

Decision no. 00–1171 of the Autorité de Régulation des Télécommunications dated 31 October 2000 in application of article D. 99–24 of the Post and Telecommunications Code

The Telecommunications Regulator (*Autorité de Régulation des Télécommunications–ART*),

having regard to:

The Post and Telecommunications Code, in particular articles D. 99–23 to D. 99–26 thereof

Decree no. 96–1225 dated 27 December 1996 approving France Telecom's specifications

The order of 12 March 1998 authorising France Telecom to establish and operate a public telecommunications network

Decision no. 00–813 of the Autorité de Régulation des Télécommunications dated 28 July 2000 establishing the list for 2001 of operators having significant market power (SMP) on the fixed telephone service market

Decision no. 00–1067 of the Autorité de Régulation des Télécommunications dated 11 October 2000 establishing the return on capital for the year 2001 according to article D.99–24 of the Post and Telecommunications Code and having considered the matter on 31 October 2000,

The implementation, as of 1st January 2001, of access to the local loop is of major importance for the development of competition on the French telecommunications services market.

Implementation will require that all players make certain commitments and take real risks:

- France Telecom will need to adapt its infrastructures and operating methods in order to—concretely—make a reference offer to other operators
- operators will have to make major—often irreversible—investments to deploy their networks in order to benefit from access to the local loop

In this context, pricing of access to the local loop is an important factor:

- it must provide fair remuneration for the adaptation investments made by France Telecom, the costs of using its infrastructures and the operating costs it incurs
- it must not be of such a nature as to create a barrier to entry, but—on the contrary—be born of a contractual mindset between parties who are committed for the long term; in this respect recovery of fixed costs over a short period or within a narrow perimeter, while legitimate in some cases, such as for creating co–location rooms, may not be appropriate in others, especially when demand is uncertain
- it must be legible and inspire trust

It is with these stakes in mind that ART—in this decision—establishes the list of relevant costs and defines the method for calculating long run average incremental costs (LRAIC).

ART is establishing a system based on reason and pragmatism; it will update it and add to it as often as necessary to take into account as much as possible the reference offer to be provided by France Telecom and market development.

It will also provide as much and as complete information as possible on the method and its changes and will develop means of verifying the valuations used in order to guarantee the security and trust of all players.

Finally, ART reminds operators that it does not *a priori* approve tariffs for access to the local loop. When France Telecom publishes its reference offer, ART will verify that the offer's tariffs are cost oriented and may present its conclusions.

I – The legal framework

Article D. 99–24 of the Post and Telecommunications Code states:

"The tariffs of access to the local loop are oriented towards corresponding costs. They are established pursuant to the following conditions:

1. The tariffs shall avoid discrimination based on geographic location
 2. The costs taken into account shall be relevant, meaning that they must be related, directly or indirectly, to access to the local loop
 3. The network elements shall be valued on the basis of their long run average incremental cost
 4. The tariffs in effect for shared access to the local loop shall not be inferior to those whose access is completely unbundled, less the amount of the subscription to the public telephone service
 5. The tariffs shall include an equitable contribution to the common costs both for the access to the local loop and for the other services of the operator
3. The tariffs shall include the normal remuneration of the capital used for investments set forth in Article D. 99–22.

The Telecommunications Regulation Authority shall determine and will publish the list of the relevant costs. It shall define and publish the calculation method for the long run average incremental costs.

The operators mentioned in the first paragraph of Article D. 99–23 are required to communicate to the Telecommunications Regulatory Authority, upon request, any information enabling it to verify that the tariffs in effect are oriented towards costs."

II – The principles followed by ART

Several principles guide ART:

- cost orientation of tariffs
- the principle of efficiency
- the principle of non-discrimination
- the principle of fair and long-lasting competition

II – 1. On cost orientation

Costs, as they are evaluated, include normal remuneration for immobilised capital. Thus, any additional income generated beyond these costs is not legitimate with regard to cost-oriented pricing.

For a given service, cost orientation of tariffs means a balance between:

- revenue generated from the provision of this service, as it results from the application of tariffs to the satisfied request
- costs incurred in providing this service, on the basis of the same hypotheses or observations of satisfied request

Still, this condition does not mean that tariffs can be determined mechanically from costs with no other hypothesis:

- certain cost items cannot be allocated to a specific service with a specific tariff, since a compromise must often be found in evaluating the cost, between detailed evaluation and precision
- other cost items are fixed (their value is independent of the volume of production) or are incurred just once
- the request to which a cost is related might be uncertain
- the choice of the pricing structure may be to some degree independent of the cost structure; thus the operators have requested a recurring tariff for after-sale service whereas we might consider that costs of after-sale service are incurred only when a disturbance is identified

Thus, a number of considerations guide ART in comparing tariffs and costs.

