

GREEN OAT

ALLOCATION AND
PERFORMANCE REPORT
FOR 2018



Photo Credit: Patrick Bagein - Bruno Le Maire, Minister of the Economy and Finance, and Brune Poirson, Secretary of State to the Minister for the Ecological and Inclusive Transition

Contents

Three questions for Anthony Requin, Chief Executive of Agence France Trésor	4
AGENCE FRANCE TRÉSOR AND THE GREEN OAT	6
Presentation of AFT	8
Tasks	8
The Green OAT, France's first sovereign green bond	10
Syndicated tap issue in June 2018	12
Performance since the previous report	13
Update: Eligible Green Expenditure for 2019	14
Monitoring arrangements	14
Green OAT Evaluation Council	15
ALLOCATION AND PERFORMANCE REPORT FOR 2018	18
Allocation to Eligible Green Expenditure	20
Presentation	20
Eligible Green Expenditure and allocation method	22
Budget programmes financed by the Green OAT	27
Statement of performance and use of proceeds	28
Four Objectives of Green OAT	32
Proceeds allocated to six sectors	33
Analysis and performance of each sector	35
Building	35
Living resources	38
Transport	44
Energy	48
Adaptation	52
Pollution	56
APPENDICES	60
KPMG assurance report	62
Carbone 4 methodology	67
Vigeo Eiris assurance report	68
Methodology	76
Reference documents	78
Abbreviations	78

3 questions for Anthony Requin

Chief Executive
of Agence France Trésor



On 24 January 2017, Agence France Trésor launched its first Green OAT with a coupon of 1.75% maturing on 25 June 2039. Two years on, would you say that the Green OAT has filled a market gap?

It's clear that there has been sustained demand since the Green OAT was first issued. The initial issuance amount was €7 billion. After two tap issues, its total outstanding volume reached €9.7 billion at the end of 2017. In 2018, the Green OAT was extended by two other tap issues for an aggregate €5.1 billion, including a €4 billion syndicated tap issue in June 2018. More recently, two auction sales in early 2019 brought the total outstanding amount to €19 billion in May 2019. The Green OAT fits the yield curve of conventional Treasury bonds, and has performed well on the secondary market. This is all proof of the bond's excellent market reception.

From the outset, you highlighted your ambition to bring together “the best of both worlds”. For Agence France Trésor, this meant that not only would the Green OAT offer the same liquidity as conventional Treasury bonds, which you have just confirmed, but it would also comply with best market practices with regard to environmental integrity. How far have you come in achieving this second objective?

During the inaugural issuance of the Green OAT, the French Government made unprecedented reporting commitments with regard to transparency and accountability. They have kept their word.

The reporting commitments include providing regular updates on the allocation of proceeds and performance of budget programmes matched to Green OAT issuance, and evaluating the associated environmental benefits. These ex-post evaluations are supervised by an independent council, comprising internationally-renowned experts.

2018 was the first complete reporting cycle. In June last year, the first Allocation and Performance Report was published on the use of proceeds from the inaugural issuance and subsequent tap issues in 2017. Then, in late November, the Green OAT Evaluation Council published the study it had commissioned on the environmentally beneficial effects of the energy transition tax credit (CITE). It is continuing its work and has addressed other topics which will be covered in specific reports slated for publication in the coming months.

Today, Agence France Trésor presents its second Allocation and Performance Report on the use of proceeds in 2018. Of the €5.1 billion of Green OAT proceeds last year, 59% was allocated to projects aimed at climate change mitigation, 21% was used for climate change adaptation, 13% was used for the protection of biodiversity, and 7% for initiatives to reduce water, air and soil pollution in France. The performance of each item of expenditure matched to Green OAT issuance has been measured in detail using the output-based indicators described in this document, taken from budget documents or data published by the relevant Government agencies.

Just as it did last year, KPMG, an independent audit firm, has provided a reasonable assurance report on the allocation of proceeds, based on the work it performed using the Government's existing tracking procedures. Moreover, Vigeo Eiris, the ESG rating agency commissioned at the start of 2018 which confirmed the sustainability of the expenditure planned for 2018, updated its opinion after expenditure had been made. Vigeo Eiris confirmed that the proceeds from the Green OAT issued in 2018 had been used to fund green initiatives, and also that France had fulfilled its commitments. It provided "a reasonable level of assurance" regarding the sustainability credentials of the sovereign green bond, which is its highest rating.

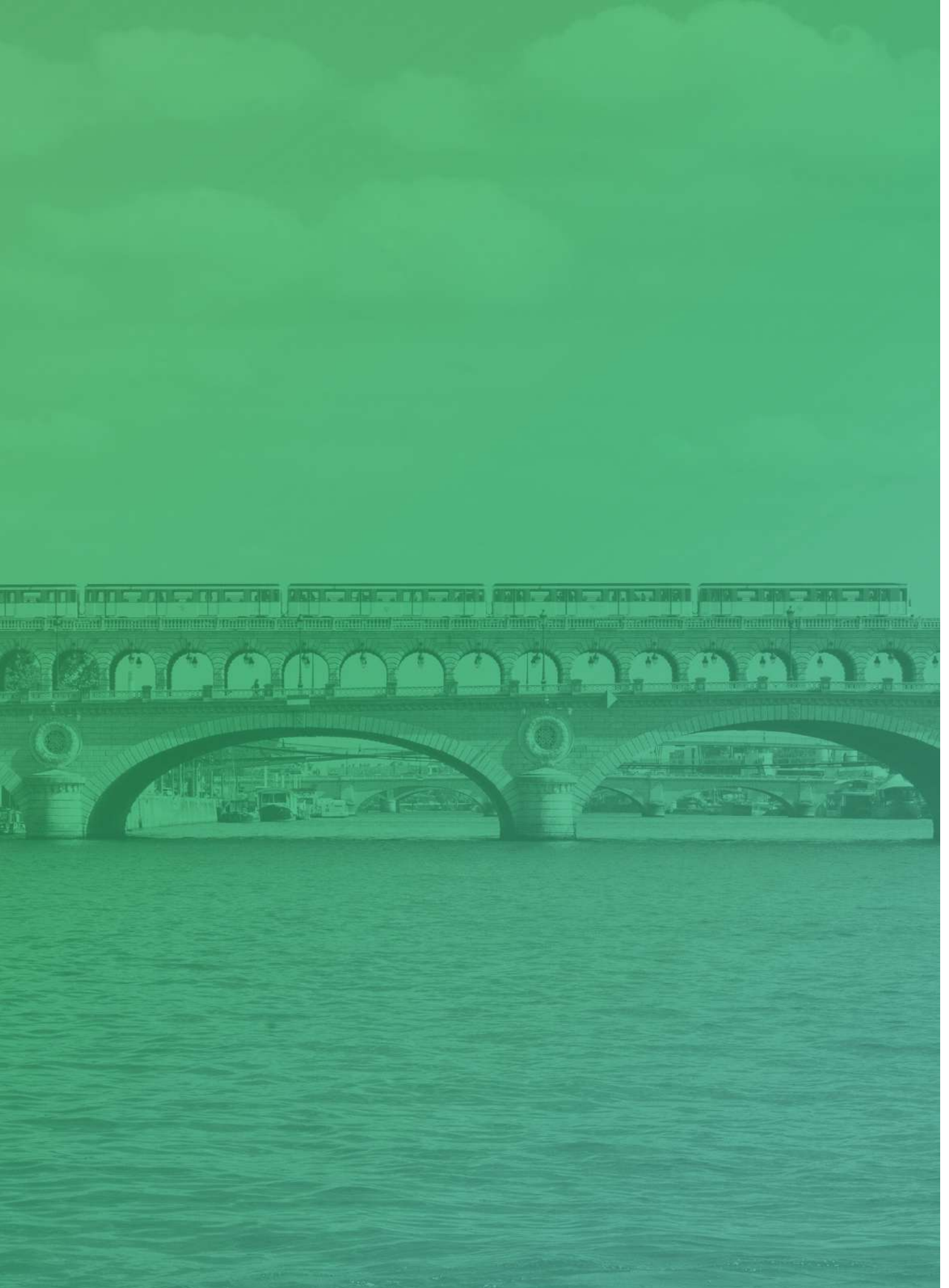
In your opinion, how has the Green OAT helped drive progress?

In a new market which is currently emerging, the Green OAT has created a benchmark, both in terms of its format and volume. It has also probably served as a trailblazer for other sovereign bond issuers.

Following France's lead, several European states issued green bonds for significant amounts, including Belgium in February 2018, Ireland in October 2018 and the Netherlands in May 2019. Moreover, by introducing a liquid product onto the green bond market, whose creditworthiness corresponds to that of French treasuries, the Green OAT should allow investors active on this segment to diversify their portfolio, to the benefit of issuers with a lower perceived credit quality or liquidity. Consequently, the Green OAT has helped expand the green bond market and, more generally, develop green finance.



AGENCE
FRANCE
TRÉSOR AND
THE GREEN
OAT



Presentation of AFT

TASKS

MANAGING THE STATE'S CASH REQUIREMENTS

Agence France Trésor (AFT) manages the State's cash requirements so that it can adhere to its financial commitments at all times, whatever the circumstances. Although it varies over the course of the year, this cash management role involves updating forecasts of the receipts and disbursements of the State and Treasury correspondents and monitoring the outturn of flows into and out of the account in order to be able to meet any temporary cash requirements on a day-to-day basis.

MANAGING THE STATE'S DEBT

AFT is tasked with managing debt in the taxpayer's best interest. In that context, its strategy is to take a long-term view, while tracking the market closely. It promotes liquidity across the full range of its debt issuances, while maintaining full transparency and a commitment to combining innovation and security.

AN AUTONOMOUS, ACCOUNTABLE AGENCY WITH NATIONAL SCOPE

Reporting to the Director General of the Treasury and managed by a Chief Executive and Deputy Chief Executive, AFT is an agency with national scope (SCN). AFT has the required scale and resources to carry out all its activities, particularly when navigating complex financial markets and

maintaining close relationships with all financial stakeholders. The fact that AFT reports to the French Ministry for the Economy and Finance means that it has access to the full range of information it needs to carry out its strictly defined tasks. It often works closely with the other structures of the Directorate General of the Treasury or the Ministry, such as the Budget Directorate and the Directorate General of Public Finances. AFT is staffed by civil servants with in-depth knowledge of the Government's financial procedures and by market professionals contracted by the government. Staff members serve in operational functions (cash management, market transactions, risk management and back office procedures, information technology), and analytical functions (modelling, economics and legal), as well as communication functions.

At the end of 2018, AFT had 47 staff members (30 men and 17 women, 18 contract employees and 29 civil servants). AFT's staff members are notable for the diversity of their educational backgrounds and career paths. They share the same values as those of the Directorate General of the Treasury, namely commitment, loyalty, openness and team spirit. All staff members adhere to strict commitments with regard to professional ethics.

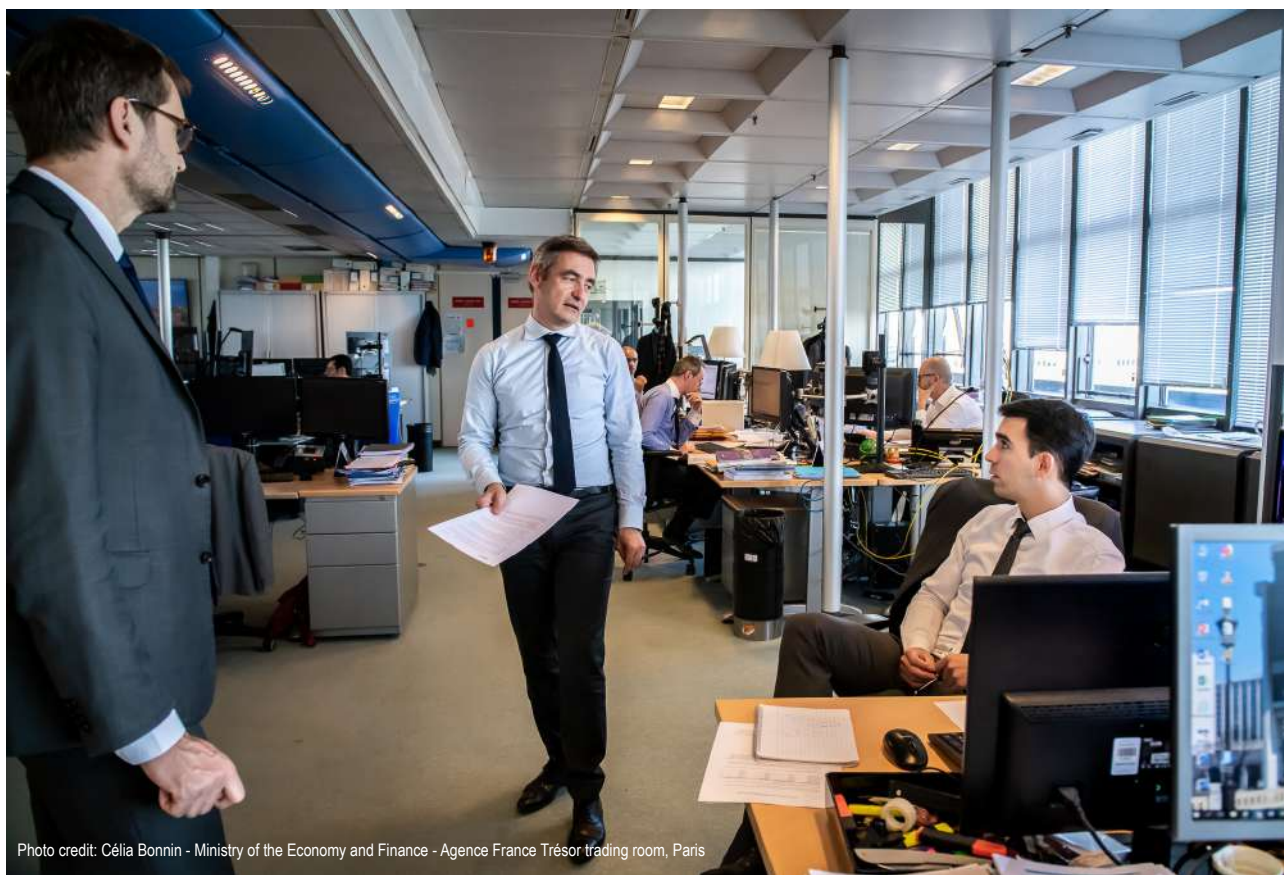


Photo credit: Célia Bonnin - Ministry of the Economy and Finance - Agence France Trésor trading room, Paris

8

9

KEY FIGURES FOR 2018

€1,756 billion

Negotiable debt securities
outstanding at
31 december 2018

**7 years
and 336 days**

Average residual maturity of debt
at 31 december 2018

0.53%

Weighted average yield
of medium- and long-term
fixed-rate securities

52.6%

Non-residents' holdings
of negotiable debt securities by market value
at 31 december 2018

The Green OAT, France's first sovereign green bond

On 24 January 2017, Agence France Trésor launched the first Green OAT with a coupon of 1.75% maturing on 25 June 2039 for an issuance amount of €7 billion. By becoming the first country to issue a large-scale Green OAT, France has confirmed its role as a driving force for the achievement of goals set at the December 2015 Paris Climate Agreement. Following several tap issues since its inaugural issuance, the amount outstanding for the Green OAT in May 2019 was €19 billion, making it the largest green bond in the world.

A sovereign green bond funds projects that have a positive environmental impact. It differs from a conventional bond by its specific reporting requirements and "green" credentials, although the financial risk is the same for investors.

France's Green OAT funds central government budget expenditure and expenditure under the Invest for the Future (PIA) programme to fight climate change, adapt to climate change, protect

biodiversity and fight pollution. Proceeds are managed in compliance with the general budget rules and finance an equivalent amount of Eligible Green Expenditure. In practice, the proceeds from the Green OAT are managed like those of a conventional sovereign bond, but allocations to Eligible Green Expenditure are tracked and reported.

AFT tapped the Green OAT after the initial issuance to maintain its liquidity, as is the case for conventional benchmark sovereign bonds. The Green OAT was tapped twice in 2017. Two successive tap issues took place in 2018, for an aggregate €5.1 billion, including a syndicated issuance of €4 million in June. Two auction sales in early 2019 brought the total outstanding Green OAT debt to €19 billion in May 2019. Consequently, the outstanding amount of the Green OAT was increased by successive tap issues, with the proceeds from tap issues systematically matched to Eligible Green Expenditure.



Photo credit: Célia Bonnin - Ministry of the Economy and Finance

THE GREEN OAT ACCLAIMED AGAIN IN 2018

Praised by industry professionals, the Green OAT has won several awards:

In September 2017

Euromoney/GlobalCapital presented the following three awards to AFT

Most Innovative Green/SRI Bond Deal

EMEA Green/SRI Bond Deal of the Year

Most Impressive Government or Government Agency Green/SRI Bond Issuer



In December 2017

AFT received the following awards for the Green OAT from the International Financing Review:

Euro Bond

SSAR Bond (sovereign, supranational, agency and regional)

SRI Bond (socially responsible investing)



10

11

In 2018, AFT received two other awards for the Green OAT:

On 20 March 2018, Climate Bonds Initiative granted the following awards for the inaugural issuance of the Green OAT: Green Bond Champion 2017 and Largest Single Bond to a Trillion Market.



On 4 September 2018, at the annual Sustainable and Responsible Capital Markets Forum, Euromoney and GlobalCapital again awarded AFT the prize for Most Impressive Government Agency Issuer, as in 2017.



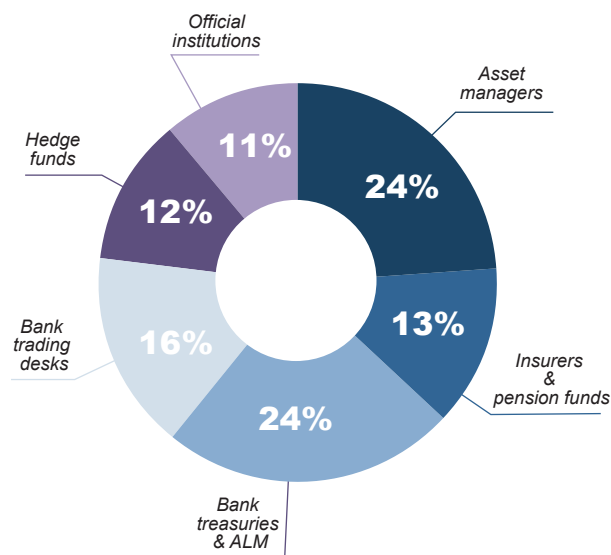
SYNDICATED TAP ISSUE IN JUNE 2018

Agence France Trésor launched its first sovereign green bond on 24 January 2017 by syndication. Based on an order book worth over €23 billion, the transaction enabled AFT to raise €7 billion in bonds. The Green OAT was then extended by three bond tap issues, with auctions in June and December 2017 and April 2018, increasing the outstanding amount by €3.8 billion.

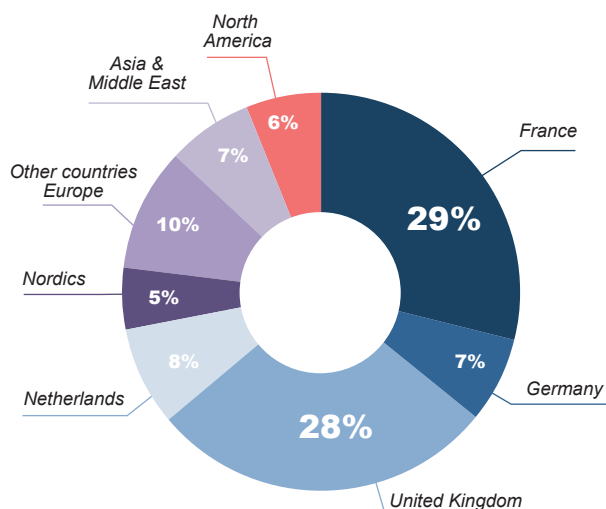
On 26 June 2018, AFT launched a syndicated tap issue. Following the book building process, total demand reached €13.75 billion, €4 billion of which were issued, with a yield at issue of 1.462%. The Green OAT tap issue is another sign of France's commitment to developing financing for energy transition, following publication of its first Green OAT Allocation and Performance Report. The tap issues in 2018 amounted to an aggregate €5.1 billion. The two auction sales in early 2019 brought the total outstanding Green OAT debt to €19 billion, confirming France's positioning as the world's largest sovereign green bond issuer.

The syndicated tap issue in July 2018 confirmed the fact that the Green OAT with a coupon of 1.75% maturing on 25 June 2039 has a very diversified investor base, both in terms of investor type and geographical origin (see graphs on the right). Nearly 140 end investors participated in the deal including, as was the case during the first issuance, the following investors who decided to disclose their participation to substantiate their support for this innovation in green bonds and the Treasury securities market:

Achmea Investment Management BV, AG2R La Mondiale, Axa IM, Bankhaus Lampe, Barclays Treasury, CASA, Candriam, CIC, Deutsche Apo, Donner & Reuschel, ERAFP, Generali France, HSBC AM, MAIF, Mutuelle d'Ivry, Nordea IM, PGGM Vermogensbeheer BV, ProBTP, Sparkasse Pforzheim, Swedish AP2, Triodos.



BREAKDOWN OF INVESTORS BY ASSET TYPE



GEOGRAPHICAL ORIGIN OF INVESTORS

PERFORMANCE SINCE THE PREVIOUS REPORT

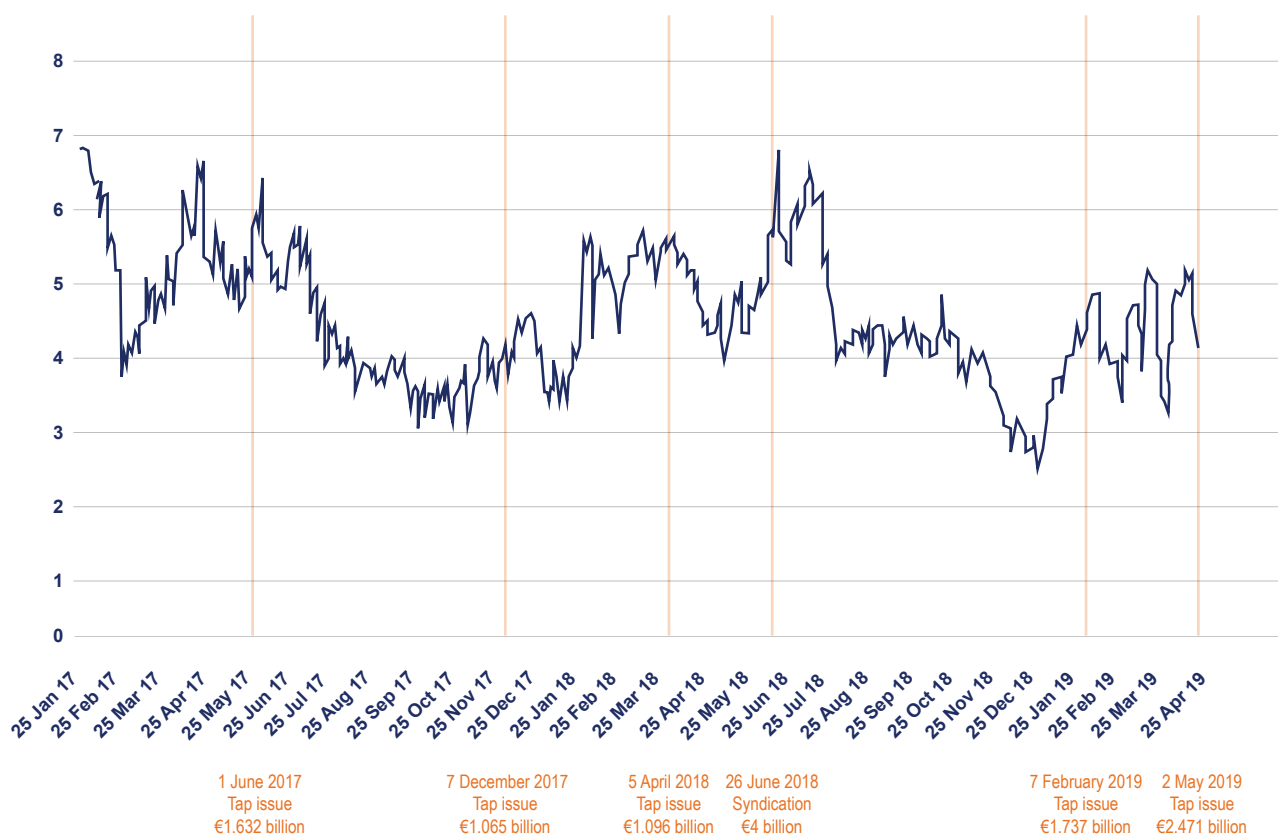
Since the previous report, the Green OAT has been extended through three tap issues, one in 2018 and two in 2019:

- on 26 June 2018 for €4 billion, through syndication, with a yield at issuance of 1.46%;
- on 7 February 2019 for €1.737 billion, with a yield at issuance of 1.25%;
- on 2 May 2019 for €2.471 billion, with a yield at issuance of 1.04%.

