NOTICE 247 OF 2005

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA (ICASA)

NOTICE PROVIDING CLARIFICATION TO NOTICE 246 OF 2005 GOVERNMENT GAZETTE NO 27284 PUBLISHED 18 FEBRUARY 2005 ("THE NOTICE") INVITING COMMENTS ON THE REVIEW OF TELKOM'S PRICE CONTROL UNDER SECTION 96 (4), READ WITH SECTION 45, OF THE TELECOMMUNICATIONS ACT NO. 103 OF 1996, AS AMENDED.

With reference to the above notice as published on 09 February 2005, the Authority has decided to disclose further details about the modeling framework used to determine the value of X in the draft PSTS price review.

ICASA believes in the interest of transparency and good regulatory practice that these details are made public whenever possible. ICASA has decided therefore to publish this short note, which provides further details about the methodology used to calculate X.

ICASA Price control model

1. This document consolidates the previous documentation (see Annexes 1 and 2) made available by ICASA on the model (now termed the 'Old Model') used in the review of Telkom's price control. The document also provides information on revisions affecting the ICASA Price Control model (now termed the 'New Model').

2. Following the initial consultation and taking account of comments submitted by interested parties, ICASA has reformulated the price control model, amended some key assumptions, and constructed a New Model. The methodology used in the New Model is equivalent to that used in the Old Model which was previously explained by ICASA.

3. **ICASA** highlights key changes between the Old Model and the New Model in the points below.

4. The GDP forecast used in the New Model is based on **statistics** produced by Statistics South **Africa** ("Stats **SA").** The New Model incorporates a real GDP growth forecast of 3.5% pa over the period 2005-08, whereas in the Old Model the forecast assumed a growth rate over the same period of 3.0% pa. The figure 3.5% pa is calculated by taking the average annualised changes in real GDP as reported by Stats **SA** over the period 2000 quarter **1** through to **2004** quarter **3. ICASA** views this period to be reflective of the business cycle. Independent forecasts of GDP closely correlate with this figure. The effect of assuming a higher value for GDP growth would tend to increase the value of **X** computed in the **ICASA** model.

5. In the New Model, residential access demand grows at **0.4%** pa, substantially below the figure of 3% used in the Old Model. **ICASA** agrees with Telkom that residential demand for access lines **is** unlikely to grow much over the period 2005-08. Similarly demand for business access lines is assumed to grow at **1.7%** in the New Model, down substantially from **5.6%** in the Old Model. The changes in these assumptions would tend to lower the value of **X** in the **ICASA** model.

6. In the Old Model it was assumed Telkom's productivity over the period 2005-08 would **be** 4.5% pa. In the New Model the productivity growth assumption is lower at **3.75%.** Telkom in its submitted comments claim that "reduced prospects for growth with diminished opportunities for cost reduction makes the environment significantly more challenging for cost reductions". It is noted that while Telkom has disputed the productivity estimates made by **ICASA,** at no stage during the price review process has Telkom furnished **ICASA** with its **own** estimates.

7. ICASA has been guided to the figure of 3.75% pa for productivity growth by two sources.

8. First, the World Bank Regulation Handbook states that "it appears that in the long-term productivity growth of the communications industry in the Developing Countries has been about 2% to 2.5% higher than productivity growth of the respective economies". [1] ICASA believes that this observation is highly likely to occur in South Africa. Given the ongoing innovations occurring in the telecommunications sector, ICASA has taken the average of these two figures, that is 2.25%.

9. Second, Telkom made a number of statements in their June 2004 filing (Form 20-F) to the SEC that suggest strongly that it will continue to improve the efficiency of the fixed line business:

"We will seek to increase operational and capital expenditure efficiencies to improve operating margins and increase cash flows in our fixed-line business. We intend to continue to streamline and improve our business operations through the following strategies:

• *Continue to reduce headcount.* We will continue to reduce headcount by utilizing voluntary severance and retirement packages, natural attrition and other employee optimization initiatives. In the 2004 financial year, Telkom employees declined *8.5%* to 32,358 and our number of fixed lines per fixed-line employee increased to 149 as of March 31, 2004.