Even if, in principle, non-recurring costs must be recovered through a non-recurring tariff and recurring costs through a recurring tariff:

- non-recurring tariffs could be a barrier to entry. Non-recurring costs underlying such tariffs must be amortised over a reasonable period given the necessarily long life of the commitment between the parties
- in particular, for operating costs, non-recurring tariffs must be fully justified with regard to costs effectively incurred by France Telecom in order to ensure parity between operating expenses effectively incurred and corresponding non-recurring revenues; thus connection costs should be invoiced only if they correspond to work which has effectively been done for an unbundling request
- fixed costs, i.e. independent of service volumes, must be recovered on a broad base and, when incurred a single time, over a reasonable period of time, which ART has set at 5 years based on practices elsewhere in Europe. Such costs could be based on forecast sales for all unbundling services and updated for the period under consideration; they would be increased and applied to all unbundling tariffs.
- the copper pair usage costs are annualised by calculating depreciation and are therefore covered by a recurring usage tariff. However, for work done by France Telecom to create or expand infrastructures excluding drop wire (civil engineering, cable laying or distribution points), ART considers that it would be equitable that this service be pre-financed by the requesting operator on the basis of investment costs effectively made by France Telecom and applied to a pair. This pre-financing would be considered a credit for local loop access services.

Finally, ART will examine unbundling tariffs, and in particular the recurring tariff of full unbundled access, with regard to cost elements for the local network provided by France Telecom in evaluating the cost of universal service, as well as with regard to international comparisons of unbundling tariffs.

II – 2. On the principle of efficiency

The costs which are taken into account must correspond to those incurred by an efficient operator; in this regard, the costs incurred by the operator will be compared, whenever possible and at least based on corresponding tariffs, to those of other operators providing comparable services. Benchmark models will also be developed.

II – 3. On the principle of non-discrimination

The unit prices applicable for access to the local loop must be equivalent for third-party operators and France Telecom's own departments or subsidiaries. Thus, when local loop access services are used by a France Telecom subsidiary or department under conditions which are equivalent to those offered to third-party operators, this use must be valued using rules which are themselves equivalent to those used for third-party operators. This principle applies both to access to the local loop, in its two forms (full unbundled access and shared access) and to their associated services.

This principle of non-discrimination also appears in article 18 of France Telecom's specifications which were approved by the abovementioned decree no. 96-1125, which states that "*the activities, services and networks elements used by France Telecom are valued at their external sale value or, if not possible, with respect to tariffs practiced by France Telecom for users or operators interconnected to its network*".

II – 4. On the principle of fair and long-lasting competition

Pricing rules must promote fair and long-lasting competition; which implies that tariffs must not block entry on the market. In particular, they must be established in such a way as to avoid pricing scissor effects between the prices for access to the local loop and the prices practiced by France Telecom for its retail services.

In this regard, fixed telephony service and high-speed data transmission service markets can be considered relevant. Other markets could be identified depending on the characteristics of the offer and of the requests as they are made.

III – The list of relevant costs

In annex I, ART has established the list of relevant costs in application of article D. 99-24 of the Post and Telecommunications Code. ART established this list based on discussions with all operators in the working group "Full unbundled access to the copper pair" set up in late 1999 and based on bilateral exchanges with France Telecom, before France Telecom produced its reference offer.

Therefore, this list could be added to or clarified.

Moreover this type of list can only be understood based on the rules of relevance which identify the costs which can legitimately be included in establishing tariffs. These rules also appear in annex I.

IV – The calculation method for long run average incremental costs (LRAIC)

At this stage, in a desire for pragmatism and efficiency, ART has chosen a method compatible with the model devised by France Telecom.

The definition of the method chosen by ART appears in annex II of this decision. This annex also describes the model devised by France Telecom.

In particular, ART will check the relevance and verifiable and reasonable character of the prices of the valuations of the parameters used in this model.

Finally, ART will initiate work necessary to improve this method for local loop access tariffs for 2002.

Decides:

Article 1

– The list of relevant costs for access to the local loop, as it appears in annex I of this decision, is approved.