The outstanding amount was €19.001 billion at 3 May 2019.

On the secondary market, the Green OAT has continued to perform extremely well since the publication of the first report. The spread between the Green OAT and the Treasury bond used to determine the issuance price remained stable compared with the previous year. The yield spread (delta z-spread calculation)¹ fluctuates between 4 and 6 basis points today. The bond tap issues were based on a yield spread approximating these levels.

SPREAD BETWEEN GREEN OAT AND 2036 OAT
Measured as the delta z-spread



Source: Bloomberg, AFT calculations

1 - The difference between the z-spread of the Green OAT and the OAT 2036 (used to determine the Green OAT issuance price). The z-spread refers to the number of basis points added to the zero coupon yield to equalise a bond's discount rate.

UPDATE: ELIGIBLE GREEN EXPENDITURE FOR 2019

On 24 January 2019, Agence France Trésor announced that Eligible Green Expenditure funded by potential Green OAT issuances (Green OAT with a coupon of 1.75% maturing on 25 June 2039) for 2019 amounted to €8 billion as in 2018.

The update of the second opinion provided by Vigeo Eiris on the sustainability of the Green OAT with a coupon of 1.75% maturing on 25 June 2039 was published on 10 April 2019. It is the opinion of Vigeo Eiris that “France’s overall sustainability performance, as a sovereign bond issuer, is advanced and stable”. The independent third-party expert declared a level of “advanced

performance” once again, which constitutes the highest level on the rating scale and an advanced level of performance in the environmental domain. Vigeo Eiris additionally has “a reasonable level of assurance on the green credentials of Eligible Green Expenditure identified by the interministerial working group” associated with issuances of the Green OAT in 2019.

Following Agence France Trésor’s two auction sales since the start of 2019, on 7 February and 2 May, together accounting for an aggregate €4.2 billion, Eligible Green Expenditure available for new Green OAT issuances in 2019 amounts to €3.8 billion.

MONITORING ARRANGEMENTS

For its first Sovereign Green Bond issue in January 2017, the French government made unprecedented reporting commitments with regard to transparency and accountability for a green bond, setting and promoting high standards for reporting within the market. As was announced in the Order of 23 January 2017 on the creation of the Treasury Bonds (Green OAT) with a coupon of 1.75% maturing on 25 June 2039 in euros: “The Government will provide an annual report on Eligible Green Expenditure and the associated performance indicators until such Expenditure has been completed. Additional reporting on the environmental impact of such Expenditure (ex-post impact assessment) will also be published at an appropriate frequency.”

Consequently, the French government committed to publishing two types of reports for investors: (i) an annual report on the use of proceeds and performance indicators of Eligible Green Expenditure, and (ii) a report on the ex-post environmental impact of Eligible Green Expenditure at appropriate intervals.

The report on the use of proceeds is reviewed by an independent third party. The report on the performance of Eligible Green Expenditure is based on the Government’s existing performance indicators. Both reports are based on data from the Budget Settlement Act, the Finance Act that sets the final amount of State expenditure and revenue, and the resulting income or expense. The Budget Settlement Bill is published for each financial year by 1 June of the following year, when it is submitted to Parliament.

The first Allocation and Performance Report relating to the inaugural issuance of the Green OAT and the tap issues made in 2017 was published in June 2018. This document provides the same analysis for tap issues made in 2018. An Evaluation Council comprising independent experts establishes a schedule and specifications for the environmental impact reports on Eligible Green Expenditure matched to France’s Green OAT issuance.

GREEN OAT EVALUATION COUNCIL

A TEAM OF RENOWNED, INDEPENDENT EXPERTS

With the issue of the first Green OAT in January 2017, the French government committed to publishing reports on the ex-post environmental impact of Eligible Green Expenditure at appropriate intervals, depending on the type of expenditure. This is unprecedented for a green bond and promotes high standards in the market.

Chaired by Manuel Pulgar-Vidal, former Minister for the Environment in Peru, President of the UNFCCC² COP20 and currently WWF Global Climate and Energy Practice Leader, the Green OAT Evaluation Council is comprised of independent experts:

- **Mats Andersson**, Vice-Chairman of the Global Challenges Foundation, Chairman of PDC and former CEO of AP4, Sweden's fourth national pension fund;
- **Nathalie Girouard**, Head of the Environmental Performance and Information Division of the Environment Directorate at the OECD;
- **Ma Jun**, Director of the Centre for Finance and Development and Special Adviser to the Governor of the People's Bank of China;
- **Karin Kemper**, Senior Director for the Environment and Natural Resources Global Practice at the World Bank;
- **Thomas Sterner**, Professor of Environmental Economics at the University of Gothenburg;
- **Eric Usher**, Head of the Secretariat of the United Nations Environment Program Finance Initiative.

The Council also includes two observers:

- **Sean Kidney**, co-founder and CEO of the Climate Bond Initiative;
- **Nicholas Pfaff**, Senior Director and Secretary to the Green Bond Principles, ICMA (International Capital Market Association).

The Secretariat of the Green OAT Evaluation Council is executed jointly by the General Commission for Sustainable Development and the Directorate General of the Treasury. The Green OAT Evaluation Council sets the specifications and schedule of reports evaluating the environmental impact of Eligible Green Expenditure funded by France's Sovereign Green Bond. The Council also issues an opinion on the quality of the evaluation reports and the impact and relevance of findings. The work of the Evaluation Council is presented in separate publications.

14

15



Photo credit: Alain Salesse - Ministry of the Economy and Finance - Working session of the Green OAT Evaluation Council

WORK OF THE EVALUATION COUNCIL

The first meeting of the Green OAT Evaluation Council was held on 11 December 2017. During the meeting, Council members defined their working methods and addressed the priorities for their schedule of evaluations.

The Evaluation Council met twice in Paris in 2018, in July and November. In connection with its mission to evaluate the environmental impact of expenditure matched to Green OAT issuance, it conducts successive analyses of various programmes. The Evaluation Council's first Green OAT impact evaluation report related to the tax credit for energy transition (CITE) and was published at the end of November 2018. The document is available for viewing on the AFT website³. The Evaluation Council appointed Philippe Quirion (CNRS) and Louis-Gaëtan Giraudet (CIRED) as independent advisers to guarantee transparency and ensure that the report would comply with academic standards.

The CITE is a tax credit that households can claim in the year after carrying out energy performance renovations in their homes. Funding for the CITE accounted for one-third of eligible green expenditure matched with green bond issuance in 2017. Evaluating its environmental impact was therefore a major challenge. This report confirms the CITE's positive environmental impact and, more specifically:

- The CITE resulted in energy performance renovations for an additional 75,000 homes per annum in 2015 and 2016, equivalent to a 16% increase in annual investments in energy performance renovations.
- The renovations made possible by the CITE over those two years are expected to reduce the energy consumption and CO₂ emissions of the residential sector over the period 2015-2050 by roughly 7% of 2015 levels.

The Council met again in Paris in June 2019. It has undertaken work in order to evaluate the environmental impact of the grant allocated to maintain France's waterway network (VNF).

3 - https://www.aft.gouv.fr/files/medias-aft/3_Dette/3.2_OATMLT/3.2.2_OATVerte/Evaluation%20of%20the%20tax%20credit%20for%20energy%20transition_uk.pdf

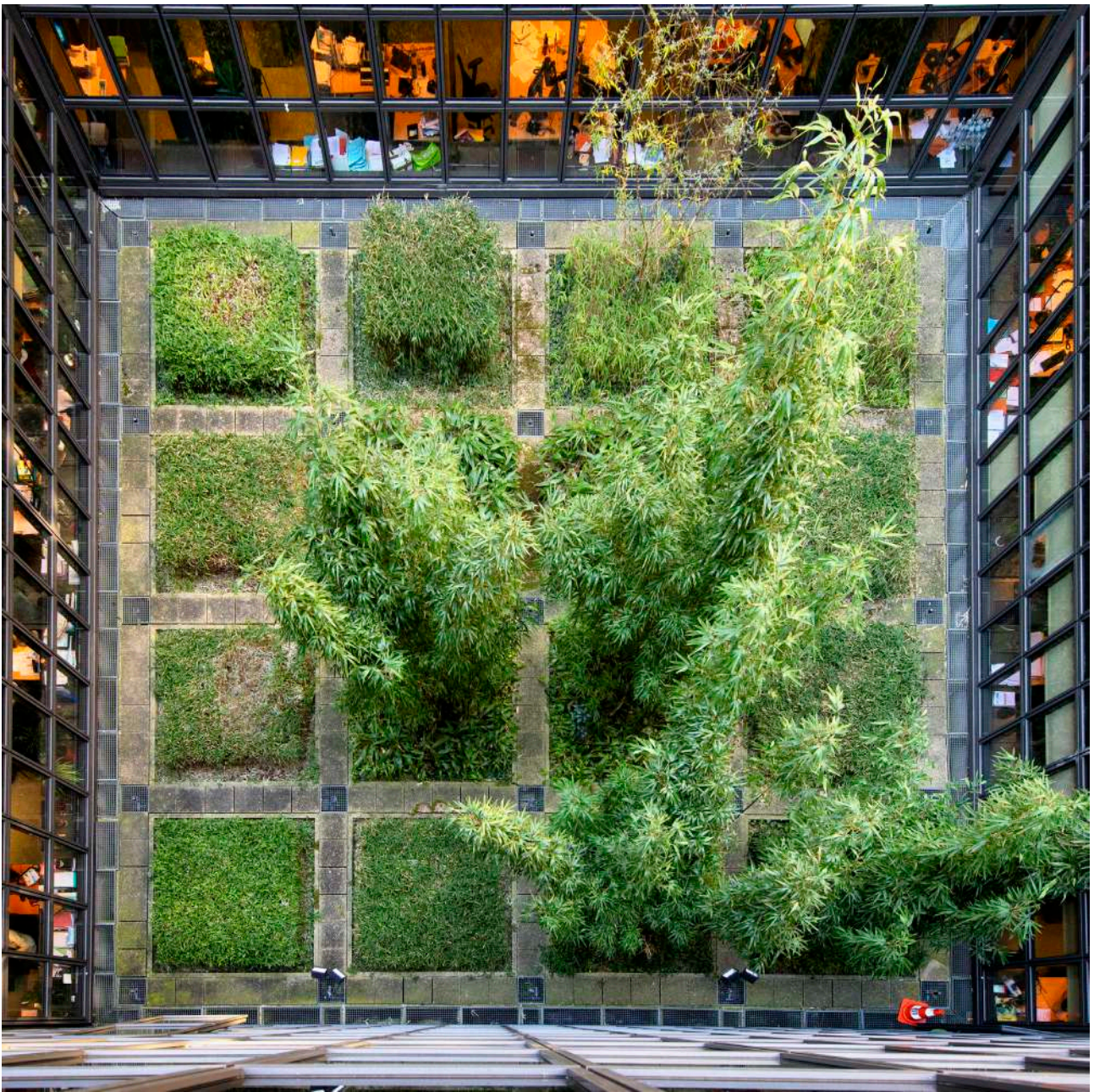


Photo credit: Gézelin Grée - Espace vert Colbert



ALLOCATION AND PERFORMANCE REPORT FOR 2018



Allocation to Eligible Green Expenditure

PRESENTATION

Proceeds are managed in compliance with the general budget rules and finance an equivalent amount of Eligible Green Expenditure. In practice, the proceeds from the Green OAT are managed like those of a conventional sovereign bond, but allocations to Eligible Green Expenditure are tracked and reported.

The sectors of activity in which Eligible Green Expenditure is funded, and the associated eligibility criteria, were defined and published prior to the first issuance in a Framework Document dated 10 January 2017, which is available on the AFT website⁴.

Eligible Green Expenditure projects are identified *ex ante* annually by an interministerial working group, which reports to the French Prime Minister. The Ecological and Energy Transition for the

Climate (TEEC) label was created in 2015 by the Ministry for Environment, Energy and the Sea, and renamed the Greenfin label in June 2019. It helps identify investment funds that promote the ecological and energy transition and is used as a reference for the selection process. Expenditure should also contribute to one of the four following green objectives: combat climate change, adapt to climate change, protect biodiversity and fight pollution; and relate to one of the six following green sectors: building, transport, energy (including smart grids), living resources, adaptation, pollution control and eco-efficiency.

Each ministry is responsible for identifying Eligible Green Expenditure within its budget programmes. The interministerial working group also ensures the exclusion of certain sectors: nuclear, armament and all expenditure dedicated to fossil fuels.

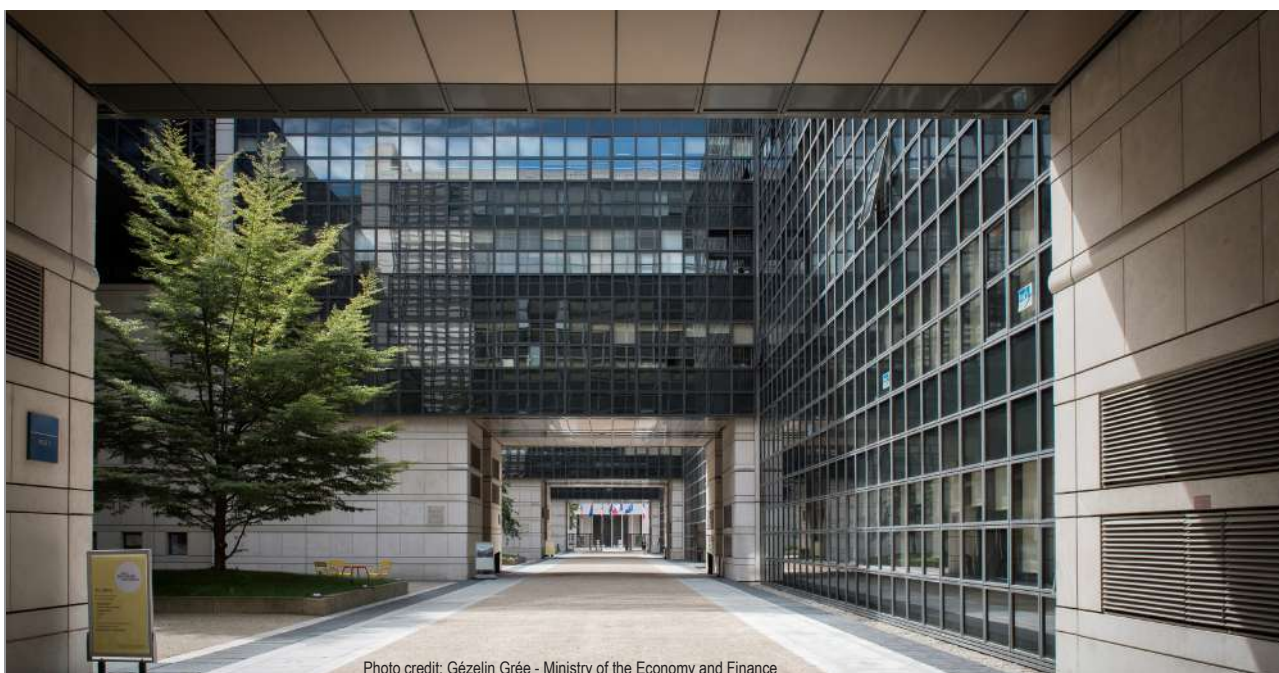
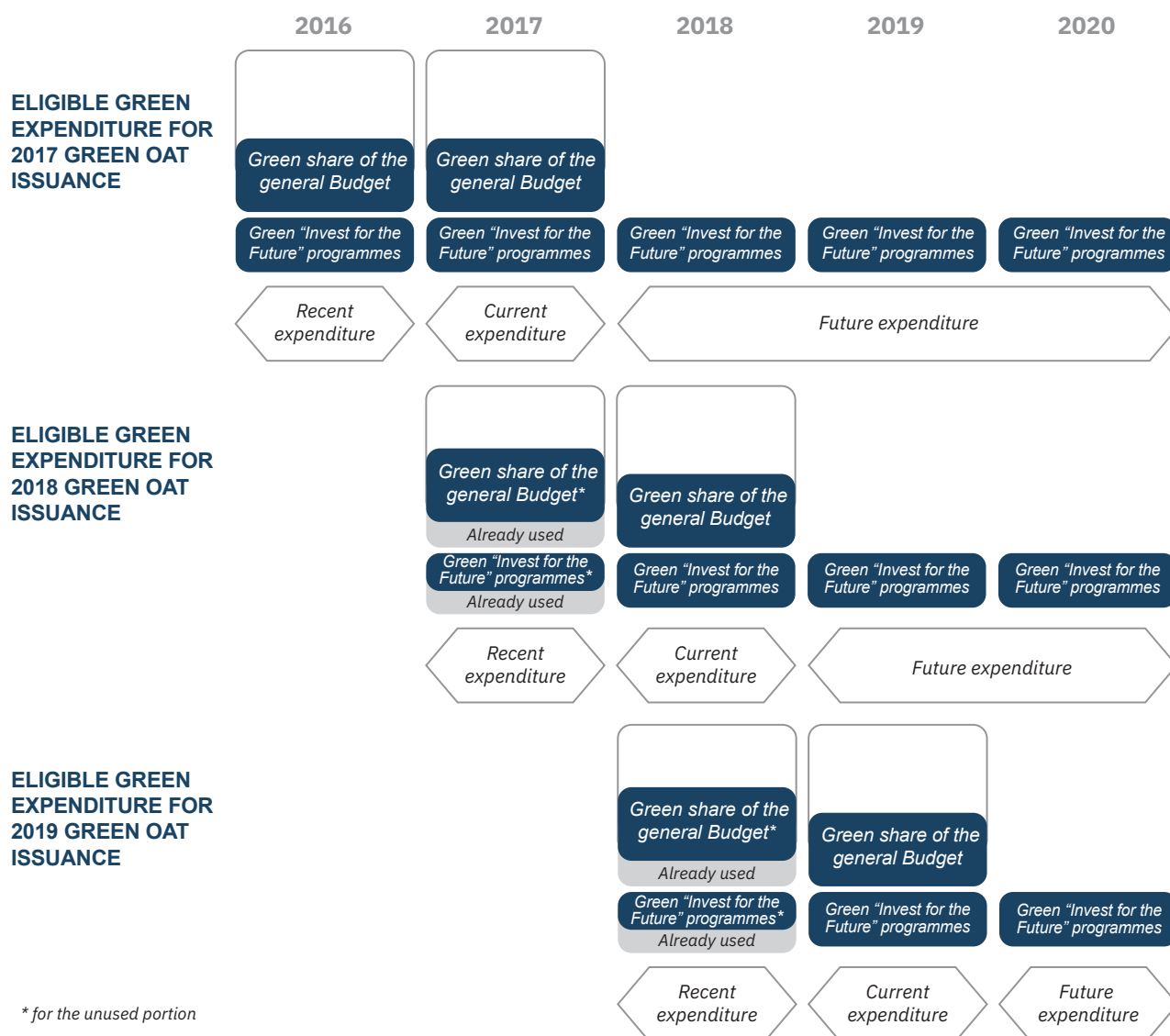


Photo credit: Gézelin Grée - Ministry of the Economy and Finance

4 - <https://www.aft.gouv.fr/files/archives/attachments/25562.pdf>

MANAGEMENT OF PROCEEDS

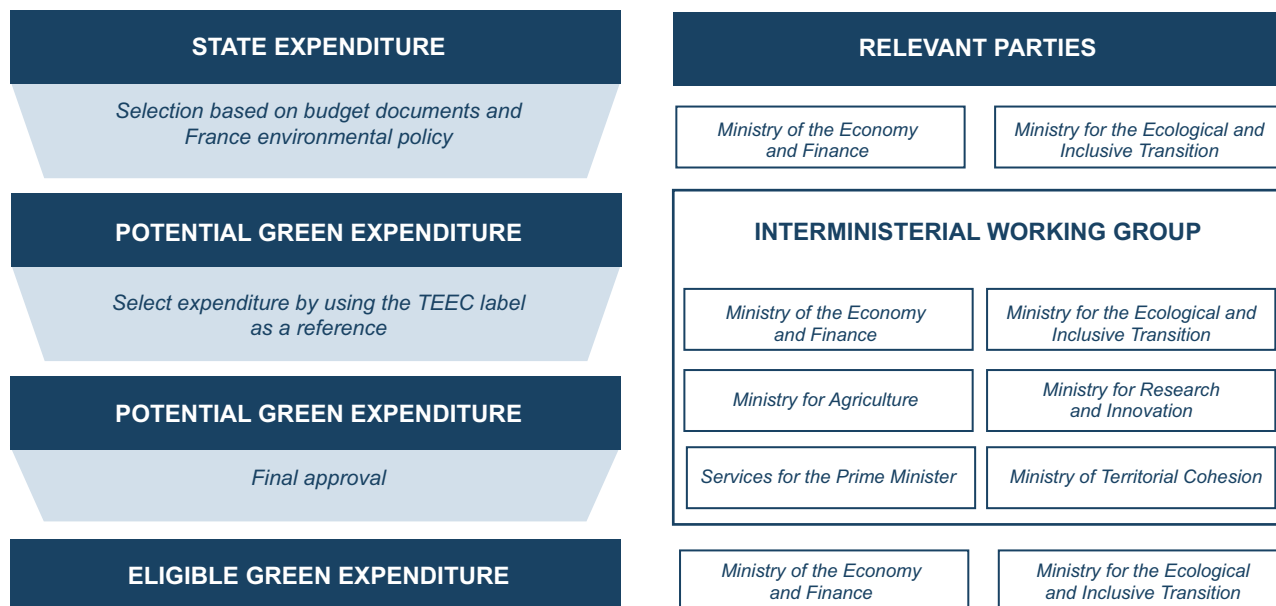


Prior to issuance of the Green OAT, in December 2016, the interministerial working group had identified **Eligible Green Expenditure funded by proceeds from issuances in 2017**. As authorised by the Framework Document dated 10 January 2017, they comprised of 2016 and 2017 budget and tax expenditure including Invest for the Future programme (PIA) expenditure, as well as future PIA investments until 2020.

The interministerial working group, following their meeting on 20 December 2017, validated **Eligible Green Expenditure for 2018** with regard to the 2018 State budget and "Invest for the Future" forecast expenditure. The eligibility of the budgetary lines identified at the end of 2016 was

confirmed, and other eligible expenditure identified. Consequently, ADEME (the French Environment & Energy Management Agency) which, since 2014, had been financed by a portion of proceeds from the TGAP (General Tax on Polluting Activities), was re-included in the State budget and now benefits from a budget allocation under the 181 programme "Risk Prevention" which accounts for over €570 million in eligible expenditure. Moreover, the Invest for the Future fund initiated its third programme, including several actions eligible for Green OAT funding. Some involve ADEME, while others relate to "high-performing innovation ecosystems" or "highly-ambitious innovative regions".

SELECTION PROCESS FOR ELIGIBLE GREEN EXPENDITURE



Vigeo Eiris had certified the relevance of the approach used by the Government given the objectives stated and compliance of Eligible Green Expenditure in 2017 with the TEEC label. Consequently, Vigeo Eiris provided a reasonable

level of assurance (the highest level of assurance) on the sustainability of the bond issue. In April 2018, Vigeo Eiris confirmed the same level of assurance with regard to the ex-ante presentation of Eligible Green Expenditure for 2018.

ELIGIBLE GREEN EXPENDITURE AND ALLOCATION METHOD

In 2018, the Green OAT issuance with a coupon of 1.75% maturing on 25 June 2039 was tapped twice. An auction on 5 April 2018 generated proceeds of €1,096 million and a syndicated tap issue on 25 June 2018 generated proceeds of €4,000 million, for an aggregate €5,096 million. Consequently, AFT is required to show that proceeds of the Green OAT issuance have been used to finance an equivalent amount of Eligible Green Expenditure.

