

## **APPENDIX 6.1.1**

# **CHARGING PRINCIPLES OF MINIMUM SERVICES**

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The information published in Appendix 6.1.1 relating to Chapter 6 of the National Rail Network Statement is intended to explain the process of establishing price scales for minimum services, with regard to the principle and “*the aim(s) of transparency, in particular concerning the description of charging principles, the justification of the links between the costs and charges and the changes in the charges*”<sup>1</sup>.

This appendix therefore provides details on the European and national legal framework for establishing charges and the process for compiling the charges imposed by SNCF Réseau.

The appendix explains the charging principles for the minimum services determined by the regulations. It recalls, in particular, the economic principle for the minimum service charges laid down by Directive 2012/34/EU: the usage charges must be equal to the “*cost directly incurred*” (CDI) as a result of operating the train service. Directive 2012/34/EU nevertheless authorises SNCF Réseau to levy mark-ups if the market can bear this.

This appendix will go on to present the implementation of these charging principles by SNCF Réseau and describe the significant changes made for the 2020 timetable.

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<sup>1</sup> Item III.18 of ARAF statement No. 2014-001.

# 1. CHARGING PRINCIPLES: LEGAL FRAMEWORK

En application du cadre législatif et réglementaire français, la tarification de l'usage du réseau ferré national dans son ensemble est décidée par SNCF Réseau<sup>2</sup>, dans le cadre mis en place par l'Etat<sup>3</sup>, et soumise, pour les prestations minimales, à l'avis conforme de l'Autorité de régulation des activités ferroviaires et routières (ARAFER)<sup>4</sup>. According to the provisions of the transport code, ARAFER gives approval on the fixing of infrastructure charges related to the use of the national rail network with regard to:

- 1° Principles and pricing rules applicable on this network, provided for in Article L. 2111-25;
- 2° Bearability of pricing developments for the rail transport market, and in view of the competitive position of rail transport in the transport market;
- 3° Contract provisions mentioned in Article L. 2111-10, concluded between the State and SNCF Réseau.

Charging must comply with the principles and the general architecture arising from European and French law constituted by the European Directive 2012/34/EU, the French Transport Code, French Decree No. 2003-194 amended and French Decree No. 97-446 of 5 May 1997 amended, and the provisions of the contract concluded between the State and SNCF Réseau.

## 1.1. EU LAW: DIRECTIVE 2012/34/EU

**Directive 2012/34/EU specifies four principal objectives for charging of the infrastructure:**

- ensuring the balance of the infrastructure management accounts in a reasonable period, taking public competition into account<sup>5</sup>;
- ensuring the necessary conditions to allow various railway undertakings equitable and non-discriminatory access<sup>6</sup>;
- encouraging infrastructure managers to optimise the use of their infrastructure<sup>7</sup>;
- issuing clear and consistent signals to allow railway undertakings to make rational decisions with regard to use of the network<sup>8</sup>.

<sup>2</sup> Transport Code, Decree No. 97-446 as amended and Decree No. 2003-194 as amended.

<sup>3</sup> In particular with regard to available public funding as *"the general level of cost recovery through infrastructure pricing has implications for the level of public contributions. Member States may require different levels of cost recovery. However, any infrastructure charging scheme should allow traffic that can cover at least the additional cost it imposes to use the rail network"* (recital 70 of the Directive)

<sup>4</sup> Article L.2133-5 of the Transport Code.

<sup>5</sup> Article 8.4: *"Member States shall ensure that, under normal business conditions and over a reasonable period which shall not exceed a period of five years, the profit and loss account of an infrastructure manager shall at least balance income from infrastructure charges, surpluses from other commercial activities, non-refundable incomes from private sources and State funding, on the one hand, including advance payments from the State, where appropriate, and infrastructure expenditure, on the other hand."*

<sup>6</sup> *"The charging and capacity-allocation schemes should permit equal and non-discriminatory access for all undertakings and should attempt as far as possible to meet the needs of all users and traffic types in a fair and non-discriminatory manner. Such schemes should allow fair competition in the provision of railway services."* (Recital 42)

<sup>7</sup> *"Within the framework set out by Member States, charging and capacity-allocation schemes should encourage railway infrastructure managers to optimise use of their infrastructure."* (Recital 43)

<sup>8</sup> *"Railway undertakings should receive clear and consistent economic signals from capacity-allocation schemes which lead them to make rational decisions."* (Recital 44)

These aims define the structure of the articles in Section 2 "Infrastructure and services charges" of Chapter IV of Directive 2012/34/EU.

**Article 31.3 establishes in particular the principle of charging on the basis of "cost directly incurred":**

*"[...] the charges for the minimum access package and for access to infrastructure connecting service facilities shall be set at the cost that is directly incurred as a result of operating the train service. Before 16 June 2015, the Commission shall adopt measures setting out the modalities for the calculation of the cost that is directly incurred as a result of operating the train."*

The modalities for the calculation of the cost that is directly incurred as a result of operating the train service are defined by the Implementing Regulation 2015/909 of 12 June 2015. It is interesting to note in particular that recital 12 of this text defines the cost directly incurred as a marginal cost: *"It is a well-established economic principle that user charges based on marginal costs ensure the optimum effective use of available infrastructure capacity. Hence, the infrastructure manager may decide to use the proxy of marginal costs for calculating its cost directly incurred as a result of operating the train service."*

**Furthermore, according to Article 31.4 of the aforementioned Directive, the basic charges may recover the costs linked to scarcity of capacity** offered by the infrastructure manager. The Directive effectively establishes that *"[they] may include a charge which reflects the scarcity of capacity of the identifiable section of the infrastructure during periods of congestion"*

**Exceptions to these charging principles are established by EU law. Article 32.1 states that mark-ups may be applied on the condition that the market can bear these:**

*"In order to obtain full recovery of the costs incurred by the infrastructure manager a Member State may, if the market can bear this, levy mark-ups on the basis of efficient, transparent and non-discriminatory principles, while guaranteeing optimal competitiveness of rail market segments. The charging system shall respect the productivity increases achieved by railway undertakings. The level of charges shall not, however, exclude the use of infrastructure by market segments which can pay at least the cost that is directly incurred as a result of operating the railway service, plus a rate of return which the market can bear.!"*

The principle of a charging system is thus in place, comprising:

- **charges whereby the network user pays the direct cost that the user incurs upon SNCF Réseau** (i.e. the marginal cost, that is to say the cost incurred for running a supplementary unit of traffic on the network)<sup>9</sup>. These charges may include the external costs linked to use of the infrastructure of the national rail network (in particular scarcity);
- mark-ups designed to cover the fixed costs incurred by SNCF Réseau. These mark-ups must be bearable for the railway undertakings operating in the market segment in which they are applied.