Article 2

– The calculation method of long run average incremental costs (LRAIC), as it appears in annex II of this decision, is approved.

Article 3

– This decision will be published in the *Journal Officiel* of the French Republic.

Delivered at Paris on 31 October 2000

The Chairman

Jean-Michel Hubert

Annex1 : list of relevant costs established in application of article D. 99–24 of the Post and Telecommunications Code

Annex2 : calculation method for long run average incremental costs

[Annex I to decision number 00–1171 of the Autorité de Régulation des Télécommunications dated 31 October 2000 Costs for access to the local loop](#)

List of relevant costs established in application of article D. 99–24 of the Post and Telecommunications Code

According to article D. 99–24 of the Post and Telecommunications Code, "*The Telecommunications Regulation Authority shall determine and will publish the list of the relevant costs*" of access to the local loop.

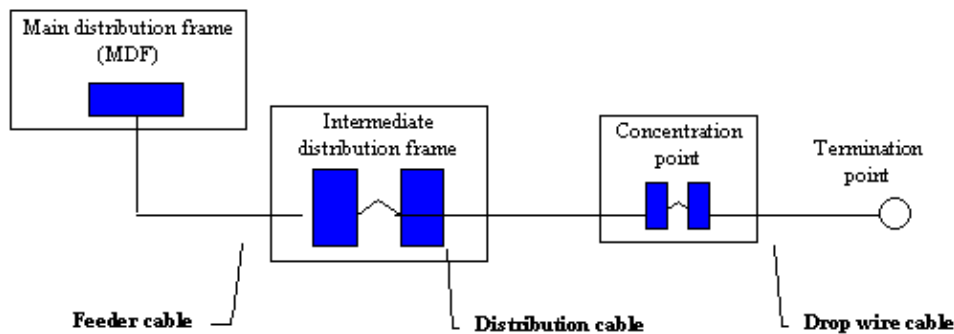
According to article D. 99–23 of the Code, "*Access to the local loop is defined (...) :*

– *either by making available the part of the network referred to above i.e. the metallic part (full unbundling to the local loop)*

– *or by making available non vocal frequencies on such part of the network (shared access to the local loop)*".

It "*also includes associated services, notably the supply of information necessary for the implementation of access to the local loop, an offer of co-location of equipment and an offer enabling the connection of the equipment to the networks of the entities requesting access*".

I – Description of France Telecom's local network



II – List of relevant costs

a) The costs of full unbundled access

Full unbundled access includes the following:

- infrastructure usage costs
- the costs of providing the copper pair
- the costs of locating disturbances

i. Infrastructure usage costs

The infrastructures include civil engineering elements (buried or above ground), feeder and distribution cables, and distribution points: main distribution frame (MDF), intermediate distribution frame, concentration point.

These costs include:

- investment costs for the infrastructure elements being considered (digging trenches, installing equipment and laying cable); these costs are determined by calculating their replacement cost. They are annualised by calculating depreciation
- operation and maintenance costs for these infrastructures (e.g.: replacement of worn cables, maintenance of distribution points)

ii. Providing the copper pair

These non-recurring costs include:

- the costs for order administration excluding adaptation of the information system
- costs for technical operations for providing and attaching cross connects and, depending on the case, either providing an existing copper pair or building and delivering a copper pair from end to end. They include drop wire costs when appropriate (including, depending on the case, provision of the internal end termination).

iii. Locating disturbances

These are costs for locating disturbances (receiving calls, handling calls and diagnostics, re-establishing the line) excluding adaptation of the information system. These costs are non-recurring, although they may be

charged on a recurring basis depending on disturbance frequency.

b) The costs of shared access

In shared access, pairs are never built—even partially. The list of relevant costs of shared access is as follows.

i. Infrastructure usage costs

In shared access, this cost, defined in subpoint *i* of a) above is a common cost for access to the local loop and France Telecom's public telephone service.

ii. Costs of providing non-voice frequencies

These non-recurring costs include:

- costs for order administration, excluding adaptation of the information system
- costs for technical operations for providing and attaching cross connects and for providing the non-voice frequencies

iii. Costs related to disturbance location

These are the costs of locating disturbances (call reception, diagnostics and line re-establishment) excluding adaptation of the information system. These costs are non-recurring. However, they may be charged on a recurring basis depending on disturbance frequency.

