GREEN BOND REPORT related to the EMTN bond Series 10 and Series 17



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FS Group Overview and Sustainability

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Informazione pubblica

FS Group in a snapshot

Ferrovie dello Stato Italiane SpA ("**FS**" or the "**Issuer**") – **100% Italian State owned** – is the holding company of the Italian railway group (FS Group). As **one of the largest industrial groups in the Country**, it manages rail and road networks and transport services by rail and bus both passenger and freight, contributing to develop integrated mobility and logistics in Italy and abroad.





Trenitalia and Mercitalia Rail received and invested the proceeds of the Green Bonds issued by FS Italiane so far.

A business model which fully integrates sustainability

FS sustainability approach permeates the full organizational structure ensuring integration of environmental, social and economical aspects within strategic business decisions

FS Group vision is to become the company that enables a system of resilient infrastructure, sustainable mobility and integrated logistics



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FS Group Sustainability Commitment

Our agenda for a sustainable mobility

The Group intends to place sustainability increasingly at the heart of its strategies. For this reason, the FS Italian Group committed to 12 of the **Sustainable Development Goals (SDGs)** identified by the United Nations 2030 Agenda.





Sustainability performance

The Group commitment is positively reflected in its sustainability ratings:





European Taxonomy

Revenue, Capex and Opex

Below is summarized the performance of the Group's **four operating sectors** (Transport, Infrastructure, Real Estate Services and Other Services) with regard to the respective **percentage shares of 2021 Turnover, Opex and Capex – "Eligible"**, for the two objectives of **mitigation and adaptation**, in accordance with **EU Regulation no. 852/2020** (so called **EU Taxonomy**)



- ✓ A total of **76.1%** of consolidated **net revenues** is Taxonomy eligible
- ✓ A total of 66.7% of consolidated operating costs is Taxonomy eligible
- Almost the entirety of consolidated capital expenditure is Taxonomy eligible



FS and the actions taken to handle the Covid-19 emergency

The Group's forward-looking approach and openness to change have allowed it to see **the emergency as a possibility rather than a restriction**, providing it with the tools to **decipher the present and rethink the future**. The Group promptly implemented **solutions and actions** in the passenger and freight rail transportation with the aim of protecting the **health and safety of people**.







Safety

Transport

Digitalisation

Green Bond Framework Summary

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Informazione pubblica

FS Green Bond Framework established in 2017

GBF currently under review in order to enlarge the list of the Eligible Green Projects



Green Bond Framework – SDGs Mapping

- The FS Green Bond Framework addresses 3 of 17 UN Sustainable Development Goals.
- The mapping has been inspired by the ICMA high-level mapping to SDGs* and existing practices of issuers of Green Bonds in the transportation sector.



SDG 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all



SDG 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport

12 RESPONSIBLE CONSUMPTION **SGD 12.2**: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

SDG 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse



* https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/June-2019/Mapping-SDGs-to-Green-Social-and-Sustainability-Bonds06-2019-100619.pdf

External Reviews

Best practice

- Sustainalytics provided a Second Party Opinion on the Green Bond Framework and a Pre-issuance verification on the Climate Bonds Initiatives standard.
- FS obtained the Climate Bonds certification.
- KPMG provided a Third Party Opinion on the Green Bond Report.
- On December 2021 Sustainalytics has also assessed the alignment of FS Italiane Green Bond Framework to the EU Taxonomy.



Safeguards."



Sustainalytics believes that the eligible category is aligned with Ferrovie's overall sustainability strategy and efforts, and will also contribute to the advancement of UN SDGs, specifically 9, 11, and 12.

Based on the above, Sustainalytics is confident that Ferrovie is well-positioned to issue green bonds, and that Ferrovie Green Bond Framework is robust, transparent and in alignment with the Green Bond Principles 2018.

FS's Green Issuances and Reporting perimeter

- Series 7's reporting already made in 2018 after full allocation of the net proceeds, no more reporting is due unless material changes occur.
- > Due to CBI certification (cfr. slide 13), reporting for Series 10, 17 and 18 is required on an annual basis.
- > Reporting activity for Series 18 is still ongoing and will be released one year after the issuance.