These EU charging principles, for the most part derived from former Directives 97/440/EEC and 2001/14/EC (now repealed) have been transposed into French law and more recently in Decree No. 2003-194 and Decree No. 97-446 now in force.

## 1.2. FRENCH REGULATORY FRAMEWORK

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<sup>9</sup> See *below* (§ 2.1)

The aforementioned provisions of Directive 2012/34/EU specify Decrees No. 97-446 and No. 2003-194, in particular:

- **the "directly chargeable cost" charging principle**, as well as the various charges that are subject to it (traffic charge, electric traction charge, charge to cover losses of electrical systems, application charge for creating or modifying train paths);
- **the possibility of levying mark-ups for specific market segments, in order to recover all costs incurred and on the condition that the market can bear these;**
- **the possibility of charging for the scarcity of capacities.**

## **2. INTERPRETATION AND IMPLEMENTATION OF THE CHARGING PRINCIPLES**

The charges adopted by SNCF Réseau, in accordance with the framework defined by the State and the regulations, are consistent with the economic analysis and respect the capacity of the railway undertakings to bear the charges. As such, the charging complies with the following principles:

- Adapting to existing strategies for market organisation by proposing the most appropriate structure in this regard so as to send good economic signals to different stakeholders (State, transport organising authority and transport operator);
- Enabling SNCF Réseau to recover its marginal cost (CDI);
- Helping to cover all or part of the fixed and capital costs borne by SNCF Réseau (beyond marginal costs);
- Encouraging good use of the network.

There are two strategies for market organisation. There are activities under contract agreed by an AOT (transport organising authority), such as TER, Transilien and territorial equilibrium trains (TET), and activities that are not (TAGV, freight, etc.).

For activities under contract, the State or the regions that are also organising authorities (except in the case of Ile de-France or where Ile-de-France Mobilités has its own status) define the service offer in the framework of contracts signed with transport companies. Charging involving both parties seems the more appropriate. In this way, each of the parties is involved in covering the costs and can therefore obtain a good economic signal. In this context, two-part charging is applied; in broad terms:

- a fixed rate charge (the access charge) is paid by the State (or Ile-de-France Mobilités in Ile-de-France). The charge can be viewed as a right of entry;
- other charges, in particular those based on the CDI or the market charge, are paid by the transport operator according to its use of the network.

For activities not covered by contract, the existence of a flat-rate fee has not been implemented in the absence of a transport organising authority. In addition, such a fee could be likened to an entry barrier, potentially deterring new entrants, for markets currently open to competition (international trains or freight). In this context, "linear" charging is applied: the fixed and variable costs are paid by the transport operators according to their use of the network and their capacity to bear the charges.

In addition, SNCF Réseau will have to assume, starting in 2020, the crisis management coordination task (formerly provided by the SNCF head of EPIC). As such, SNCF Réseau is implementing a charge for this task, starting with the 2020 timetable.

The table below presents a summary of the allocation of costs per charge.

Type of charge		Allocation of costs
<b>Running charge (RC)</b>	Unit price according to the transport service and actual use of the network	CDI: marginal cost of maintenance, operation and renewal of the network (excluding electric facility costs)
<b>Electric traction charge (RCE)</b>	Unit price according to the actual use of the electric facilities	CDI: marginal cost of maintenance and renewal of the electric facilities
<b>Covering the losses in electrical systems (RCTE – component A)</b>	Unit price according to the actual use of the electric systems	CDI: marginal cost of providing the electrical energy to compensate for losses in electrical systems from substations up to train detection points
<b>Market charge (RM)</b>	Unit price according to the market segments with possible modulation	All or part of the fixed cost
<b>Access charge (RA)</b>	Fixed flat rate	All or part of the fixed cost
<b>Congestion charge (RS)</b>	Unit price to be defined	Financial incentive for good use of the network
<b>Train path charge</b>	Unit price to be defined	CDI: directly attributable cost related to the creation and modification of the train path
<b>Charge for crisis management coordination</b>	Unit price according to the actual use of the Network	Cost of the service

## 2.1. CHARGES BASED ON THE CDI: THE RUNNING CHARGE (RC), THE ELECTRIC TRACTION CHARGE (RCE), THE RCTE (COMPONENT A) AND THE TRAIN PATH CHARGE

### 2.1.1. Application of the principles provided by European and national regulations

As indicated in the first section, the basic principle for charging for minimum services, using "cost directly incurred" ("CDI"), is given in Article 31.3 of Directive 2012/34/EU.

The Implementing Regulation 2015/909 of 12 June 2015 defines the modalities for the calculation of the cost directly incurred. In particular, it specifies that the cost directly incurred ("CDI") must be considered to be a marginal cost.

Within this framework, the running charge must be equal to the cost incurred by the infrastructure manager when running a supplementary unit of traffic on the network (in train-km or tonne-km), i.e. the sum of the marginal costs for maintenance, renewal and operation.

Article 6 of the Implementing Regulation also stipulates that econometric methods or engineering cost modelling can be used to estimate the cost directly incurred, if these works are conducted under the control of the regulatory body. The regulation therefore supports SNCF Réseau in the methods implemented to date for calculating the CDI.

Finally, the regulation stipulates that the CDI must be regularly updated to take into account the best international practices. SNCF Réseau plans to update the CDI every three to five years (excluding

indexing), which is in line with the recommendations of the regulator<sup>10</sup> and the group of European regulators, the IRG-Rail association<sup>11</sup>.

### 2.1.2. The marginal cost estimation process

SNCF Réseau's CDI estimation work is one of the most advanced studies in Europe. In fact, over the past ten years, significant progress has been made following several updates of these estimates. This work was done by recognised researchers from the academic community. In addition, SNCF Réseau has always regularly communicated its work (methodology and results) to clients (railway undertakings, AOT, combined transport operators, associations and institutional partners) during consultation meetings on tariff reform. This work and its results are particularly cited by CERRE in its report on tolls<sup>12</sup>.