iv. Technical costs specific to shared access

These are the costs of providing, installing and maintaining racks, pre-equipped with splitters, between France Telecom's MDF and the tie cable to the operator's distribution frame.

c) Costs related to providing information required to implement local loop access

Two types of information are needed to implement access to the local loop:

- "prior" information on the local loop network (site addresses and MDF coverage zones)
- information specific to a pair

These are administrative costs. They are non recurring.

d) Co-location service costs

These are non-recurring costs for:

- setting up premises to host third-party operators (excluding electrical power, air conditioning and telecommunications equipment), including secure access and the provision of badges
- installing electrical power, air conditioning and telecommunications equipment

- providing and installing the operator's copper distribution frame and the operator's optical distribution frame
- providing and laying a tie cable between the France Telecom main distribution frame (MDF) and the operator's copper distribution frame, for physical co-location
- pulling and connecting tie cables for distant co-location
- providing and laying a tie cable between the France Telecom optical distribution frame and the operator's optical distribution frame
- providing and installing mounting blocks

And recurring costs for:

- depending on the case, operating and maintaining the element listed above
- usage of surface area occupied by the third-party operators, including maintenance
- providing power for third-party operators

In some cases, some of these costs might not be incurred by France Telecom (e.g. equipment provision costs when the equipment is provided by the operator).

e) Costs related to the equipment-to-network connection service for operators requesting access (excluding distant co-location)

These are usage costs for the infrastructure set up by France Telecom to connect equipment to networks for operators requesting access (chamber 0, duct to chamber 0, penetration into chamber 0).

f) Other relevant costs

- i. The costs of creating applications specific to access to the local loop and the costs of adapting existing information systems

In order to provide an unbundling offer, France Telecom needs to develop computer applications specific to access to the local loop and adapt its existing computer applications.

These adaptation costs are, by nature, non recurring.

- ii. The costs of the France Telecom entities responsible for putting in place access to the local loop

These are the costs of these entities.

N.B.

: for items i and ii above, France Telecom must avoid double accounting which might occur if these costs are included in usage costs.

- iii. The costs of invoicing access to the local loop

France Telecom will invoice all local loop access services. These costs are relevant and can therefore be recovered by France Telecom through the tariffs for access to the local loop.

iv. Shared costs

The fifth paragraph of article D.99–24 states "*The tariffs shall include an equitable contribution to the common costs both for the access to the local loop and for the other services of the operator*".

The common costs in shared access for the use of infrastructure defined in b) i, are excluded.

III – Rules of relevance

The purpose of these rules is simply to determine the costs that the operator can legitimately recover through local loop access tariffs, without pre-determining the exact way in which they will be recovered.

a) The costs of full unbundled access

These costs must be recovered in their entirety by France Telecom through local loop access tariffs.

If a customer cancels the service it received from another operator in order to return to France Telecom, the costs France Telecom incurs to retrieve the customer are at its own expense.

b) The costs of shared access

The costs of infrastructure usage are common to the France Telecom telephone service and shared access to the local loop. This is valid for the network elements effectively used by both services.

Economically, this cost is to be recovered through a contribution from each of these two services. Article D. 99–24 of the Code states that this contribution must be equitable.

At this stage, ART considers that:

- it might be advisable that high-speed services not be assigned such a contribution during roll-out
- this contribution must apply to France Telecom's Netissimo offer, at the very least

The other costs must be recovered in their entirety by France Telecom through tariffs for access to the local loop.

If a client cancels the service it received from another operator in order to return to France Telecom, the costs France Telecom incurs to retrieve the customer are at its own expense.

c) Costs related to providing information required to implement access to the local loop

These costs must be recovered in their entirety by France Telecom through local loop access tariffs.

d) Costs related to the co-location service

These costs must be recovered in their entirety by France Telecom through local loop access tariffs.

e) Costs related to the interconnection service for operator equipment to networks

These costs can be recovered in their entirety by France Telecom through local loop access tariffs.

f) Other relevant costs

The characteristics of several cost items are such that they cannot be directly charged for at a certain tariff.

- adaptation costs incurred by France Telecom
- costs of the France Telecom entities responsible for putting in place access to the local loop
- invoicing costs
- costs common to several local loop access services or common to access to the local loop and to other France Telecom services

Adaptation costs

The costs of creating specific applications for access to the local loop and of adapting existing information systems are relevant in themselves and must therefore be recovered by France Telecom through the tariffs for access to the local loop.

