

## THE ELEMENTS OF "COST" FOR LEASED LINES

### Talk to EC Sector Inquiry on the Competitive Provision of Leased Lines in EU Telecoms Market, Brussels 22 September, 2000

#### 1. Definitions

---

Leased lines services can be defined to include:

- provision of dedicated transmission services
- lease of transmission capacity and provision of related services
- Indefeasible Right of Use (IRU)
- Retail or Wholesale
- Terminating segment/part leased line/ tail end/ local end
- Partial Private Circuit (PPC)
- Partial Baseband Leased Circuit (PBLC)
- Own exchange circuits
- etc. etc.

---

*Europe Economics*

I will begin this short talk by discussing different possible definitions of leased lines that bear significantly on cost. I will then suggest what the main elements of cost for leased lines are, recalling the reasons for measuring cost and the main relevant cost concepts. Finally, I will say a few words about our work in modelling and estimating these costs.

To save time, I will sometimes omit qualifications and subtleties which would be appropriate in a fuller treatment of this subject.

#### 1. DEFINITIONS

First let us define our terms. The Commission Recommendations of last November state that "Leased line services consist in the provision of dedicated transmission circuits to users allowing them for example to establish high capacity private networks or to be permanently connected to Internet Service Providers".<sup>1</sup> In the Phoenix/Global One decision, cited in the Working Document published this month, the Commission stated that the leased lines market "comprises the lease of transmission capacity and the provision of related services to third party telecommunications traffic carriers and service providers...".<sup>2</sup> The same document notes that a distinction has been drawn between wholesale and retail leased lines, and that "leased line offerings vary greatly among different Member States and different routes depending on network architecture and the

---

<sup>1</sup> Commission Recommendation on Leased Lines interconnection pricing in a liberalised telecommunications market (provisional text), Brussels, 24 November 1999, footnote 2.

<sup>2</sup> EC Directorate-General-Competition Working Document on the Initial Results of the Leased Lines Sector Inquiry, Brussels, 8 September, 2000 page 6.

availability of alternative infrastructure". Moreover, leased line capacity may be offered not only for lease, but for purchase as an "Indefeasible Right of Use" (IRU).<sup>3</sup>

In the UK, OFTEL's Consultation Document, published last month, draws further important distinctions including between wholesale trunk segments (the provisions of capacity within an operator's trunk network) and wholesale terminating segments (provision of capacity from a customer's premises to an operator's trunk network).<sup>4</sup> The "terminating segment" is also referred to by the Commission as a "part leased line", and by others as a "tail end", or "local end". One important type of terminating segment is a Partial Baseband Leased Circuit (PBLC) which consists of a copper link extending from the customer's premises to the local exchange; this part of the network is also known as the "local loop".<sup>5</sup> A "Partial Private Circuit" (PPC) is a term used to refer to one local end and part of a main link (rather than an end to end leased line).<sup>6</sup>

"Own exchange circuits" are retail leased lines which do not have a "main link", as they do not use the conveyance network.<sup>7</sup> They are in effect two local ends. A "trunk segment" by contrast is capacity between the serving centres for leased lines located at trunk exchanges.<sup>8</sup>

Leased lines are of course also defined in terms of capacity, length, and number of end users connected (offering in some ways a similar service to a virtual private network where there are a number of users); and according to whether they are analogue or digital; and according to the technology used. They may be real, or "virtual".

The standards of reliability and quality of service also define different offerings; and like all the other differences brought out by the definitions recalled in the last few minutes, have substantial implications for likely costs. Neither cost nor price can be defined in real terms without also specifying quality.

In summary leased lines can be defined according to type of customer; to points of interconnection; to standards; to suitability for different types of traffic; and to technology used to supply them. They can be bought as well as leased. Almost all they have in common is an apparently guaranteed level of availability and that they are paid for by the time available rather than per call minute or the volume of data transmitted.