Initial estimation works date back to 2007. They produced an objective assessment of part of the charging system for the 2010 charging reform<sup>13</sup>. Significant resources were mobilised between 2010 and 2012 to update these estimations. The marginal costs of maintenance, operation and renewal were estimated using econometric analyses<sup>14</sup>, carried out on the data from 2007 to 2009. The methodological choices were based on the conclusions drawn by academic works, in particular those conducted within the scope of European research programmes<sup>15</sup>. These estimates have been integrated in the charges that took effect in the 2014 timetable.

**Since 2015, SNCF Réseau has completed a new update of the CDI, which has been implemented for the charges of the 2019 timetable.** This update concerned the maintenance and renewal costs. The analyses mobilised a panel of high-level international experts<sup>16</sup> and were supervised by a scientific committee (Professors E. Quinet and M. Gaudry) to guarantee the reliability of the methodological choices made. This approach was also carried out in close collaboration with the regulator.

The methodological bases have not been modified since the "cost model" process in 2010-2012. The calculation of the cost directly incurred is based on econometric analyses designed to explain the expenses observed (maintenance) or modelled (renewal) by the technical characteristics of the

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<sup>10</sup> "Updating work will have to be periodically scheduled to ensure the validity of the estimates forming the basis for the charges billed to the users of the network and thus prevent the risk of a disconnection from the actual costs observed. For example, a frequency of three years could be used, in line with the timetable for updating the contract concluded between the State and SNCF Réseau." -(cf. recommendations No. 2016-016 of 10 February 2016 relating to the overhaul of the pricing for the use of the national rail network)

<sup>11</sup> "The periodicity of updates should be in line with other relevant periods regarding the general review of the charging system, with a maximum of five years between two calculations" (cf. IRG-Rail (16) 8 - An introduction to the calculation of direct costs in respect of implementing regulation 2015/909).

<sup>12</sup> "Probably the most reliable evidence on the absolute level of wear and tear costs comes from econometric evidence, given the extensive range of studies conducted through co-ordinated research programmes. This evidence suggests that charges for these costs are generally far too low, except in France" (cf. CERRE, *Track access charges: reconciling conflicting objectives*, may 2018).

<sup>13</sup> See IGF-CGPC report on rail network charging, July 2007

<sup>14</sup> The econometric analyses conducted for maintenance and operation were the subject of a scientific article presented at the annual conference of the International Transportation Economics Association (ITEA, Toulouse, 2014): *Estimating the marginal cost of operation and maintenance for French railway network*. The article can be accessed using the following link: [https://editorialexpress.com/cgi-bin/conference/download.cgi?db\\_name=ITEA2014&paper\\_id=137](https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=ITEA2014&paper_id=137)

<sup>15</sup> The study conducted by SNCF Réseau sought in particular to apply analysis methods that are consistent with the most advanced scientific work in this field. It endeavoured to apply the methods used as part of the CATRIN European research project, which brought together Phill Wheat, Andrew Smith and Chris Nash (from the University of Leeds) or Marc Gaudry and Emile Quinet to look at the case with regard to France. In particular, the functional form initially used to estimate the cost functions was a Box-Cox formula.

<sup>16</sup> The analyses were conducted by a panel of experts formed from the STRATEC design office, the ECOPLAN design office (Mickael Marti and Philip Walker) and the Leeds Institute for Transport Studies (Philip Wheat and Andrew Smith).

infrastructure and by the stresses it suffers (traffic). These analyses are used to estimate the cost functions, from which the marginal costs are derived.

The scope of costs used to estimate the CDI is as follows:

- Maintaining the track, switchgear, signalling and catenary system. This is cost data.
- Operational traffic management.
- Track, switches and crossings renewals. These costs are derived from simulated renewal schedules. Indeed, an econometric analysis of the costs of renewal investments could not be carried out by taking data from a single year since the renewal operations are by definition cyclical.

Significant improvements have been made to assess the marginal cost of maintenance and renewal.

Relating to the source of data:

- For maintenance: During its work carried out in 2015 and 2016, SNCF Réseau used more recent (2013) and richer data. These databases created allow for the introduction of many additional variables in the cost functions. In total there are more than a hundred variables that have been collected.
- For the renewal of conventional lines: SNCF Réseau used a new tool, more successful and built by the internal maintenance experts. It allowed them to calculate the cost of future renewal operations, over a long period of time, from the data for recorded unit costs and lifespan assumptions according to the policies in place.

On the analyses carried out:

- Use of econometric models among the most adapted and in line with the best practices.
- Advanced analyses on the choice of explanatory variables to be retained, in agreement with the business experts.
- Tests of robustness and adequacy of the models.

A second assessment of all the work done by SNCF Réseau was carried out under the auspices of the regulator<sup>17</sup> at the end of 2016. This second assessment led to the choice of a functional form different from the one initially proposed. Ultimately, it is a cost function of the Translog form that is used to estimate marginal maintenance and renewal costs. One of the main benefits of the Translog forms over the Box-Cox forms, initially tested, lies in the easier interpretation of the coefficients.

### **2.1.3. Estimation of marginal cost per activity**

The econometric analyses enable the cost functions to be estimated. These functions were then derived to estimate the average marginal cost of each activity in order to transpose this into the toll price scale. The activities operating on the network have been re-grouped into 3 main types:

- “passenger” activities on conventional lines (LC),
- “passenger” activities on high speed lines (LGV),
- and freight and light running freight activities.

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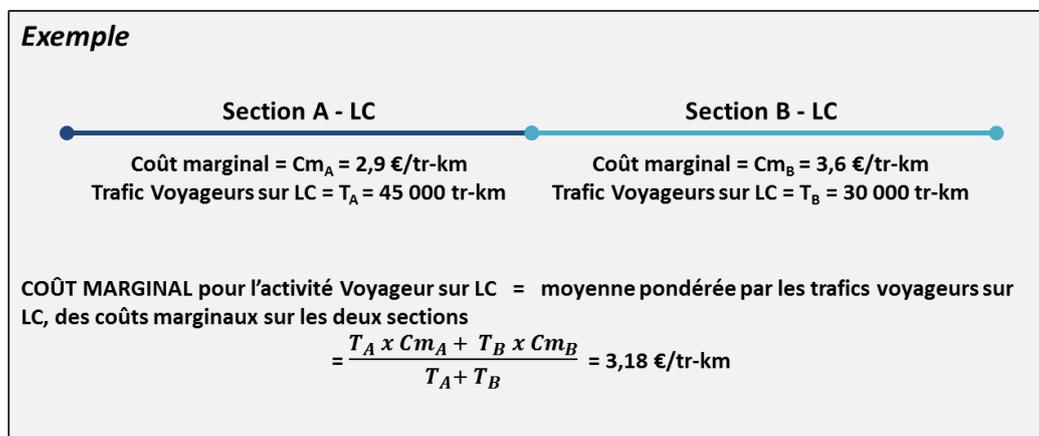
<sup>17</sup> The second assessment was carried out between November and December 2016 by the econometrics firm, Frontier Economics, on behalf of the regulator. These results were made available to the public by the regulator.