France Telecom must avoid double accounting which might result if these costs are included in information system usage costs. This is why, since provisions clearly eliminating the risk of double accounts do not exist, the adaptation costs of existing computer applications will be allocated to all uses of these applications.

Costs of the France Telecom entities responsible for putting in place access to the local loop

These costs must be recovered in their entirety by France Telecom through local loop access tariffs.

Invoicing costs

France Telecom will invoice all local loop access services. These costs are relevant and must therefore be recovered by France Telecom through tariffs for access to the local loop.

Shared costs

The fifth paragraph of article D. 99–24 states that "*The tariffs shall include an equitable contribution to the common costs both for the access to the local loop and for the other services of the operator*".

[Annex II to decision n° 00–1171 of the Autorité de Régulation des Télécommunications dated 31 October 2000](#)

Calculation method for long run average incremental costs (LRAIC) for access to the local loop defined in application of article D.99–24 of the Post and Telecommunications Code

Article D. 99–24 of the Post and Telecommunications Code stipulates "*The network elements shall be valued on the basis of their long run average incremental cost*".

I – The long run average incremental cost (LRAIC)

I – 1. Definition

The *incremental* cost method aims to determine the additional costs incurred for producing a service with respect to the costs already incurred by producing a portfolio of other services. In a way, the incremental costs of a service or element *A* represent cost savings from not producing or implementing *A*, or in other terms, the costs incurred for producing *A* in addition to the portfolio of existing products. In this sense, incremental costs are similar to marginal cost, except that the marginal cost is those costs needed to produce an additional small amount of a product which has already been produced.

The concept of *long run* involves taking the costs in a long-term perspective, i.e. also considering the investment costs required by the service or element. The aim is to make the fixed costs of production or implementation as "variable" as possible. This means that the long run incremental costs of service or element *A* represent all the costs which could be avoided if *A* had not been produced or implemented. Therefore, incremental costs include all costs which can be directly attributed to *A*, whether variable (depending on the level of production) or fixed (part of capacity): because fixed costs directly attributable to *A* are included, the incremental costs are qualified as being *average*.

However, *A* can also require elements, services or functions which are also required by other services or elements. The incremental costs, even though long run, in their strictest sense, do not include common or joint costs, depending on whether they apply to a subset of a firm's production or concern its entire production. Economists use incremental costs as a criterion for determining whether to produce *A*: if expected returns from offering *A* are greater than long run incremental costs in a ratio covering the expected capital cost, then the company should launch production of *A*.

Still, incremental costs—as defined in their strictest sense—cannot really be used to price access to the service or element because they cover only part of the costs. If *A* also uses other "costs", these also need to be taken into consideration, as long as a causal relationship exists, i.e. that *A* could not be produced without the services, elements or functions causing the costs. Therefore, relevant joint and common costs should be allocated according to allocation methods which must be defined. Article D. 99–24 of the Post and Telecommunications Code also states that "*The tariffs shall include an equitable contribution to the common costs both for the access to the local loop and for the other services of the operator*" and it considers "*network elements*" as the basis of the costs.

Finally, ART considers that the concept of long run necessarily refers to an evaluation of costs on the basis of so-called "forward-looking" or "current" costs, i.e. the costs which would be incurred if the production plant were rebuilt at the time of calculation.

I – 2. Implementation

Thus, LRAIC is the fruit of a model and therefore, from a series of chosen factors (technology, architecture, capacity, price) which are independent of the company's accounts. In principle, all these factors are used when seeking the most efficient solution. In practice, the choices are successive:

- *technology*: a good starting point is the technology used by the operator because we can expect that the operator will choose—at least for its recent investments—the most suitable technology. Even if the activity for which this technology will be used is in a quasi-monopolistic position, we can expect that the operator will make efficient choices in this activity as long as there is sufficient competitive pressure on all its other activities
- *architecture and capacities*: the network architecture of the regulated operator as well as the installed capacity are a good starting point. This ensures a certain degree of realism guaranteeing that the modelled network is compatible with production

- *price*: the players (suppliers, operators) may not wish to reveal their actual prices to the regulator; therefore, the prices observed by the regulated operator in recent operations may provide a good estimate

Still, the operator cannot always choose the very best technology: e.g., it must also take into account the presence of older technologies in its network, which might need to be compatible, or the operator may require operating or engineering rules which take its history into account. The same is true for architecture and capacity where, again, the choices made by the company, even the most recent, may be influenced by its history. Finally, as regards price, it is important to pay close attention to the conditions of their observation by asking oneself whether the context (volume effect) or content (e.g., whether services or non relevant rules are included in the price) of the operations observed are comparable to those to be modelled.