In line with its commitments, in 2018 AFT monitored Eligible Green Expenditure identified ex ante by the interministerial working group and the associated performance indicators. As stated in the Green OAT Framework Document, expenditure corresponds to budgetary, tax and Invest for the Future expenditure incurred in 2017 and 2018 meeting the eligibility criteria set out in the Framework Document.

As presented in the Methodology section in the appendices hereto (p. 76), Eligible Green Expenditure has been tracked through budget documents (2017 and 2018 Annual Performance Reports), and data derived from the information systems of the tax authorities and Secretariat General for Investment, with their assistance. The associated performance indicators are primarily those described in the French Organic Law on Finance Laws (LOLF), also available in the budget documents. In the other cases, they are available in documents published by the public authorities in charge of the associated expenditure.

In accordance with the budget schedule set out by the LOLF and the Budget Settlement Act for 2018, the Finance Act was presented to the Council of Ministers on 15 May 2019. The Finance Act sets the final amount of State expenditure and revenue and the resulting income or expense. It was submitted to Parliament on the same day for approval in July 2019, and made public.

The statement on the statutory validity of the State's accounts issued by the National Audit Office is included in the appendices and published at the same time as the Budget Settlement Act for 2018, along with State budget and accounting data. Budget data may not be changed as of the publication date. The publication schedule for this report is in line with the publication schedule for the Budget Settlement Act for 2018.

ALLOCATION OF GREEN OAT PROCEEDS FOR 2017

As shown in the Allocation and Performance Report for 2017, published in June 2018, Eligible Green Expenditure for 2016 and 2017 amounted to €4,956 million and €5,120.3 million, respectively. AFT's Green OAT issuances in 2017, matched to Eligible Green Expenditure, brought the bond's total outstanding volume to €9,697 million. In accordance with the Green OAT Framework Document, half of the proceeds from the issuances in 2018 were used to fund Eligible Green Expenditure incurred in 2016 and the other half for expenditure incurred in 2017, i.e. €4,848.5 million per year. Consequently, the remaining €107.5 million⁵ in eligible expenditure for 2016 will not be matched to Green OAT issuance. However, the €271.8 million⁶ of eligible expenditure incurred in 2017 and which had not been matched to Green OAT issuance, were carried forward as eligible expenditure for 2018.

ALLOCATION OF GREEN OAT PROCEEDS FOR 2018

Thanks to the budget tracking procedure, it was shown that €6,070 million in Eligible Green Expenditure was funded in 2018⁷. However, in 2018, the Green OAT issuance amount was €5,096 million. Of this amount, €271.8 million were allocated to the portion of 2017 expenditure not matched to Green OAT proceeds, and the rest (€4,824.2 million) was allocated to expenditure incurred in 2018. In line with the commitments presented in the Green OAT Framework Document, in 2018, expenditure for the current year accounted for more than half of the Green OAT issuance amount. As €1,245.8 million⁸ of green expenditure in 2018 were not matched to 2018 Green OAT issuance, this sum may be carried forward and matched to 2019 tap issues. Finally, we note that future expenditure of Invest for the Future programmes authorised to receive proceeds under the Green OAT Framework Document for current and past expenditure is still available.

To summarise, this Allocation Report is based on the total Green OAT issuance amount for 2018, i.e. €5,096 million. This amount is allocated to expenditure incurred partly in 2017 (€271.8 million) and partly in 2018 (€4,824.2 million). In 2017 and 2018, the amount allocated was apportioned to the different items in proportion to expenditure actually incurred.

22

23

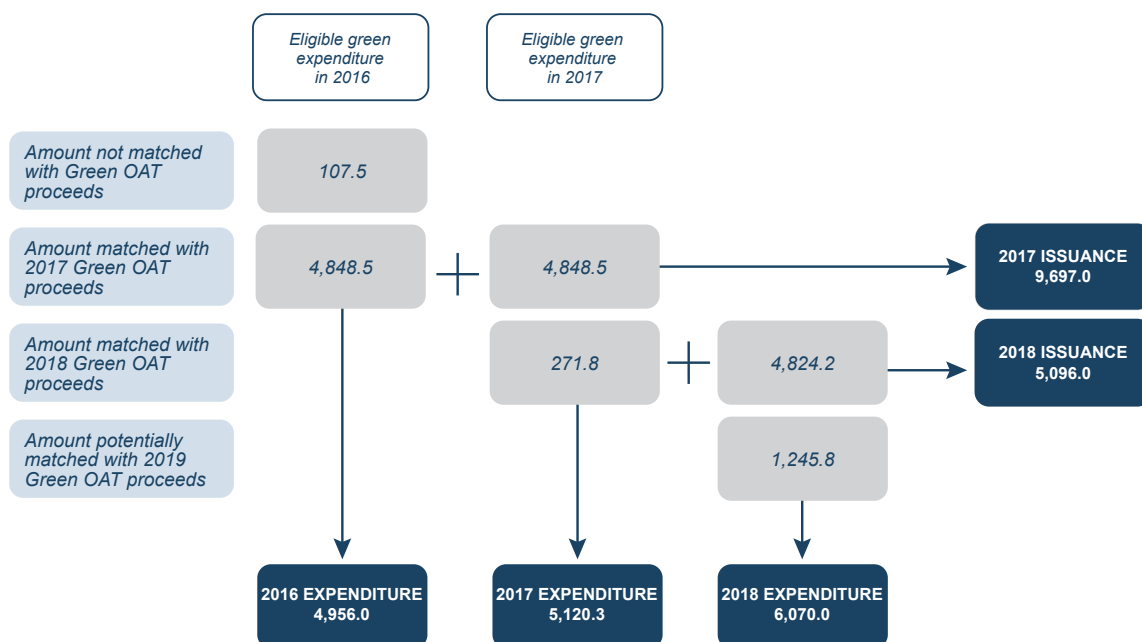
5 - = 4 956,0 – 4 848,5

6 - = 5,120.3 – 4,848.5

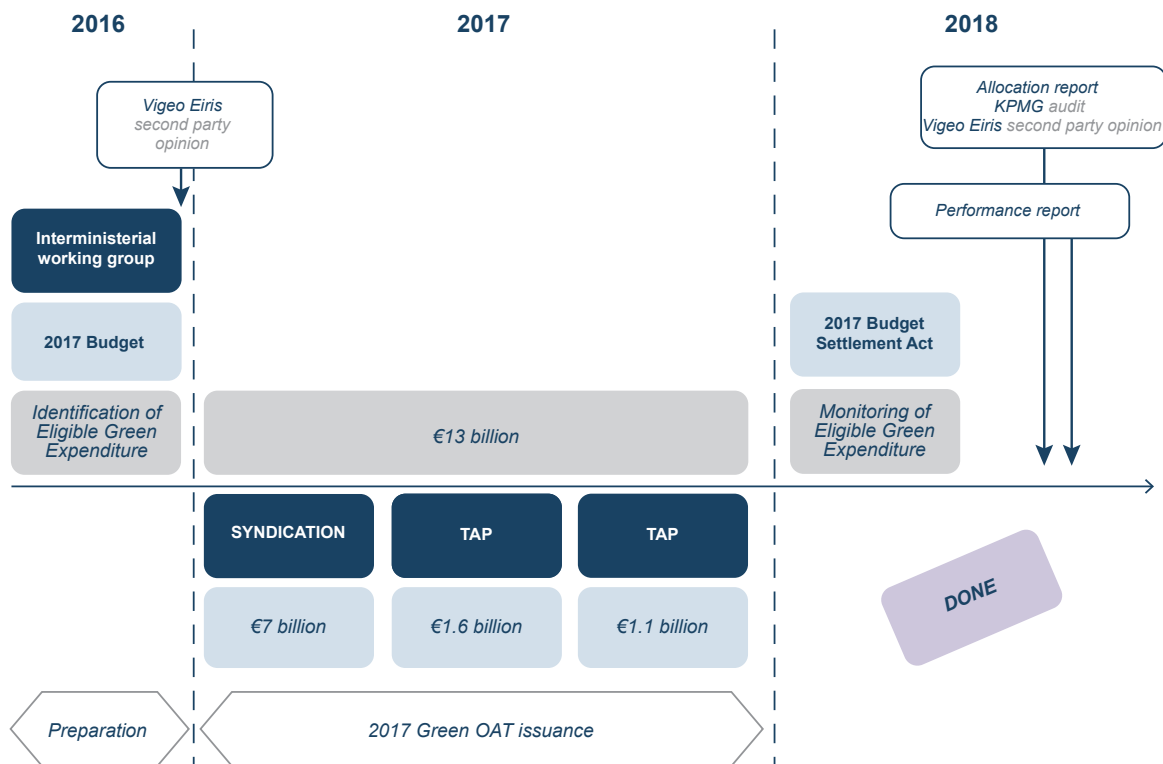
7 - The increase in eligible expenditure funded in 2018 compared with 2017 was primarily due to the inclusion of ADEME in the scope of Eligible Green Expenditure and the increase in the energy transition tax credit (CITE).

8 - = 6,070.0 – 4,824.2

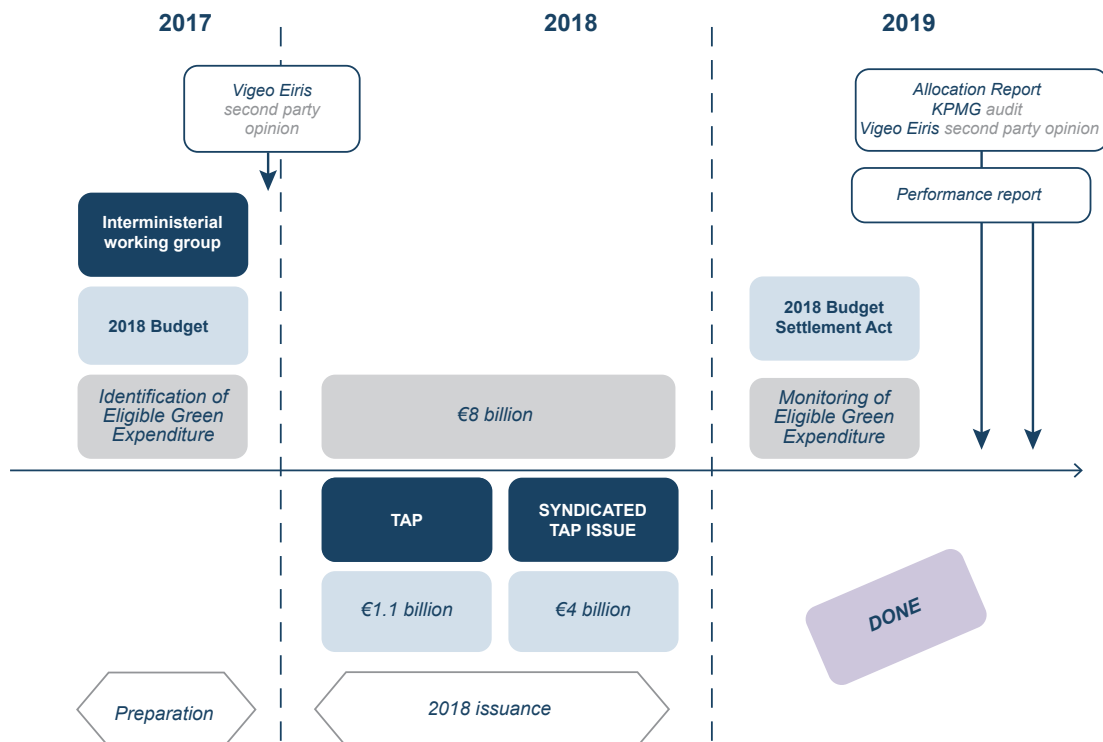
ALLOCATION OF GREEN OAT PROCEEDS (in € millions)



MONITORING OF 2017 EXPENDITURES



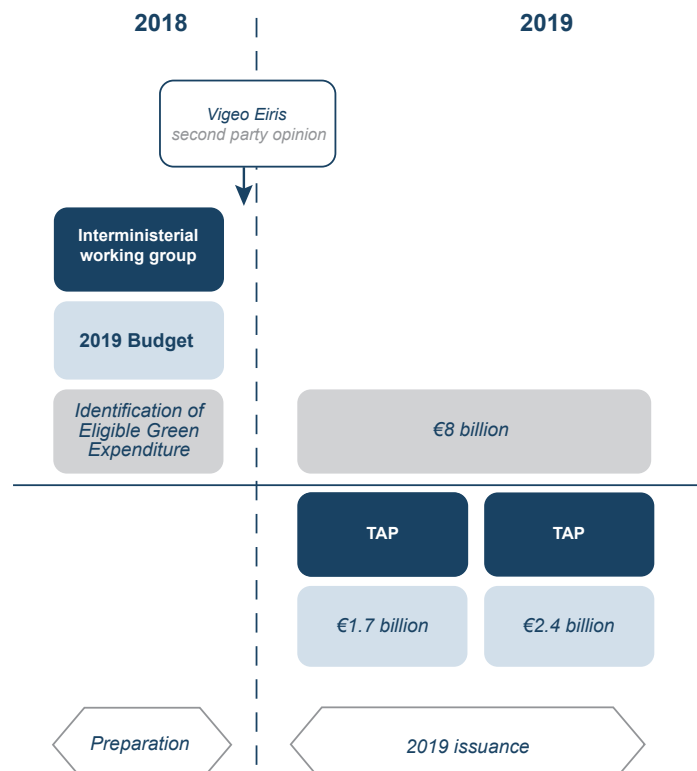
MONITORING OF 2018 EXPENDITURES



24

25

MONITORING OF 2019 EXPENDITURES



In line with France's commitments at bond issuance, expenditure monitoring has been audited by an independent third party, selected following a public call for tender. Consequently, KPMG has provided an assurance report on the use of proceeds based on procedures performed, which is included in extenso in the appendices to this report (p. 62).

The procedures performed include the following (see report in appendix for more detail):

- assessing the appropriateness of the Guidelines⁹ in terms of their relevance, comprehensiveness, reliability, neutrality and understandability;
- verifying the implementation of the process used to collect, compile, process and control data to ensure completeness and consistency of the Verified Information¹⁰ and gain an understanding of the internal control and risk management procedures used to prepare the Verified Information;
- verifying that the procedures were properly applied and performing tests of details, using sampling techniques, to verify the calculations and reconcile data with the supporting documents, including:
 - the annual performance reports appended to the French Budget Settlement Act,
 - the statements of roles and responsibilities extracted from the tax expenditure tools used by the French Ministry for the Economy and Finance,
 - the extracts of funding per project from the information systems of the Secretariat General for Investment for the years ended 31 December 2017 and 31 December 2018 under the "Invest for the Future" programme.
- ensuring that the Verified Information is consistent with other publications, including the Budget Settlement Acts and reports by the National Audit Office;
- performing analytical review procedures on the Verified Information and checking its consistency with the information provided in the statement on Performance and Use of Proceeds.

Vigeo Eiris was entrusted with providing a second party opinion prior to the issuance and confirmed the sustainability of the transaction. It was subsequently commissioned by AFT to update its opinion, as an independent third party expert, on the environmental and social responsibility factors and objectives involved in structuring and managing the Green OAT. Vigeo Eiris reaffirmed its "reasonable" level of assurance (its highest rating) on the issuer's performance in terms of sustainable development, based on the green credentials of Eligible Green Expenditure funded by the tap issues executed in 2018 and on adherence to the commitments made for bond tap issuance. The full report is provided in the appendices to this document.

The performance of each item of expenditure has been measured using the Government's output indicators and the environmental indicators disclosed by the government agencies responsible for monitoring France's environmental performance. All the performance indicators combined, which use existing procedures, are also presented in this document.

9 - The notion of "Evaluation framework" is defined by KPMG in its assurance report in the appendices hereto on p. 62

10 - The notion of "Verified Information" is defined by KPMG in its assurance report in the appendices hereto on p. 62

BUDGET PROGRAMMES FINANCED BY THE GREEN OAT

Budget programme	Reference	Year	Source
Landscape, water & biodiversity	P113	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM113.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM113.pdf
Urbanism, territories and habitat improvement	P135	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM135.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM135.pdf
Economy and sustainable development of agricultural, agribusiness & forestry businesses	P149	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM149.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM149.pdf
Geographical information and cartography	P159	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM159.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM159.pdf
Scientific research & multidisciplinary technologies	P172	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM172.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM172.pdf
Energy, climate & former mines	P174	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM174.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM174.pdf
Risk prevention	P181	2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM181.pdf
Research in the sustainable energy, development and mobility fields	P190	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM190.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM190.pdf
Space research	P193	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM193.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM193.pdf
Infrastructure and transport services	P203	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM203.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM203.pdf
Public energy board	P345	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM345.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM345.pdf
Renovation of administrative complexes and other multi-occupant government buildings	P348	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM348.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM348.pdf
Civil service	Several	2017	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/rap/pdf/DRGPGMPGM27.pdf
		2018	https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2018/rap/pdf/DRGPGMPGM27.pdf
Invest for the Future programmes (PIA)	PIA 1, 2 and 3	2017	https://www.gouvernement.fr/sites/default/files/contenu/piece-jointe/2018/08/ra_sgpi_2017_web.pdf

STATEMENT OF PERFORMANCE AND USE OF PROCEEDS

In 2018, Green OAT proceeds were allocated to a wide spectrum of environmental issues, providing funding for various Government policies. The relevance and effectiveness of the measures taken under these policies can be assessed using a diverse range of performance indicators. The following table highlights, for each sector, Eligible Green Expenditure made in 2017 and 2018, the allocation of Green OAT proceeds in 2018, and the associated performance indicators.

Mission	Pro-gramme	Expenditure	Amounts (in € millions)				
			2017		2018		Total
			Eligible	Remainder allocated	Eligible	Allocated	Allocated
Agriculture, food industry, forestry and rural matters	P149	Sustainable forest management and development of the timber industry	241.2	12.8	268.6	213.5	226.3
		Tax credit for organic farmers	33.3	1.8	37.3	29.6	31.4
		"Organic future fund" (Fonds Avenir Bio)	5.4	0.3	6.0	4.8	5.1
Social cohesion	P135	Energy renovations to housing (ANAH)			110.0	87.4	87.4
		Interest-free green loans	56.0	3.0	48.6	38.7	41.6
Ecology, Sustainable Transport Development	P203	Funding for the maintenance of French waterways (VNF)	244.6	13.0	248.2	197.3	210.3
		Support for combined transport (rail, sea and inland waterways)	16.8	0.9	34.9	27.7	28.6
		Reduced tax on electricity (TICFE) for operators of rail or cable transport or electric or hybrid buses	186.2	9.9	197.8	157.2	167.1
	P113	Landscape, Water and Biodiversity programme to protect environments	220.6	11.7	142.0	112.8	124.5
	P159	Funding allocated to the French Research Centre on Environmental Risk, Transport and Planning (CEREMA)	96.6	5.1	96.0	76.3	81.4
		Funding allocated to Météo France	22.5	1.2	61.6	49.0	50.2
	P174	Energy transition and fighting climate change	226.5	12.1	61.5	48.9	61.0
		Fighting air pollution: funding for studies, agencies and policies	24.0	1.3	23.5	18.7	20.0
		Energy transition tax credit	1,682.0	89.3	1,953.3	1,552.4	1,641.7
		Property tax exemptions for social housing agencies (HLM) and semi-public companies (SEM)	52.2	2.8	92.2	73.3	76.1
	P181	ADEME (the French Environment & Energy Management Agency)			572.4	454.9	454.9
	P345	Promoting renewable energies in areas not connected to the national grid (ZNI)	20.1	1.1	41.4	32.9	34.0

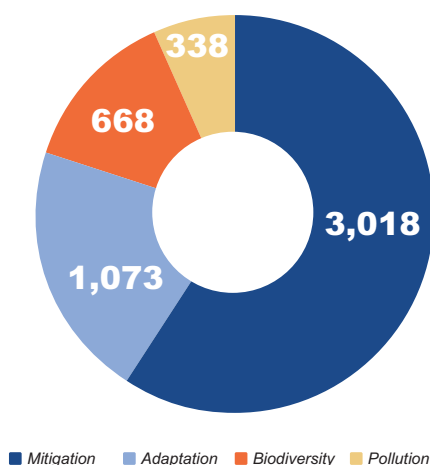
Expenditure by sector (in € millions)							Expenditure by objective (in € millions)				Indicator			
Building	Living resources	Transport	Energy	Adaptation	Pollution	Multi-sector	Mitigation	Adaptation	Biodiversity	Pollution		2016	2017	2018
	226.3							113.1	113.1		Percentage of publicly-owned forests being sustainably managed	94.8%	94.6%	95.8%
	31.4							10.5	10.5	10.5	Number of farming businesses benefiting from the tax credit	12,124	13,531	14,851
	5.1							1.7	1.7	1.7	Percentage of organic farms in total agricultural land area in use	5.8%	6.6%	7.5%
87.4							87.4				Number of homes renovated	40,726	52,266	62,345
41.6							41.6				Number of credit institutions authorized to grant zero-interest green loans	538	539	529
		210.3					70.1	70.1	70.1		Waterway availability rate	97.9%	98.2%	96.1%
											Modal shares			
											...Share of combined transport in inland passenger transport	17.8%	18.2%	17.9%
		28.6					28.6				... Share of rail transport in internal goods transport/	10%	9.6%	9%
											... Share of waterway transport in internal goods transport	2.1%	1.9%	1.9%
		167.1					167.1				Volume of power usage concerned by the reduced TICFE tax rate (in TWh)	8.46	8.87	8.91
	124.5							62.3	62.3		Percentage of mainland France subject to stringent protection measures	1.35%	1.35%	1.37%
											Percentage of maritime areas under protection	22.36%	22.36%	22.91%
		81.4					27.1	27.1		27.1	Number of publications intended for public authorities per CEREMA agent	0.50	0.46	0.53
				50.2				50.2			Number of international research publications in peer-reviewed journals, per researcher	1.50	1.77	1.50
			61.0				61.0							
					20.0					20.0	Annual air pollution emissions (in kt)			
											NOx	843	807	751
											NH ₃	609	606	605
											COVnm	619	612	600
											PM _{2.5}	170	164	156
1,641.7							1,641.7				Number of households benefiting from the CITE tax credit	1,201,316	1,245,754	1,419,100
76.1							76.1				Number of HLMs and SEMs benefiting from the exemption	6,128	6,446	8,369
						454.9	227.4			227.4	Efficiency of the energy fund in euros/TOE:			
											Biomass sector, heavy industry	599	747	741
											Biomass sector, other industries	875	852	849
											Solar heating	11,000	7,687	5,480
											Geothermal energy	1,763	1,697	930
			34.0				34.0							

Mission	Pro-gramme	Expenditure	Amounts (in € millions)				
			2017		2018		Total
			Eligible	Remainder allocated	Eligible	Allocated	Allocated
Management of public finances and human resources	Several	Reimbursement of public transit passes for civil servants			77.9	61.9	61.9
Public action and transformation	P348	Energy renovations in public buildings			1.8	1.5	1.5
Research and higher education	P172	Environmental projects of public research bodies (BRGM, CEA, CIRAD, CNRS, IFREMER, INRA, IPEV, IRD, IRSTEA)	1,197.5	63.9	1,148.9	913.1	976.6
	P193	Developing space research technology for improved Earth observation	365.9	19.4	378.7	301.0	320.4
	P190	CEA research into new energy technologies	50.4	2.7	70.0	55.7	58.3
		Funding for the applied research of the French Science and Technology Institute for Transport Network Development (IFSTTAR)	17.4	0.9	18.0	14.3	15.3
Invest for the Future (PIA)	PIA 1	Energy renovations to housing (ANAH)	64.0	3.4	117.3	93.2	96.6
		Energy transition institutes (ITEs)	45.0	2.4	46.5	37.0	39.3
		City of the future	56.6	3.0	32.0	25.4	28.4
		Green technology funding (innovative SMEs)	20.1	1.1	15.2	12.1	13.1
	PIA 1 et 2	"Energy transition demonstrators" (which includes the circular economy and SEI)	104.0	5.5	62.9	50.0	55.5
		Vehicles of the future	71.4	3.8	93.5	74.3	78.1
	PIA 3	Innovation competition (ADEME)			8.1	6.4	6.4
		Faster development of high-performing innovation ecosystems (transport and sustainable mobility)			0.2	0.2	0.2
		Energy transition demonstrators and the "TIGA" highly ambitious innovative regions scheme (CDC)			3.8	3.0	3.0
Total			5,120.3	271.9	6,070.0	4,824.2	5,096.1
As a % of the total							