<http://www.araf.fr/wp-content/uploads/2017/02/RAP-Frontier-Expertise-cout-marginal-dentretien-stc-vf-pour-public....pdf>

<http://www.araf.fr/wp-content/uploads/2017/02/RAP-Frontier-Expertise-cout-marginal-de-renouvellement-vf-pour-pub....pdf>

Given the cost functions estimated, the marginal cost is a local concept which depends on the characteristics of the infrastructure at the point where this cost is measured. As the running charge is unique, a weighted average of marginal costs was implemented for each activity, over the entire national rail network. For each activity, the weighting assigned to each marginal cost at the level of each segment corresponds to the weighting for the segment in the total traffic for the activity.

The figure below illustrates the process for calculating the average marginal cost according to activity across the whole network.



For the marginal cost of renewal, a distinction is added according to the UIC group:

- For network sections within UIC groups 2 to 6: an average marginal cost of renewal is calculated via a weighted average over the UIC 2 to 6 network.
- For network sections within UIC groups 7 to 9, the marginal cost of renewal is set at 0. The CDI is therefore the sum of the marginal costs of maintenance and renewal only. In fact, given the investment grants provided by the regions in particular, for the renewal operations of these lines, the renewal costs of these lines are not included in the network pricing.

In addition, depending on the cost item and asset analyses, marginal costs are estimated in euros per tonne-kilometre<sup>18</sup> or in euros per train-km<sup>19</sup>. Following exchanges with the regulator, and in order to respect the non-discriminatory nature imposed by Article 29 of the Decree of 7 March 2003, it was decided to keep this double unit for the 2019 rates for the transport of passengers. For freight trains, modulation per class of tonnage was kept (cf. section 2.2, below).

#### 2.1.4. Indexation of the results

New marginal cost estimations were introduced in the charges for the 2019 timetable. They must therefore be expressed under the economic conditions of the timetable in question, using inflators specific to each of the categories, based as far as possible on the observed changes in these costs.

- **Until 2014: taking into consideration actual changes**

For the period for which SNCF Réseau has data recorded and for a constant scope (RFF scope until 2014) for the costs of maintenance, operation and renewal, the marginal costs are updated using the following annual rates:

<sup>18</sup> This concerns marginal costs of maintenance and renewal of the track and switchgear.

<sup>19</sup> This concerns the marginal costs of operating and maintaining signalling devices.

Cost categories	Initial economic conditions	Taking into consideration actual changes	Overall change	Average change per year
Maintenance	2013	2013-2014	-0.37%	-0.37%
Operation	2009	2009-2014	8.18%	1.58%
Renewal	2012	2012-2014	1.98%	0.98%

- **2014-2016 period: taking into account the average change over 2009-2014**

For the 2014-2016 period, SNCF Réseau used the average annual growth rate<sup>20</sup> calculated over the 2009-2014 period. This rate rose to 2.60%. It was therefore decided to use a "older" average change for this period, given the profound change in the company's cost structure (following the August 2014 railway reform).

- **2016-2020 period: taking into consideration the forecast rate of change**

For the 2016-2019 period, SNCF Réseau used the forecast cost change trajectories (OPEX and Gopeq) resulting from the multi-year Performance Contract between the State and SNCF Réseau<sup>21</sup>. The result of this was an average growth of 1.1 % per year, taking productivity into account.

Lastly, compared to the values used for the 2019 charges, the traffic charge was increased by 1.2% between 2019 and 2020. This rate corresponds to the average rate of change in operating, maintenance and renewal costs, weighted by the share of each of these items in the marginal cost.

Annual rate of change per cost category	2014-2016	2016-2017	2017-2018	2018-2019	2019-2020
Maintenance	2.60%	1.2%	1.6%	1.0%	1.4%
Operation	2.60%	1.2%	1.6%	1.0%	1.4%
Renewal	2.60%	1.0%	1.0%	1.0%	1.0%

For freight, the change in marginal cost is + 1.8%, excluding productivity.

## 2.1.5. Results

For 2020, the marginal costs for maintenance, operation and renewal are as follows:

	Maintenance mc (Track + Adv) €2020 / kCGT-km	Maintenance mc (Signalling) €2020 / tr-km	Renewal mc (Track + Adv) €2020 / kCGT-km		Operation mc €2020 / tr-km
	RFN	RFN	UIC 2-6	UIC 7-9	RFN
Passenger on LC	1.516	0.226	1.689	0.000	0.206
Passenger on LGV	0.680	0.116	5.149	N/A	0.122

<sup>20</sup> This overall average annual growth rate was calculated for all maintenance, operations and renewals, taking into account the share of each of these items in the total variable costs.

<sup>21</sup> Contract signed on 20 April 2017.

Freight & Light Running Freight	0.689	0.220	1.699	0.000	0.227
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**Total:**

	MC total €2020 / kCGT-km		MC total €2020 / tr-km	
	UIC 2-6	UIC 7-9	UIC 2-6	UIC 7-9
Passenger on LC	3.205	1.516	0.432	0.432
Passenger on LGV	5.830	N/A	0.237	N/A
Freight & Light Running Freight	2.388	0.689	0.447	0.447

The above results, which are reflected in the traffic charge, show as with the previous study, relatively different marginal costs from one activity to the next. This is because activities do not operate in the same places (marginal costs vary from one section of the network to another).

