project

253 ktCO<sub>2</sub>eq  
2,980 ktCO<sub>2</sub>eq

#### PROTECTION OF RESOURCES

- Share of re-used rails (tons)
- Share of recycled rails (tons)
- Share of ballast re-used (tons)
- Volume of wooden sleepers recycled for energy purposes
- Number of kilometres of catenary replaced

3.5%  
96.5%  
30 to 50%  
78,300 tons  
400 km

**INVESTMENTS RELATED TO NEW LINES AND LINE EXTENSIONS**

#### GREENHOUSE GAS (GHG) EMISSIONS

- Greenhouse Gas emissions due to the project
- Emissions avoided

54 ktCO<sub>2</sub>eq  
244 ktCO<sub>2</sub>eq

#### PROTECTION OF RESOURCES

- Number of hectares compensated
- Number of wildlife crossings created

6,430  
1,253

**OTHER INVESTMENTS LINKED TO THE GLOBAL CLIMATE CHANGE CHALLENGES, THE PROTECTION OF BIODIVERSITY AND NATURAL RESOURCES**

The category is to be expanded as it groups several projects that are less significant in terms of amounts, but important for the overall corporate strategy.

### LEGEND

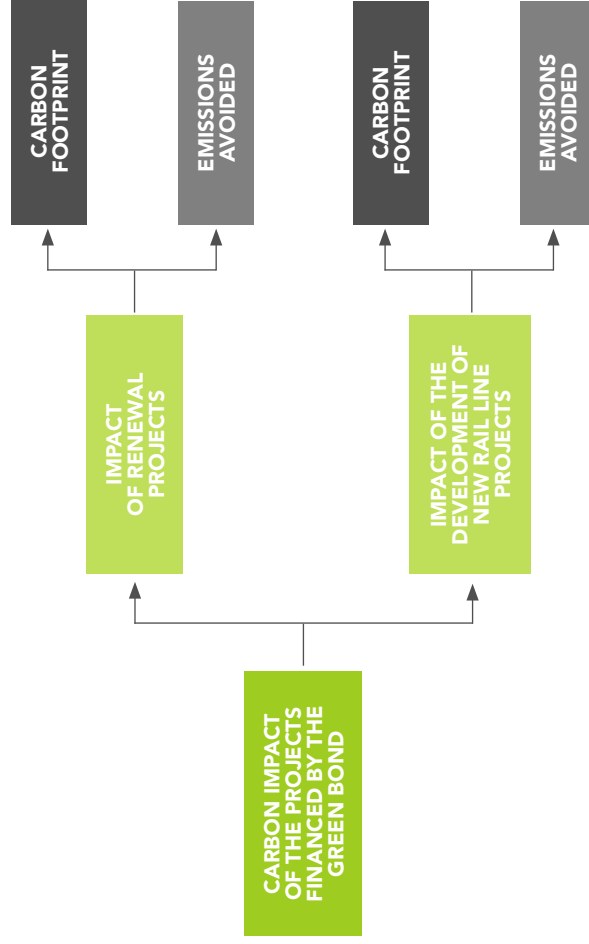
- LGV (HIGH-SPEED LINES) UNDER CONSTRUCTION WITH CONNECTIONS TO THE CONVENTIONAL NETWORK.
- TRACK WORK, INCLUDING "SUITE RAPIDE" OPERATIONS.
- SIGNALLING INSTALLATIONS/CCR.
- SWITCHES.
- CATENARY WIRES.

# 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 4<sup>1</sup>, has drafted a **specific methodology**<sup>2</sup> 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<sup>3</sup>, 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.



1. Carbone 4 is an independent consulting firm specialised in low carbon strategy and adaptation to climate change.  
 2. This methodology is available at [sncf-reseau.fr/fr/finance-durable](http://sncf-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.