This is why the LRAIC method must be implemented using two types of model:

- a top–down model provided by the incumbent operator. This is based on its current network and uses cost accounting data. However, it values the equipment using a current cost method and includes the predictable network upgrades adapting it according to pre–determined hypotheses.
- a bottom–up model: this technical–economic model imagines an optimised network which an operator could build using the best available technology to meet the same request as the incumbent operator and to evaluate its cost. The equipment is evaluated at its current costs.

The top–down and bottom–up models are both based on hypotheses which make them similar despite their different methodology. This means that the results of both models can be reconciled as long as suitable common conventions are defined first.

The European Commission recommends this method. It is based on the observation that a bottom–up model best meets the principle of efficiency in the long term, as being less dependent on choices made by the operator and closer to the best practices on the market. Nevertheless, this type of model is not robust enough to be used alone. By comparing the two approaches, we get realistic results thanks to elements of the top–down model, which are less satisfactory in theory but closer to the real historical experience.

I – 3. Valuing investments

A classic formula links an asset's depreciation expense to its net value:

In this formula:

- K_t is the (net) value of the asset at time t
- a is the rate of return on capital
- A_t is the depreciation expense, i.e. the normal remuneration for the use of the asset between $t-1$ and t

We check that this depreciation expense A_t , which should be paid at the end of the period $[t-1, t]$, increased by the value at the end of the period, K_t , is equal to the actualised value of the asset's value at the start of the period.

In other words, $A_t = K_t - K_{t-1} + aK_{t-1}$, the depreciation expense shows two terms: the first corresponding to the return on the fixed capital; the second corresponding to its depreciation.

Thus, the valuation of the remuneration for the use of this asset is linked to that of the net value of the asset, and to the method used for this valuation.

Several methods can be used to establish an asset's value.

The accounting method

An asset, with purchase cost I_o and accounting lifetime T , is generally valued in the company's accounts according to the formula:

However, this method does not have a true economic basis: it simply reflects the accounting conventions adopted by the company, even if this economic valuation must, in principle, reflect an economic valuation of the asset.

The replacement cost method

The value K^t of an asset aged n years, with lifetime d ($n < d$) at date t , is based on the fact that by owning it, the owner can put off investing in a new equivalent asset. Therefore, this value is equal to the difference between:

- the actualised cost of the "new" line: where it is necessary to invest at date t , then renew the investment with an equivalent asset every d years
- the actualised cost of the "maintained" line: the asset is kept for a period equal to its residual lifetime, i.e. for $(d-n)$ years, the equipment then being renewed every d years

This method can use a *technical progress rate* g which takes into account price decreases which can be observed, or predicted, over time for the acquisition of the same asset. By "same asset", we mean an asset which provides the same services (same production capacity, same operation and maintenance functions).

Thus, an asset purchased new I_o at time $t = 0$, at time t is supposed to cost new:

This method supposes, in addition to the use of discount rate a , the evaluation of a technical progress rate g , the definition of a lifetime d , the determination of the age of each asset and that of its residual lifetime.

In fact, the value of the depreciation expense A^t does not depend on the age of the asset in question.

Thus, using this method, the value of the depreciation expense for one year can be established by considering the value of the new asset at the beginning of the year, and a residual value at the end of the year determined by the replacement cost method.

The only difference between the two methods is the distribution between the return on capital and depreciation. When we consider the effective age of the assets, using the replacement cost method, we determine their "current" value. When we consider a complete renewal of the network, we establish a "new" value (as well as a resale value at the end of the year). The "new" value is greater than the "current" value and generates a greater return on capital. Conversely, depreciation is lower.

II – The model used by France Telecom

The cost of network elements is the sum of two terms:

- the investment cost: this includes the cost of equipment but can also include operating costs for bringing the equipment on line
- the operating cost of infrastructures, excluding operating costs included in the investment cost

II – 1. Investment costs

France Telecom has developed a top–down model to determine the costs of capital for access to the bare copper pair (excluding drop wire).