The estimations have estimated the portion of network costs that varies according to the traffic. This analysis shows in particular that the portion of costs that varies according to the traffic is much less than 50%. Therefore for renewal, the marginal portion of the costs (the portion that varies according to the traffic) is 22%. Conversely, this means that 78% of the renewal expenses of SNCF Réseau are not included in the running charge. The same applies for the operating costs and the maintenance costs. Only 18% of maintenance costs and 10% of operating costs vary according to the traffic. Conversely, the fixed portions of the maintenance costs (82%) and operating costs (90%) are not covered by this charge. These values are in the order of magnitude recommended by the CERRE in its report on track access charges<sup>22</sup>.

Marginal portion of costs (portion of costs that vary according to traffic)	
Maintenance	18%
Operation	10%
Renewal	22%

Concerning the cost items related to fixed electric traction installations (catenaries and EALE), only the marginal maintenance cost of catenaries was updated as part of the work carried out between 2015 and 2016. For the year 2020, SNCF Réseau estimates and the application of the change rates (between 2013 and 2019) resulted, for the maintenance of catenaries, to a value of €0.105 of the electric train-km, and this for all activities.

### 2.1.6. Running charge (RC)

The running charge for passenger trains is directly determined from the marginal costs presented above: marginal operating, maintenance and renewal costs.

Since the 2019 service schedule, the traffic charge is calculated from two cost drivers, the tonne-kilometre (85%) and the train-kilometre (15%).

<sup>22</sup> "Overall, given the extensive nature of the econometric evidence, it seems hard to ignore the conclusion that marginal wear and tear costs for maintenance and renewals should be above 20%" (cf. CERRE, *Track access charges : reconciling conflicting objectives*, may 2018).:

For freight, specific provisions are applied, as presented below (see §2.2).

### 2.1.7. Electric traction charge (RCE)

The RCE is equal to the cost of fixed electric traction installations directly attributable to traffic. This cost corresponds to the sum of these four items:

- (1) the marginal maintenance cost of catenaries
- (2) the marginal maintenance cost of EALE
- (3) the marginal renewal cost of catenaries
- (4) the marginal renewal cost of EALE

As mentioned in 2.1.5, only the marginal maintenance cost of catenaries (1) was estimated using econometric analyses. On the other hand, the other items (2), (3) and (4) could not be treated in the same way, as the data (observed or simulated) was not sufficiently specific to allow econometric analyses to be carried out.

For these items, a simplified approach was used: it was assumed that the traffic marginality of these three cost items was on average that of the maintenance cost of catenaries (20%), which is a reasonable assumption.

The marginality of 20% was applied on the one hand to the observed maintenance expenses of the 2016 EALE inflated in 2020, and on the other hand to the renewal expenses of the IFTE planned in 2020 in the trajectory of the multi-year State - SNCF Réseau contract mentioned above. The forecast rate between 2019 and 2020 for the CDI for electrical installations is + 8.5%.

The **final outcome** was as follows:

	Total Cost (M€2020)	Mortality	Variable Costs (M€2020)	Marginal costs (€2020/tr-km)
(1) Maintenance of catenaries	/	/	/	0.105
(2) Maintenance of EALE	70.3	20.00%	14	0.038
(3 + 4) Renewal of catenaries and of EALE	259.0	20.00%	52	0.139
<b>RCE 2020 (€2020)</b>				<b>0.281</b>

### 2.1.8. Charge for transmission and distribution of electric power (RCTE – component A)

Since the NST 2016, SNCF Réseau has distinguished the RCTE in two components, one covering the expenses related to the losses (component A) and the other the transport and distribution charges

(component B), in application of the amended version of Decree No. 2003-194, which states that the part covered by the coverage of electrical losses is included in the minimum services. Thus, the cost of these losses is considered a cost directly attributable to traffic using electric traction.

This change is a mere formality and does not result in any economic change in situations where all other things are equal; this means no income changes for SNCF Réseau, and no changes to charges for the railway undertakings using electric traction. The principles of the pricing of this charge are detailed in Appendix 6.1.3 of the NS.

## 2.2. SPECIAL CASE FOR FREIGHT

Due to the particular economic context of the freight activity, the charges have the following specificities:

- the "directly attributable cost" charging principle is maintained; however, the coverage of the CDI is shared between the State and the companies in the sector;
- the additional increase in the total cost recovery cannot be applied.

Since the 2019 timetable, SNCF Réseau has introduced the principle of a different rate per tonnage class: the candidates pay according to what tonnage class they belong to and not based on their intrinsic tonnages. At the end of the 2019 consultation, SNCF Réseau set:

- 5 classes of tonnage: the 1st category affects the lightest trains (especially "top-of-the-line" trains), while the last category applies mainly to the heavy train market;
- a reference tonnage (used to calculate the rates for the whole class) at a level favourable to the railway undertakings, which has the effect of encouraging massification within the same class;
- particularly incentive charges: it is generally more beneficial to run a single convoy than several, for the same level of total tonnage.

In the same way, the State has decided to contribute more financially to the heaviest trains. Conversely, for the 1st category of tonnage, its contribution is zero, insofar as these trains already benefit from low levels of tonnage.

In this context, the following two charges should be distinguished for each of the tonnage classes:

- net traffic charge (RC): it represents the share of the CDI borne by the undertakings after deduction of the State subsidy;
- gross traffic charge (RC): it corresponds to the CDI of the category; in the end, this amounts to the charges collected by SNCF Réseau. For 2020, SNCF Réseau will receive the net freight companies' charge, and compensation from the State equal to the difference between this net charge and the gross charge.

Categories in tonnes	Reference tonnage	% Tkm	"Net Traffic Charge"			"Gross Traffic Charge"			CDI coverage rate
			UIC 2-6	UIC 7-9	Average toll € / Tkm	UIC 2-6	UIC 7-9	CDI € / Tkm	
[0-350[	175	5%	0.86	0.57	1.91	0.86	0.56	3.25	100%
[350-750[	525	12%	1.03	0.49		1.69	0.80		61%
[750-1050[	875	11%	1.53	0.64		2.52	1.04		61%
[1050-1550[	1300	43%	2.14	0.81		3.53	1.33		61%
>=1550	1659	28%	2.37	0.85		4.38	1.58		54%

## 2.3. MARKET CHARGE (RM) AND ACCESS CHARGE (RA)

The access charge (RA) and the market charge (RM) are mark-ups defined by market segment, which contribute to the coverage of fixed costs of the network. These charges are only applicable to passenger trains.

N.B.: this part only concerns passenger activities; the specific case of freight is described in § 2.2.