FS's Green Bond	Issue Date	Allocation	Reporting
EMTN Series 7	7/12/2017	100%	Once until full allocation
EMTN Series 10	09/07/2019	100%	Annually
EMTN Series 17	25/03/2021	100%	Annually
EMTN Series 18	23/12/2021	100%	Annually



Allocation and Impact Report

Green Bond Series 10

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Euro 700 million second Green Bond – EMTN SERIES 10 Deal review

Carry on the Group's sustainability path for a clean transport including the freight sector among the Eligible Green Projects

3.5x oversubscription with Eur
2.5 billion orders coming from
160 investors, of which around
50% from SRI investors

Final spread at the tighter end of the guidance, at m/s+128bps (equivalent to BTPs -16bps), fixing the final size at EUR 700m

First Italian bond CBI Certified

Climate Bond Certified

Transaction Key Terms

	Issuer	Ferrovie dello Stato Italiane SpA
	Issue Type	Green Bond
7	Issuer Rating (at Issue)	BBB / BBB (S&P / Fitch)
	Format	Senior Unsecured, Reg S Bearer
	Amount	Euro 700m
	Issue Date	09 July 2019
otes	Maturity Date	09 July 2026
0163	Coupon	1.125%
	Reoffer Price / Yield	99.967 / 1.130%
	Reoffer Spread	m/s+ 128bps
	Listing / Docs	Irish Stock Exchange / Green Bond Framework / EMTN

Geographical breakdown









FERROVIE

Climate

Certified

Bond

EUR 700,000,000

Green Senior UnsecuredNo

1.125% Due 2026

Allocation of the Proceeds

100% proceeds allocated at the issue date, via intercompany loan from FS, the issuer, to Trenitalia and Mercitalia Rail

PROCEEDS ALLOCATION		
ELIGIBLE GREEN PROJECT	Trains' value	Unit of vehicle funded (equivalent)
1. Investments in public passenger transport rolling stock renewal		
New Electric Multiple Unit (EMU) Trains For Regional Passenger Transport: "Pop" and "Rock"	€ 463.77 million	53
New High Speed Trains "Frecciarossa1000"	€ 117.60 million	3
2. Investments in freight transport rolling stock renewal		
New Electric Locomotives For Freight Transport	€ 103.6 million	40
New Wagons For Freight Transport	€ 14.3 million	140
TOTAL NET PROCEEDS	€ 699,279,000 100% financing of new projects	



Impact reporting as of year end 2021 - environmental performance



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Passenger transport «train vs. train» approach (2019-2020-2021)

Project Category	Eligible Green Project	Year	Unit of Vehicle funded	Energy Saving MWh	Baseline GHG emissions tCO2	Total GHG emissions tCO2	Total GHG emissions avoided tCO2	Total GHG emissions avoided %
		2019		24,944	38,729	30,837	-7,892	-20.40%
	REGIONAL - POP	2020	53	18,257	26,979	21,203	-5,776	-21.41%
AND ROCK	AND ROCK TRAIN ⁽¹⁾	2021		24,114	36,722	29,092	-7,630	-20.78%
Investments in public		Total	53	67,315	102,430	81,132	-21,298	-20.79%
passenger transport rolling stock renewal		2019		6,035	9,324	7,415	-1,909	-20.50%
1	HIGH SPEED – FRECCIA ROSSA1000 TRAIN ⁽²⁾	2020	3	2,771	4,281	3,404	-876	-20.48%
		2021		3,184	4,919	3,912	-1,007	-20.48%
		Total	3	11,990	18,524	14,731	-3,792	-20.47%

Data refer to 3 years time period (2019-2020-2021)

1. Data related to the POP and ROCK are estimates based on the values stated by the suppliers in the tender procurement process according to the European technical specification TS 50591 "Specification and verification of energy consumption for railway rolling stock". The baseline for the calculation of energy saving and avoided GHG emissions is the market average for comparable trains in operation stated by the suppliers in the tender procurement process.

2. Data related to the ETR1000 are actual as the fleet is full in operation. The baseline for the calculation of energy saving and avoided GHG emissions is the previous generation High-Speed train "ETR 500" with 9 coaches in the fleet of Trenitalia.