• *Continue to reduce operating expenses*. We will seek to continue implementing a strict cost management policy and further operating expense reduction initiatives. In the 2004 financial year, our cost-saving program in our fixed-line business contributed to an approximate 3.5% decrease in total fixed-line operating expenses, while materials and maintenance expenses declined approximately 16.0% as we realized

[1] pp. 4-20 *op. cit.*

benefits from our network investment and saw fault rates and losses in respect of cable theft decrease. Our current initiatives include cable alarm systems, enhanced fraud management, consolidation of stores, space optimization and continual reduction of our vehicle fleet."[2]

"We intend to continue to reduce our fixed-line headcount over the next few years."[3]

10. ICASA believes that Telkom's statements are strongly indicative of a company that expects to maintain healthy rates of productivity growth. It seems reasonable therefore to suppose that Telkom's productivity growth will exceed growth in total factor productivity by 2.25% over the period 2005-08.

11. According to Professor Ben Smit, Director of the Bureau of Economic Research[4], total factor productivity in the South African economy is expected to grow at 1.5% p.a. over the period 2005-08.[5] Therefore ICASA believes that Telkom's productivity will grow at 3.75% i.e. (1.5% + 2.25%) pa over the period 2005-08.

12. A number of further refinements were made by ICASA in producing the New Model. The most significant of these refinements involved the removal of a modelling assumption used in the Old Model that required each service line to break-even by 2008. This assumption was invoked because it meant that Telkom's fixed line business would by definition break-even in 20086 However, there is no reason to believe that Telkom

[2] Page 41, Form-20F, submitted to the SEC by Telkom, June 2004.
[3] Page 112, Form-20F, submitted to the SEC by Telkom, June 2004.
[4] Homepage http://www.ber.sun.ac.za/.
[5] The forecast of 1.5%p.a. total factor productivity is taken from Table 3 in "The South African Economy: A 10 Year View", presented by Professor Ben Smit, presented 18 November 2004. This forecast is also used by the IMF in "IMF: South Africa: Selected Issues", *IMF Country Report*, June 2004, p12.
[6] As the model incorporates a weighted average cost of capital (WACC), the break-even requirement is compatible with Telkom earning a normal return. By imposing a break-even requirement at the end of the price control period, ICASA is able to determine a value of X that ensures this requirement is met.

would wish to select tariffs for each line of service such that each service on a stand-alone basis would break-even. Indeed, there is good reason to expect the continuation of access deficits, albeit at a declining rate, on the access products.

13. As a result of the change to the break-even requirement assumption on a per service basis, the tariffs that could be set by Telkom in the model allow for greater flexibility. Mathematically the effect of this is benign, and as a result Telkom can achieve higher rates of performance in the New Model. However, the calculation of X in the model still requires that Telkom break-even as a whole in 2008. However, over the price control period as a whole 2005-08 Telkom should make a positive profit. The latter is important as this provides a strong incentive for Telkom to continue to improve its business and is one of the cornerstones of incentive based regulation.

14. ICASA believes that the changes made to the way in which prices are calculated strengthens the credibility of the price review model.

15. As a result of the changes made to the model, the New Model computes a value of X equal to 3.72%, which is lower than that produced in the Old Model.

16. Another way to compute the value of X, is to use an approach suggested by the World Bank Regulation Handbook.?States that the value of X can be calculated by using the following formula:

the regulated firm's productivity LESS *the* economy's total *factor productivity* PLUS *Producer* price inflation LESS *Input* price inflation *for the* telecommunications *sector*

[7] See *Telecommunications Regulation Handbook* Module 4 'Price Regulation' pp. 4-20, World Bank November 2000.

17. The World Bank Regulation Handbook further states that "The long-term historical input price differential **(IPD)** between the telecommunications sector and the economy is generally positive, but smaller than 1%".[8] ICASA therefore assumes that over the period 2005-08 the **IPD** will average around ***0.5%.***

18. Calculating X by using the above formula yields the following:

the regulated firm's productivity (3.75%) **LESS** ***the economy's total factor productivity*** (1.**5%) PLUS** *Input Price Differential* **(0.5%) =** 2.75%.

19. The above calculation is only an approximation and omits an incentive factor. The ICASA New Model allows for an incentive factor. **According** to the World Bank Regulation Handbook, an incentive factor **(IF)** can add anywhere between **0.5%** to **1%** to the value of **X.** Therefore, allowing for incentive effects in the approximation method results in a value of **X** between 3.25% and 3.75%.

20. ICASA therefore proposes X=3.5% i.e. 2.75 + 0.75 where 2.75 is as calculated above and 0.75 is the incentive factor **(IF).**

21. ICASA would like to emphasise that its modified assumptions in the New Model have taken account of Telkom's comments. In particular, the expected efficiency gain has been reduced substantially **from** an approximate **4.5%** p.a. to 3.75% p.a. (a 28% reduction). The **lower** figure used is consistent with observations in other jurisdictions and **has** been applied widely elsewhere.