## 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 POWER SUPPLY INFRA-STRUCTURE	SIGNALLING	TOTAL
EXPENSES FINANCED BY GREEN BONDS 2016 (€M)	484	106	20	100	710
CARBON FOOTPRINT (IN THOUSAND TONS OF CO <sub>2</sub> EQ)...					
... ALLOCATED TO EXPENSES FINANCED BY THE GREEN BONDS	175	38	2	38	253
AVOIDED EMISSIONS (IN THOUSAND TONS OF CO <sub>2</sub> EQ)...					
... ALLOCATED TO EXPENSES FINANCED BY THE GREEN BONDS	2,083	456	92	350	2,980
CARBON IMPACT (FOOTPRINT - AVOIDED EMISSIONS) (IN THOUSAND TONS OF CO <sub>2</sub> EQ)...					
... ALLOCATED TO EXPENSES FINANCED BY THE GREEN BONDS	- 1,908	- 418	- 90	- 312	- 2,728
AVERAGE CARBON NEUTRALITY TIME OF REPAIR PROJECTS					
<b>3.3 YEARS</b>					

#### METHOD USED TO CALCULATE THE CARBON IMPACT OF RENEWAL PROJECTS

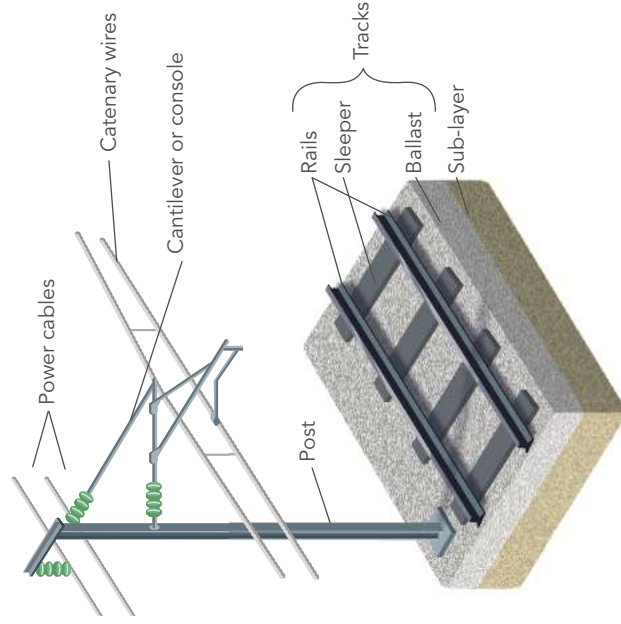
##### Carbon footprint

The Green Bonds helps finance hundreds of renewal projects per year, of varying scale. Assessing the carbon footprint of each project individually would require an extremely cumbersome reporting process and a costly mobilisation of resources.

## PRESENTATION OF LINE RENEWAL PROJECTS

The renewal operations carried out on the rail network ensure the infrastructure is maintained in an operational condition at its rated level, thus securing the attractiveness of the rail network for users. A renewal project consists of replacing all or part of the infrastructure components, which may be grouped into four sub-sets:

- **Track and switches**, primarily composed of two rails, sleepers, ballast and switching systems, allowing trains to run;
- **Traction power supply infrastructure**, consisting of catenary wires, supports, sub-stations, providing power to electric trains;
- **Signalling**, consisting of different types of signals (light, mechanical, manual, audible) as well as operations buildings that contain the centralized network command centre. Signalling conveys orders to the train driver and is used to regulate circulation in complete safety;
- **Civil engineering structures (bridges, tunnels) and earthworks** that allow the track to cross natural or artificial obstacles.



## INVESTMENTS RELATED TO MAINTENANCE, UPGRADE AND ENERGY EFFICIENCY OF THE RAIL SYSTEM

	GREEN BONDS SCOPE		GREEN BONDS ALLOCATION	
	€M	N° <sup>1</sup>	€M	N°
<b>TOTAL</b>	<b>1,303</b>	<b>1,067</b>	<b>710</b>	<b>36</b>
<b>TRACKS</b>	<b>1,083</b>	<b>619</b>	<b>590</b>	<b>27</b>
OF WHICH HSL	113	33	62	3
OF WHICH UIC 1 TO 4	776	360	423	8
OF WHICH SWITCHES	195	226	106	16
<b>SIGNALLING AND OPERATION</b>	<b>183</b>	<b>187</b>	<b>100</b>	<b>5</b>
<b>ELECTRIC TRACTION</b>	<b>36</b>	<b>261</b>	<b>20</b>	<b>4</b>

A decision was made to determine the carbon footprint of the representative renewal projects and to extrapolate the results of similar projects with the same carbon profile.

The projects covered by SNCF Réseau's Green Bonds have very different characteristics (materials, service life, etc.), and were therefore grouped into various categories regarding these characteristics.

A carbon footprint was determined for renewal of the following equipment categories, according to different calculation methods.