Expenditure by sector (in € millions)							Expenditure by objective (in € millions)				Indicator			
Building	Living resources	Transport	Energy	Adaptation	Pollution	Multi-sector	Mitigation	Adaptation	Biodiversity	Pollution		2016	2017	2018
		61.9					61.9							
1.5							1.5							
	385.1		183.7	385.1	22.7		183.7	385.1	385.1	22.7	Research produced by the programme operators			
											Worldwide	1.8%	1.7%	1.6%
											In the European Union	6.2%	6.1%	6.0%
											In France, Germany and the United Kingdom	14.0%	13.9%	13.8%
				320.4				320.4			Research produced by the programme operators			
											Worldwide	4.2%	3.9%	3.9%
											In the European Union	14.8%	14.2%	14.1%
											In France, Germany and the United Kingdom	31.6%	30.7%	30.6%
			58.3				58.3				Measurement of transfers of NETs to industrial players			
											Number of patents filed	266	259	200
											Valuation (in € millions)	40.5	41.1	38.6
		15.3					7.6	7.6			Research produced by the research bodies in the programme: number of publications per researcher	0.85	0.90	0.96
96.6							96.6							
			39.3				39.3				Number of active projects at the end of the year	12	12	9
						28.4	7.1	7.1	7.1	7.1	Number of active projects at the end of the year	441	433	461
						13.1	3.3	3.3	3.3	3.3	Number of active projects at the end of the year	15	17	16
						55.5	13.9	13.9	13.9	13.9	Number of active projects at the end of the year	315	428	440
		78.1					78.1				Number of active projects at the end of the year	233	305	307
						6.4	3.2			3.2	Number of active projects at the end of the year			63
		0.2					0.2				Number of active projects at the end of the year			1
						3.0	0.8	0.8	0.8	0.8	Number of active projects at the end of the year			24
1,944.8	772.4	642.7	376.4	755.7	42.7	561.4	3,017.6	1,073.1	667.8	337.6				
38.2	15.2	12.6	7.4	14.8	0.8	11.0	59.2	21.1	13.1	6.6				

FOUR OBJECTIVES OF GREEN OAT

As defined in the Framework for the Green OAT, expenditure must address one of the four objectives of Green OAT: combating climate change (or mitigation), adapting to climate change, protecting biodiversity and reducing pollution. The allocation of proceeds to Eligible Green Expenditure in 2017 and 2018 for each objective was as follows:



EXPENDITURE BY OBJECTIVE (€ MILLIONS)

CLIMATE CHANGE MITIGATION

Of the €5.1 billion allocated in 2018, 59% was allotted to programmes for climate change mitigation, amounting to €3 billion. The high percentage reflects the magnitude of the issue. Today, combating climate change is a priority for which effective initiatives can and must be implemented without delay. It is the intensity and the quantity of current greenhouse gases that largely determine the planet's climate for the next century, as on average carbon dioxide remains in the atmosphere for around 100 years. In 2016 the annual carbon footprint per French citizen was 6.3 tonnes of carbon dioxide. This individual amount of emissions is calculated by subtracting carbon stored in France's carbon sinks (such as forests, bogs, prairies and natural soils) from the country's greenhouse gas emissions by households (cars, heating) and industry (production of goods and energy for both export and domestic

consumption). This figure is then divided by the number of inhabitants. Today France is one of the best performers in the European Union. The 28 member states had an average carbon footprint of 7.8 tonnes of carbon dioxide per inhabitant in 2016. France's carbon footprint has steadily shrunk since 1990, when it was 9.7 tonnes of carbon dioxide per inhabitant. However, it must shrink faster if France is to reach the carbon neutrality objective set in its national low-carbon strategy rolled out in December 2018, a final version of which is expected sometime in 2019. The new Strategy is aiming to almost completely eliminate carbon emissions from the transportation, energy and building industries by 2050. The targets match the need to balance manmade emissions with the capacity of natural carbon sinks throughout the French territory. Projects funded by the Green OAT will work to that end.

That objective requires reaching an estimated 1.1 tonnes of carbon dioxide per inhabitant by 2050.

ANTICIPATING RISKS

Risk mitigation must be stepped up since climate change is under way, with some effects already palpable. The year 2018 was ranked the fourth hottest ever on record, and also saw several extreme weather events such as cyclones, severe storms, flooding, landslides, heat waves and droughts. Similarly, glaciers and polar ice caps are melting at an increasing pace, raising sea levels.

Risk mitigation must therefore coincide with preparation for the long-term effects of global warming. Some €1.1 billion (21%) of Green OAT proceeds allocated in 2018 were used for climate change adaptation. Initially this involves improving our ability to forecast climate change and its consequences on socio-economic activities and nature.

PROTECTING BIODIVERSITY

Another already visible sign of the environmental crisis is the escalating erosion of global biodiversity, currently considered the sixth mass extinction event in Earth's history. The May 2019 global assessment report by the UN's Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) confirms this trend and warns of the rapid decline of our ecosystems.

Protecting biodiversity is a fundamental, emblematic aspect of the ecological challenge, commensurate with the countless ecosystem services that biodiversity bestows on us. This objective is closely tied to the other three set for Green OAT, given that pollution and climate change are the two leading reasons for loss of biodiversity, along with habitat destruction, invasive species and overharvesting. Some 13% of funding allocated in 2018 (€668 million) was used for the protection of biodiversity.

Such protection requires two parallel actions: furthering knowledge of biodiversity on French territory and enhancing conservation of the most sensitive natural areas.

REDUCING POLLUTION

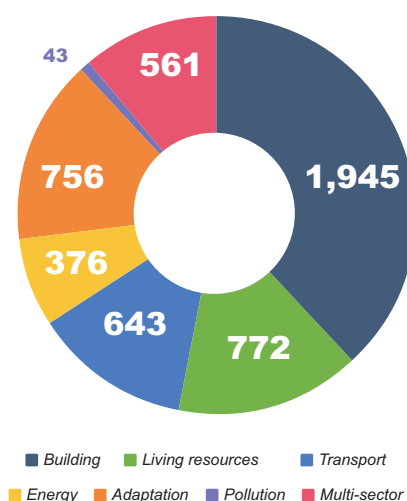
The remaining 7% of Green OAT proceeds allocated in 2018 (€338 million) funded efforts to reduce water, air and soil pollution in France. These environments are most likely polluted from common, highly visible yet harmful human activities, with direct consequences for public health and biodiversity. Water, air and soil pollution also closely echo our ability – or inability – to live and grow with due concern for our environment and that of future generations. Reducing the polluting effects of our activities requires implementing measures in all major sectors of our economy (residential/tertiary, transport, industry and agriculture). It also means monitoring air, water and soil quality to determine which measures to take and where, and then ensuring that they are effective.

32

33

PROCEEDS ALLOCATED TO SIX SECTORS

To meet the four objectives previously mentioned, programmes funded by the Green OAT fall into six major sectors: Building, Energy, Transport, Living resources, Pollution and Adaptation. The sectors are defined in the Green OAT Framework, available on the AFT website¹¹. They encompass economic sectors that are heavily affected by greenhouse gas emissions (e.g. building, energy production, transport and agriculture), and other issues directly related to Green OAT objectives (e.g. preserving living resources, controlling pollution and adapting to climate change).



EXPENDITURE BY SECTOR (€ MILLIONS)

11 - <https://www.aft.gouv.fr/files/archives/attachments/25562.pdf>

Three large sectors account for almost two thirds of the €5.1 billion in proceeds allocated in 2018: Building (38%), Living resources (15%) and Adaptation (15%). Transport (13%), Energy (7%) and Pollution (1%) benefited from the remaining proceeds allocated, along with some expenditures spanning all of these sectors.

The individual sectors meet the four Green OAT objectives in different ways. For example, Building expenditure almost entirely advanced the objective of climate change mitigation, promoting energy efficiency with insulation work on French residential-tertiary sector buildings. Proceeds allocated to Living resources, on the other hand, were more diversified, as they funded biodiversity protection and climate change adaptation. They were devoted to tax expenditure, research sustainable forestry management and farming.

Moreover, some expenditure is classified as multi-sector. This category represents 11% of Green OAT expenditure (€561 million) and includes six expenditure items of which the four largest are:

- €454.9 million in funding for the French Environment & Energy Management Agency (ADEME) in connection with the Great investment Plan (GPI) for ecological transition. In particular, it comprises specific funds for heating, air quality and mobility, another for the circular economy, and support for SMEs to cut back on waste. For 2018, an additional €164 million were allocated to ADEME as part of the Great Investment Plan. This funding bolstered the heating fund, a crucial tool in reaching the goal of 32% renewable energy within total national power use by 2030 (objective set out in France's Energy Transition Act for Green Growth)¹². In 2018, the heating fund budget was increased by 14%.
- €55.5 million in funding for demonstrators (including ones for circular economy and smart electric grids) of the Invest for the Future Programme. The purpose of the demonstrators is to develop tools to modernise the French economy, particularly as regards the circular economy (less use of raw materials), smart grids (reduced energy use), and incorporating more renewable energies.

- €28.4 million of funding for the Invest for the Future fund, namely the Cities of the Future ("*Ville de demain*") initiative. This programme funds various projects aimed at developing attractive and robust cities that protect the environment, and promote social cohesion and quality of life for inhabitants. Initiatives include industrial conversion, regeneration of wasteland, refocusing the city around the river, quality of life in densely populated areas, generation of renewable energy with the construction of positive energy buildings, energy renovation, mobility management and the enhancement of natural areas.
- €13.1 million of funding from the Invest for the Future eco-technology fund for innovative SMEs operating in four major areas: renewable low-carbon energy and green chemistry; circular economy (waste recycling, eco-product design, industrial ecology); smart grids; and vehicles of the future (projects using non-fossil energy sources).

The following section presents a sector-by-sector analysis of Green OAT expenditure and the associated KPIs. These performance indicators are taken from annual performance reports of programmes that benefit from Green OAT funding, among which the French environmental performance indicators measured by independent public bodies.

Analysis and performance of each sector

BUILDING

LOWERING ENERGY NEEDS IN OUR BUILDINGS

Buildings account for 45% of final energy consumption in France. They also produce 26% of the country's greenhouse gas emissions, both directly (from heating, hot water, cooking and fluorocarbons) and indirectly (from power and heating grids). Residential and tertiary sector buildings are therefore at the heart of the climate challenge: it is imperative to reduce their power consumption and improve their carbon performance.

Although it is also crucial to address these concerns in new builds, the sector's main challenges concentrate on existing buildings. Given the slow pace of building renewal (around 1% per year), by 2050 France's built environment will mainly comprise structures already existing today. One of the four focus areas for buildings defined by the National Low-Carbon Strategy (SNBC) is to increase energy retrofit efforts by both renovating the building envelope (i.e. thermal insulation) and improving the energy and climate efficiency of systems (e.g. heating, air conditioning, domestic hot water, ventilation). The objective released in December 2018 aims to renovate 300,000 dwellings from 2015 to 2030 and 700,000 between 2030 and 2050.

Today there are many energy-efficient solutions to overhaul France's housing stock and impart performances close to those of new builds. However, energy renovations of existing buildings have yet to occur, and were classified as a national priority in the Climate Plan released in July 2017.

The renovation project is a major issue for the climate and for the energy transition of French economy, since it can develop the building sector while creating qualified jobs that are local and not susceptible to relocation.



“Renovation can also be tied in with a solidarity policy, with the short-term focus on improving energy efficiency in the homes of low-income households”

Energy savings also considerably improve quality of life (e.g. thermal comfort, sound insulation, lower bills leading to stronger purchasing power). Some 3.8 million uninsulated homes are currently occupied by households suffering from energy poverty¹³. Renovation can also be tied in with a solidarity policy, with the short-term focus on improving energy efficiency in the homes of low-income households.

SUPPORTING ENERGY RENOVATION

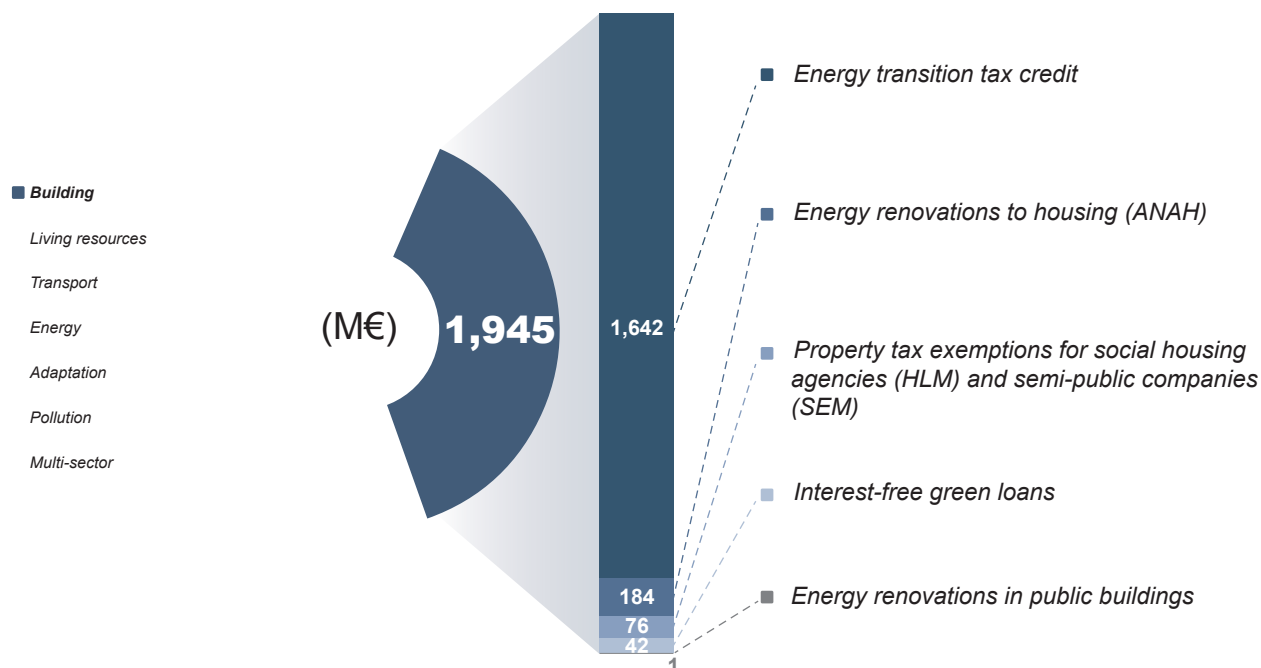
France's Climate Plan places great importance on the energy renovation of residential and commercial buildings. This is reflected in the way Green OAT proceeds are allocated to the Building sector, in particular funding several initiatives devoted to improving the energy efficiency of French housing stock.

34

35

13 - Energy precarity dashboard (Tableau de bord de la précarité énergétique), ONPE, 2018

2018 proceeds allocated to Building



The €1.6 billion in funding through the energy transition tax credit (CITE) accounted for the majority of the Green OAT proceeds allocated to the Building sector. The CITE is a household income tax credit for energy-saving renovation of a primary residence. Typical examples are thermal insulation, high efficiency water heaters, thermostats and equipment using greener power sources such as renewable energy. Materials, equipment and appliances must meet well-defined performance standards and criteria and be installed by professionals. In 2018 the tax credit amounted to 30% of the eligible renovation invoices¹⁴. That same year, more than 1.4 million households benefited from the CITE tax credit for their contribution to France's energy renovation of buildings.

Some €76.1 million of Green OAT proceeds funded property tax exemptions for social housing agencies (HLM) and semi-public companies (SEM) for the same purpose. Under the scheme, up to 25% of energy-saving¹⁵ renovation expenditure was deducted from property tax on buildings. In 2018 over 8,000 HLM agencies and semi-public companies benefited from the relief. The tax credit also promotes solidarity endeavours aiming foremost to reduce the number of uninsulated low-income homes and achieve a rapid reduction in energy poverty.

“1.42 million households benefited from the CITE tax credit for their contribution to France's building energy renovation”

In a similar vein, interest-free green loans received €41.6 million Green OAT proceeds. Interest-free green loans, an arrangement managed and tracked by French low-income mortgage intermediary SGFGAS¹⁶, provide up to €30,000 to fund renovation that improves energy efficiency in buildings built before 1990. The funded renovation must either form a "package" from an official list of eligible renovations or result in a legally-defined quantitative improvement in the dwelling's energy consumption. The SGFSAS acts as an intermediary between the French State and lending banks, controlling and managing the subsidised loans. Interest-free green loans used to be available only for homes built before 1 January 1990. However starting 1 July 2019, homeowners may apply for an interest-free green loan for a home that is two years old. In 2018, 529 approved credit institutions were able to set up interest-free green loans for their customers' home renovations.

14 - Primary residence guide (Habitation principale, Impôts 2018), published by Finances publiques

15 - PLR 2018 – Excerpt from the allocation and performance report of "Ecology, development and sustainable mobility" - Programme 174

16 - SGFGAS missions - <https://www2.sfgas.fr/web/site-public-anglais/missions>

Finally, in 2018 Green OAT proceeds amounting to €96.6 million were allocated to the Invest for the Future programme's home thermal renovation initiative launched by the Investment Commission "*Commissariat général pour l'investissement*", later the Secretariat General for Investment. The initiative in turn funds the Better Living "*Habiter mieux*"¹⁷ programme to fight energy poverty, organized by the State Home Improvement Authority (ANAH). The ANAH's goal for the programme is to renovate over 75,000 homes per year, with priority given to low-income households, in order to implement the French President's commitments to halve the number of uninsulated homes by 2022. In 2018 the ANAH achieved a record peak of activity, with 62,345 homes renovated.

The Invest for the Future fund for home thermal renovation therefore also contributes to programmes aimed at "city planning and social cohesion" along with other urban renewal initiatives such as Cities of the Future ("*Ville de demain*").

This programme supports outstanding, innovative urban renewal projects and aims to promote the emergence of ground-breaking, appealing, sustainable and resilient models.

Finally, in 2018 Green OAT proceeds amounting to €1.5 million were allocated to renovating public buildings. First, energy and technical audits were performed in 2018 to provide comparable information used to decide which buildings were the priority for renovations. A total of 54 administrative complexes were audited.

Focus PIA

INEF 4 for energy efficiency in buildings

The Institutes for Energy Transition are public/private interdisciplinary research structures in energy transition and low-carbon energy sources. They were created with the aim of pooling expert knowledge, jointly investing in test facilities and internationally-renowned technological platforms, as well as conducting applied research and shared interest programmes in areas conducive to energy and ecological transition.

The INEF 4 Institute for Energy Transition, which specialises in sustainability and energy efficiency in buildings, was awarded the 2020-2050 Start-Up Trophy at the 2018 EnerJ-meeting for its joint development of Basticaf, a virtual training project for energy performance professionals. The project is aimed at helping industry players acquire new skills through a virtual learning environment that prepares them for real-life situations

in their companies. Virtual reality headsets enable participants to move about freely and practise energy testing on current facilities. This technology should generate economies of scale by creating a specific training tool able to replicate all real-life situations.

Total cost of the project: €12.2 million

Invest for the Future contribution to ITE INEF 4: €7 million



LIVING RESOURCES

AN ICONIC ENVIRONMENTAL CONCERN

France's living resources designate all the natural riches housed on its lands. They include the territory's biodiversity, from well-known animals and plants to everyday species involved in agriculture and forestry. They also embrace natural environments such as the ecosystems that provide us manifold services: insects pollinate, earthworms enrich the soil, plants naturally purify water and prevent erosion and flooding, and bogs store carbon. More generally, living resources comprise all the public lands and natural areas that enhance our living environment through their aesthetic, spiritual, recreational and educational qualities.

Today these resources are threatened in France, as across the globe. Some natural environments are fragmented and destroyed in the name of urbanisation and developing human infrastructure.

Some wild species fall victim to overfishing, deforestation and poaching. Others, suffering from water, soil and air pollution, are forced to migrate to adapt to climate change – if they still can.

With its extensive, diverse territories, France boasts outstanding natural heritage. Mainland France displays a variety of landscapes (including continental, Alpine, Atlantic and Mediterranean environments), while the overseas regions feature tropical forests in French Guiana, coral reefs in three different oceans, and lands in the southern hemisphere and Antarctic. The issues facing living resources are therefore of deep concern.

Over years of intensive development, natural areas have been swallowed up at a rate of 68,000 hectares per year in mainland and overseas France. As a result, France is one of ten countries worldwide with the highest number of endangered species (1,235 total, including 293 in mainland France)¹⁸



“France boasts outstanding natural heritage [and] is one of ten countries worldwide with the highest number of endangered species”

Against this backdrop, public policies on preserving biodiversity have gradually developed since the early 1960s. They promote action across three parallel areas:

- consistently furthering scientific knowledge of our natural environments, since to draw up effective measures it is crucial to determine the biodiversity in them and the way their ecosystems work;
- protecting and enhancing our natural heritage through the wide range of resources (e.g. national parks, marine parks, Natura 2000 sites, etc.) that can be tailored to diverse grassroots issues;
- modernising our farming and forestry practices to achieve more sustainable, environmentally-friendly management of our natural resources.

A LARGE PORTION OF EXPENDITURE

At almost €772 million in 2018, “Living resources” was the second largest item of Green OAT expenditure.

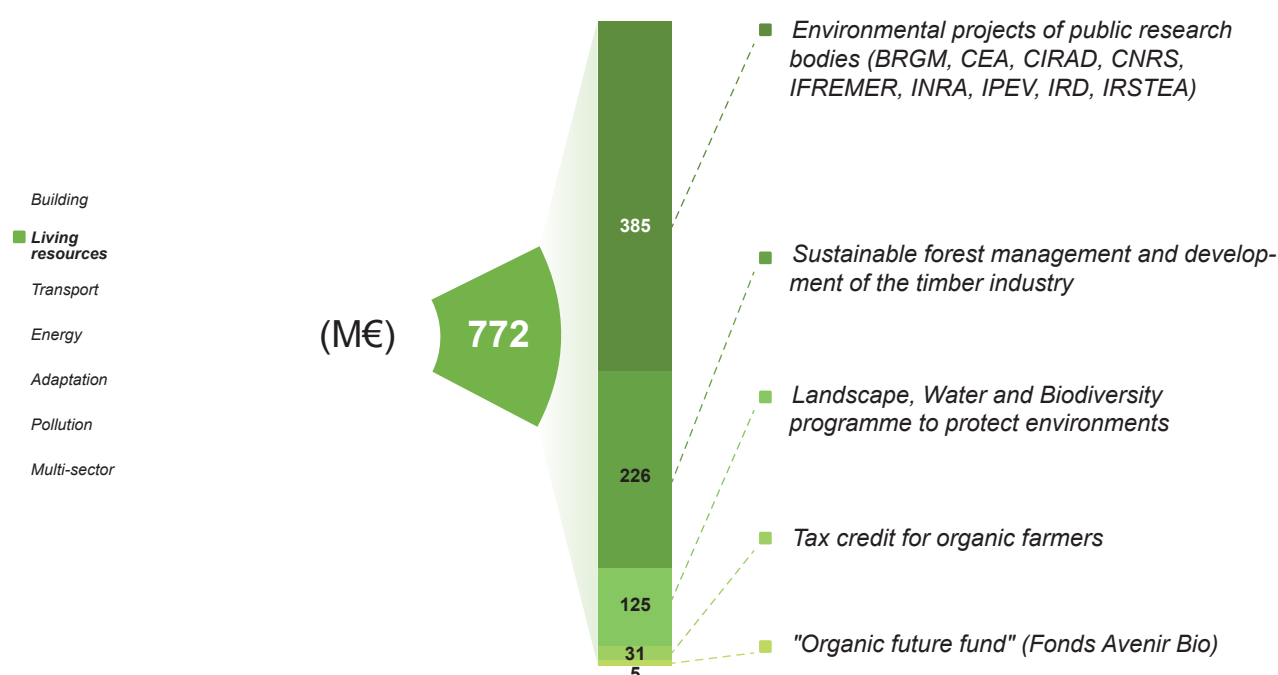
Expenditure met the three above-mentioned goals of furthering knowledge of biodiversity, protecting environments and encouraging change:

- €385 million are earmarked to fund scientific and technological research at leading French research facilities (CIRAD, CNRS, INRA, etc.)¹⁹ to deepen knowledge of our country’s biodiversity and explore new farming solutions;
- €226 million support best practices in forestry and agriculture by funding sustainable forest management, the mobilisation of renewable wood resources and certified organic farming;
- €125 million are invested in the Landscape, Water and Biodiversity programme that supports initiatives to protect natural environments and preserve natural resources.

