National Retail Tariff Guideline

National Electricity Regulator guideline on electricity pricing in South African Electricity Distribution Industry

August 2004
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INTRODUCTION:
This document, National Retail Tariff Guideline, is the replacement of the 1995 Interim National Distribution Tariff systems document, which has been used as pricing guideline document in the South African electricity distribution industry. It focuses only on electricity pricing in the distribution segment of the electricity industry i.e. from a bulk point of supply to the end-consumer. Distribution within the context of this document refers to what is internationally known as retail, and this document only touches briefly on network charges.

The National Electricity Regulator (hereafter referred to as “NER”) is undertaking separate processes for developing regulatory tools such as detailed guidelines for network charges, cross-subsidies, and benchmarking; and the guidelines (that will be produced through those other processes) will supplement this guideline document when completed. The issues such as customer segmentation and cost allocation will be dealt with as part of those separate processes, and outputs will thereafter be fed into this document.

This document outlines the requirements for setting electricity tariffs, highlighting standard tariff structures and principles that shall be complied with by all licensed electricity distributors when setting their tariffs.

ELECTRICITY PRICING PHILOSOPHY, POLICY & OBJECTIVES:

The following are the most important attributes of an electricity tariff system (ranked in order of importance) that licensees should consider in setting their electricity tariffs:

1. Tariffs should enhance economic efficiency in the allocation of the country’s resources.
2. An important step in satisfying the above criterion is that the structure and level of tariffs should be cost-reflective. However, under special circumstances deviations in structure and level may be necessary so as to provide for other considerations.
3. Within limits, customers should be free to choose from a range of applicable tariffs.
4. Tariffs should be based and defined on the cost of supply to the customer and not on the customer’s usage of electricity.
5. All distributors should apply a defined national cost of supply methodology so as to ensure equity and fairness between customers serviced by different suppliers.
6. In absence of an approved industry cost of supply methodology, all distributors are required to conduct a cost of supply study that will form basis of their tariffs. Some guidance in this regard can be received from the NRS058

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1 See section 2 of Annexure 1 for an example of such circumstances
2 This would mean that, for example, an industrial/manufacturing customer and a commercial customer should have access to the same tariffs if their cost of supply is the same.
7. Wide tariff differentials between different/neighbouring suppliers must be prevented and where they occur they will have to be justified.

8. Where there are inherent cross-subsidies in electricity tariffs, these should be levied *transparently*. Licensees are required to make effort to establish and publicise the average level of *cross subsidy* between customer categories so that customers are made aware of it.

9. Tariffs should take account of a number of other factors, such as:
   - the need to be *easy and economical* to administer;
   - the need to *reflect the cost* of differing levels of quality of supply;
   - the need to facilitate the use of appropriate technologies; and
   - the need to ensure *stability, simplicity* and *understandability*.

**COST CLASSIFICATIONS AND ALLOCATIONS:**

Electricity distribution costs can be grouped under three headings: purchase cost, capital cost and support cost\(^3\). Having pooled the costs into the three groups, that can be defined as capacity costs, variable costs and customer specific costs. Each of these different costs are then expressed as Rands/kVA/month, cents/kWh and Rands/customer/month respectively.

The following table briefly illustrates this cost allocation system:

<table>
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<tr>
<th>Cost Groupings</th>
<th>Customer Specific Costs: Expressed as Rands/customer/month</th>
<th>Variable Costs: Expressed as Cents/kWh</th>
<th>Capacity Costs: Expressed as Rands/kVA/month</th>
<th>Capacity Costs: Expressed as Rands/kW/month</th>
<th>Other costs: Charged as a %</th>
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<td>Energy Cost</td>
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<td>- Purchases active energy*</td>
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<tr>
<td>- Losses</td>
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<td>Transmission Costs</td>
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<td>- Network</td>
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<td>- Ancillary services</td>
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\(^3\) See section 3.3 of Annexure 1 for more detail on these costs.
The above table attempts to reflect the basis of cost allocations and all licensed distributors need to construct such a table for each different category of customers.

When allocating costs to various tariffs, the distributors should use the bulk tariff at which they purchased electricity as a reference point. This will ensure that they reflect their input costs in their rates (i.e. the end-user prices at which they sell electricity to customers) as closely as possible. That way, they can then be able to pass on some of the risks to customers. Once the cost allocation process is complete, the costs need to be converted into actual tariff charges.

Until such a time that a national cost of supply methodology has been developed and approved by NER, distributors should diligently examine their costs and make the necessary tariff adjustments to ensure that tariffs accurately reflect the cost of supply, thereby ensuring that their tariff systems can claim to be in accordance with the broad requirements in this document.