The France Telecom model covers 12 network elements:

- 3 civil engineering elements: ducts, above ground and buried
- 6 cable elements: ducted cables, above ground and buried, distinguishing between distribution and feeder
- 3 distribution elements: main distribution frames, intermediate distribution frames and concentration points

For each of these 12 network elements, France Telecom has defined network components, measured or calculated a volume of network components on the perimeter of its network as well as a unit investment, as shown in the table below.

Investment item	Network component	Volume of network components	Investment costs		
			Unit	Mass	Annual
Ducts civil engineering	Artery length				
Buried civil engineering	Artery length				
Above ground civil engineering	Number of poles				
Total civil engineering					
Ducted distribution cable	Number of pairs km				
Buried distribution cable	Number of pairs km				
Above ground distribution cable	Number of pairs km				
Ducted feeder cable	Number of pairs km				
Buried feeder cable	Number of pairs km				
Above ground feeder cable	Number of pairs km				
Total cables					
Concentration points	Number				
Intermediate distribution frames	Number				
Distribution frames	Number				

Total distribution frames					
Total					
	<i>Total number of lines in service</i>				
	<i>Total annual cost per line</i>				

The *volumes of network components* equals all of France Telecom's installed components.

The *unit investment cost* considered is that of the best available technology, defined as the cheapest technology currently available in the manufacturers' and service providers' catalogues. The model takes into account the fact that third parties sometimes return civil engineering to France Telecom at no charge.

The *mass investment cost* is obtained by applying the unit investment cost to the volume of network components.

The *annual investment cost* is equal to the first depreciation expense, calculated using the replacement cost method, corresponding to the total investment cost. This calculation uses the discount rate, a technical progress rate and a depreciation period specific to each investment item.

The total of all investment items of annual investment costs is applied to all pairs carrying a telecommunications service (whether analogue or digital) in order to obtain a total unit cost per pair. Therefore, for each network element, the model includes reserve capacity.

II – 2. Operating costs

These do not have an LRAIC model but are taken from costs in France Telecom's accounts.

III – The calculation method for long run average incremental costs (LRAIC) defined by ART

In unbundling, and given France Telecom's obligation to publish tariffs by 1st December 2000, ART has chosen for 2001 a method based on the France Telecom model, that is, a top-down model established using France Telecom's existing network architecture and where investment costs are evaluated using the replacement cost method and operating costs are taken from accounting.

ART considers that in the future, the LRAIC methodology must be "unified", i.e. be applied to both investment costs and operating costs.

ART also feels that, in the future, it would be appropriate to combine the top-down and bottom-up approaches, to set the tariffs for access to the copper pair starting 2002. As a result, these tariffs will have to be set by bringing together the two models: France Telecom's top-down model and a bottom-up model developed by ART.

III – 1. The network element model

The chosen model includes twelve network elements:

- three civil engineering elements: ducts, above ground and buried
- six cable elements: ducted cables, above ground and buried, distinguishing between distribution and feeder

- three distribution elements: main distribution frames, intermediate distribution frames and concentration points

III – 2. Model parameters

The increment

The increment is France Telecom's entire copper pair network, regardless of the service they carry: the leased link access part, analogue subscriber lines, digital subscriber lines.

This choice limits the number of joint costs: in principle, these appear only for ducts and above-ground civil engineering. The civil engineering ducted arteries are shared with cable networks, optical networks, as well as with the general network.

Equipment lifetime

The term lifetime can have several possible meanings:

- accounting lifetime: this is, for a given asset category, the lifetime chosen by the company to depreciate this asset category in its accounts
- real lifetime: this is the time, whether observed or expected, during which the asset is actually used
- economic lifetime: this is the optimum renewal period for an asset when we take into account the increase in operating costs for the asset; indeed it may appear preferable to renew the asset early to minimise operating costs and usage costs

In a replacement cost method which does not include changing operating costs, the lifetime is an exogenous parameter which must be the real lifetime of the asset.

The technical progress rate

The technical progress rate is not the same for all types of equipment: cables, civil engineering and distribution points. To evaluate the technical progress rate, we need econometric studies in order to establish series of historical prices with constant functions.

Given the difficulties in establishing an incontestable valuation of this parameter and of the stable character of the technologies implemented, ART has chosen a technical progress rate of zero for investment items for 2001.

The discount rate (or return on capital)

For 2001, ART has chosen a return on capital of 12.1%. This value is obtained using a weighted average cost of capital method (cost of the debt, cost of shareholders equity) and using an evaluation of the cost of shareholders' equity involving measuring the risk differential between the activity in question and the entire equity market.