## 2. MAIN ELEMENTS OF COST FOR LEASED LINES

Let us now turn to review the main likely elements of cost for leased lines, always remembering that the large number of different definitions implies that the elements of cost which are important will vary from case to case. The elements of cost may include:

---

<sup>3</sup> Ibid, page 8

<sup>4</sup> OFTEL consultation document: National Leased Lines: Effective competition review and policy options, August 2000, page 2.

<sup>5</sup> OFTEL Access to Bandwidth, November 1999, para 4.2

<sup>6</sup> Ibid, para 3.67

<sup>7</sup> OFTEL consultation document: National Leased Lines: Effective competition review and policy options, August 2000 para 1.9

<sup>8</sup> Ibid, para 3.31 and Figure 2.

## 2. Main Elements of Cost for Leased Lines

---

- Installation costs, including co-location
- Copper
- Fibre
- Wireless
- Multiplexers
- Cross connects
- Signalling equipment
- Regenerators
- Electronic equipment in access network specific to high bandwidth leased lines
- Duct
- Overhead capital costs
- Network operating cost
- Retail costs
- ROCE

---

*Europe Economics*

Only four of these – items 1,2,11 & 15 - are peculiar to be leased lines; and even here there may be exceptions. Mostly, costs are shared with other services.

In general, costs arising in the access network are determined by the number of subscribers, whilst costs arising in the core network depend on capacity needed.

**Installation costs** vary a great deal from case to case, and are one-off; it does not follow that they should be recovered in an initial charge. An alternative is to add them to the rental charge so that they are recovered over the life of the average contract.

**Co-location costs** also vary, and can provide food for argument; the economic principle is that the cost which an efficient incumbent would incur in providing co-location facilities to a wholesale customer should be charged to that customer. (If more than one wholesale customer would be willing to pay that price, for a particular space, there should perhaps be an auction.)

**Copper or fibre or wireless** costs are incremental costs of this kind resulting from the provision of the service. Fibre and wireless costs arise in both the core and access networks, albeit for different purposes. Where the leased line service uses excess spare capacity, that cost, should be allocated between the services (more in this in a few minutes).

**Multiplexers** (varying between those for SDH and those for PDH), **cross connects**, **signalling equipment** and **regenerators** are relevant costs in the core network.

**Electronic equipment in the access network specific for the service** is likely to relate mainly to the leased lines with large data capacity (in the UK, BT's kilostream and megastream services are examples).

**Duct** is almost always likely to be a shared cost, between leased lines and other services. It is a major cost element.

**Overhead capital costs (direct and indirect)** and **network operating costs** are significant items which also need to be allocated between customers.

All **capital equipment employed** needs to be appropriately depreciated, to estimate the annual cost, and the appropriate **return on capital employed** needs to be included as a cost.

Note that I have not included "loss of profit" as a cost: it raises different kinds of issues.

### 3. REASONS FOR BEING INTERESTED, AND MAIN COST CONCEPTS INVOLVED

Let us at this stage recall the public policy reason for being interested in the costs, standards, and availability of leased lines. The economic reason is that if they are provided by a monopolist or near monopolist, and are therefore to be subject to price control and other regulation, the regulator should be aiming to set charges and standards so as to approximate to the likely level of prices and service which would obtain if the market were competitive; and such prices would reflect costs (somehow defined). The legal reason, reflecting this, is the requirement under the relevant Directives that tariffs charged by an operator with significant market power should follow the principles of cost orientation non-discrimination and transparency.

The main concepts of "cost" which are relevant to these objectives, given the nature of leased line provision, are essentially as shown on the next slide:

#### 3. Cost Concepts

---

Cost concepts include:

- Historic accounting cost
- Common or shared cost
- Opportunity or avoidable cost
- Incremental cost
- Total Service Long Run Average Incremental Cost
- LRIC +

---

*Europe Economics*

**Historic accounting cost concepts** are relevant only as a check on estimates of forward looking opportunity costs, and as a source of estimates of the amount which an incumbent may stand to lose if its infrastructure is made redundant by the advent of competition ("stranded costs" or "stranded assets").

**Common or shared costs** are hugely important since (as already emphasised) many of the assets used to provide leased line services are also used to provide other (PSTN and data) services.