38

39

2018 proceeds allocated to Living resources



19 - CIRAD - French agricultural research and international cooperation organization; CNRS - French National Centre for Scientific Research; INRA - National Institute of Agricultural Research

SAFEGUARDING THE VALUE OF OUR FOREST ASSETS

Mainland France boasts over 17 million hectares of forest – 31% of its land area – and there are another 8 million hectares in overseas regions (mainly French Guiana).

This heritage is a crucial resource for the French economy. Of 2.7 billion cubic metres of standing timber, some 45 million cubic metres are harvested and sold in particular to the building, furnishing, packaging and power industries each year.

Forests are also a treasure trove of biodiversity. Even excluding French Guiana and other overseas territories, which account for over 60% of France's catalogued species, the forests of mainland France are home to 138 tree species, 73 mammal species, 120 bird species and 72% of mainland plant life. Natura 2000 sites also include woodlands.

Finally, forests also play a crucial role in climate change mitigation as carbon sinks. Every year, French forests sequester around 60 million tonnes of carbon, the equivalent of 15% of the country's greenhouse gas emissions.

However, many French forests are ageing and their timber is harvested little if at all. They are near saturation as carbon sinks, and more vulnerable to climate change and biological threats. Faced with this situation, France has set up an active, sustainable management strategy for forests and the timber industry, to foster more dynamic forestry that cares for ecosystems.

“Every year, French forests sequester [...] the equivalent of 15% of the country's greenhouse gas emissions”

The €226 million of Green OAT proceeds allocated in 2018 to sustainable forest management and sustainable timber industry development also fund this strategy, which entails developing and planning and the long-term management of private and public forests.

The National Centre for Forest Owners (CNPF) is a Government entity serving 3.5 million forest owners. Through territorial development it contributes to the sustainable management of private forests and their maintenance, in particular by advising and training forest owners.

The French Forestry Commission (ONF) is a public entity that manages public forests in France, i.e. 25% of forest assets. Its threefold objective is to grow and harvest timber to meet society's needs; to preserve the environment; and to provide services for the public.

Over almost 12 million hectares, the Forestry Commission strives to develop knowledge of forest geography and characteristics (via field and satellite observation, monitoring of biodiversity, etc.) to enable it to manage forests over the long term and ensure that trees are harvested at a rate suited to their natural life spans while replacing old growth with new trees. This also entails conducting the work and investment necessary for forest renewal.

PROTECTING AND RESTORING BIODIVERSITY

Preserving biodiversity on French territory requires two main actions: researching and monitoring biodiversity (to determine which areas to protect and assess the outcomes of such protection); and providing effective protection in natural areas teeming with biodiversity. In 2018, €125 million in Green OAT proceeds were allocated to the Landscape, Water and Biodiversity programme that furthers both those goals by funding the planning, maintenance and extension of protected areas, as well as biodiversity monitoring.

The French Biodiversity Observatory (ONB) monitors and inspects the status of biodiversity in mainland and overseas France. With the support of such institutions as the Natural History Museum (MNHN), the French Biodiversity Observatory annually prepares and publishes indicators that monitor society's impact on biodiversity. The indicators are tailored to various audiences and scopes to encourage all members of society to take ownership of biodiversity issues.

The observations and indicators published by the French Biodiversity Observatory provide a crucial basis for public policy on restoring biodiversity and protecting natural areas.

Such protection takes many different forms: national and regional parks, sites benefiting from France's SCAP programme for the creation of protected areas, water-and-land belts, Natura 2000 sites and wetlands. All these measures meet one of the objectives of the Convention on Biological

Diversity (CBD), an international treaty signed at the 1992 Earth Summit in Rio de Janeiro, namely to conserve at least 17% of land and inland water and 10% of coastal and marine areas by 2020. In 2018 there were 1,780 Natura 2000 sites over more than 7 million hectares of French land (around 12.9%) and 12 million hectares of French waters (34%). France has the second largest maritime area in the world, with an exclusive economic zone (ZEE) covering over 10 million square kilometres. The country therefore spearheads efforts to preserve natural areas, and fully intends to pursue this course.

FOSTERING GREENER AGRICULTURE

Some €36 million in Green OAT proceeds were allocated to the Sustainable Development of Agriculture and Territories programme in 2018, to fund organic farming and biodiversity restoration –

particularly in agricultural areas where the French Biodiversity Observatory has noted decline. The programme encourages farm operations to stop using synthetic farm inputs, through incentives such as Organic Future Fund subsidies and tax credits (€31.4 million and €5.1 million respectively). These aids are helping develop France's organic farming sector, which accounted for 7.5% of farms in 2018, compared to 6.6% in 2017.

The programme also helps combat pollution, since phytosanitary products and synthetic pesticides are toxic not only to wildlife, but also to humans when they enter the food and water supply.

“Organic Future Fund subsidies [...] are helping develop France's organic farming sector, which accounted for 7.5% of farms in 2018, compared to 6.6% in 2017”

French Forestry Commission (ONF)

In accordance with the Forestry Code, the French Forestry Commission (ONF) is in charge of implementing, subject to control, a special forestry regime (*régime forestier*) for mainland national forests and overseas forests. With regard to mainland national forests, ONF has also been granted an overarching management remit. The French government also entrusts ONF with general interest operations beyond the basic remit provided for in the Forestry Code.

By conferring management of France's mainland and overseas forests to a single public entity, the government hopes to guarantee a high degree of environmental performance. In particular, ONF has played a major role in:

- **Ensuring the integrity and sustainability of the forest heritage:** one of the major causes of the rapid erosion of biodiversity is the fragmentation and degradation of land. However, the forestry regime and the inalienability of national forest areas provide strong land tenure guarantees. The average surface area of private forest land in France is under 4 ha. It increases to 190 ha for overseas forests and 1,320 ha for mainland national forests. Integrity of the forest heritage is also ensured through controlled implementation of an environmental policy, with over 4,000 fines issued each year.
- **Maintaining very high environmental quality in managed areas:** a comparison between mainland national forests and private woodlands illustrates this accomplishment. Type 1 natural zones of ecological interest, fauna and flora (ZNIEFF) account for 37% of the surface area of mainland national forests, compared with 11% of the surface area of private woodland. 25% of Important Bird Areas (ZICO) are in mainland national forests and 7% on private woodland. Areas with an environmental protection status (buffer zones of national parks, including reserves) account

for 6.6% of the surface area of mainland national forests and 4.4% of the surface area of overseas forests – an average of 1.9% for all forests, including private woodland.

- **Assisting with the implementation of the Natura Directive in France in 2000:** 30% of national forests are labelled Natura 2000 sites (38% in the case of mainland national forests). As over 98% of these national forests are covered by management plans, compatibility with Natura 2000 rules has been verified and validated.
- **Implementing a policy to set up a network of reserves in France:** ONF currently manages 257 reserves accounting for 155,000 hectares. One-third of this surface area is located in mainland France and two-thirds overseas, mainly in French Guyana, which is a tropical forest and global biodiversity hotspot.
- **With regard to general interest operations:** “natural risks” general interest operations help prevent soil erosion (and, consequently, maintain forest soil capital, a major carbon stock), and protect against forest fires (limiting carbon stock release). Maintaining a healthy forest canopy significantly offsets greenhouse gas emissions thanks to the dual effect of carbon sequestration (the managed forest is a carbon sink) and substitution (wood is a renewable material with a lower carbon footprint than other materials). “Biodiversity and overseas” general interest operations play a direct role in preserving the most remarkable species and ecosystems, in particular thanks to internal networks comprising 230 nature experts, who conduct nearly 200 biodiversity initiatives each year in forests managed by ONF.
- **Removal of glyphosate in managed forests:** in general, chemical products are very rarely used in forest management given the length of forest cycles.

Focus on a research project funded by P172

Octocrylene (OC), a common ingredient in sunscreens and cosmetics, found toxic to coral

A team of researchers from the Laboratory of Microbial Biodiversity and Biotechnology (LBBM) and the Banyuls-sur-Mer Oceanographic Observatory (Sorbonne Université, CNRS) discovered that octocrylene, an ingredient used in many sunscreens and cosmetics worldwide, is toxic to coral. The study recently published in *Analytical Chemistry* flags the need to find new UV filters that are not harmful to coral reefs.

Article reference: "Metabolomics reveal that octocrylene accumulates in *Pocillopora damicornis* tissues as fatty acid conjugates and triggers coral cell mitochondrial dysfunction", Didier Stien et al., *Analytical Chemistry*, 5 December 2018.

<https://pubs.acs.org/doi/pdf/10.1021/acs.analchem.8b04187>



Coral reef, Mayotte

TRANSPORT

A CARBON-INTENSIVE SECTOR

In 2016, the transport sector was responsible for 29% of France's greenhouse gas (GHG) emissions, making it the country's most GHG-emitting sector²⁰. These emissions are mainly generated by road transport, which is still highly dependent on hydrocarbons and contributes heavily to overall emissions of air pollutants in urban areas (harmful fine particles and nitrogen oxides). Road transport is still the most common means of transport despite its emissions-intensive nature, with a modal share amounting to 88%²¹.

It was against this backdrop that the following five focus areas were set out in the French low-carbon strategy (SNBC) to reduce sector energy consumption, greenhouse gas emissions and dependency on petroleum products:

- moving to zero-emissions vehicles and adapting the related infrastructures;
- energy efficiency of vehicles;
- controlling increases in demand;
- modal shift;
- optimising vehicle use.

Action to be taken is mainly aimed at meeting the target of mitigating climate change through the long-term transition to more optimal, balanced and less carbon-intensive transport. The measures introduced by the Government to address the issue include increasing the tax on consumption of energy products and electricity (TICPE), in particular the component relating to carbon emissions, otherwise known as the Climate and Energy Contribution (CCE). The results of the transition will also indirectly further the objectives of reducing pollution and protecting biodiversity.

EXPENDITURE CONSISTENT WITH FRENCH LOW-CARBON STRATEGY

Green OAT proceeds allocated to the transport sector focus on three areas: energy efficiency of vehicles, carbon intensity of fuels and modal shift.

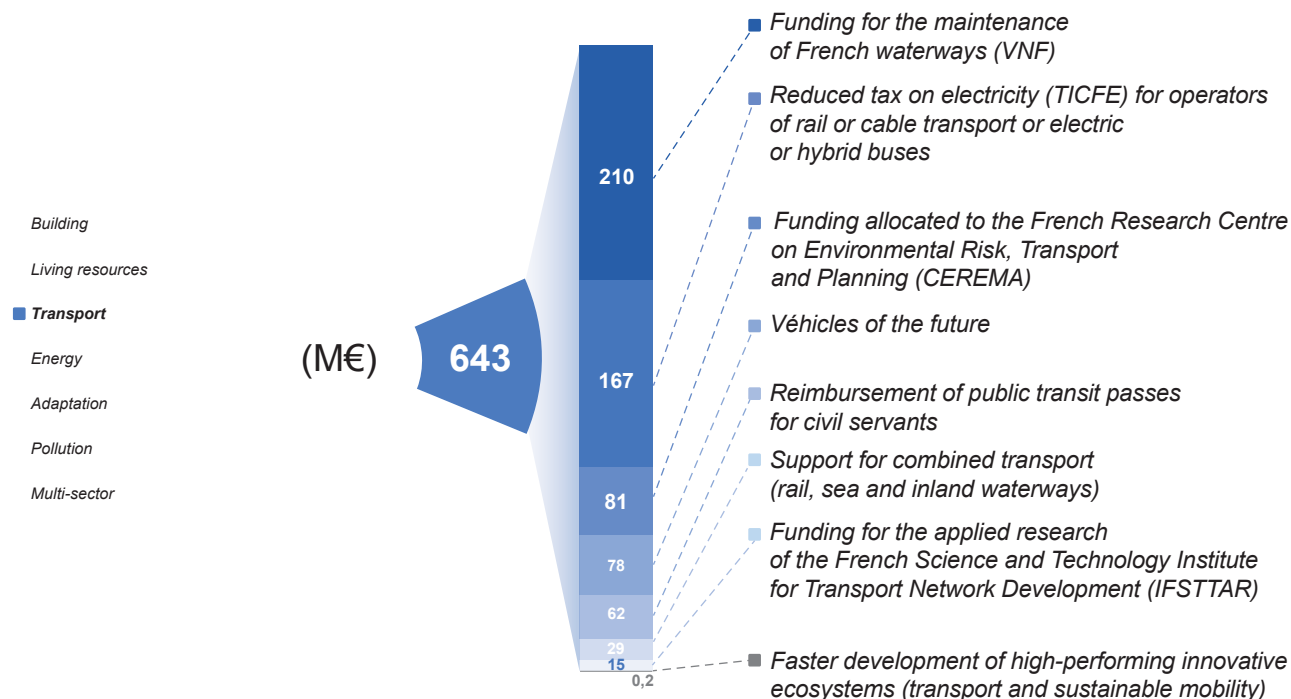
The first two require better knowledge of types of transportation and their impacts, as well as investment in research and development to find more effective means of transport, which can be deployed in the near future on a large scale. This is the aim of funding allocated to the French Research Centre on Environmental Risk, Transport and Planning (CEREMA), the French Science and Technology Institute for Transport Network Development (IFSTTAR), and the "Vehicle of the Future" programme under the "Ecology, Sustainable Transport Development" mission of the "Invest for the Future" programmes 1 and 2.

The modal shift accounted for the remaining Green OAT eligible expenditure in the transport sector: funding French Waterways (VNF), reduced rate of tax on energy products and electricity (TICFE), and support for combined transport. The expenditure has encouraged the modal shift by funding the maintenance and management of non-road transport networks (rail, inland waterways and sea), and by providing tax incentives to develop low carbon-intensive modes of transport.

20 - Key Climate Figures - France, Europe and World, 2019 edition, page 37

21 - Modal share of road transport in overland freight transport excluding oil pipeline, air cargo and passenger transit. Key Transport Figures, 2019 edition

2018 proceeds allocated to Transport



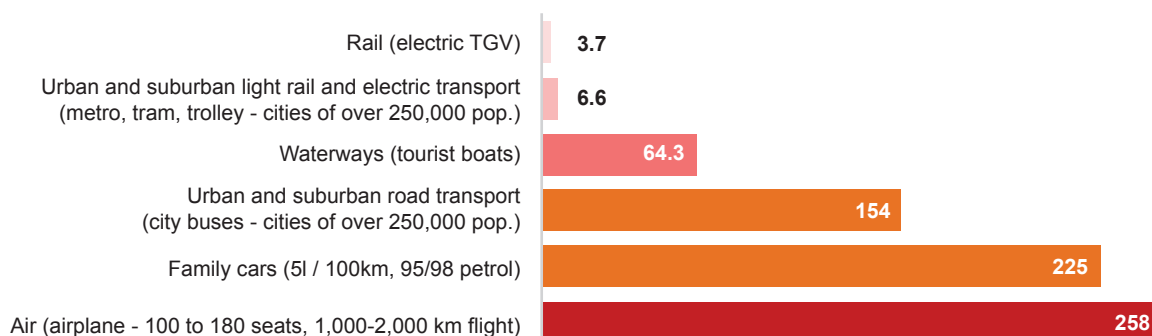
44

ENCOURAGING THE MODAL SHIFT

45

To understand the importance of the modal shift in reducing the transport sector's greenhouse gas emissions, it is useful to recall the magnitude of emissions for the various modes of transport. Examples for passenger transport:

EMISSIONS FACTORS (gCO₂e/passenger/km)



Source: Carbone 4 graph, ADEME data

transport has the highest emissions after air transport, it has the majority modal share in overland freight transport excluding oil pipelines (88%) naturally making it the mode of transport with the highest emissions: 95% in this sector. Conversely, rail and inland waterway transport only account for 1.4% of emissions, for a modal share in overland freight transport above 10%, given their low carbon-intensive nature. Therefore, encouraging the use and development of alternatives to road transport, if their socio-economic profitability is established, is an important driver for reducing emissions. This can be done through electricity-based transport in France, where there is low-carbon electricity production. The reduced tax (TICFE) on electricity for operators of rail or cable transport and electric or hybrid buses contributes to the modal shift. The reduced rate helps reduce electricity costs for electric transport operators²². In 2018, the €57 million allocated from Green OAT funds made it possible to distribute 8.9 TWh of electricity at a reduced rate.

Another aspect of the modal shift is from road transport to waterway transport. The modal share of waterway transport is 1.9% of inland goods transport in France, a figure that has been stable for decades²³. The emission factor of a self-propelled barge or pusher tug is significantly less than that of a heavy goods vehicle of 7.5 tonnes²⁴. Reducing road freight volumes in favour of river cargo contributes to reducing transport emissions, especially if the French inland waterways network is well maintained.

Consequently, €210 million allocated to French Waterways (VNF) from Green OAT proceeds in 2018 is aimed at supporting VNF's policy to enhance the reliability of waterways. Page 47 of this report focuses specifically on VNF.

“Rail and waterway transport only account for 1.4% of emissions, for a modal share above 10%”

The €28.6 million allocated from Green OAT proceeds in 2018 to support combined transport is in addition to VNF funding and the reduced tax on electricity for operators of rail or cable transport and electric or hybrid buses. Combined transport means the coordinated use of various alternative modes of transport: collective, sea, inland waterways and rail to transport passengers and goods. Grants funded by Green OAT assist public services and infrastructure operators of combined transport (ports, train stations, multi-modal transport platforms) and those experiencing economic difficulties. Ensuring the optimal operation of these infrastructures is necessary to ensure a high utilisation rate of the inland waterways maintained by VNF, and the electric modes of transport benefiting from the reduced TICFE rate. In 2017, the modal share of combined transport for inland passenger transport amounted to 21.8%, a rate that has been on the rise since 2014. The share of rail transport in internal goods transport amounted to 9.6%.



Seine river barge

22 - The tax on energy products and electricity (TICFE) is due by energy providers for delivery to an end consumer or for final consumption. Reducing the TICFE for energy providers on electricity supplied to electric transport operators also indirectly reduces the electricity costs of these operators

23 - Modal share of road freight transport (excluding pipelines) in 2017, *Key Transport Figures*, 2019 edition, SDES

24 - Greenhouse gas inventory, ADEME

French Waterways (VNF), committed to ecological and energy transition

French Waterways (VNF) maintains, operates and develops the largest European river system: 6,700 km of rivers, canals and canalised rivers, 4,000 civil engineering structures (including locks, dams and navigable aqueducts) and 40,000 ha of public waterways.

Through its work, VNF meets three major challenges. It:

- fosters freight transport;
- contributes to urban planning and tourism development; and
- manages the water system by ensuring the safety of hydraulic structures and water use, preventing floods and hydraulic stress, fostering hydroelectricity and preserving biodiversity.

VNF, committed to water resource management and the preservation of biodiversity

French Waterways is involved in a programme to improve water resource management and optimisation. Its purpose is three-fold:

- Wisely manage water resources to preserve aquatic ecosystems. VNF optimises water sources, through its programme for reconstructing, modernising and automating civil engineering structures, thereby ensuring precise, real-time water management. To ensure the most effective water resource management, VNF also strives to control water abstraction from the environment. In 2018, 77% of abstracted water was monitored or measured. As of 2022, all VNF water abstractions will be measured or monitored and the resulting data made available in a data tracking tool.
- Ensure ecological, efficient network management. "Zero pesticides": Since 2013, VNF has touted its ambition to pursue efficient river system management, without using

pesticides. To avoid any accidental leakage or pollution, VNF is progressively generalising use of biodegradable lubricants on its river works. At the start of 2018, biodegradable hydraulic oil was used for 71% of river works.

As part of its work to maintain and modernise France's waterways, in 2018, VNF recycled 234,000 cubic metres of sediment dredged from the river system, thereby contributing to waste reduction in a circular economy approach.

- Restore natural habitats and foster ecological continuity.

River works are redesigned to ensure the restoration of ecological continuity. In 2018, VNF operated 63 fish ladders. VNF continues to promote and develop ecological engineering, wherever possible, to restore dikes and banks and ensure lateral continuity. In 2017, plant or mixed techniques accounted for 43% of river bank restoration.

VNF, committed to fostering sustainable river transport

To enhance its service to users, VNF invested €11 million in 2018 to renovate and modernise locks. In 2018, despite unusual weather phenomena, VNF was able to maintain a 98% availability rate in France's river system.

In promoting ecological and energy-efficient freight transport, VNF aims to significantly cut GHG emissions. In an effort to foster sustainable river transport, French Waterways deploys, alongside its partners and river transport companies, two main financing programmes. The first programme supports the transition to shipping as the preferred method for freight transport (€16 million) and the second is aimed at modernising France's navigation fleet, making it more ecological (€12.5 million).

ENERGY

ENERGY TRANSITION IN FRANCE

Efforts to combat global warming, in line with the objectives defined at the 2015 United Nations Climate Change Conference (COP 21) have made energy consumption one of the main challenges of the 21st century. Electricity can significantly help us reduce our carbon footprint as we now have the technology to produce it without emitting excessive amounts of carbon dioxide. France's electricity supply is low-carbon (comprising less than 12% fossil energy), but electricity currently accounts for less than 23% of domestic final energy consumption, and its production only accounts for 35% of primary energy consumption. Consequently, although the electricity mix in France is low-carbon, fossil energy sources comprise more than 47% of the primary energy mix. Renewable electricity sources (hydroelectric, wind and solar power) only account for 3% of the primary energy mix²⁵.

“While the electricity mix in France is low-carbon, fossil energy sources comprise more than 47% of the primary energy mix”

Of the 48% of fossil fuels in the primary energy mix, oil accounts for 29%, natural gas for 16%, and coal accounts for the rest. The sectors that consume the

lion's share of fossil energy are transport (74% of final energy consumption of oil) and the residential-tertiary sector (65% of final energy consumption of natural gas and 16% of final energy consumption of oil).

France's Energy Transition Act for Green Growth, one of the key objectives of which is to quarter the country's greenhouse gas emissions between 1990 and 2050, should therefore significantly reduce fossil energy consumption, in particular in the building and transport sectors. The objective was boosted by the national low-carbon strategy of December 2018, which set the target of carbon neutrality by 2050. The main measures for each sector have been presented in the relevant sections, including energy renovation of buildings, electrification of transport and energy efficiency and savings for both sectors.

Industry, energy generation, waste management, agriculture and forestry all have a role to play in reducing greenhouse gas emissions. Reducing carbon intensity of the economy should be placed in the wider context of reducing the carbon footprint. Changes in production and consumption methods in order to reduce greenhouse gas emissions should be made while bearing in mind the specific challenges of including intermittent renewable energies in the electricity grid and available biomass resources.



Wind turbines in Normandy

PROMOTE THE USE OF LOW-CARBON ELECTRICITY BY SOCIETY...

The percentage of electric vehicles in the French car market is currently 1.9%²⁶, but current initiatives, including the decision to stop selling internal-combustion engine vehicles by 2040, augur well for future growth. However, electrification of vehicles will only foster the energy transition if French electricity production develops sufficiently while remaining low-carbon.

Consequently, one of the key challenges facing the energy sector is to develop carbon-free electricity production, by diversifying energy sources. Development must effectively include new energy sources, in particular by taking into account the intermittent nature of renewable energies.