Impact reporting as of year end 2021 - environmental performance



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Freight transport «train vs. train» approach (2020-2021)

Project Category	Eligible Green Project	Year	Unit of Vehicle funded	Energy Saving MWh	Baseline GHG emissions tCO2	Total GHG emissions tCO2	Total GHG emissions avoided tCO2	Total GHG emissions avoided %
		2020	40	994	10,797	10,482	-314	-2.91%
Investments in <u>freight</u> transport rolling stock renewal	ELECTRIC LOCOMOTIVE E494 (1)	2021		2,580	28,030	27,213	-816	-2.91%
		Total	40	3,574	38,827	37,695	-1,130	-2.91%
	WAGON SHIMMNS	2020	140	32	417.0	406.9	-10.1	-2.44%
		2021	140	37	475.0	463.4	-11.6	-2.44%
		Total	140	69	892.0	870.3	-21.7	-2.44%

- Data refer to 2 years time period (2020-2021)
- 1. Data related to the freight fleet are actual. The baseline for the calculation of energy saving and avoided GHG emissions are the last locomotive and wagon purchased, before these one, by Mercitalia Rail.



Note on Calculation Methodology GHG EMISSION

GHG emissions of the EGPs ($tCO_2^{(1)}$)

=

[Annual average consumption (MWh) of the relevant train] X [CO₂ emission factor (gCO₂/kWh)]/1000

- The Annual Avarage Consumption is actual or estimate depending on the deployment status of project ⁽²⁾
- The CO₂ Emission Factor (316.4 gCO₂/kWh) is the CO₂ emission factor related to the Italian electricity production mix as calculated by ISPRA⁽³⁾



(1): Location-based approach. CO₂ emission are included, other gas (CH₄ e N₂O) are not included (less than 1%)
(2): Refer to the previous slide for detail on each project
(3): Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA) Reports 303/2018, "Atmospheric emission factors of greenhouse gases in the national electricity sector and in the main European countries" (Table 2.4, p., 32, Gross electricity production year 2017)

Informazione pubblica

Allocation and Impact Report

Green Bond Series 17

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Informazione pubblica





Allocation of the Proceeds

100% proceeds allocated at the issue date, via intercompany loan from FS to Trenitalia

PROCEEDS ALLOCATION		
ELIGIBLE GREEN PROJECT	Trains' value	Unit of vehicle funded (equivalent)
 New Electric Multiple Unit (EMU) Trains For Regional Passenger Transport: "Pop" and "Rock" 	€ 834.58 million	108
 New High Speed Trains "Frecciarossa1000"* 	€ 166.79 million	5
ΤΟΤΑΙ	L € 1,001.37 million 100% financing allocated	5

*Trains operating in both Italian and Spanish high speed services.



Impact reporting as of year end 2021 - environmental performance



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«train vs. train» approach

Project Category	Eligible Green Project	Unit of Vehicle funded 2021	Energy Saving MWh 2021	Baseline GHG emissions tCO2 2021	Total GHG emissions tCO2 2021	Total GHG emissions avoided tCO2 2021	Total GHG emissions avoided % 2021
Investments in public passenger transport rolling stock renewal	REGIONAL - POP AND ROCK TRAIN (1)	108	27,309	38,942	31,362	-7,581	-19.5%
	HIGH SPEED - FRECCIAROSSA1000 TRAIN (2)	5	9,447	0	0	-	-

Data refer to the March – December 2021 time period

- 1. Data related to the POP and ROCK are estimates based on the values stated by the suppliers in the tender procurement process according to the European technical specification TS 50591 "Specification and verification of energy consumption for railway rolling stock".
- 2. Data are related only to energy saving due to the fact that the trains will be in service in Spain where traction energy comes 100% from renewable sources, therefore without CO₂ emissions.