- **Tracks and switches:** footprint of 361 tCO<sub>2</sub>eq per million euros invested,

based on the carbon footprint reported at a 90-km track renewal operation realized by a high output renewal train on the line from Narbonne to Montpellier line in 2015.

- **Traction power supply infrastructure:** footprint of 86 tCO<sub>2</sub>eq per million euros invested, based on life cycle analysis of 1.5 and 25 kV catenaries.
- **Signalling:** footprint of 380 tCO<sub>2</sub>eq per million euros invested, based on two monetary emission factors established by ADEME<sup>2</sup> [computer, electronic and optic products (400 tCO<sub>2</sub>eq/€M) and construction (360 tCO<sub>2</sub>eq/€M), concerning the buildings hosting the centralized traffic control rooms].

1. Number of projects.

2. ADEME is the French state agency for energy saving. Monetary emission factors of products and services at [bilans-ges.ademe.fr \(bit.ly/bilansademe\)](http://bilans-ges.ademe.fr (bit.ly/bilansademe)).

These values are applied to the expenditures funded by the Green Bonds, which determinates the carbon footprint of an equipment category. Carbon footprints of the three equipment categories provide the total carbon footprint of the renewal projects.

#### Emissions avoided

**by infrastructure renewal projects**  
The quality of rail infrastructure would decline if no renewal is done, gradually followed by speed restrictions for trains. Passengers and shippers would then prefer other modes of transport (road, air, waterborne), which emit more greenhouse gases than trains.

In order to estimate the negative consequences of modal shift from rail, the reference scenario (no renewal) is compared to the project scenario.

In simple terms, the method to calculate emissions avoided by keeping a railway line in good condition is as follows:

#### • Calculation of emissions

##### in the renewal project scenario

1. Estimation of the traffic running on the line section during the year prior to the renewal.
2. Traffic forecast during the service life of the renewed equipment.
3. Application of rail transport emission factors and their evolution (origin of electricity, etc.) on the service life of the renewed equipment.

#### • Calculation of emissions in the reference scenario

1. Same as points 1 and 2 above.
2. Application of hypothesis of modal shift from rail resulting of the lack of renewal on the line section.
3. Application of transport mode emission factors and their evolution (electric cars, origin of electricity, etc.) on the service life of the renewed equipment.

The difference in GHG emissions over the entire transport system between the two scenarios corresponds to the emissions avoided by operating the renewed equipment over its service life. The share of these avoided emissions allocated to Green Bonds is proportional to the scope of operations and their part funded by Green Bonds.

Avoided emissions are calculated over the service life of the renewed equipment: forty years for tracks, forty three years for traction power supply infrastructure, and thirty three years for signalling installations.

## CATEGORY 2 Investments related to new lines and line extensions

### CARBON IMPACT OF RENEWAL EXPENSES FINANCED BY GREEN BONDS FOR NEW RAIL LINE PROJECTS

	EST 2	BPL	SEA	CNM	TOTAL
EXPENSES FINANCED BY GREEN BONDS 2016 (€M)	14	53	73	36	175
CARBON FOOTPRINT (IN THOUSAND TONS OF CO <sub>2</sub> EQ)...					
... ALLOCATED TO EXPENSES FINANCED BY THE GREEN BONDS	7	21	16	10	54
AVOIDED EMISSIONS (IN THOUSAND TONS OF CO <sub>2</sub> EQ)...					
... ALLOCATED TO EXPENSES FINANCED BY THE GREEN BONDS	5	36	98	105	244
CARBON IMPACT (FOOTPRINT - AVOIDED EMISSIONS) (IN THOUSAND TONS OF CO <sub>2</sub> EQ)...					
... ALLOCATED TO EXPENSES FINANCED BY THE GREEN BONDS	2	- 15	- 82	- 95	- 190
AVERAGE CARBON NEUTRALITY TIME OF NEW LINE PROJECTS					7.4 YEARS



## PRESENTATION OF NEW RAIL LINE PROJECTS

Four new rail line projects were financed by the Green Bonds

### **LGV Est européenne high-speed line phase 2 (Est 2), 116 km of rail line and connections operational since 3 July 2016.**

**Project.** The second phase of the Est européen High-Speed Line (LGV) connects Baudrecourt (Moselle) to Vendenheim (to the North of Strasbourg), continuously for the first 300 km, commissioned in 2007.