**TARIFF STRUCTURES:**

In designing a tariff structure it is necessary to find a compromise between:

- The need to accurately reflect costs so as to achieve economic efficiency.
- The need to ensure equity and fairness between different types of customers.
- The need for a practically implementable tariff that is also sustainable.
- The need to utilise appropriate metering and supply technology.
- The need for an understandable tariff.
• The customer’s ability to pay.

All licensees should comply with the five (5) standard structures as shown in the table below. Even in cases where the tariffs have been either unbundled or seasonised, they should still conform to these structures and reflect the three standard tariff components. These tariff structures are as follows:

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<td>Two-part time-of-use tariff</td>
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<td>Three-part tariff</td>
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<td>Three-part time-of-use</td>
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• The NER shall not force licensees to introduce seasonal and unbundled tariffs, since unbundling and introduction of seasonality comes with more administrative costs and more complex billing systems. However, all licensees are encouraged to introduce seasonality and unbundling of their tariffs as much as practically possible to reflect the cost of supplying electricity to customers more.

• In addition to the five standard tariff structures, one special tariff group catering for customised price agreements can be approved as part of the national tariffing system. The special tariff structure is should cater for specific customised price agreements, and these should comply with the guidelines provided in the NER policy for Negotiated Pricing Agreements.

• The types of customers for whom the above tariff structures may be applicable, are described in annexure 1 of this document. Distributors of electricity who do not currently have these tariff structures in place should ensure that their tariff structures are brought in line with these structures over of the next 2 years. However, depending on their customers, some distributors may not have all the above tariff structures.

The licensees should not charge their customers inclining- and/or declining block tariff, which are structurally non-cost-reflective and their implementation on prepayment electricity meters impractical. All licensed distributors should do away with existing inclining block and declining tariff structures. The NER will

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3 These components are the fixed charge, energy charge and capacity charge. For example, some distributors split the fixed charge (in Rands/customer/month) into service charge, administration and network charge for large customers. For some distributors, the levels of these charges differ in winter and summer seasons.
not approve such tariffs, except in cases where an inclining block tariff is introduced to implement a specific government’s targeted policy.5

In addition to the above recommended standard tariff structures; there are also other charges that are normally levied by distributors as a percentage. These include surcharges and charges for transmission losses, among other things (as shown in the cost allocations table above). Distributors shall reflect all such charges on their standard schedule of tariffs.

NON-TARIFF CHARGES:

Where additional non-tariff charges are levied to recover the costs of (amongst others) individual customer connection costs, meter-installation/alteration costs, the cost of network extensions/upgrading in the case of the extension of a distribution/reticulation to the exclusive benefit of a specific customer, or specific group of customers, such charges should be distinguished from tariff charges. These should preferably be recovered directly from the customer either as an up-front payment or as a monthly/annual amount. Licensees should avoid as much as possible recovering such costs through % surcharges on the standard tariff, payable for a specific period.

Such non-tariff charges should be levied on customers as a fixed charge because they may have unintended consequences if levied as a cents/kWh charge.

TAXATION:

Heavy cross-subsidisation of other services rendered by the licensed electricity distributors from electricity customers is not justified, considering the fact that electricity is basic service. While the NER has no direct jurisdiction over the issue of local government taxation of electricity supply, it is an absolutely necessary requirement where local governments tax electricity, that such taxes should be levied transparently. Any taxes levied on electricity should be reflected separately on the customers’ bills and not as part of the cost. Furthermore, an effort should be made by distributors to limit such taxation to the minimum.

The manner in which taxes are levied determines what impact such taxes will have on customers. Levying taxes as percentage or as a c/kWh charge both have their pros and cons.6 The licensed electricity distributors are therefore required to ensure that any taxes on electricity are levied appropriately, to avoid unintended consequences.

CONCLUSION:

This document is a living document that should be complied with by all licensed distributor in setting their electricity tariffs and it shall be updated annually to reflect new ideas and new developments in the electricity distribution industry. It

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5 In this regard, the provision of free basic electricity is the case at hand. This is a type of inclining block tariff that will be permissible as government’s initiative to address a specific policy objective.

6 See section 9 of Annexure 1 for more detail
is envisaged that the once the outputs of the work currently done by NER to
develop guidelines for network charges (DUOS), system losses, connection
charges, cross-subsidies framework and benchmarking, they will supplement this
high level document by providing more details on specific issues. The outcomes
that work may even necessitate further revisions and amendments of this
document.
ANNEXURE 1: DETAILED RETAIL TARIFF GUIDELINES

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EXECUTIVE SUMMARY

The South African electricity supply and distribution industry is made up of Eskom, which is accountable for approximately 97% of all electricity produced in the country and a few local governments who also undertake a limited amount of self-generation. Eskom is also the only licensed transmitter of electricity. In the distribution industry, Eskom directly distributes electricity to approximately one-third of South African electricity consumers, who account for approximately 60% of all electricity sales. The remaining two-thirds of the country’s customers (and 40% of total sales) are supplied predominantly by local government electricity distributors. This document refers only to electricity pricing in the distribution segment of the industry i.e. from a bulk point of supply to the end-consumer.