Note on Calculation Methodology GHG EMISSION

GHG emissions of the EGPs ($tCO_2^{(1)}$)

=

[Annual average consumption (MWh) of the relevant train] X [CO₂ emission factor (gCO₂/kWh)]/1000

- The Annual Avarage Consumption is actual or estimate depending on the deployment status of project ⁽²⁾
- The CO₂ Emission Factor (277.6 gCO₂/kWh) is the CO₂ emission factor related to the Italian electricity production mix as calculated by ISPRA⁽³⁾



(1): Location-based approach. CO₂ emission are included, other gas (CH₄ e N₂O) are not included (less than 1%)
(2): Refer to the previous slide for detail on each project
(3): Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA) «Emission factors for the production and consumption of electricity in Italy 19/01/2022» (tab 14, column "Gross electricity production year 2019»)

Third Party Opinion

KPMG

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Independent auditors' report on the Green Bond Report

To the Board of Directors of Ferrovie dello Stato Italiane S.p.A.

We have been engaged to perform a limited assurance engagement on the Allocation of the Proceeds data and on the environmental performance data resulting from green projects financed with the Green Bonds (as defined below) included in the Green Bond Report -May 2022 (the "Report") of Ferrovie dello Stato Italiane S.p.A. (the "Company") prepared on the basis of the Green Bond Framework -June 2019 and available on the Company's website (the "Framework"), developed by the Company in accordance with the Green Bond Principles 2018 issued by the International Capital Market Association - ICMA (the "Principles") related to the Green Bonds issued on 9 July 2019 (EMTN Series 10) and on 25 March 2021 (EMTN Series 17) (the "Green Bonds").

Responsibilities of the Company's Directors for the Report

The Directors are responsible for the preparation of the Report in accordance with the Framework, developed by the Company in accordance with the Principles. In particular the Directors are responsible for the preparation of the Allocation of the Proceeds data in accordance with the eligible green projects categories and of the environmental performance data resulting from green projects financed with the Green Bonds included in the Report as described in the "Green Bond Framework Summary" paragraph of the Report.

Trieste Varese Verona

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The Directors are also responsible for such internal control as they determine is necessary to enable the preparation of a Report that is free from material misstatement, whether due to fraud or error. It also includes identifying the content of the Report, selecting and applying policies, and making judgments and estimates that are reasonable in the circumstances.

Auditors' independence and quality control

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants (including International Independence Standards) (IESBA Code) issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour. Our firm applies International Standard on Quality Control 1 (ISQC Italia 1) and, accordingly, maintains a system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Auditors' responsibility

Our responsibility is to express a conclusion, based on the procedures performed, about the preparation of the Allocation of the Proceeds data and of the environmental performance data resulting from green projects financed with the Green Bonds included in the Report in accordance with the "Green Bond Framework Summary" paragraph of the Report.



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Third Party Opinion



Ferrovie dello Stato Italiane S.p.A. Independent auditors' report 27 May 2022

We carried out our work in accordance with the criteria established by "International Standard on Assurance Engagements 3000 (Revised) -Assurance Engagements other than Audits or Reviews of Historical Financial Information" ("ISAE 3000 Revised"), issued by the International Auditing and Assurance Standards Board applicable to limited assurance engagements. This standard requires that we plan and perform the engagement to obtain limited assurance about whether the Report is free from material misstatement. A limited assurance engagement is less in scope than a reasonable assurance engagement carried out in accordance with ISAE 3000 Revised, and consequently does not enable us to obtain assurance that we would become aware of all significant matters and events that might be identified in a reasonable assurance engagement.

The procedures we performed on the Report are based on our professional judgement and include inquiries, primarily of the Company's personnel responsible for the preparation of the information presented in the Report, documental analyses, recalculations and other evidence gathering procedures, as appropriate.

Specifically, we carried out the following main procedures:

- reviewing the second party opinion;
- evaluating the design and implementation of the reporting processes and the controls regarding the Allocation of the Proceeds data and the environmental performance data;
- interviewing relevant staff at corporate and business level responsible for the Green Bonds management and reporting;
- interviewing relevant staff at corporate and business level responsible for providing and consolidating the Allocation of the Proceeds data and the environmental performance data;

 evaluating internal and external documentation, based on sampling, to determine whether the Allocation of the Proceeds data is supported by sufficient evidence in line with the eligible green projects and the environmental performance data resulting from green projects financed with the Green Bonds is prepared in line with the methodology included in the Framework.