### 2.3.1. Application of the principles provided by European and national regulations

As stipulated in the first section, Article 32.1 of the Directive 2012/34/EU specifies that *"In order to obtain full recovery of the costs incurred by the infrastructure manager a Member State may, if the market can bear this, levy mark-ups" on "rail market segments"*. The relevance of the segments is assessed with regard to the element pairs listed in point 1 of the Annex VI thereto<sup>23</sup>. They shall contain *"at least the three following segments: freight services, passenger services within the framework of a public service contract and other passenger services"*.

These principles have been transposed in Article 31 of the amended Decree No. 2003-194 of 7 March 2003. Article 31-2° of the aforementioned Decree further stipulates that the infrastructure manager (IM) may make a more in-depth segmentation of the markets according to the goods or passengers transported. A more in-depth segmentation has been adopted by SNCF Réseau.

### 2.3.2. Segmentation process for the rail market

In application of Article 31-1° of the amended Decree No. 2003-194 of 7 March 2003, the IM assesses the relevance of the segmentation implemented *"on the basis of data available to it and in accordance with the best practices in this field"*. The segmentation is in keeping with the regulatory framework. The segmentation criteria used are mainly related to the nature of the transport service. They are different for contracted services and for non-contracted services.

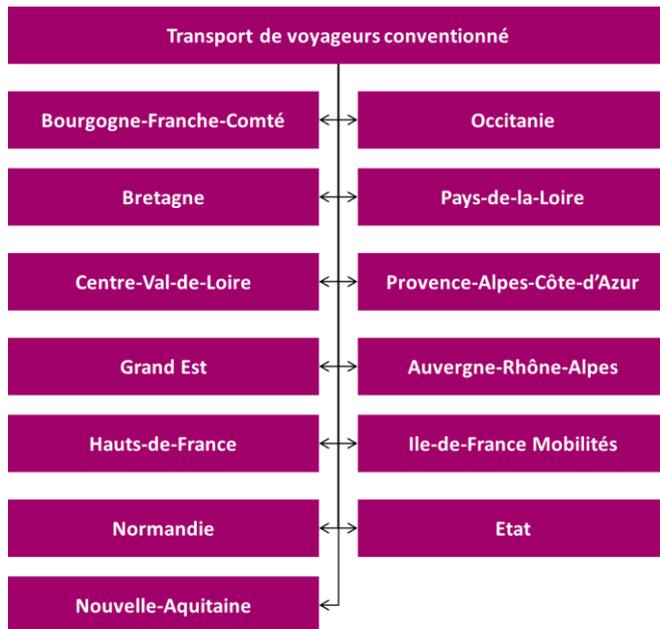
- **Segmentation of passenger transport activities under contract**

The category of "passenger services within the framework of a public service contract" constitutes one of the three minimum market segments explicitly provided for in the aforementioned Article 31.2° of the Decree No. 2003-194 of 7 March 2003. It concerns TER, Transilien and TET transport activities. Article 5 of Decree No. 97-446 specifies that SNCF Réseau distinguishes at least one segment by transport authority for the activities of transport of contracted passengers.

The segmentation of passenger transport activities under contract is described in the diagram below:

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<sup>23</sup> "1. The pairs to be considered by infrastructure managers when they define a list of market segments with a view to introducing mark-ups in the charging system according to Article 32(1) include at least the following:  
a) passenger versus freight services;  
b) trains carrying dangerous goods versus other freight trains;  
c) domestic versus international services;  
d) combined transport versus direct trains;  
e) urban or regional versus interurban passenger services;  
f) block trains versus single wagon load trains;  
g) regular versus occasional train services".



- **Segmentation of passenger transport activities not under contract**

Article 31.2° of the amended Decree No. 2003-194 of 7 March 2003 mentions the existence of a mandatory minimum segment, referred to as "*other passenger services*". This essentially concerns long-distance TAGV and conventional Train activities (other non-contracted trains).

Article 5 of Decree No. 97-446 specifies that SNCF Réseau may carry out a further differentiation taking into account the origin or destination of the transport service.

For the TAGV activity, segmentation differentiates services according to groups of **origins / destinations**, referring to a division by **axes** including a distinction between domestic and international connections<sup>24</sup>.

For the Other non-contracted Trains activity, the segmentation differentiates between the **main types of traffic** and does not refer to a division by axis used by the TAGV. Five market segments have been defined: **day trains on conventional lines, night trains on conventional lines, vehicle transport trains (Auto-trains), historical and tourist trains, test trains and AEF**.

<sup>24</sup> As suggested in Article 31-1° of the amended Decree No. 2003-194.

The segmentation of "other passenger transport services" can be summarised using the following breakdown:



### 2.3.3. The level of the mark-ups associated with the market segments

The mark-ups are levied, in principle, in line with the logic described in Article 6 of Decree No. 97-446. The level of mark-ups can be based on:

- Performance offered by the railway infrastructure (speed, power of the electrical system, etc.);
- The quality of the services facilities of SNCF Réseau;
- The density of use of a line or line section;
- Intrinsic characteristics of insured transport services (carry capacity of trains etc.).

- **The level of mark-ups for passenger transport activities not under contract**

For the TAGV, the market charge is defined by axis, with a separate scale for conventional lines (LC) and for high speed lines (LGV).

In order to check the adequacy of the charging system for the different TAGV market segments, SNCF Réseau conducts evaluations based on the economic model of a "normative transport operator", which is deemed to be representative of operators of high speed transport on the national rail network. This model can be used to estimate the transport operators' profitability and therefore to ensure that the level of the charges is bearable by the transport operators.

### **Model of a normative transport operator**

The normative transport operator model incorporates different sections (model for forecasting revenue, model for estimating operating costs, model that recreates the financial value of the assets from the rolling stock), and makes it possible to test the impact of changes in charges on the profitability of a normative transport operator. This model is broken down by market segment to correspond with the market segments defined for the application of increases.

A demand forecasting model makes it possible to calculate revenue by axis in relation to macroeconomic parameters (GDP, price of oil, inflation on a national scale) combined with hypotheses concerning rail service policy (volume and price per axis).

A model for transport operator costs enables the operating costs and, combined with the demand forecasting model, the gross operating surplus of a transport operator to be estimated.

The cost items considered are as follows:

- traction, support and shunting
- energy
- maintenance
- on-board services
- services within stations, distribution and communication
- structure
- infrastructure charges

In addition to operating expenses and income, capital costs related to the ownership of an asset are estimated (depreciation, financial expenses).