“Electrification [of vehicles] will only foster the energy transition if French electricity production develops sufficiently while remaining low-carbon”

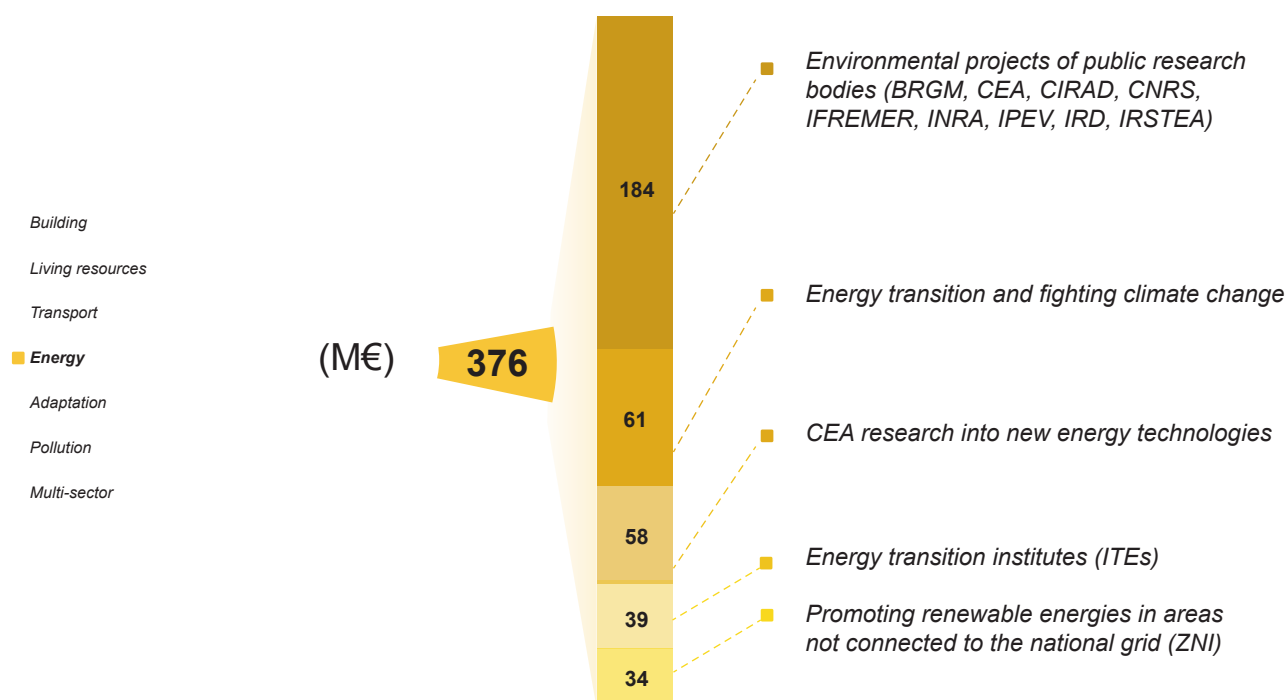
This requires greater network flexibility to secure energy supply. It involves peak production, demand management, electricity storage and interconnection. France's national low-carbon strategy (SNBC) has set four priorities for that purpose:

- Drastically cut energy intensity of the French economy by setting up actions in all industries and adopting available top-of-class technologies. In particular, keep watch on public policy as regards how well it addresses power supply and demand, to ensure that said policy encourages less waste and promotes the best efficiency.
- Even out demand, and more specifically encourage a better match between supply and demand (flexibility, cutting back on electrical use in electricity-intensive industries).
- Encourage research and innovation in energy efficiency (daily and interseasonal storage, industrial manufacturing lines, waste-to-energy plants, motor efficiency, thermal insulation).
- Encourage moderate, mindful power use and related behaviours (developing smart devices, choosing off-peak hours, raising consumer awareness of responsible power use).

48

49

2018 proceeds allocated to Energy



The €376 million of Green OAT proceeds allocated to the Energy sector contribute to these three development initiatives, as well as research into new carbon-free energy sources to improve sustainable mobility.

...BY DEVELOPING TOMORROW'S TECHNOLOGIES TODAY

The five types of Energy expenditure funded by Green OAT proceeds are all dedicated to research and to developing solutions to ensure electricity network flexibility and carbon-free transport.

In 2018, €184 million were allocated to public research bodies (including IRD, IFREMER and CEA) working in the field. One fifth of the funding is used for applied research in new energy technologies (NET), available in the short or medium term, by CEA, under the "Research in sustainable energy, development and mobility" programme.

"IN 2018, CEA REGISTERED 200 PATENTS IN THE FIELD OF NEW ENERGY TECHNOLOGIES"

CEA develops disruptive innovations in power generation, storage, distribution and consumption to promote the use of renewable energies and enhance energy efficiency. Its new energy technologies research strategy is aimed at supporting research in energy and energy-intensive sectors (transport and building) to develop a technologically efficient and economically competitive industry. The main research projects funded relate to solar power, hydrogen and fuel cells, energy storage and batteries for vehicles, second-generation biofuels and synthetic fuels, as well as marine energies.

In 2018, CEA registered 200 patents in the field of new energy technologies. Revenue received by CEA from manufacturers' use of the patents bears witness to their value and relevance for industry²⁷. In the same year, technology transfers from the research institute to industry generated over €38.6 million in revenue for the CEA.

"In 2018, technology transfers from the CEA to industry generated almost €39 million in revenue"

Lastly, the €39 million of Green OAT proceeds allocated to the "Invest for the Future" programme contribute to funding applied research by Energy Transition Institutes (ITEs), interdisciplinary platforms combining industrial and public research expertise in carbon-free energies in a joint investment approach. These institutes primarily target high-potential sectors, including those with a proven positive impact on climate change, such as the energy efficiency of transport equipment, energy management tools, geothermal energy, renewable marine energies, solar power, energy storage and smart grids. At the end of 2018, a total of nine projects were supported by Energy Transition Institutes (ITEs) as part of the Invest for the Future fund, which also financed 440 projects for the action "Energy transition demonstrators" (which includes the circular economy as well as smart grids), and 16 for the eco-technology fund.

27 - Calculated as total revenue from services and collaborative research with manufacturers and fees/royalties received for manufacturers' use of software and processes.

Focus on “Invest for the Future”

DEMOS 2 for better water management using solar energy

Meeting the increasing water requirements of the global population is the challenge addressed by Mascara’s Demos 2 project by providing a sustainable alternative to current water desalination processes. Each year, the currently used energy-intensive technology emits several million tonnes of CO₂.

The project will enable the production of drinking water by desalination using solar-powered reverse osmosis, with no CO₂ emissions or external energy supply. France’s overseas regions and departments, faced with the consequences of climate change and higher fossil energy prices, will be able to reach their drinking water supply objectives at reasonable prices (<€1.5/m³).

Consequently, they will be able to cut costs compared with conventional solutions, with a return on investment in less than five years, while limiting the damage caused by the production of brackish water.

Total cost of the project: €2.8 million

Invest for the Future contribution: €1.3 million



50

51

Connected networks and renewable energies: two key features of smart grids



ADAPTATION

FORESEEING CLIMATE CHANGE RISKS

Global warming is a reality. Efforts to curb it may minimise its future impact, but climate inertia and the intensity of greenhouse gas emissions over the last centuries have made certain major changes inevitable. These changes will profoundly impact numerous sectors, including agriculture, forestry, tourism, fisheries, land and urban planning, building and infrastructure, and population protection. Some of these changes are already visible, such as more frequent extreme weather events (including storms and cyclones, drought, heavy rainfall and flooding), changes in seasonal patterns with harmful effects on agriculture and biodiversity, the rise in sea level and acidity, melting of glaciers and polar ice caps and rapid erosion of biodiversity.

“By foreseeing physical and financial risks, we can identify the levers for minimising future damage”

The risks identified in France include losses for the agricultural sector, due to heat waves and drought; the depletion of water resources in areas already in a precarious situation; a network of roads and highways estimated at €2 billion and thousands of homes and businesses that will be directly affected by a one-metre rise in sea level.

With the combat against climate change as a national priority, adapting land use to climate change has also become a key challenge requiring nationwide efforts. The objective is to minimise the future impact of climate change on socioeconomic activities and nature, by foreseeing the physical and financial risks involved to identify the levers for minimising future damage.

SPONTANEOUS ADAPTATION / PLANNED ADAPTATION / MALADAPTATION

While spontaneous adaptation involves adapting to a climate constraint by means of an immediate, automatic response, planned adaptation is the fruit of deliberate strategic decisions, based on a clear understanding of impending change and the appropriate measures needed to achieve the desired result.

Spontaneous adaptation may lead to conflict with existing policies (for example, the massive use of air-conditioning, which increases energy consumption and greenhouse gas emissions) or maladaptation, where vulnerability to unpredictable weather conditions is paradoxically increased.

“Maladaptation” may refer to one of the following situations:

- inefficient use of resources compared with other use options (for example, widespread use of air-conditioning instead of investing in insulation materials);
- uncontrolled transfer of vulnerability from one system to another, but also from one period to another (for example, the equipment used to protect a motorway from flooding should not increase the risk of flooding for a nearby A-road);
- reducing leeway for future adaptation (measures that limit flexibility, for example the construction of flood barriers and urbanisation of new protected areas);
- scope errors: over-adaptation (excessive cost) or under-adaptation (excessive individual risk).

“Improving knowledge through research programmes is an essential aspect of planned adaptation policy”

To avoid maladaptation, it is therefore essential to correctly foresee risks, rationally measure them and define the most acceptable risk levels.



The International Space Station orbiting Earth

52

53

Improving knowledge through research programmes is an essential aspect of planned adaptation policy.

There are various types of adaptation measures:

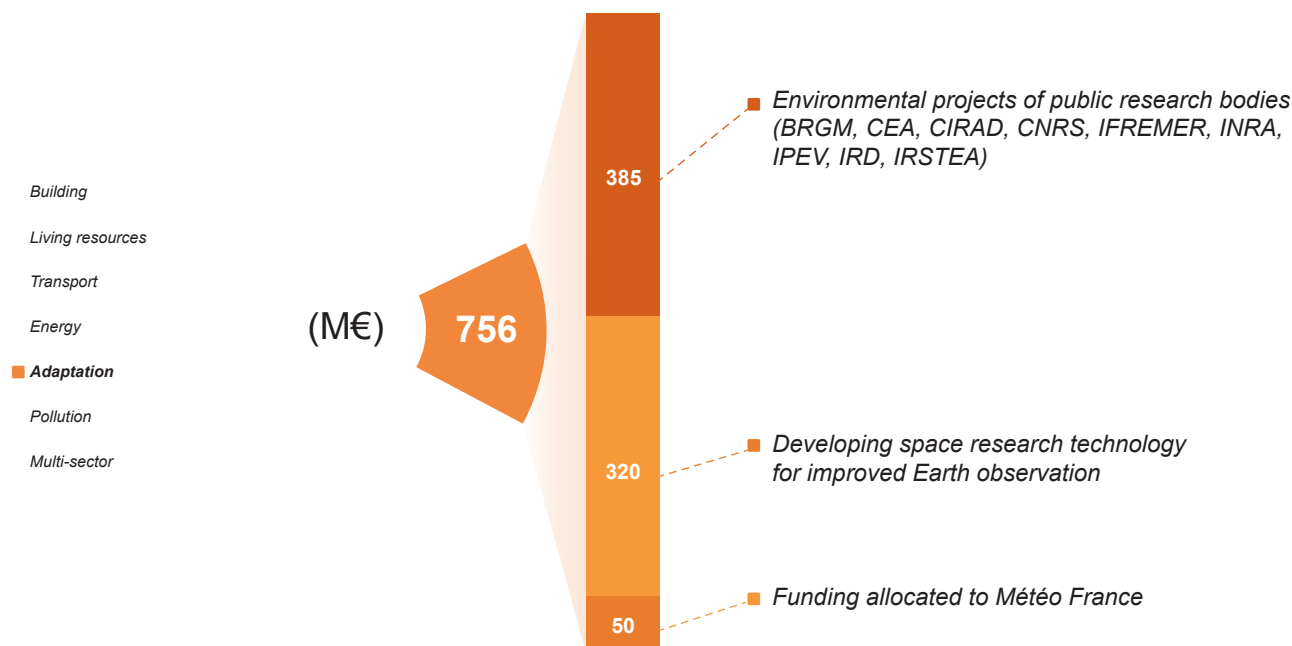
- physical, such as flood barriers;
- institutional, such as crisis management mechanisms or specific regulations;
- strategic, such as population displacement or settlement, or measures facilitating recovery in the event of a disaster;
- improving public disclosure and answering decision-makers' information needs, to facilitate accountability and decision-making.

These policies are already covered by other industry expenditure. Moreover, to improve our ability to adapt, it would appear desirable to develop reliable risk forecasting through scientific research.

SUPPORT RESEARCH TO ENHANCE ADAPTATION

In 2018, research expenditure in support to climate change adaptation accounted for €775 million of proceeds from the Green OAT. The expenditure has been used entirely to improve climate change knowledge through public research programmes on observation of the Earth and the environment. It is essential to obtain the best understanding possible of phenomena relating to the Earth's atmosphere and climate in order to predict future changes and adopt the most efficient adaptive responses.

2018 proceeds allocated to Adaptation



In all, €320 million of Green OAT proceeds were allocated to the French Space Research Centre's (CNES) "Space research" programme. The purpose of the programme is to ensure that both France and Europe master the technologies and space systems needed to meet the research, security, economic development, land and urban planning and environmental challenges facing them. The programme also funds France's contribution to the European Organisation for the Exploitation of Meteorological Satellites (Eumetsat), which develops and operates a fleet of European meteorological satellites in geostationary (Meteosat) and polar (Metop and EPS) orbit, and publishes the findings.

One of the major challenges of the programme is to improve knowledge of the major scientific issues regarding sciences of the universe and the functioning of the Earth system, in particular to better understand and monitor global warming. Space techniques play an essential role in scientific progress as the data obtained by the main space observatories could generally not have been obtained otherwise: the scientific use of space has been revolutionary for the study and exploration of our universe.

Globally, and particularly in Europe, France's scientific communities play a significant role in the choice of programmes and their scientific use, as witnessed by the share of international and European publications attributable to French programme participants. In 2018, French laboratories wrote 3.9% of international reference publications on space research, 14.1% at EU level (EU 28) and 30.6% in the France-Germany-United Kingdom area. These three measurements demonstrate the vibrancy of French scientific production in space research, with a practically stable contribution in a highly competitive international environment in which France is a key historic player.

Similarly, the "Expertise, geographic information and meteorology" programme to which some Green OAT proceeds are allocated enables Météo France to maintain a high level of research production, with an average 1.5 publication per researcher in 2018. This indicator measures the teams' production using standard bibliometrics: it only takes into account publications in leading scientific journals with an impact factor above 1 as defined by ISI web²⁸. This means that only the most impactful, peer-reviewed journals are concerned. Consequently,

the indicator reflects Météo France's efforts in terms of research and innovation. The researchers' work enables the agency to continuously improve its services, enhances understanding of complex weather phenomena at the source of significant meteorological events, and provides the skills necessary to understand past climate phenomena, make forecasts and support public authorities' climate change adaptation policies.

“In 2018, French laboratories wrote 3.9% of international reference publications on space research”

Focus on research funded by P172

Forecasting systems and flooding response strategies

The extraordinary flooding that hit the areas surrounding the Seine and Loire rivers in 2016 moved the authorities and the National Institute for Environmental and Agricultural Science and Research (IRSTEA) to reconsider forecasting systems and flooding response strategies.

IRSTEA invented the “engine” behind France's forecasting algorithms. Following the floods, IRSTEAs observed that the hydrological models had worked properly overall... except in specific areas, like the Loing river basin, that were hit by extremely rare events with a recurrence interval exceeding 1,000 years. The hydrological models leverage parameters that are “calibrated” based on series of historical flooding data, to reproduce

the river's usual behaviour as accurately as possible. By definition, extraordinary events fall outside these parameters. IRSTEAs therefore researched mathematical techniques that could be used to make calibration more robust and cope with truly extraordinary events. In parallel, public demand to be able to access flooding forecasts led to another development of the model. Releasing these forecasts is not an exact science, since “it is never fully possible to determine the extent of flooding, if only because of uncertainty over the amount of rain that will fall in the coming hours”. This led IRSTEAs to develop OtaMin, an uncertainty calculation system.

54

55



The Doubs river in Bourgogne-Franche-Comté



The hare, a vulnerable species

POLLUTION

SIGNIFICANT REPERCUSSIONS FOR HEALTH

Deterioration of air, water and soil quality from human activity is an issue that society has understood far longer than the effects of global warming due to greenhouse gas (GHG) emissions. In the 19th century, with the Industrial Revolution and increasing use of coal and factories, air pollution became a visible and tangible phenomenon for the whole population. Over the last century, major environmental disasters worldwide have marked the collective consciousness, such as the Dust Bowl in the United States (1930s), the Great Smog of London (1952) and more recently in Beijing (2015), the Bhopal disaster in India (1984), historic oil spills (Torrey Canyon, Exxon Valdez, Erika etc.), and lakes and rivers contaminated by toxic sludge spills (Ajka factory, Bento Rodrigues dam disaster).

“In 2018, French public opinion ranked air pollution as the second most worrisome environmental problem”

These short-term environmental disasters have alerted public authorities and raised public awareness of the relationship between health and the quality of the air, water and soil. In the mid-twentieth century, they gave rise to the first environmental anti-pollution regulations, including the Clean Air Act of 1956, well before any consideration was given to the greenhouse effect.

Despite efforts made over several decades, pollution remains a highly-publicised, persistent problem: in 2018, French public opinion ranked air pollution as the second most worrisome environmental problem, followed very closely by global warming. Pollution of water, rivers and lakes was fourth²⁹.

“The French Public Health Agency (ANSP) estimated in 2016 that air pollution would result in the premature death of 48,000 people per year, representing 9% of France’s mortality rate”

These concerns are closely related to the direct implications of pollution on public health: in 2016, the French Public Health Agency estimated that air pollution would result in the premature death of 48,000 people per year, representing 9% of France’s mortality rate, with life expectancy at 30 years of age possibly being reduced by more than two years. Moreover, pollution of soil, groundwater and streams by micropollutants from agriculture (pesticides) and industry (heavy metals, PCBs, hormones, medication, etc.) has an adverse effect on consumer health that is still difficult to quantify: these harmful compounds enter the food chain, either through dissolution in drinking water or through bioaccumulation in products grown or reared by the Agro-Food Industry.

ACTION REQUIRED

The health impact of pollution naturally has an economic cost. It includes the cost of treating illnesses such as cardiovascular disease, cancer, respiratory disease and developmental disorders, and also the intangible human and psychological cost of poorer health and quality of life. The French Senate Select Committee has estimated the economic and financial cost of air pollution at between €70 and €100 billion per year³⁰.

On top of the health cost is the cost to the environment, whether due to the chemical breakdown of building materials, lower agricultural productivity and quality or the endangering of ecosystems, particularly through the process of eutrophication. To limit the socio-economic and environmental consequences of pollution, the State has committed to various measures affecting all pollution-intensive sectors in the economy.

For water and soil pollution, the “Nitrates Directives” and the General Tax on Polluting Activities (TGAP) for detergents, have introduced measures limiting the release by industry of harmful micropollutants (nitrates, phosphates) into groundwater and streams. At the same time, measures such as the “Healthy Land” label, the Ecophyto 2 plan and the National Micropollutants Plan are reducing the use of pesticides, phytosanitary products and other micropollutants in agriculture and industry.

“The health cost of air pollution is estimated at between €70 and €100 billion per year”

For air pollution, international action is required as pollutants can spread over large distances. Two European directives have set the maximum air concentrations for each class of pollutant. The directives oblige member states to list and measure pollutants, monitor pollutant concentrations and take the necessary measures to correct exceeded thresholds. At the same time, each country is required to set targets for reducing concentrations of the most harmful pollutants. As a result, France has pledged to reduce the following emissions by the year 2030 compared to 2005 levels: sulphur dioxide (SO₂) by 77%, nitrogen oxides (NOx) by 69%, non-methane volatile organic compounds (NMVOC) by 52%, particulate matter (PM_{2.5}) (fine particles with a diameter of 2.5 microns or less) by 57%, and ammonia (NH₃) by 13%³¹.

MONITOR AND REDUCE

Two actions are required to comply with international directives: on the one hand, keeping track of pollutants and their appropriate spatial and temporal concentrations, on the other hand, implementing effective measures to achieve national concentration reduction targets.

While pollution is the shared responsibility of all major sectors of the economy, the measures to be taken to reduce concentrations of main pollutants are specific to each sector:

- In 2017, transport represented 64% of NOx emissions, 11% of NMVOC emissions, 14% of PM₁₀ particulate matter (fine particles with a diameter of 10 microns or less) and 17% of PM_{2.5} particles. A key driver for action is reducing combustion engine road transport, and the associated exhaust emissions.
- Building sector activities (residential and tertiary) emit the highest levels of PM₁₀ particles (33%), PM_{2.5} particles (50%) and NMVOC (46%), mainly as a result of air-conditioning and heating systems. Renovating residential and tertiary property and changing energy sources, can therefore significantly reduce the pollution generated by this sector.
- Heavy industry (including electricity generation) is responsible for a high percentage of SO₂ (76%) and NMVOC (40%) emissions. In addition, certain pollutants are specific to particular industrial activities: chromium, nickel, mercury, cadmium,

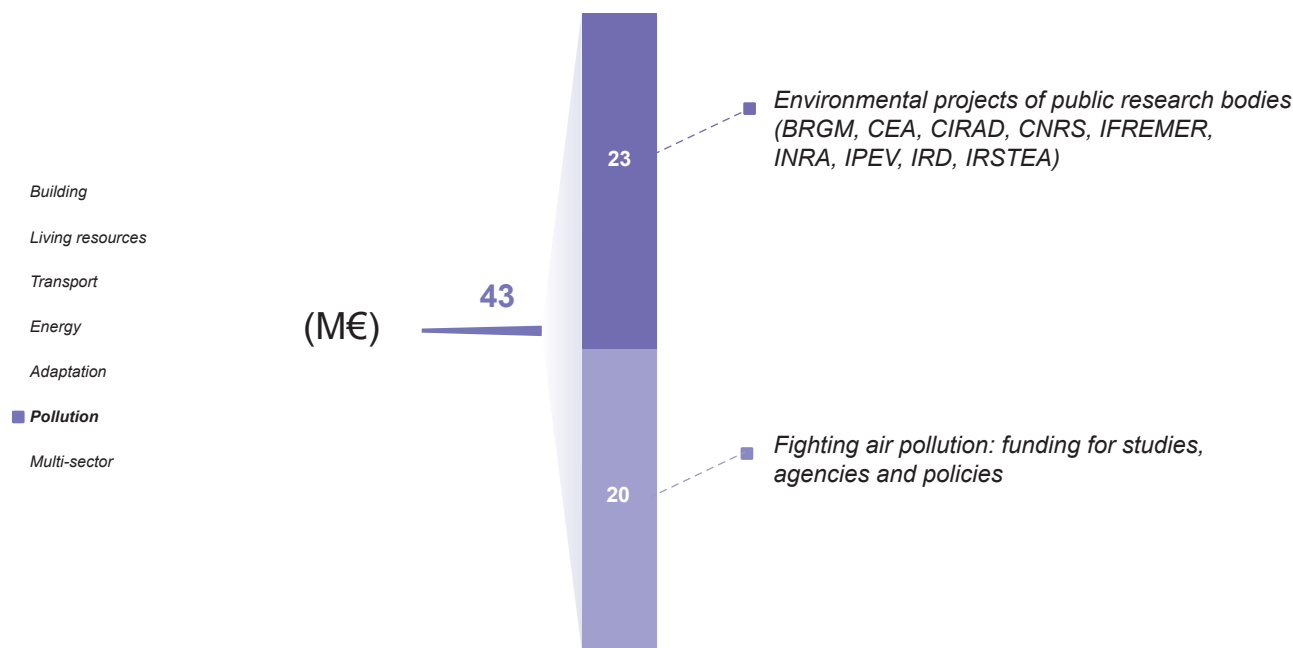
56

57

30 - <http://www.senat.fr/rap/r14-610-1/r14-610-11.pdf>

31 - Decree 2017-949 of 10 May 2017, Legifrance

2018 proceeds allocated to reducing Pollution



arsenic, etc. Improvements in industrial processes and productivity (through technological research), progress in recycling and the circular economy, the energy transition, and the development of sustainable energy generation methods (without combustion) are solutions for reducing these emissions.

- Agriculture is responsible for almost all NH₃ (94%) emissions and 20% of PM₁₀ particulate matter. New types of agriculture such as organic farming and agroforestry generate fewer emissions.

Anti-pollution measures appear to be very similar to those for tackling climate change. Through synergies, expenditure in the five other Green OAT sectors (Building, Living Resources, Transport, Energy and Adaptation) is also contributing to pollution reduction.