**Objectives.** Connecting the Eastern Greater Paris area and other French regions (North, West, South-West) with a time gain of thirty minutes. The project also improves international connections between the Strasbourg and Luxembourg regions, and provides quicker access to Southern Germany. The second phase of the LGV Est européenne completes France's participation in the "Main Line for Europe", a trans-European rail network that spans 1 500 km from Paris to Budapest. In 2010, for its actions within the framework of the LGV Est européenne, SNCF Réseau obtained the Grenelle de l'environnement label "Biodiversity Year".

### **LGV Bretagne - Pays de la Loire (BPL), 213 km of line and connections commissioned on 2 July 2017.**

**Project.** The LGV Bretagne – Pays de la Loire, high-speed line from Connerré to the west of Rennes, is part of the extension towards Rennes and Nantes of the western branch of the LGV Atlantique high-speed line commissioned in 1989.

**Objective.** Significantly developing the service to Brittany and the Pays de la Loire, by reducing the peripheral position of the West and by improving accessibility to other French regions (Paris and major regional cities with direct "province-province" connections) and European cities. A thirty seven-minute time gain between Paris and Rennes and further into Brittany. Paris is 22 minutes closer from Laval and 8 minutes closer from Angers, Nantes and the territories beyond. For the existing TGV Atlantique trains (commercial speed of 300 km/h), the best journey time is for example 1 h 26 minutes for Paris – Rennes, 1 h 17 minutes for Paris – Angers (instead of 1 h 25 minutes) and 1 h 51 minutes for Paris – Nantes.

The new rail line also has a positive impact on the regional and inter-regional services. More regional and freight trains can circulate on the conventional line between Le Mans and Rennes. The "Virgule de Sablé-sur-Sarthe" junction also significantly reduces the regional travel time between Nantes and Laval, and between Angers, Laval and Rennes.

### **LGV Sud Europe Atlantique (SEA), 340 km of line and connections into service since on 2 July 2017.**

**Project.** The LGV SEA high-speed line, from the south of Tours to the north of Bordeaux, is part of the extension of the southern branch of the LGV Atlantique commissioned in 1990, from Tours to Bordeaux. It is a large-scale project, serving most of South-Western France.

**Objective.** Ensuring time savings of fifty minutes between Paris and the North-East, and between Bordeaux and the South-West.

The project is subject to a concession contract for a term of fifty years with the company LISEA, of which Vinci Concessions and Vinci SA own 33.4% of the shares, CDC Infra 25.4%, Meridiam 22% and Ardian 19.2%. The SEA project crosses areas of high environmental value (50% of the protected species listed in France and Europe, 14 Natura 2000 sites, etc.). Despite an iterative study to define the best route, the habitat of 223 protected species was affected by the LGV project. The concessionary tried its utmost to avoid or reduce the impacts of the project (wide crossing structures, 800 ecological transparency works, protected areas, etc.).

### **Nîmes – Montpellier Bypass (CNM), 80 km of line and connections commissioned on 10 December 2017.**

**Project.** The Nîmes – Montpellier Bypass is an essential link in the European high-speed network and the trans-European rail freight network.

#### **Objectives.**

- Boosting the development of rail freight, of which the Languedoc line is an important link, moving heavy goods traffic from the parallel A9.
- Relieving the conventional line and enhancing the regional service.
- Ensuring high-speed passenger transport in the medium and long term, when the CNM will be extended towards the South.

In the immediate future, the CNM ensures time savings of almost twenty minutes between Paris and the South of the Languedoc region and Barcelona.

**METHOD TO CALCULATE THE CARBON IMPACT OF NEW LINE PROJECTS**

New line projects are limited in number (four) and represent a major investment (15 billion euros in total).

Their carbon impact can be determined individually, without extrapolation based on a limited panel of operations as applied to renewal operations.

**Carbon footprint**

The carbon footprints of the four new line projects were calculated by their project owners (SNCF Réseau for Est 2, Eiffage Rail Express for BPL, LISEA for SEA, Oc'Via for CNM).

**Emissions avoided by new rail line projects**

Since rail is the mode of transport with the lowest GHG emissions, opening a new line reduces the overall emission level of the transport system.

Calculating avoided emissions consists of comparing the carbon footprint of passengers and freight transport in two scenarios:

- reference scenario: the studied project is not realized and the initial situation goes on;
  - project scenario: opening the new line shifts traffic from road or air to rail and generates a new transport demand called induction.
- The method used to calculate the emissions avoided by opening a new line is formulated as follows.