The model of a normative transport operator is updated annually to take into account changes in the macroeconomic context and intermodal competition (changes in the air markets, emergence of "low cost" competition, etc.).

In terms of control, the model of a normative transport operator is transmitted every year to the Regulator to justify the bearability of the charging system for high-speed trains.

For other trains not under contract:

- Day trains, a reputedly sustainable segment whose mark-up level is set at the same level as conventional line TAGVs;
- Night trains represent a more fragile market than day trains and whose mark-up level is zero;
- Auto-trains are services used to transport, usually at night, a vehicle between two stations in the rail network. This is a declining market for which the CDI is similar to that of freight trains and whose mark-up level is zero;
- Historical and tourist trains, a fragile segment, often run by associations, are at a zero mark-up level;
- Test trains and AEF, a segment deemed sustainable (with AEF invoicing the cost of tolls to its customers), has a mark-up level set to the same level as day trains. Trains running on high-speed lines have an RM corresponding to the rate of domestic inter-sectors.

- **The level of mark-ups for passenger transport activities under contract**

For activities under contract, the level of mark-ups for the 2020 timetable is set at the same level as the mark-ups in the 2019 timetable, excluding rail inflation.

Only the Normandy segment market charge scale has been modified to reflect TET transfers to Normandy. Like for the other line transfers and according to the same methodology, the scale has been set to ensure the neutrality of the transfer for SNCF Réseau.

### **2.3.4. Access charge (RA)**

For activities under contract, SNCF Réseau levies an access charge (RA) that was historically designed to cover the fixed costs of the infrastructure that are directly attributable to activities under contract (TER, Transilien, TET). This charge helps to cover the total cost borne by SNCF Réseau in addition to the other revenues it receives as part of the minimum services. The access charge is owed by the State for TET activity, by the State to account for regions for TER activity and by Ile-de-France Mobilités for Transilien activity.

The amount for the TER access charge was estimated in 2007 at the time of the IGF-CGPC report on national rail network charging in preparation for the 2010 charging reform (see part 2, § 1.2 of the report). The amount for the fixed costs for maintenance, operation and renewal was calculated from the difference between the total cost and their variable costs (product of the traffic and marginal costs of each of the activities) for each line category. The fixed costs are divided between the activities in proportion to the number of trains. For each region, the TER RA was calculated in order to match the sum of fixed costs allocated to TER activity on the corresponding network.

The access charge for TET was estimated in 2011 for the 2012 Network Statement. It was calculated using the same principles as the TER RA and reflects the fixed costs of TET activity.

Since 2017, TET line transfers have been made to AOTs.

These transfers taking place until 2020 and in order to take into account this strong move from TET to TER activity, the amounts of RA have been revised for the 2020 timetable. Therefore, €247m was deducted from the TET RA and broken down into each segment in proportion to the train-km transferred to each region.

The annual changes to access charges are described in § 3.1.

## **2.4. CONGESTION CHARGE (RS)**

In accordance with Article 33-1 of Decree No. 2003-194 of 7 March 2003, SNCF Réseau proposed in 2016 to introduce a congestion charge in the scale of minimum services in the NST 2018, under the rarity capacities.

The congestion charge suggested by SNCF Réseau corresponds to a price signal intended to encourage train path applicants to reconsider their needs. The fee was flat-rate, separate according to the activities, and had to be clear-cut during the NST 2018, in order to be eventually reviewed for the NST 2019 taking experience feedback into account.

In its opinion No. 2017-006 of 1 February 2017, ARAFER noted that the principle of the congestion charge was consistent but that the level of charges was not justified.

Pending the continuation of joint discussions on an experimental phase, a congestion charge will not be implemented for the NST 2020.

## **2.5. SPECIAL CHARGES**

The additional charges for the use of the infrastructures referred to above are specifically set out to take account of the investment costs incurred by SNCF Réseau or the loss (maintenance, operating) connected with the implementation of these projects. According to the methods in Article L2111-10-1 of the Transport Code, these charges are calculated to avoid any negative impact on the SNCF Réseau accounts in the depreciation period for this investment. The charges change in line with the indexation of tolls.

### **2.5.1. Charge for use of freight trains on the section 38080 "Montérolier-Buchy – Motteville"**

The Montérolier-Buchy-Motteville charge is part of a corridor policy designed to improve the accessibility of the Port of Le Havre (Port 2000), in particular by modernising the section in question, which forms an alternative route avoiding the dense node of Rouen.

To enable SNCF Réseau to fulfil its financial commitment estimated at a current value of €9.918 M, a specific Montérolier-Buchy-Motteville charge was introduced in 2007 and will cease to apply as of the 2027 timetable.

### **2.5.2. Charges for use of freight trains and trains on the piggyback corridor through the Alps (AFA) on the line "Saint-Pierre-d'Albigny – Modane Frontière"**

These charges were introduced to cover the financing provided by SNCF Réseau for implementation of:

- the facilities on the section "Saint-Pierre-d'Albigny – Modane Frontière" (freight trains and AFA trains): this was introduced in 2008 and will cease to apply as of the 2028 timetable;
- modernisation work on the Mont Cenis (or "Frejus") tunnel and the conversion to gauge GB1 and work to improve security between Ambérieu and the French-Italian border (Modane): this was introduced in 2012 and will cease to apply as of the 2032 timetable.

The aim of this work is to develop cross-border traffic of freight transport.

The financial contribution made by SNCF Réseau in 2004 provided additional financing via a special charge based on the traffic level of the benefiting activities, with a distinction between freight and piggyback corridors.

In 2004, these charges were configured to produce the SNCF Réseau contribution of € 5.409 M current value.

### **2.5.3. Charge for use of the short link line at Mulhouse**

The short link line at Mulhouse is an investment that avoids the need for direct trains capable of high speeds that are travelling from and to northern Alsace to double back in Mulhouse station or to use the Mulhouse-Nord marshalling yard bypass. It allows trains capable of high speeds to gain around 10 minutes and was introduced from the 2012 timetable (at € 300/train path).

This special charge (charge is per train path) covers the SNCF Réseau contribution of € 5.1 M current value within this project and will cease to apply as of the 2032 timetable.