“Measures to be taken to reduce concentrations of main pollutants are specific to each sector”

In conjunction with sector-specific regulations, European directives require a second initiative that calls for specific anti-pollution funding: monitoring the quality of the environment (air, water, soil). Monitoring is performed by various scientific entities. The main duties of the French Interprofessional Technical Centre for Studies on Air Pollution (CITEPA) include reporting comprehensive data on air pollutants and monitoring their concentrations.

One of the main missions of the CITEPA is to inventory atmospheric pollutants and track concentrations thereof.

In 2018, €20 million of Green OAT proceeds were used to fund the activities of various organisations measuring air quality, including CITEPA and the Central Laboratory for Air Quality Surveillance (LCSQA) as well as overseas bodies. CITEPA prepares and distributes an independent annual report on France's air pollutant and greenhouse gas emissions. In 2018, France generated 751 thousand tonnes of NO_x, 605 thousand tonnes of NH₃, 600 thousand tonnes of NMVOC and 156 thousand tonnes of PM_{2.5}³².

Total annual emissions were down in 2018 compared with 2017, which confirms the continuous decrease recorded since the start of the millennium: between 2000 and 2018, NO_x emissions decreased by 54%, PM_{2.5} emissions by 53% and SO₂ emissions by 79%. In general, there has been an overall decrease in concentrations of pollutants in ambient air, and fewer cities where concentration limits have been exceeded.

“Between 2000 and 2018, NO_x emissions decreased by 54%, PM_{2.5} emissions by 53% and SO₂ emissions by 79%”

The remaining Green OAT proceeds allocated to the sector to reduce pollution were earmarked for public research entities involved in developing innovative environmental solutions such as the Sense-City project described in the inset below, which is spanning all six Green OAT sectors. The funding was allocated based on the same logic as presented

earlier: in order to reduce pollution and pursue the downward trend in pollution concentrations, new regulations must be implemented and innovation introduced in all sectors of the economy.

Focus on multi-sector research

SENSE-CITY: mini-city of the future

Sense-City is a facility of excellence for ANR's "Invest for the Future" Program, running from 2011 to 2019, with a budget of 9 million euros. Initially led by Université Paris-Est, the programme today involves IFSTTAR, ESIEE-CCIP, LPICM (UMR 7647 CNRS-Ecole Polytechnique), CSTB, INRIA and UPEM .

Sense-City is a climate chamber that can cover two 400m² areas. A portion of territory, called a Mini-City, is built on each and equipped with multiple sensors to:

- study the performance of facilities and urban materials;
- monitor the city of tomorrow by sending out appropriate information;
- study air, water and soil pollution.

Sense-city will also be used to move forward on the design, improvement and calibration of micro and nanosensors, and improve the chain from the sensor to decision-making.

The programmed climate may be standard or extreme depending on research needs. For example it is possible to simulate heat waves over periods of several weeks to examine their effects on pollution, plant resistance or sensor calibration.

The climate chamber can be moved from one area to another as needed. This makes it possible to perform experiments in real instrumented conditions, in the open air or under controlled conditions, and also to build new mini-cities without interrupting all the experiments. The mini-cities are built to research and technological requirements. One of the two spaces has an underground area to study network detection, geothermal considerations and soil pollution. A mini-city is made to support a set of experiments over periods ranging from several days to several months depending on the needs expressed.



APPENDICES





KPMG S.A.
Registered Office
 Tour EQHO
 2 Avenue Gambetta
 CS 60055
 92066 Paris la Défense Cedex
 France

Telephone: +33 (0)1 55 68 86 66
 Fax: +33 (0)1 55 68 86 60
 Website: www.kpmg.fr

Agence France Trésor

139, rue de Bercy
 75012 Paris

Limited Assurance Report on the allocation at 31 December 2018 of proceeds from the Green OAT issued by Agence France Trésor

This is a free English translation of the Assurance report issued in French and is provided solely for the convenience of English-speaking readers. This report should be read in conjunction with, and construed in accordance with professional standards applicable in France.

In compliance with the engagement entrusted to us, we hereby provide limited assurance on the allocation at 31 December 2018 of proceeds from the Green OAT issued by Agence France Trésor (hereinafter “the Verified Information”) in accordance with the Guidelines set out below.

The information is presented as total allocated amounts in the statement on 2018 Performance and Use of Proceeds on pages 27 and 30 of the “Allocation and Performance Report for 2018 Green OAT Issuances” available on Agence France Trésor’s website¹.

Agence France Trésor’s responsibility with regard to the Verified Information

The Verified Information was prepared under the responsibility of Agence France Trésor Management in accordance with the principles set forth in paragraph IV of the Green OAT Framework Document dated 10 January 2017 (hereinafter the “Guidelines”) available on Agence France Trésor’s website¹.

Agence France Trésor’s management is responsible for preparing the Allocation and Performance Report for 2018, including the Verified Information, in accordance with the methods and processes described in the Guidelines. It does so based on:

- information sources used by Agence France Trésor to determine the amounts allocated to eligible Green OAT projects;
- internal control procedures it deems necessary to ensure that the information is free from material misstatement, whether due to fraud or error.

¹ <https://www.aft.gouv.fr/en/green-oat>



Agence France Trésor
Limited Assurance Report on the allocation at 31 December 2018
of proceeds from the Green OAT issued by Agence France Trésor
 12 July 2019

The Methodology associated with the Verified Information, available on pages 75 and 76 of the Appendices to the Allocation and Performance Report for 2018, provides details on the methods used to collect and measure the Verified Information.

Independence and quality control

We apply International Standard on Quality Control 1² 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 set out in the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants.

KPMG's responsibility

Our responsibility is to express a conclusion on the allocation of proceeds in compliance with the Guidelines, based on the work performed. We conducted our engagement in accordance with International Standard on Assurance Engagements (ISAE) 3000³. The Standard requires that we plan and perform our work to obtain limited assurance about whether the information has been prepared, in all material respects, in accordance with the Guidelines.

It is not our responsibility to provide an opinion on:

- project eligibility criteria defined in the Guidelines and validated in the Second Party Opinion provided by Vigeo-Eiris prior to issuance of the Green OAT;
- compliance, in all material respects, of eligible projects mentioned in the Annual Report with the Green Bond eligibility criteria defined in the Guidelines, validated in the Annual Review of the Second Party Opinion delivered by Vigeo-Eiris on 17 June 2019;
- the accurate breakdown of amounts allocated to the eligible projects in millions of euros, by Green Bond sector, based on the French Energy and Ecological Transition for the Climate (TEEC) label⁴, as well as their intended objective in climate terms, as defined in the Guidelines and validated in the Annual Review of the Second Party Opinion delivered by Vigeo-Eiris on 17 June 2019;

² ISQC1 – Quality control of firms conducting audit or review engagements, as well as other assurance and related services.

³ ISAE 3000 – International Standard on Assurance Engagements other than audits or reviews of historical financial information.

⁴ <https://www.ecologique-solidaire.gouv.fr/label-transition-energetique-et-ecologique-climat>



Agence France Trésor
Limited Assurance Report on the allocation at 31 December 2018
of proceeds from the Green OAT issued by Agence France Trésor
 12 July 2019

- management of net Green Bond proceeds pending allocation of proceeds;
- the use of proceeds for eligible projects subsequent to allocation;
- performance indicators disclosed in the Allocation and Performance Report for 2018.

Our work only concerned the allocation of proceeds and not the Allocation and Performance Report for 2018 taken as a whole.

Nature and scope of our work

We used our professional judgement to select appropriate procedures for our limited assurance engagement, and to assess the risk of material misstatement in the Verified Information, whether due to fraud or error.

To assess risk, we took into account Agence France Trésor's internal controls on the preparation of the Verified Information in order to design appropriate assurance procedures, and not to express a conclusion as to the effectiveness of the entity's internal control system.

We conducted interviews with the persons responsible for preparing the Verified Information, with those in charge of collecting the information and, where appropriate, with those responsible for internal control and risk management procedures.

Our work entailed:

- gaining an understanding of France's sustainability policies and any actions or programmes arising from them;
- gaining an understanding of the procedures implemented by Agence France Trésor to determine the information presented in the Allocation and Performance Report for 2018;
- assessing the appropriateness of the Guidelines in terms of relevance, completeness, reliability, neutrality and understandability;
- verifying the implementation of a process to collect, compile, process and control data to ensure completeness and consistency of the Verified Information and gain an understanding of the internal control and risk management procedures used to prepare the Verified Information;
- gaining an understanding of the information sources used by Agence France Trésor to determine the amount of proceeds allocated, in millions of euros, to eligible Green OAT projects at 31 December 2018;



Agence France Trésor
Limited Assurance Report on the allocation at 31 December 2018
of proceeds from the Green OAT issued by Agence France Trésor
12 July 2019

- verifying that procedures were properly applied and performing tests of details, using sampling techniques, in order to verify the calculations and reconcile data with the supporting documents, including:
 - annual performance reports appended to the French Budget Settlement Act,
 - statements of roles and responsibilities extracted from the tax expenditure tools used by the French Ministry for the Economy and Finance,
 - extracts of funding per project from the information systems of the Secretariat General for Investment for the year ended 31 December 2018 under the “Invest for the Future” programme.
- ensuring that the Verified Information is consistent with other publications, including the Budget Settlement Acts and reports by the National Audit Office;
- gaining an understanding of external controls that have already been performed on the Verified Information, including by the National Audit Office;
- performing analytical review procedures on the Verified Information and checking its consistency with the information provided in the statement on Performance and Use of Proceeds.

64

65

We believe that the sampling methods and sample sizes we have used, based on our professional judgement, are sufficient to provide a basis for our limited assurance conclusion; a higher level of assurance would have required us to carry out more extensive procedures.

Due to the use of sampling techniques and other limitations inherent to information and internal control systems, the risk of not detecting a material misstatement in the Verified Information cannot be totally eliminated.



*Agence France Trésor
Limited Assurance Report on the allocation at 31 December 2018
of proceeds from the Green OAT issued by Agence France Trésor
12 July 2019*

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 allocation of proceeds from issuance of the Green OAT is not presented fairly, in all material respects, in the statement on Performance and Use of Proceeds on pages 27 and 30 of the Allocation and Performance Report for 2018, in accordance with the principles described in paragraph IV of the Green OAT Framework Document.

Paris La Défense, 12 July 2019

KPMG S.A.

Philippe Arnaud
Associé
Sustainability Services

CARBONE 4 METHODOLOGY

Main objective: to describe how allocated green expenditures from the Green OAT fit in with the current environmental context, and how the programmes funded contribute to the major ecological transition issues defined by the French government.

Our methodology is as follows:

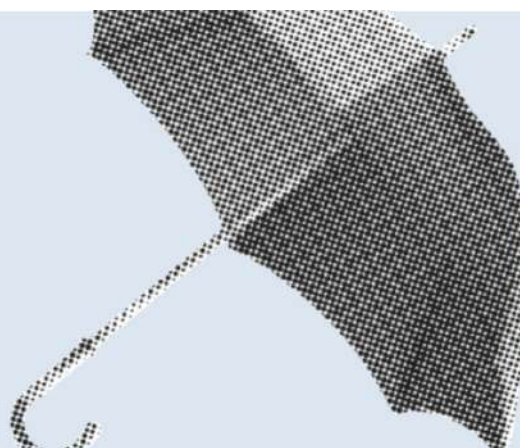
- Carbone 4 first worked on a general overview of the allocated expenditures, giving a certain distance from which to assess the way Green OAT investments were allocated to the four main objectives - combating climate change (or mitigation), adapting to climate change, protecting biodiversity and reducing pollution – and the six sectors with heavy considerations for the environmental challenges of the 21st century.
- To highlight the performance of these investments, a deeper analysis of each individual sector was carried out. The setting and major issues of Building, Living resources, Transport, Energy, Adaptation and Pollution are presented to help the reader understand the problems facing each sector, as well as possible solutions. The report strives to demonstrate how each OAT expenditure supports these solutions. To do so, it introduces performance indicators chosen because they are the most relevant and cover most expenditures.
- The report is mainly based on the Annual Performance Reports (RAP) of the funded programmes, as well as a large number of other public documents, a complete list of which is provided in the Appendix.

66

67



Founded in 2007 by Alain Grandjean and Jean-Marc Jancovici, Carbone 4 is an independent consultancy firm and leader in climate strategy, specialising in energy transition and climate change. Our team assists companies in their transition to a low carbon and climate resilient economy.



VIGEO EIRIS ASSURANCE REPORT



ANNUAL REVIEW OF THE SECOND PARTY OPINION¹ ON THE SUSTAINABILITY OF THE FRENCH REPUBLIC'S GREEN OAT

19th June 2019

In January 2017, the French Republic issued the first French sovereign green bond (green OAT² 1.75% 25 June 2039) (hereafter referred to as the "Green OAT"), dedicated to finance expenditures in line with the commitments that France made for the implementation of the Paris Climate Agreement under the terms of the Energy Transition and Green Growth Act. Agence France Trésor (AFT), tasked with managing the government debt and cash positions, had mandated Vigeo Eiris as an independent expert to deliver a Second Party Opinion on the Green OAT³.

Since then, to maintain the liquidity of this Green OAT through tap issues after the initial issuance, as for conventional benchmark OATs, AFT has proceeded to six reissuances, first €1.63 billion in June 2017, 1.06 billion in December 2017, 1.10 billion in April 2018, 4 billion in June 2018, 1.73 billion in February 2019 and 2.47 billion in May 2019, bringing the total outstanding Green OAT debt standing at €19 billion as at May 3rd, 2019.

During the same period, AFT kept its commitment to set up the Green OAT Evaluation Council, which met for the first time on December 11th, 2017. The AFT plans to publish three types of reports (allocation, performance and impact) in 2019.

SCOPE

The projects evaluation and selection process follows a structured and controlled process, with potential for improvement to strengthen the prevention of opacity risks, but at this stage in line with France's environmental policies.

Our opinion is prepared in accordance with our exclusive social responsibility performance and risk assessment methodology (Environmental, Social and Governance Factors - ESG) of sovereign issuers, and in line with the Green Bond Principles (the "GBP") edited in June 2018. This review involves updating our initial opinion on the following two components:

- **Issuer: evaluation of the issuer's sustainability performance as regards its contribution to the sustainable development goals.**
 - Comparative analysis, as of November 2018 (date of the last rating cycle), of the level at which the issuer commits to integrate into its legislative and regulatory framework and into its public policies the sustainable development principles and goals as they are broadly defined by international public law conventions, as well as by the guidelines and recommendations formulated by public international organisations.
 - Review of publicly disclosed sustainability-related stakeholder feedbacks on France's sustainability commitments and practices in order to take account of their views and opinions for the year 2018.
- **Green Expenditures 2018:** verification of the green credentials of the Green Expenditures that have been financed over the year 2018.
 - Use of proceeds: document-based review of the correspondence of these 2018 green expenditures with the six Green Sectors defined in the "Framework for the Green OAT".
 - Process for Projects Evaluation and selection: review of transparency and implementation of AFT's commitments regarding the evaluation and selection of Green Expenditures and the application of the eligibility criteria initially defined by AFT.
 - Reporting: assessment of AFT's ability to report on the allocation, performance and impact of Green Expenditures 2018, and the compliance of the processes put in place and AFT's reporting with the commitments made at the time of the inaugural issuance.

Vigeo Eiris' sources of information are gathered from our sovereign issuers' rating database, public information, the issuer and data published by its stakeholders. We were able to access all solicited documents. Vigeo Eiris has carried out its due diligence from February 28th to June 17th, 2019.

¹ This opinion is to be considered as the "Second Party Opinion" described by the International Capital Market Association (www.icmagroup.org).

² OAT: « Obligations Assimilables au Trésor » : government bonds, issued by the French Treasury

³ <https://www.aft.gouv.fr/fr/oat-verte>

VIGEO EIRIS' OPINION

- **Issuer** (see Part I.):
 - France's overall sustainability performance as a sovereign bond issuer is advanced and stable: France continues to demonstrate an advanced⁴ performance (best level on our rating scale), among the best issuers at the European and global scale, particularly in the environmental domain.
 - Since our initial opinion and until the end of the period under review (2018), France has faced isolated occasional allegations, mainly related to its institutional responsibility. We have positively rated France's behaviour regarding the controversies it faced by considering the issuer as "remediated": France communicates in a transparent way on its cooperation with impacted parties and on the corrective actions consequently implemented.
- **Green Expenditures 2018:** we have a reasonable level of assurance on the green credentials of the Green Expenditures associated with all the issuances made in 2018 and on the compliance with the commitments made at the time of the issuance concerning these contributions (see Part II.).
 - To date, selected expenditures are consistent with the six Green Sectors initially defined by the issuer in the "Framework for the Green OAT". We maintain a reasonable level of assurance on the issuer's capacity to use the Green OAT proceeds for projects contributing to climate change mitigation and adaptation, protection of natural resources and reduction of ecosystems degradation, in line with seven UN SDGs, and in accordance with its initial commitments.
 - We consider that the overall level of implementation of the issuer's commitments is good in terms of evaluation and selection process of the projects, application of eligibility criteria and allocation of proceeds from the OAT.
 - We have a reasonable level of assurance on the issuer's capacity to report on the funds allocation and on the environmental performance of Green Expenditures.

Paris, June 19th, 2019

Project team

Julien Souriau
Sustainability Consultant
Project manager

Amaya London
Sustainability Consultant

Fouad Benseddik
Director of Methodology at Vigeo Eiris
Supervisor

For more information, contact:

Paul Courtoisier
Head of sustainability bonds & loans
(+33) 6 85 35 43 51
paul.courtoisier@vigeo-eiris.com

Disclaimer

Transparency on the relation between Vigeo Eiris and the issuer: since 2013, Vigeo Eiris has executed several audit missions for the French Republic (Second Party Opinion in 2017 and review of the Second Party Opinion in 2018). No established relationship (financial or other) exists between Vigeo Eiris and the French Republic.

The hereby review is an independent opinion delivered to Agence France Trésor at its demand and is aimed at investors and/or other stakeholders. Its aim is to explain to investors why the 2017 Green OAT and its tap issues are considered as sustainable and responsible. It has been established based on the information that has been made available to Vigeo Eiris and that we have analysed based on our internal methodology and our internal quality control rules. Providing this opinion does not mean that Vigeo Eiris certifies the materiality, the excellence or the irreversibility of the impacts from projects financed by the Green OAT. The French Republic is fully responsible for attesting the compliance with its commitments defined in its policies, for their implementation and their monitoring. The opinion delivered by Vigeo Eiris neither focuses on financial performance of the Green OAT, nor on the effective allocation of funds' use of proceeds. Vigeo Eiris is not liable for the induced consequences when third parties use this opinion either to make investment decisions or to make any kind of business transaction. The opinion delivered is not a conclusion on the creditworthiness of the French Republic or its financial obligations and may under no circumstances be invoked or used in the context of a dispute or a mechanism for settling a commercial dispute.

Restriction on distribution and use of this Opinion: the opinion is provided by Vigeo Eiris to the Agence France Trésor and can only be used by the Issuer. The distribution and publication are at the discretion of the issuer, submitted to Vigeo Eiris approval.

⁴ Vigeo Eiris rating scales:
Performance level: advanced, good, limited, weak.
Assurance level: reasonable, partial, weak.

DETAILED RESULTS

Part I. ISSUER

Level of the issuer's sustainability performance⁵

As of November 2018 (date of the last rating cycle), France's overall level of integration of sustainable development objectives in its institutional systems and public policies is considered to be advanced (80/100) and has remained stable during the last six years. For the second consecutive year, France ranks 8th out of 178 countries worldwide and 7th out of the 28 European Union (EU) member states.

France's sustainability policy, in institutional, social and environmental terms, is considered advanced. France has ratified all international conventions and texts related to sustainability themes, apart from the Protocol against the Illicit Manufacturing of and Trafficking in Firearms, their Parts and Components and Ammunition and the Convention on the Rights of Migrant Workers.

- France achieves an advanced performance in terms of Environmental responsibility with a score of 73/100, or a point below last year's score, ranking 13th out of 178 countries. This decrease can be explained by the reduction of the score of the indicator "Public budget of Research and Development (R&D) related to the environment, in percentage of R&D's total public expenditures" (2017's score was of 90/100 whilst the 2018's score was of 40/100). Amongst France's strengths to be noted are the commitments taken regarding the reduction of atmospheric emissions and the effort in favour of biodiversity protection. France is among the worldwide leaders regarding the protection of terrestrial and marine areas. The country has also actively steered and ratified the Paris Agreement and jointly committed with EU member states to reduce EU GHG emissions by 40% by 2030 compared to 1990, while it is achieving advanced performance in terms of CO₂ emissions, being the 3rd low-carbon economy in the OECD (0,11 kg of CO₂ USD/GDP). Room for improvement still lies in the transition towards green growth, notably in terms of nuclear waste production per Gross Domestic Product.
- France obtains an advanced score in terms of Social responsibility and solidarity (78/100), or a progression of two points compared to last year, now ranking 10th out of 178 countries. This increase can be explained by the positive evolution of the score of the "Promotion of social protection" criteria, particularly on the "Poverty and inequalities reduction" and "Unemployment rate and services". The social strengths of France relate to education, social infrastructure management, gender equality, with top leading scores attained, namely on both primary school and secondary school education indicators, as well as on the Gender Inequality Index. Performance relating to social protection is uneven, with advanced score on poverty reduction but moderate score on employment. Development aid displays a stable score.
- France achieves an advanced performance in Institutional responsibility (88/100), ranking for the second consecutive year 11th out of 178 countries. France regularly reaffirms its commitments to democracy and human rights. France plays an active role in supporting and facilitating the advocacy efforts of human rights and anti-corruption associations within United Nations agencies and organisations.

Sustainability-related stakeholders' feedback

Since our initial opinion, France has faced "occasional" allegations, mainly related to its institutional responsibility, as observed for its peers, reflecting the effectivity of free exercise by citizens of the right of appeal to the European Court of Human Rights (ECHR). France's policy is considered as "remediative" as regards those allegations: the government communicates in a transparent way on its cooperation with impacted parties and the corrective actions implemented.

Domain	Comments	Frequency	Severity	Responsiveness
Environmental responsibility	Neither new controversy nor new event were identified.	N/A	N/A	N/A
Social responsibility and solidarity	Neither new controversy nor new event were identified.	N/A	N/A	N/A
Institutional responsibility	In 2018, 871 applications involving France were allocated to a juridical formation by the ECHR and France faced 8 adverse judgments finding at least one violation (which represents 0.92% of applications). These figures seem in line with legitimate practices in a society guaranteeing all citizens a right of appeal to the ECHR.	Persistent	Critical	France is overall remediative: it has enforced all the judgments.
		Frequent	High	
		Occasional	Significant	
		Isolated	Minor	

⁵ Since our last assessment, Vigeo Eiris has updated its methodology for research on country rating (see « Methodology » part). According to the previous version of our methodology, France would have reached an overall score of 81/100, and scores of 71/100 in Environmental Responsibility, 80/100 in Social responsibility and solidarity and 93/100 in Institutional responsibility.

Nota Bene: In December 2018, four non-governmental organisations (NGO) have expressed their intention to assign in justice the French Republic for “inaction facing climate changes”. On February 15th, 2019, in response to this graceful recourse, the Ministry of Ecological and Solidary Transition handed a note presenting the actions of the State in favour of climate. On March 14th, the four NGOs have filed a recourse for “inaction facing climate changes” in front of the Administrative Court of Paris. Of note, similar actions have been and are still taken in other countries, to date, in Europe (Belgium, the Netherlands) and in the rest of the world (Colombia, United States, New-Zealand and Pakistan) as well as with the European jurisdictions (European Union’s Court of Justice and the European Court of Human Rights). Given its preliminary character, this controversy is not analysed at the date of this opinion.

Part II. ISSUANCE

Green Expenditures 2018

We express a reasonable level of assurance on the green credentials of the Green Expenditures associated with all contributions made in 2018, those of the inaugural issuance and the tap issues subsequent to it, and on the compliance with the commitments made at the time of the issuance concerning these contributions.

Use of proceeds

To date, 45 expenditures have been financed by the Green OAT proceeds in 2018, corresponding in their entirety to the six Green Sectors initially defined by the issuer in the “Framework for the Green OAT”, namely:

- Buildings
- Transport
- Energy
- Living resources and biodiversity
- Adaptation
- Pollution control and Eco-efficiency

We consider that the Green Sectors targeted by the Green OAT – and associated tap issues – are aligned with the following UN SDGs: 7. Affordable and clean energy, 9. Industry, innovation & infrastructure, 11. Sustainable cities & communities, 12. Sustainable consumption & production, 13. Climate action, 14. Life below water and 15. Life on land.