Distribution within the context of this document refers to what is internationally known as retail, and only touches briefly on the network charges. The National Electricity Regulator (hereafter referred to as “NER”) is undertaking a separate process of developing guidelines for network charges, and those guidelines will supplement this guideline when completed. The issues such as customer segmentation and costing will be determined as part of that separate process.

Since the NER has the legal duty to approve electricity tariffs levied to customers by all electricity suppliers in South Africa, it is necessary for the NER to explain the basis upon which it expects electricity tariffs to be determined. The document that the NER has been providing to guide its licensees regarding tariff setting was developed in 1995 by the National Distribution Tariff System Working Group under the leadership of an NER member, with representatives from the Association of Municipal Electricity Undertakings, Eskom and the National Electricity Regulator. The document, titled Interim National Distribution Tariffs Systems (hereunder referred to as “INDTS”), was thereafter presented to the National Electricity Regulator and endorsed as a NER-approved guideline on electricity pricing in the South African Electricity Distribution Industry.

The 1995 INDTS document built on the work of the Tariffs and Finance Working Group of the National Electrification Forum and specifically its recommendations in respect of national residential electricity tariffs. The INDTS was called “interim” because the document was meant to broadly define the construction of tariffs during the interim period until the National Distribution Tariff System Working Group (hereunder referred to as “NDTS working group”) had completed its task of developing detailed national electricity costing and tariffing system.

Since its approval in 1995, the NER has been using the INDTS as the industry guideline for tariff making, as well as a reference point when approving the tariffs of electricity distributors. With the prevalence of innovation by electricity distributors in designing their tariffs, while being judged against the 1995
document when they apply to NER for approval of their tariffs, the NER realised that some aspects of the INDTS may have become outdated, and the document has long been due for revision. Hence, its acknowledgement in 2002 by deciding to undertake a process of reviewing the guideline document that is used as basis for setting tariffs in the South African electricity distribution industry (hereafter referred to as EDI).

The NER invited participation of all relevant stakeholders during this process of revamping the industry guideline document, through written comments and in workshop that was held at NER. The aim of that consultation is to ensure that the new guideline document that has come out of the review process encompasses all issues of importance in tariff setting and costing. There has been consensus view that the name of the industry guideline document should be changed to National Retail Tariff Guideline.

Although changes have been made to the guideline document, it was agreed that most aspects of INDTS (including all objectives) are still relevant and are therefore retained in this document.

The key recommendations contained in this document are as follows:

- The most important attributes of an electricity tariff system are that (ranked in order of importance):

  - Tariffs should enhance economic efficiency in the allocation of the country’s resources. An important step in satisfying this criterion is that the structure of tariffs should be cost-reflective. Tariffs should also be cost-reflective in terms of their level, though under special circumstances deviations in structure and level may be necessary so as to provide for other considerations.

  - Within limits, customers should be free to choose from a range of applicable tariffs. Tariffs should be based and defined on the cost of supply to the customer and not on the customer’s usage of electricity. This would mean that, for example, an industrial/manufacturing customer and a commercial customer should have access to the same tariffs if their cost of supply is the same.

  - All distributors should apply a defined national cost of supply methodology so as to ensure equity and fairness between customers serviced by different suppliers. In absence of an approved industry cost of supply methodology, all distributors are required to conduct a cost of supply study that will form basis of their tariffs. Some guidance in this regard can be received from the NRS058 cost of supply methodology available on NER website: http://www.ner.org.za, although not an approved industry document. Wide tariff differentials between
different/neighbouring suppliers must be prevented and where they occur they will have to be justified.

- An effort should be made to establish and publicise the average level of cross subsidy between customer categories so that customers are made aware of it.

- Tariffs should take account of a number of other factors, such as the need to be easy and economical to administer, the need to reflect the cost of differing levels of quality of supply, the need to facilitate the use of appropriate technologies and the need to ensure stability, simplicity and understandability.

It is believed that the 5 standard tariff structures are still valid because even those tariffs that are unbundled still conform to these structures. The difference is that there has been an increasing trend towards unbundled and seasonalised tariffs in an effort to be more cost reflective. Unbundled tariffs reflect various elements of the three standard tariff components. For example, some distributors split the fixed charge (in Rands/customer/month into service charge, administration and network charge for large customers.

- Five standard tariff structures plus one special tariff group catering for customised price agreements, are proposed for approval as part of the national tariffing system. These tariff structures are as follows:

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<td>Two-part time-of-use tariff</td>
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<td>Three-part time-of-use</td>
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The special tariff structure is intended to cater for specific customised price agreements, and these should comply with the guidelines provided in the NER policy for Negotiated Pricing Agreements.