### **2.5.4. Charge for use of electric trains on the sections 53003 A "Pasilly – Le Creusot" and 53003 B "Le Creusot – Mâcon"**

The charge for use of electric trains on the sections 53003 A "Pasilly – Le Creusot" and 53003 B "Le Creusot – Mâcon" (both on the Paris-Lyons HSL) corresponds to the use of facilities distributing traction energy to trains ("catenary systems").

This charge is designed to cover the investment of € 52.333 M excluding VAT and is fixed for a period of 15 years from the end of the work. It was introduced at the time of the 2009 timetable and will cease to apply as of the 2024 timetable.

### 2.5.5. Special charge related to the CEVA project

The Cornavin-Eaux Vives-Annemasse rail link project will be implemented at the start of the 2020 timetable. It is designed to offer passengers' access to "Greater Geneva" via the Lemman Express, with 2 km of new line in France between Annemasse and Geneva.

This charge is designed to cover the SNCF Réseau investment exceeding the rules for financing projects of €9 M, linked to the amount of the investment of € 244 M excluding VAT and is fixed for period of 20 years from the end of the work. It will start with the 2020 timetable and will cease to apply as of the 2040 timetable.

### 2.5.6. Special charge related to the Serqueux-Gisors modernisation project

The Serqueux Gisors modernisation project will also be commissioned during the course of 2020. The plan is to create a new freight route to strengthen the rail service to the port of Le Havre and to offer additional capacity for freight trains between the Normandy ports and the Paris region.

This charge is designed to cover the SNCF Réseau maintenance and operating loss linked to the investment of € 244 M excluding VAT and is fixed for period of 20 years from the end of the work. It will start with the 2020 timetable and will cease to apply as of the 2040 timetable.

### 2.5.7. Summary

For each of the charges defined above, the amount of the investment made by SNCF Réseau and covered by the special charge, and the period of application for the charge are detailed below:

Special charges	Amount of investment borne by SNCF Réseau In million euros, current value	Duration of collection	First year of collection	Last year (last timetable) of collection
Charge for use of freight trains on the section 38080 "Montérolier-Buchy – Motteville"	€9.9 M(*)	20 years	2007	2026
Charges for use of freight trains on the line "Saint-Pierre-d'Albigny – Modane Frontière"	€5.4 M(*)	20 years	2008	2027
Charges for use of trains of the piggyback corridor through the Alps (AFA) on the line "Saint-Pierre-d'Albigny – Modane Frontière"			2012	2031
Charge for use of electric trains on the sections 53003 A "Pasilly – Le Creusot" and 53003 B "Le Creusot – Mâcon"	€52.3 M(*)	15 years	2009	2023
Charge for use of the short link line at Mulhouse	€ 5.1 M	20 years	2012	2031

Special charges	Amount of investment borne by SNCF Réseau In million euros, current value	Duration of collection	First year of collection	Last year (last timetable) of collection
Special charge related to the CEVA project	€35 M(*)	20 years	2020	2039
Special charge related to the Serqueux-Gisors modernisation project	€0 M(*)	20 years	2020	2039

(\*) For this project, the special charge covers the maintenance and operating loss.

### 3. CHANGES IN COSTS AND CHARGES

The multi-year performance contract, mentioned in Article L.2111-10 of the Transport Code, concluded between the State and SNCF Réseau on 20 April 2017<sup>25</sup> for a period of 10 years (2017-2027), sets the financial trajectory of SNCF Réseau and in particular the management of global annual variations in pricing, enabling it to reach the goal of full cost coverage by the end of the contract.

This trajectory is determined over the first 3 years and is then only indicative until the end of the ten-year contract. The rates of change used in the contract may be revised on a triennial basis.

#### 3.1. CHANGES IN PASSENGER CHARGES

For the period 2017-2019, the indexation for passenger tolls was up by 1.1% for the 2018 timetable and up 1.7% for the 2019 timetable.

In his speech of 25 May 2018, the Prime Minister announced that changes in tolls paid by high-speed trains would be limited to the level of inflation. **Thus, as an exception to the performance contract, the indexation of tolls on trains capable of high speed is +1.8% between 2018 and 2019** (HICP 2020 - source Bank of France June 2018).

In its opinion no. 2019-005 of 7 February 2019, ARAFER limited to +1.8% the change in passenger tolls paid by TER contracted services (RM + RCE + RC, excluding the access charge, paid by the State) as well as for charges paid by contracted services in Ile de-France (RM+ RCE + RC +RA).

In detail, the charges for passenger activities for the 2020 timetable will then change as follows:

- The running charge (RC) will change according to the CDI indexation (+1.2%)<sup>26</sup>;
- The electric traction charge (RCE) will change according to the CDI indexation specific to this service (+8.5%);
- The market charge will change based on the indexation rate leading to an overall increase in tolls (+1.8% for activities not under contract, +2.4% for TET contracted activities, +1.8% excluding access charge for TET contracted activities, +1.8% for Transilien contracted activities).

<sup>25</sup> The contract is published on the SNCF Réseau website

<sup>26</sup> Excluding auto-trains (CDI freight: +1.8%).

- The access charge for activities under contract will change according to the contract rate (+2.4%), apart from the access charge for activities under contract in Ile de-France, which will change to +1.8%;

However, SNCF Réseau asked the Conseil d'Etat to cancel the ARAFER opinion on these +1.8% limitations for the activities under contract. The Conseil d'Etat has not yet ruled on SNCF Réseau's request. When it gives its decision, SNCF Réseau will draw the conclusions from that decision and set the level of revaluation accordingly. If the level thus set is greater than 1.8%, SNCF Réseau will issue revised invoices to take account of the revaluation retroactively.

### **3.2. SPECIFIC CASE OF CHANGE TO THE AMOUNT OF THE RUNNING CHARGE FOR FREIGHT ACTIVITIES**

In his speech of 25 May 2018, the Prime Minister confirmed the State's support for freight business and announced that changes in prices paid by companies will be limited to the change in consumer prices. Consequently, changes in tolls for companies will no longer include the catch-up assumption of the CDI, provided for by the 2017-2026 contract signed between the State and SNCF Réseau on 17 April 2017.

Thus, after the increases of +3.80% in 2018 and +5.80% in 2019, the running charge rate paid by freight companies will increase by +1.80% between 2019 and 2020 (HICP 2020 - source Bank of France June 2018). The electric traction charge (RCE) will increase by +8.5%.