**Opportunity costs** or **avoidable costs** are the resources consumed in the provision of a service: these are the costs to which prices should be orientated, if we wish regulated prices and service standards to approximate those which would result from competition.

**Incremental cost:** the change in opportunity cost resulting from a change in supply, from a defined base.

**Total service long run average incremental cost** is the cost which would be avoided if the service in which we are interested – which might be leased line services as a whole, or terminating segments, or any other particular sub-set of the whole – were withdrawn. This cost, averaged over the number of customers or volume of output (suitably defined), implies the average price at which the service would be viable (ie including normal profitability). It is therefore of central interest in the present context.

**LRIC plus** is LRIC plus an appropriate share of common costs.

## 5. MODEL

Finally, a few words about our recent work in estimating and modelling the cost of leased lines, in a scoping study for ODTR, then in a substantive exercise with OFTEL (described in the consultation document which has just been published).

The model is "bottom-up" rather than "top-down"; meaning that in principle it estimates the costs which would be incurred by an efficient operator using modern techniques rather than attempting to deduce from the incumbent's accounts what its actual expenses have been. It assumes a "modified scorched node" constraint, rather than unconstrained greenfield "scorched earth" approach, partly to avoid excessive confrontation with BT's actual network costs and partly because the engineering resource which will be needed to advise on a fully specified – town by town – network would seem disproportionate. It also calculates costs on a mix of equipment similar to that of the actual operator.

In defining 'increment', three alternatives are among those modelled:

- (1) Leased line service as a whole, as an increment to the existing PSTN, and all other services. Some may see this as the purest form of LRIC estimation; it measures only those costs which would be saved if the leased line service were withdrawn but all other services were maintained.
- (2) Leased line service as standalone service, needing to bear all the costs of providing duct, medium, electronics etc that are needed for the leased line service (and which in fact also provide other services). This cost estimate would provide a ceiling above which the incumbent's charges should not be allowed to go.
- (3) Leased lines together with PSTN and data services. This definition of the increment has the effect of including costs common to each service, which must therefore be shared in some way between the services.

In all cases, the assumption was that the costs measured would be those of an efficient operator, using modern technology. This assumption reflects the premise that we are seeking to estimate efficient/competitive prices.

#### **4. Model: Indicative Results for the UK include**

---

|               |          | <u>Cost Ratio</u> |
|---------------|----------|-------------------|
| Alternative 1 | (LRIC)   | 100               |
| Alternative 2 | (SAC)    | 950               |
| Alternative 3 | (LRIC +) | 190               |

---

*Europe Economics*

As you would expect, the results showed costs under definition (1) – the incremental leased lines bearing none of the common costs with other services – yielded by far the lowest estimate. Alternative (2), the stand alone costs, were of course high, while the third option produced estimates much closer to the first. Detailed numbers would be out of place, but if the LRIC estimate – alternative 1 as calculated for the UK were 100, alternative 2 (stand alone costs) would be 950, and alternative 3 would be 190.<sup>9</sup> These results underline the importance of treating common or shared costs appropriately; alternative 3 corresponds to what OFTEL call 'LRIC +' is LRIC plus a mark-up to cover the appropriate share of common costs.

In estimating the costs of terminating segments, or any other sub-set of leased lines coming into the centre of regulatory attention, it is also necessary to decide the basis on which costs common to leased lines as a whole should be allocated to the terminating segments: as far as possible (as with all issues concerning allocation of common costs) the principles of cost causation should be followed.

#### **CONCLUSION**

In conclusion, I would emphasise the need to recognise that the elements of cost vary considerably according to the definition of leased line being used; and the need to base estimates of cost on a forward looking 'LRIC +' methodology. I have also referred to the importance of availability and quality as well as of price; we are interested in real costs and prices, and quality is fundamental to that definition.

\\EER01\DOCUMENTS\Articles & Speeches\Speeches\DRG\Brussels Leased Lines 22 Sep 00\Speech after.doc\24-Oct-00\16:48

---

<sup>9</sup> OFTEL Consultation Document, Annex F Table 1