Conclusion

Based on the procedures performed, nothing has come to our attention that causes us to believe that the Allocation of the Proceeds data and the environmental performance data resulting from green projects financed with the Green Bonds included in the Green Bond Report - April 2022, are not prepared, in all material respects, in accordance with the "Green Bond Framework Summary" paragraph of the Report.

Rome, 27 May 2022

KPMG S.p.A.

Gabriele de Gennard Director of Audit



Other ESG indicators – EU Taxonomy assessment

Summary of Alignment with the EU Taxonomy– Screening criteria

Eligible Green Project	Substantial contribution to	Taxonomy activity	EU Technical Screening Criteria	Alignment with Technical Screening Criteria
REGIONAL - POP AND ROCK TRAIN HIGH SPEED - FRECCIAROSSA1000 TRAIN	Climate change mitigation	Passenger interurban rail transport	The activity complies with one of the following criteria: (a) the trains and passenger coaches have zero direct (tailpipe) CO ₂ emissions; (b) the trains and passenger coaches have zero direct (tailpipe) CO ₂ emission when operated on a track with necessary infrastructure, and use a conventional engine where such infrastructure is not available (bimode).	Eligible green projcets fulfill criteria a). Regional trains "Pop & Rock" and High speed trains "ETR 1000" are electric and they have zero direct (tailpipe) CO2 emissions
ELECTRIC LOCOMOTIVE E494 WAGON SHIMMNS	Climate change mitigation	Freight rail transport	The activity complies with one or both of the following criteria: (a) the trains and wagons have zero direct tailpipe CO2 emission; (b) the trains and wagons have zero direct tailpipe CO2 emission when operated on a track with necessary infrastructure, and use a conventional engine where such infrastructure is not available (bimode). 2. The trains and wagons are not dedicated to the transport of fossil fuels.	Eligible green projcets fulfill criteria a). Locomotives are electric and they have zero direct (tailpipe) CO2 emissions Trains and wagons are not dedicated to the transport of fossil fuels



Other ESG indicators – EU Taxonomy assessment

Summary of Alignment with the EU Taxonomy– Do Not Significant Harm «DNSH» criteria

Eligible Green Project	Taxonomy activity	Environmental objectives	DNSH Criteria	Alignment with DNSH Criteria
REGIONAL - POP AND ROCK TRAIN HIGH SPEED - FRECCIAROSSA1000 TRAIN ELECTRIC LOCOMOTIVE E494	Passenger interurban rail transport Freight rail transport	Climate change adaptation	Climate risk and vulnerability assessment	Ferrovie has a risk management approach in place that includes climate risk. The Group has two main approaches to climate change adaptation: mitigation and adaptation. These dimensions are in line with the recommendations of the Task Force on Climate Related Financial Disclosures (TCFD) and aim to identify possible outcomes of climate-related risk and opportunity factors, at the Group and portfolio level. The Group set up a Project Team in 2020 tasked with developing an infrastructure adaptation plan, building resilience, and maintaining profits in the face of climate- related events. The Project Team carried out the first pilot project for vulnerability assessment, and physical risk modelling to identify the areas with the greatest exposure to climatic events. The assessment used the Representative Concentration Path (RCP) which is a greenhouse gas (GHG) concentration trajectory adopted by the Intergovernmental Panel on Climate Change (IPCC) and describes the different climatic futures possible depending on the volume of GHG in the atmosphere across varied timelines. Ferrovie assessed the adaptation measures for the risk arising under each scenario of the analysis.
WAGON SHIMMNS		Transition to a circular economy	Measures are in place to manage waste in accordance with the waste hierarchy, in particular during maintenance	The Group's main subsidiaries are ISO 14001:2015 Environment Management System (EMS) certified. The guidelines of EMS are applied to all operations including, procurement of goods and services, waste management, water management, preparation of train and crew, and shunting and maintenance of trains, wagons and locomotives. The Group's waste management policy is included in the EMS and the generated waste is managed in accordance with the waste management hierarchy while ensuring compliance with national and European regulations.