22 By responding to observations and comments received from Telkom and other interested parties, ICASA has reformulated its price control model. ICASA has also calculated X using an alternative approximation method

[8] pp. 424 *op. cit.*

which is recommended by the World Bank for Developing Countries Regulators. ICASA proposes a new value for X= 3.5%.

ANNEXURE 1

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA (ICASA)

NOTICE PROVIDING CLARIFICATION TO NOTICE 2490 OF 2004 GOVERNMENT GAZETTE NO. 26977 PUBLISHED 8 NOVEMBER 2004 ("THE NOTICE") INVITING COMMENT ON THE REVIEW OF TELKOM'S PRICE CONTROL UNDER SECTION 27 READ WITH SECTION 96 (4), AND SECTION 45, OF THE TELECOMMUNICATIONS ACT NO. 103 OF 1996, AS AMENDED.

With reference to the above notice as it was published on the 8 November 2004, the Authority has received a written request from an interested party regarding the Price Review, that ICASA provide further details about the modeling that was used to determine the value of X in the draft Price Review consultation paper.

ICASA believes in the interest of transparency and good regulatory practice that these details are made public whenever possible. ICASA has decided therefore to publish this short note, which provides further details about the methodology used to calculate X. Further queries regarding the methodology employed by ICASA and any other aspects relevant to the Price Review can be raised at the Public Hearings scheduled to take place Monday and Tuesday, 13 and 14 December at Block C- Presentation Room, Pinmill Farm, 164 Katherine Street, Sandton.

1. Methodology

In order to establish a framework within which the parameters of the new price control arrangements could be set, ICASA has developed a financial model of Telkom. This model enables ICASA to calculate the expected impact of various alternative price control regimes under a range of alternative assumptions.

The model has been developed in line with international best practice and consists of a number of modules. Initial values of key variables are used as inputs and assumptions are made about a number of variables. Together these effect revenues through their affect on demand for services, and demand volumes drive costs. The model is closed by seeking a value for X, the productivity factor, which results in revenues being equal to costs in the final year of the price control review period. To ensure that Telkom earns a return that covers its estimated cost of capital, costs used in the financial model include a cost of capital element. A schematic representation of the financial model is shown in Figure 1.

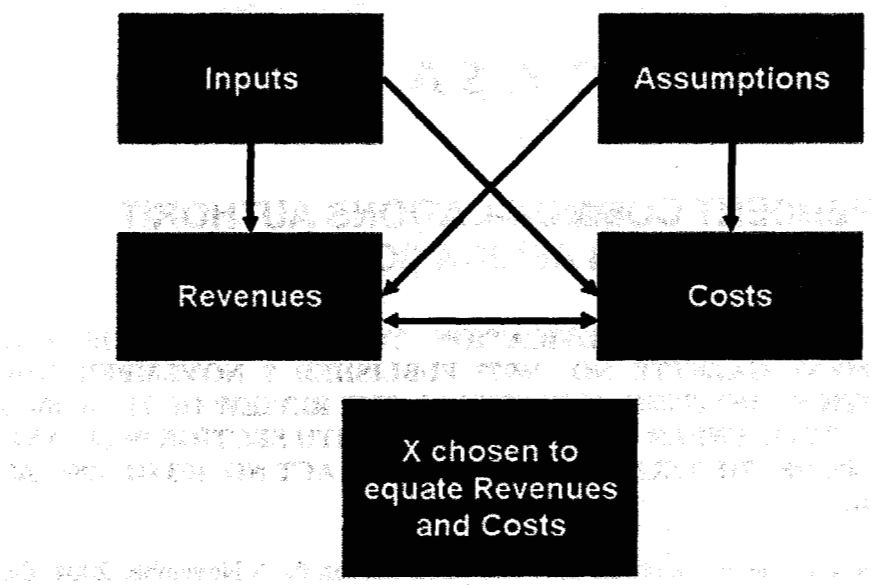

Figure 1: Schematic representation of the ICASA financial model

Tables 1-4 below provide further information about assumptions, input data, and variables in the ICASA financial model.