To date, selected expenditures are consistent with the six Green Sectors initially defined by the issuer in the “Framework for the Green OAT”. We maintain a reasonable level of assurance on the issuer’s capacity to use the Green OAT proceeds for projects contributing to climate change mitigation and adaptation, protection of natural resources and reduction of ecosystems degradation, in line with seven UN SDGs, and in accordance with its initial commitments.

Process for Projects Evaluation and Selection

The process for projects evaluation and selection obeys to a structured and controlled process and at this stage is in line with France’s environmental policies. However, there is a potential for improvement to strengthen the prevention of opacity risks.

- The selection and validation of Green Expenditures was ensured via an interministerial working group, put in place by the Prime Minister’s cabinet and involved the concerned ministries (Ministry of Ecological and Solidary Transition, Ministry of Economy and Finance, Ministry of Public Accounts Action, Ministry of Higher Education, Research and Innovation, Ministry of Territorial Cohesion and Relations with Territorial Collectivities, and Ministry of Agriculture and Food).
- Selection and exclusion criteria, notably based on the Energy and Ecological Transition for Climate label (TEEC label), appear to have been appropriately applied during the evaluation and selection of Green Expenditures.

We consider that the involvement of external experts or independent scientific committees in the process of selecting and defining the conditions for updating eligible expenditure can be an area of progress.

- The €5.1 billion issued in 2018 was allocated, of which €0.3 billion were attributed to the remaining 2017 expenditure that had not been financed by the Green OAT and €4.8 billion were attributed to expenditure incurred in 2018. The final amount of budgetary expenditure for 2018 is determined by the draft law on the regulation of the budget and approval of the State accounts for 2018, which was presented to the Council of Ministers on May 15th, 2019.
- All 2018 green expenditures have been documented through pre-existing government expenditure and accounting tracking and management systems, and the majority are detailed in public documents such as the Annual Performance Reports annexed to the Settlement Finance Act. All expenditures are tracked in the State Expenditure Information System ("Chorus") and subject to monitoring of budgetary tax revenues or expenditure management of the Future Investment Programme. In addition, records of decisions were kept for interdepartmental meetings (i.e. "bleu" de Matignon), allowing the traceability of selection decisions.

We consider that clarifying the method for classifying and selecting expenditure is an area for improvement, in order to straighten its reproducibility and the definition of the conditions for updating eligible expenditure.

- The integration of environmental and social factors into expenditure management also presents an area for improvement: it includes an analysis of potential impacts in terms of economic, social and environmental impacts, however this approach does not appear to be systematic.

We consider the general level of deployment of the issuer's commitments to be good in terms of process for projects evaluation and selection, implementation of the eligibility criteria and allocation of the funds resulting from the Bond.

Reporting

The issuer produces a report combining allocation reporting and performance reporting. This report will be supplemented by the publication of an *ex-post* evaluation report, carried out under the supervision of the Green OAT Evaluation Council.

Issuer's capacity to report

Indicators on funds allocation are reported. In addition, the issuer provides information on the environmental performance of the Green Expenditures. These are based solely on existing State's expenditures indicators and mainly on performance indicators identified in existing government budget documentation, specifying calculation methodologies. AFT selected 41 indicators on the proposal of an external third party who evaluated their relevance.

External reviews

In addition to the audits carried out by the Court of Auditors, France is committed to have its report on the funds allocation reviewed by an independent auditor including:

- All operational processes leading to the allocation of eligible Green Expenditure backed by OAT issuances in 2018.
- The proper implementation of public expenditure among eligible Green Expenditures.

We have a reasonable level of assurance on the issuer's capacity to report on the funds allocation and on the environmental performance of Green Expenditures.

METHODOLOGY

In Vigeo Eiris' view, Environmental, Social and Governance/Institution (ESG/I) factors are intertwined and complementary. As such they cannot be separated in the assessment of ESG management in any organisation or activity, including the issuance of bonds. In this sense, Vigeo Eiris writes an opinion on the Issuer's sustainability performance as an organisation, and on the Issuance's objectives, management and reporting of the expenditures (re)financed by this transaction.

Part I. ISSUER

Level of the Issuer's sustainability performance

Vigeo Eiris has revised its sovereign rating research, resulting from a continuous improvement process and based on permanent monitoring of international normative developments as well as stakeholder expectations and debates. This enhanced version includes 69 new factors to meet market needs. The 172 indicators are put into perspective with the UN Sustainable Development Goals and are organized into 56 criteria, 17 sub-domains and 3 rating domains. Of note, the new methodology leads to a decrease in the absolute scores of the majority of countries.

Vigeo Eiris' methodology, the Sustainability Sovereign Rating®, measures and compares the levels of integration of international public law and soft law frameworks, including for the recent period the Sustainable Development Goals (SDGs), and the action programmes of Agenda 21, adopted by 173 countries at the Rio Earth Summit in 1992. We pay particular attention to the commitments, policies and impacts of public policies in terms of respect of fundamental human rights, access to economic, social, cultural and environmental rights, quality of governance, as well as international solidarity and cooperation. Based on the analysis of a universe composed of 178 countries, the results provide a comparative view of risks and performances, with regard to universally acknowledged sustainability objectives.

The sustainability performance of the French Republic was evaluated by Vigeo Eiris in November 2018 based on three rating domains, all equally weighted in the model: Environment (i.e. environmental protection), Social (i.e. social protection and solidarity) and Institutions (i.e. rule of law and governance). These three domains are analysed through 56 criteria, which bring together 172 indicators of two types:

- Commitment indicators: reflecting the state's level of commitment to the goals and principles set by major international agreements: Conventions, recommendations and statements of the ILO; UN Charters and treaties; guiding principles of the OECD; regional instruments (assuming their full compliance with the United Nations Charter); the Universal Declaration of Human Rights and its related protocols and treaties.
- Result indicators: measuring the efficiency of the country's sustainable development actions.

Vigeo Eiris gathers information from diversified sources including international organisations such as intergovernmental organisations, international trade unions and NGOs.

Sustainability-related stakeholders' feedbacks

Vigeo Eiris has gathered sustainability-related stakeholder feedbacks on France's sustainability commitments and practices from public information in order to take account of their views and opinions. The main sources of information used by Vigeo Eiris to collect this information are:

- Amnesty International, Transparency International, the United Nations Food and Agriculture Organization (FAO), International Labour Office (ILO), the United Nations Division for Sustainable Development of the Department of Economic and Social Affairs (DESA-DSD), the United Nations Conference on Trade and Development (UNCTAD), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the UNICEF, the Office of the United Nations High Commissioner on Human Rights (OHCHR), the World Resources Institute (WRI), the Organization for Economic Cooperation and Development (OECD), the European Commission, the European Court of Justice, the European Court of Human Rights, the UN International Court of Justice

An allegation is an information, a flow of information, or a contradictory opinion that is public, documented and traceable, allegation against an Issuer on country/state responsibility issues. Such allegations are mainly related to infringement procedures that can be initiated when a failure to comply with obligations under national, community or international laws is detected. We have considered different steps of the procedures based on their status in the advancement of the infringement procedures and decisions, and have only integrated material non-compliances and condemnation/adverse judgment, i.e. justice decision ruled against the Issuer and possible penalties payment or corrective measures to be taken.

Vigeo Eiris provides an opinion on sustainability-related allegations risk mitigation based on the analysis of three factors:

- Frequency: reflects for each ESG challenge the number of allegation cases faced. At country level, this factor reflects on the overall number of cases faced and scope of ESG issues impacted (scale: Isolated, Occasional, Frequent, Persistent).
- Severity: the more a controversy will relate to stakeholders' fundamental interests, prove actual Issuer responsibility in its occurrence, and have adverse impacts for stakeholders, the highest its severity will be. Severity assigned at country level will reflect the highest severity of all cases faced by the Issuer (scale: Minor, Significant, High, Critical);
- Responsiveness: ability demonstrated by an Issuer to dialogue with its stakeholders in a risk management perspective and based on explanatory, preventative, remedying or corrective measures. At country level, this factor will reflect the overall responsiveness of the Issuer for all cases faced (scale: Proactive, Remediate, Reactive, Non-Communicative);

The impact of an allegation on an Issuer's reputation reduces with time, depending on the severity of the case and the Issuer's responsiveness to this case. Conventionally, Vigeo Eiris covers allegation cases during 4 years.

Part II. ISSUANCE

In the initial opinion, our analysis included:

Use of proceeds

The use of proceeds requirements are defined to ensure that the funds raised are used to finance and/or refinance an Eligible Projects and are traceable within the issuing organisation. Each project endorsed shall comply with at least one of the Eligible Project Category definition in order to be considered as an Eligible Green Project. Vigeo Eiris evaluates the relevance, visibility, and measurability of the associated environmental and/or social objectives. The sustainability purpose of the Green OAT's associated Eligible Green Expenditures has been precisely defined, with regard to the Issuer's commitments, and assessed based on the described and estimated benefits of Eligible Projects. The contribution of Eligible Projects to Sustainable Development is evaluated based on the United Nations Sustainable Development Goals.

Process for expenditure evaluation and selection

The evaluation and selection process has been assessed by Vigeo Eiris regarding its transparency, governance and efficiency. The relevance and exhaustiveness of selection criteria and associated supporting elements integrated in the Green OAT framework, and the coherence of the process are analysed based on material issues considered in Vigeo Eiris' methodology.

Reporting

Reporting indicators, processes and methodologies are defined by the Issuer to enable annual reporting on fund allocation, environmental benefits (output and impact indicators) and on the responsible management of Eligible Projects financed by the Green OAT proceeds, collected at project level and potentially aggregated at bond level. Vigeo Eiris has evaluated the relevance of the reporting framework according to three principles: transparency, exhaustiveness and effectiveness.

We have updated our initial opinion on the green credentials of the Green Expenditures associated with all the contributions made in 2018, those of the inaugural issuance and its subsequent tap issues, France's respect of its commitments made at the time of the issuance concerning these contributions, and the issuer's performance in terms of sustainable development.

VIGEO EIRIS' ASSESSMENT SCALES

Performance evaluation		Level of assurance	
Advanced	Advanced commitment; strong evidence of command over the issues dedicated to achieving the objective of social responsibility. Reasonable level of risk management and use of innovative methods to anticipate emerging risks	Reasonable	Able to convincingly conform to the prescribed principles and objectives of the evaluation framework
Robust	Convincing commitment; significant and consistent evidence of command over the issues. Reasonable level of risk management	Moderate	Compatibility or partial convergence with the prescribed principles and objectives of the evaluation framework
Limited	Commitment to the objective of social responsibility has been initiated or partially achieved; fragmentary evidence of command over the issues. Limited to weak level of risk management	Weak	Lack or unawareness of, or incompatibility with the prescribed principles and objectives of the evaluation framework
Weak	Commitment to social responsibility is non-tangible; no evidence of command over the issues. Level of insurance of risk management is weak to very weak		



Vigeo Eiris is an independent international provider of environmental, social and governance (ESG) research and services for investors and public & private organizations. We undertake risk assessments and evaluate the level of integration of sustainability factors within the strategy and operations of organizations.

Vigeo Eiris offers a wide range of services:

- ▶ **For investors:** decision making support covering all sustainable and ethical investment approaches (including ratings, databases, sector analyses, portfolio analyses, structured products, indices and more).
- ▶ **For companies & organizations:** supporting the integration of ESG criteria into business functions and strategic operations (including sustainable bonds, corporate ratings, CSR evaluations and more).

Vigeo Eiris is committed to delivering client products and services with high added value: a result of research and analysis that adheres to the strictest quality standards. Our methodology is reviewed by an independent scientific council and all our production processes, from information collection to service delivery, are documented and audited. Vigeo Eiris has chosen to certify all its processes to the latest ISO 9001 standard. Vigeo Eiris is an approved verifier for CBI (Climate Bond Initiative). Vigeo Eiris' research is referenced in several international scientific publications.

With a team of more than 240 experts of 28 different nationalities, Vigeo Eiris is present in Paris, London, Boston, Brussels, Casablanca, Hong Kong, Milan, Montreal, Rabat, Santiago and Stockholm.

The Vigeo Eiris Global Network, comprising 5 exclusive research partners, is present in Brazil, Germany, Israel, Japan and Mexico.

For more information: www.vigeo-eiris.com

Vigeo SAS
Les Mercuriales
40 rue Jean Jaurès
93170 Bagnolet - France

METHODOLOGY

Eligible Green Expenditure is State expenditure that complies with the eligibility terms set forth in the Green OAT Framework Document³³. It includes general State budget expenditure, and expenditure for 'Invest for the Future' programmes. This memo sets out the method used to monitor disbursements and the associated performance indicators.

Expenditure is monitored exclusively using the State's existing tracking procedures and performance indicators, which provide the same level of reliability as those used for the State budget. Wherever possible, expenditure is monitored using online, publicly available documents, in which case the way to access them is explained.

Eligible Green Expenditure includes tax and investing, operating and intervention expenditure used to implement France's climate and environmental policy. Based on the Green OAT Framework Document, Eligible Green Expenditure is selected each year when the Finance Act for the following year is voted, by an Interministerial Committee, which reports directly to the French Prime Minister. Each Ministry is responsible for identifying eligible expenditure in its scope of activity, while the final decision is taken by the Interministerial Committee.

Eligible Green Expenditure is monitored separately, depending on its type (budgetary, tax or Invest for the Future). Vigeo Eiris verifies that eligible expenditure has been correctly identified based on the Green OAT Framework Document's eligibility criteria.

1. BUDGETARY EXPENDITURE

Eligible green budget expenditure comprises investing, operating and intervention expenditure. Expenditure and the associated indicators are monitored through annual performance reports appended to the French Budget Settlement Act, the Finance Act that sets the final amount of State expenditure and revenue, and the resulting financial income or expense.

The Finance Acts "determine, for a given reporting period, the nature, amount and appropriation of State revenue and expenditure, and the resulting budget and financial balance. [...] The reporting period is one calendar year. [...]" (Article 1, of French Finance Act No. 2001-692 of 1 August 2001 (LOLF³⁴)). All budget documents are available online: <https://www.performance-publique.budget.gouv.fr/>.

Each year, the National Audit Office issues a statement on the statutory validity of the State's accounts. In the statement, which is appended to the French Budget Settlement Bill for the prior budget reporting period, with a summary of the verification procedures performed, the National Audit Office provides assurance on the regularity and true and fair presentation of the State's accounts. The National Audit Office carries out its constitutional mandate to assist Parliament and Government in controlling the implementation of Finance Acts and, more specifically, the provisions (paragraph 5 of Article 58) of the aforementioned French Finance Act (LOLF).

The annual performance reports appended to the Budget Settlement Act are included in the budget documents verified by the National Audit Office, before being made public. They provide details of expenditure and indicators for each mission, programme and initiative, and the associated budget categories. Data in the reports is tracked in CHORUS, a software application used by all public sector accounting stakeholders to manage ministerial programmes and services. The annual performance reports provide an appropriate level of detail on each Eligible Green Expenditure selected.

2. TAX EXPENDITURE

Eligible Green Expenditure may also correspond to tax expenditure. Such expenditure is also tracked in budget documents, albeit with a time lag. The use of internal Ministry of the Economy and Finance documents enables quicker access to data, while providing for adjustments once the final figures are published.

33 - https://www.aft.gouv.fr/files/medias-aft/3_Dette/2_Framework_FR_cadre%20OAT%20Verte%20130117.pdf

34 - <https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000394028>

In accordance with the European System of Accounts (ESA 2010)³⁵, in the national accounts³⁶ refundable tax credits are recognised as State expenditure. Tax credits are “refundable” when total credits exceed the taxpayer’s tax liability. As a result, certain tax expenditure items may be recognised as Eligible Green Expenditure.

Budgeted tax expenditure for a given year corresponds to rights granted to individuals and companies for their expenditure in the prior year. The data obtained, including the amounts and performance indicators, is derived from software associated with each tax concerned (income tax for natural persons, corporate income tax and property tax). For each of these taxes, the data extracts serve as a basis for the national accounts.

The National Audit Office assesses the entire tax chain for each of these taxes when performing procedures to issue assurance on the validity of the State’s accounts.

3. EXPENDITURE FOR INVEST FOR THE FUTURE PROGRAMMES

Finally, Eligible Green Expenditure corresponds, in part, to expenditure for Invest for the Future programmes, managed by the French Secretariat General for Investment (SGPI). The latter submits a quarterly report to Parliament, which serves as a basis for monitoring the expenditure.

The Invest for the Future programmes were set up by the State to fund innovative investments with strong growth potential, based on a joint funding per project principle. The €57 billion invested by the State in such investments was made available in three stages: €35 billion in 2010 (Invest for the Future programme 1); €12 billion in 2014 (Invest for the Future programme 2); and €10 billion in 2016 (Invest for the Future programme 3).

Management of the Invest for the Future programmes was entrusted to 12 operators (French Research Agency (ANR), Caisse des Dépôts et Consignations, etc.), which were responsible

for managing national calls for proposals. The Secretariat General for Investment is responsible for overall management. Invest for the Future programmes provide funding for structuring research universities, setting up entities to capitalise on research, and funding collaborative, industrial projects in areas such as the digital economy, green biotechnology and chemistry, and marine technologies. The programme operators award selected beneficiaries grants or repayable advances (intervention expenditure), or acquire equity interests (investing expenditure). Each project is assessed by independent experts and the decision to invest is made under the aegis of the Prime Minister.

On a quarterly basis, the Secretariat General for Investment sends Parliament a report on Invest for the Future funding, presenting both commitments and disbursements, by type of funding, operator and initiative, and the percentage of joint funding provided. The Secretariat General for Investment also regularly publishes information on Invest for the Future programmes³⁷. A Supervisory Committee, which includes members of Parliament, provides an annual assessment of programmes’ performance. These documents enable Eligible Green Expenditure to be monitored, with the related performance indicators. Operators that manage Invest for the Future programmes on behalf of third parties are audited by the National Audit Office, which verifies the financial flows between the State and the operators.

Under the Green OAT Framework Document, expenditure for Invest for the Future programmes can be Eligible Green Expenditure for current or past expenditure (if disbursements were made in 2017 or 2018), or future expenditure (if it involves future disbursements). The Sovereign Green Bond Framework Document prioritises current and past expenditure.

76

77

35 - <https://ec.europa.eu/eurostat/documents/3859598/5925793/KS-02-13-269-FR.PDF/cfd0cb42-e51a-47ce-85da-1fbf1de5c86c>, page 493 of the document.

36 - <https://www.insee.fr/fr/statistiques/fichier/2832834/comptes-nationaux-base-2010.pdf>

37 - Including, for example, the annual report of the Secretariat General for Investment: <http://www.gouvernement.fr/commissariat-general-investissement-rapport-activite>

REFERENCE DOCUMENTS

- *Key Climate Figures – France, Europe and the World*, SDES, 2019
- *National Low-Carbon Strategy*, draft version– December 2018
- Energy precarity dashboard (*Tableau de bord de la précarité énergétique*), ONPE, 2018
- Primary residence, 2018 tax guidance (*Habitation principale, Impôts 2018*), Finances publiques
- PLR 2018 – Excerpt from the allocation and performance report of “Ecology, development and sustainable mobility” - Programme 174
- SGFGAS missions - <https://www2.sgfgas.fr/web/site-public/missions>
- Information package for the “Better Living” programme (*Habiter mieux*), 2016 - ANAH
- Biodiversity explained (*La Biodiversité s'explique*), French Ministry for the Ecological and Inclusive Transition, 2018
- *Key Transport Figures*, SDES, 2019
- *Key Energy Figures*, SDES, 2018
- Greenhouse Gas inventory, ADEME
- AF new registrations M1 (2019) – European Alternative Fuels Observatory
- ADEME poll: French citizens and the environment (*Les Français et l'environnement*), 2018
- Web of Science, base de données bibliographiques universitaire en ligne, fournie par l'Institut for Scientific Information (ISI)
- French Order No 2017-949 of 10 May 2017, available in French on the Légifrance website
- French Senate enquiry on the economic and financial costs of air pollution: <http://www.senat.fr/rap/r14-610-1/r14-610-11.pdf>
- Inventory of the economic and energy sectors (*Inventaire SECTEN*), 2019, CITEPA

ABBREVIATIONS

ADEME	French Environment & Energy Management Agency
AFT	Agence France Trésor
agгло	Agglomeration
ALM	Asset/liability management
ANAH	French State Home Improvement Authority
BRGM	French geological and mining research bureau
CBD	Convention on Biological Diversity
CCE	Climate and energy contribution
CDC	Caisse des dépôts et consignations (French public financial institution)
CEA	French Alternative Energies and Atomic Energy Commission
CEREMA	French Research Centre on Environmental Risk, Transport and Planning
CIRAD	French agricultural research and international cooperation organization
CIRED	International Research Centre for Development and the Environment
CITE	French energy transition tax credit
CITEPA	French Interprofessional Technical Research Centre on Air Pollution
CNES	French Space Research Centre
CNRS	French National Centre for Scientific Research
CO₂	Carbon dioxide
COP	Conference Of the Parties
EMEA	Europe, Middle-East, Africa
EPS	EUMETSAT Polar System
EPTZ	Interest-free green loan
EU 28	European Union
EUMETSAT	European Organisation for the exploitation of Meteorological Satellites
gCO₂e/passenger/km	grams CO ₂ per passenger per kilometre
GHG	Greenhouse gas
HLM	French social housing

ICMA	International Capital Market Association
IFR	International Financial Review
IFREMER	French marine research institute
IFSTTAR	French Institute of Science and Technology for Transport, Development and Networks
INRA	National Institute of Agricultural Research
IPEV	Paul-Emile Victor Polar Institute (France)
IRD	French Research Institute for Sustainable Development
IRSTEA	National Institute for Environmental and Agricultural Science and Research
ISI	Institute for Scientific Information
ITE	Institute for Energy Transition
km	Kilometre
kt	Kilotonne
LCSQA	French central laboratory for air quality monitoring
l/km	Litres per kilometre
m²	Square metre
m³	Cubic metre
Metop	Meteorological Operational Polar satellite
MNHN	France's National Natural History Museum
NH₃	Ammonia
NMVOC	Non-methane volatile organic compound
NO_x	Nitrous oxide
NET	New energy technologies
OAT	French sovereign bond
OECD	Organisation for Economic Cooperation and Development
ONB	French Biodiversity Observatory
ONF	National Forests Office (France)
PCB	Polychlorinated biphenyl
PDC	Portfolio Decarbonization Coalition
PIA	Invest for the Future programme
PLR	French budget settlement bill
PM_{2.5} /PM₁₀	Particulate Matter (suspended particles with a diameter of 2.5 or 10 microns)
PPI	Principle Power, Inc.
RAP	Annual Performance Report
SCAP	Strategy to Create Protected Areas (France)
SCN	Agency with national scope
SEM	Semi-public company
SGFGAS	French low-income mortgage intermediary
SME	Small and Medium Enterprises
SNBC	French national low-carbon strategy
SO₂	Sulfur dioxide
SRI	Socially Responsible Investment
SSAR	Sovereign, Supranational, Agency and Regional bond
tCO₂e/hab	Tonnes CO ₂ equivalent per inhabitant
TEEC	"Ecological and Energy Transition for the Climate" label
TGAP	General tax on polluting activities
TGV	High-speed train
TICFE	Tax on energy products and electricity
TICPE	Tax on consumption of energy products and electricity
TIGA	"Highly ambitious innovative regions" scheme (France)
TWh	Terawatt hour
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
VNF	French waterways board
WWF	World Wide Fund for Nature
ZEE	Exclusive economic zone
ZICO	Important Bird Area (France)
ZNI	Area not connected to the national grid (France)
ZNIEFF	Natural zone of ecological interest, fauna and flora (France)



AGENCE FRANCE TRÉSOR

Contact:

Agence France Trésor

139, rue de Bercy – Télédéc 287

75572 Paris Cedex 12

Tel.: 01 40 04 15 00

Fax: 01 40 04 15 93

contact@aft.gouv.fr

www.aft.gouv.fr

Reuters : <TRESOR>

Bloomberg : TREX <GO>