Other ESG indicators – EU Taxonomy assessment

Summary of Alignment with the EU Taxonomy– Do Not Significant Harm «DNSH» criteria

Eligible Green Project	Taxonomy activity	Environmental objectives	DNSH Criteria	Alignment with DNSH Criteria
REGIONAL - POP AND ROCK TRAIN				
HIGH SPEED - FRECCIAROSSA1000 TRAIN	Passenger interurban rail transport	Pollution prevention and	Engines for the propulsion of railway locomotives (RLL) and engines for the propulsion of railcars (RLR) comply with emission limits set out in Annex II to	All trains and locomotives are electric and do not have any direct emissions related to combustion.
ELECTRIC LOCOMOTIVE E494	Freight rail transport	control	Regulation (EU) 2016/1628 of the European Parliament and of the Council	
WAGON SHIMMNS				



Other ESG indicators – EU Taxonomy

Summary of Alignment with the EU Taxonomy - Minimum safeguards assessment

Eligible Green Project	Minimum safeguards
ALL	FS Italiane promotes the protection of human rights for its employees, customers, citizens, suppliers and business partners, helping create a responsible supply chain and operating in accordance with the United Nations' Universal Declaration of Human Rights and the fundamental conventions of the International Labour Organization. The principles on which the Group operates include respect for human rights and the commitment to contribute to the creation of a responsible supply chain, also established in the Code of Ethics (which guides the Group in its relationships with stakeholders). Furthermore, the Group promotes open and inclusive employment relationships and rejects any type of discrimination or harm against people, prevents any form of illegal labour and endorses policies aimed at psychological and physical well-being of personnel. Since 2017, the Group has joined the UN's Global Compact ("GC") network.



3 Green Bonds for a total Eur 2.3 bn issued until March 2021

Total allocation and environmental impact (Series 10 and Series 17)



Furthermore, the **Bond issuance Series 7** allocated **€549.64 million** and **€49.78 million** to fund respectively **17** High Speed Electric Trains "ETR1000" and **7** Regional Electric Trains "POP" and "ROCK". Total **13,491 tCO₂ saved** * in 2018 thanks to the Series 7.

FERROVIE TALIANE * Compared to previous train models

Informazione pubblica

Appendix & Contacts



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EGP - New Regional Trains "Pop" & "Rock"

- New electric highly energy efficient trains both medium capacity ("Pop") and high-capacity ("Rock")
- Innovative technologies for energy efficiency (engines with natural ventilation, use of light alloys, LED lighting, CO₂ sensors for optimal climatization, smart parking mode, etc)
- **Recyclability** rate between **92%** and **96%**
- More **bikes racks**, with charging points for electric bikes
- Access to "White Certificate" mechanism (national incentives scheme for high energy efficiency investments) obtained on February 15th, 2017







EGP - New High Speed Trains "ETR 1000"

- The ETR 1000, named "Frecciarossa 1000" is the new electric high-speed train of Trenitalia, comfortable, safe and environmentally friendly, designed to meet the most advanced technology (ERTMS/ECTS traction control system)
- Extremely accurate aerodynamic design to minimize motion resistance
- High efficiency of traction system
- **Recyclability** rate over **94%**
- First HS train provided with Environmental Product Declaration (EPD)
- Access to "White Certificate" mechanism (national incentives scheme for high energy efficiency investments) obtained on December 1st, 2015









Focus EGP – New electric Locomotives and Wagons for freight transport

- New electric locomotives "E494" the latest model of the TRAXX family single-system locomotive, designed to minimize energy consumption and assures a significant efficiency improvement compared to the previous models
- "Parking Mode" and "Eco-mode" enable a very low energy consumption during the standstill and the use of the locomotive in the case of partial load reducing the vibration and noise level
- Electrodynamic braking system regenerates the energy to the overhead line, magnetic components with very high energy efficiency and optimized cooling control improve energy efficiency
- Oil free compressor and the new fire-fighting system reduce environmental impact



- New wagons for coils transportation are equipped with electronic monitoring devices for accident prevention solutions for coil fastening
- Lighter by 1400 kg
- Noise reduction with respect to existing wagons



use each component for its entire useful life for a lower environmental impact

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