Table 1: Input data in ICASA financial model

Input	*Source of information*	*Purpose*
Current service volumes	Telkom, Telkom published accounts, Form 20-F, COACAM (Chart of Accounts and Cost Allocation Manual)	Volumes associated with individual services, for residential and business
costs	COACAM	Unit *costs* (average *costs)* per service, incremental *costs* (applied cost volume relationship assumption)
Tariff weightings	Telkom tariff filings, service volumes	Weights used in price *cap*
Macroeconomic and demographic	Statistics South Africa (population data)	Feed into demand functions

The macroeconomic and demographic data used in the model are described in Table 2.

Table 2: Macroeconomic and demographic data

Year	2004	2005	2006	2007	2008	2009	2010
Population million	46.6	47.4	48.0	48.7	49.3	49.9	50.6

GDP growth %	3.8	3.0	3.0	3.0	3.0	3.0	3.0

Table 3 presents information about the key assumptions applied in the financial model.

Table 3: Key assumptions in ICASA financial model

Assumption	Purpose
Price demand elasticities	Used to assess how demand varies as service prices vary. Assumed inelastic for all services; business users more inelastic than residential (Table 4 shows elasticity values).
Income elasticities	Used to assess how demand varies as incomes change. Assumed to be 0.8 for all services. Thus if income increases by 1% then demand increases by 0.8%.
Market shares	Telkom's share of the different service markets is assessed. These assumptions are market sensitive as they take account of the degree of success of entry, assumed to *occur* in many markets from February 2005.
Use of telephony services by marginal user	To assess how revenues evolve.
Second lines	Growth in second lines affects costs/revenues.
ISDN, ADSL	Growth affects costs/revenues.
Business demands	Feed into demand functions.
Efficiency due to technological progress	Account for exogenous technical progress. 3% per annum assumption, source Oftel.
Catch-up efficiency	Telkom to catch-up with average of UK, Germany and France lines per employee over a four year period, requiring a 1.3% per annum improvement in productivity (up to 2008).
Cost volume relationship	Taken *to* be 0.75 for all *services*. The *cost* of the marginal service is 75% of the current unit *cost*.
Weighted average cost of capital	Calculated to be 13.04% nominal on a post-tax basis. Explained fully in the 2004 Price Control Review consultation *document*.

Table 4: Price elasticity of demand assumptions for residential and business services 2004-10

Descriptions	Sources	Units	2004	2005	2006	2007	2008	2009	2010
8.1 Price elasticity									
Residential									
Short Distance Calls	Assumption	%	-30%	-30%	-30%	-30%	-30%	-30%	-30%
Long Distance Calls	Assumption	%	-30%	-30%	-30%	-30%	-30%	-30%	-30%
International calls	Assumption	%	-60%	-60%	-60%	-60%	-60%	-60%	-60%
Calls to mobile	Assumption	%	-40%	-40%	-40%	-40%	-40%	-40%	-40%
Calls to internet	Assumption	%	-30%	-30%	-30%	-30%	-30%	-30%	-30%
Business									
Short Distance Calls	Assumption	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Long Distance Calls	Assumption	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
International calls	Assumption	%	-60%	-60%	-60%	-60%	-60%	-60%	-60%
Calls to mobile	Assumption	%	-30%	-30%	-30%	-30%	-30%	-30%	-30%
Calls to internet	Assumption	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%

The above data, information and assumptions were fed into a spreadsheet model designed using Microsoft Excel. The model was programmed to calculate X, which equates revenues with *costs*. The linkages between different elements of the model are shown in Figure 2.

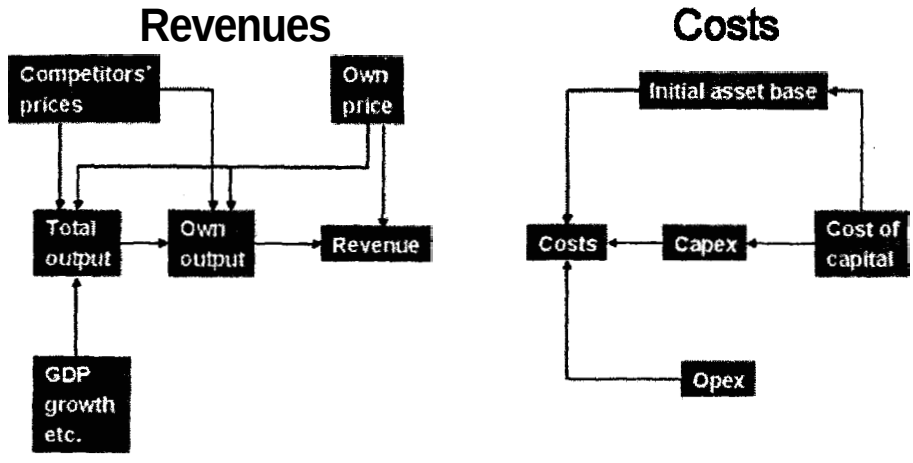

Figure 2: Linkages between different elements in the ICASA mode

ANNEXURE 2

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA (ICASA)