- **Calculation of emissions in the reference scenario (without project):**
  - estimation of the traffic, for each mode of transport, of passengers and goods running on the route impacted by the new line project;
  - traffic forecast on the long term;
  - application of emission factors for different types of traffic and their evolution (for example: gCO<sub>2</sub>/km for private cars).

- **Calculation of emissions in the project scenario:**
  - estimation of the traffic running on the new line and its origin (other rail services, modal shift, traffic induction);
  - traffic forecast on the long term;
  - application of emission factors for different types of traffic and their evolution (for example: gCO<sub>2</sub>/kWh of the French electricity mix).

**CARBON FOOTPRINT OF NEW LINE PROJECTS**

PROJECT	LENGTH (LINES, CONNECTIONS)	COST (€M)				GHG EMISSIONS (BILAN CARBONE®)			
		TOTAL	OF WHICH FINANCED BY SNCF RESEAU	OF WHICH FINANCED BY GREEN BONDS 2016	THOUSAND TCO <sub>2</sub> EQ	THOUSAND TCO <sub>2</sub> EQ PER KM	T CO <sub>2</sub> EQ PER €M INVESTED	THOUSAND T CO <sub>2</sub> EQ ALLOCATED TO THE GREEN BONDS 2016	
	A	B	C	D	E	F = E/A	G = E/B	H = D*G	
EST 2	L: 107 km C: 9 km	2,191	580	14	1,049	9	479	7	
BPL	L: 182 km C: 32 km	3,380	1,435	53	1,350	6	400	21	
SEA	L: 302 km C: 38 km	7,546	2,098	73	1,671	5	221	16	
CNM	L: 60 km C: 20 km	2,291	465	36	621	8	271	10	
<b>TOTAL</b>	<b>L: 651 km C: 99 km</b>	<b>15,408</b>	<b>4,578</b>	<b>176</b>	<b>4,691</b>	<b>6</b>	<b>304</b>	<b>54</b>	

The difference in emissions between the two scenarios is the volume of avoided emissions due to the new rail line over the service life of its rail equipment (forty years, level of uncertainty is too high beyond).

## GLOBAL OVERVIEW

The total carbon impact allocated to expenses financed by the Green Bonds 2016 is obtained by adding:

- the carbon impact allocated to expenses financed by Green Bonds for the renewal projects (category 1);
- the carbon impact allocated to expenses financed by Green Bonds for new rail line projects (category 2);

Therefore, in total, the expenses financed by the Green Bonds 2016 reduce the GHG emissions of the transport system by 2.9 million tons equivalent CO<sub>2</sub>.

The carbon impact of the SNCF Réseau Green Bonds 2016 is **equivalent to the carbon footprint of approximately 6,000 French citizens over forty years.**

## ONE STEP FURTHER

All of the documents related to this Green Bonds programme (Green Bonds Framework, Second Party Opinion, Climate Bonds Initiative certification, presentation of Green Bond investors, etc.) are available on the SNCF Réseau website, in the section "SRI/Green Bonds":  
[sncf-reseau.fr/fr/finance-durable](http://sncf-reseau.fr/fr/finance-durable)

All the information concerning the SNCF Réseau CSR policy is available on the dedicated pages of the SNCF Réseau website:  
[sncf-reseau.fr/fr/a-propos/developpement-durable](http://sncf-reseau.fr/fr/a-propos/developpement-durable)

The first SNCF Réseau responsible activity report (2016) is available at [flipbook.sncf-reseau.fr/rse-2016](http://flipbook.sncf-reseau.fr/rse-2016)

All the CSR reports, indicators, and methodologies can be accessed on the dedicated page "Reports and indicators":  
[sncf-reseau.fr/fr/rapports-et-indicateurs](http://sncf-reseau.fr/fr/rapports-et-indicateurs)

## TOTAL CARBON IMPACT OF THE EXPENSES FINANCED BY GREEN BONDS AS ON 31 DECEMBER 2016

RENEWAL PROJECTS	- 2,727,800 tCO <sub>2</sub> EQ
NEW RAIL LINE PROJECTS	- 190,200 tCO <sub>2</sub> EQ
<b>TOTAL</b>	<b>- 2,918,000 tCO<sub>2</sub>eq</b>

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