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ICASA Price control model

- ICASA establishes the value of X in the price control applied to Telkom using a financial model of *Telkom's regulated business.* In the model Telkom's regulated business accounts for 71.4% of Telkom's total fixed line and data business.[9] The model does not include revenues derived from other activities undertaken within the Telkom Group of companies.
- The model has been developed by ICASA in line with international best practice and consists of a number of modules. The model has been constructed using Microsoft Excel, and contains a number of macros for solving various problems.

[9] The model assumes that R21,547 million revenues are attributable to the regulated business, whereas Telkom as a *company earned* R30,175 million revenues in 2003-04.

- The model has been populated with data derived from Telkom's published accounts, other Telkom sources, and Telkom's COA-CAM submitted to ICASA. The data are a mix of financial and quantity variables.
- The service revenues and costs data in the model are deflated to take account of inflation (real values are used).
- Data for the financial year 2003-04 comprise the initial values of key variables.
- The model incorporates assumptions about market growth, cost volume relationships, demand elasticities, cost of capital, efficiency (productivity), and the effect of competition (loss of market share to competitors). These assumptions are informed by Telkom's recent history, the financial markets in South Africa, the South Africa macro economy, appropriate international experiences and independent forecasts for the same.
- The model also incorporates a number of constraints. In particular, tire price changes for some services over a year cannot exceed 5% in real terms.
- The model also has a module for the residential sub-basket.
- The initial values, the assumptions and the constraints form the inputs to the model.
- The value of X is calculated by solving an algorithm, which works by applying an iterative procedure.
- The duration T of the price cap is selected (ICASA has chosen T=4 years) and a value of X is selected. The initial value of X is deliberately chosen to be low (typically 0.5).
- Having selected T and X, the model solves for each year the *optimal* set of prices for services in the regulatory basket. Optimal means the set of prices resulting in the highest profit level, subject to complying with the price cap. This process is undertaken sequentially in the model. Optimal prices are established initially for Year 1, then Year 2, and so on.
- In determining optimal prices, the model assesses how demand varies for each service (governed by demand elasticity assumptions) and how costs vary (governed by the cost volume relationships). For services where total demand increases, it is assumed that Telkom benefits from scale economies.
- For the X chosen and the set of optimal prices determined for each year, the model compares the final period (Year T) costs and revenues. Costs in the model are real costs and include a contribution towards the cost of capital. If efficient costs are less than revenues in Year T, the model chooses a higher value of X and repeats the computations described above. This process continues until costs equal revenues in Year 4 (or where revenue is greater than cost but very close to cost). At this point the model has solved for X.
- The model does not constrain revenues, as revenues are endogenously determined.
- Having established a value for X, the model then performs sensitivity analysis around key parameters.
- The value established for X should ensure that in Year T Telkom's regulated business earns a rate of return on capital employed equal to the weighted average cost of capital. Alternatively, revenues of services in the price control basked are equal to the costs of supplying such services. This approach is in line with

international best practice: "The intention behind reducing the regulated charges by RPI-X in each year of the charge control is for the weighted average charge of the products and services within the charge control basket to equal the forecast of the efficient level of costs at the end of the charge control period."[10]

- One of the main benefits of a CPI-X price cap is that it creates incentives on Telkom to increase its efficiency, over the period in which the price control is in force. The objective of the price control is to bring the controlled charges of Telkom into line with an efficient level of costs at the end of the price control period. As part of this process it is important to understand the extent of Telkom's efficiency/inefficiency at the outset of the price control so that erosion of inefficiency can be reflected in the value of X. It is reasonable to expect inefficiency existing at the start of the price control to be eliminated over the life of the four-year control, just as competitive pressures would force inefficient companies to become efficient in a competitive market. ICASA is currently re-assessing the degree to which Telkom is inefficient relative to best practice

[10] Para. 4.1, Ofcom "Partial Private Circuits Charge Control: Final Statement", September 2004. Annex B of this document provides a detailed overview of Ofcom's price control methodology. The Ofcom methodology is similar to the methodology employed by ICASA.