The types of customers for whom the above tariff structures may be applicable, are described in the document. It is recommended that in the case of distributors of electricity who do not currently have these tariff structures in place, that their tariff structures will be brought in line with these structures in the course of time.
It is acknowledged that, in addition to the above recommended standard tariff structures; there are also other charges that are normally levied by distributors as percentage. These include surcharges and charges for transmission losses, among other things. Distributors should reflect all such charges on their standard schedule of tariffs.

On the issue of the taxation of electricity by local government electricity distributors, the National Electrification Forum’s Tariffs and Finance Working Group expressed serious concern over the practice of taxing electricity - which is used as an input commodity by industry and commerce. The National Distribution Tariff System (NDTS) working group also shared that concern. The NDTS working group also raised concerns that electricity is used by local government to subsidise other services while at the same time inadequate attention is paid to the electrification needs of the local government’s own communities.

These concerns are still valid. Heavy cross-subsidisation of other services rendered by the licensed electricity distributors by electricity customers is not justified, considering the fact that electricity is basic service. While the NER has no direct jurisdiction over the issue of local government taxation of electricity supply, it is an absolutely necessary requirement where electricity is taxed by local governments, that such taxes should be levied transparently. Any taxes levied on electricity should be reflected separately on the customers and not as part of the cost. Furthermore, an effort should be made by distributors to limit such taxation to the minimum.

The manner in which taxes are levied determines what impact such taxes will have on customers. Since electricity supply is not only volume related and has other factors such as load factor, a tax levied in c/kWh may have unintended consequences on some customers. It will have a higher impact on high load factor customers than on customers with low load factors. A percentage on the other hand may impact more on low load factor customers, who are also poorer. It is therefore very important for electricity distributors to ensure that any taxes levied on electricity are levied appropriately, to avoid unintended consequences.

Finally, electricity pricing is a dynamic field and the development of an electricity pricing policy and its application, should be reactive to the needs of the industry, to its customers and to society at large. This document is a living document and shall be up-dated periodically to reflect new ideas and new developments. Specifically, it is envisaged that the once the outputs of the work currently done by NER to develop guidelines for network charges (DUOS), system losses, connection charges, cross-subsidies framework and benchmarking, they will supplement this high level document by providing more details on specific issues. The outcomes that work may even necessitate further revisions and amendments of this document.
1. INTRODUCTION AND BACKGROUND

The South African electricity supply and distribution industry is made up of Eskom, which is accountable for approximately 97% of all electricity produced in the country and a few local governments who also undertake a limited amount of self-generation. Eskom is also the only licensed transmitter of electricity. In the distribution industry, Eskom directly distributes electricity to approximately one-third of South African electricity consumers, who account for approximately 60% of all electricity sales. The remaining two-thirds of the country’s customers (and 40% of total sales) are supplied predominantly by local government electricity distributors. This document refers only to electricity pricing in the distribution segment of the industry i.e. from a bulk point of supply to the end-consumer.

Distribution within the context of this document refers to what is internationally known as retail, and only touches briefly on network charges. The National Electricity Regulator (hereafter referred to as “NER”) is undertaking separate processes for developing regulatory tools such as guidelines for network charges, cross-subsidies, and benchmarking; and the guidelines (that will be produced through those other processes) will supplement this guideline document when completed. The issues such as customer segmentation and cost allocation will be dealt with as part of those separate processes, and outputs will thereafter be fed into this document.

The NER is the regulatory authority over the electricity supply industry in South Africa. It is a statutory body, established under the Electricity Act No 41 of 1987 (as amended in 1994 and 1995). Under the 1987 Act it is required to issue licences to all players involved in the production and supply of electricity and to “determine prices and conditions under which electricity may be supplied by a licensee.” The NER has a duty to set prices for electricity by taking a balanced view between the interests of customers, the need for an economic and efficient system of electricity supply and the objective of ensuring that licensees are able to finance their activities.

It is necessary for the NER to take into account developments taking place in the industry, to affectively fulfil its role of regulating the South African ESI. The rationalisation of local government and the EDI restructuring as recommended in the Blueprint report that was compiled by a consortium led by PriceWaterhouseCoopers (PWC) and later approved by the cabinet with modification, are two developments have a major impact on regulation of electricity tariffs in the South African Electricity Distribution Industry.

The Constitution of South Africa obliges a local government to make the same tariffs available to all customers of the same type, within its area of jurisdiction. Since the NER has the legal duty to approve electricity tariffs levied to customers by all electricity suppliers in South Africa, it is necessary for the NER to explain the basis upon which it expects electricity tariffs to be determined. The document
that the NER has been providing to guide its licensees regarding tariff setting was
developed in 1995 by the National Distribution Tariff System Working Group under the leadership of an NER member, with representatives from the Association of Municipal Electricity Undertakings, Eskom and the National Electricity Regulator. The document, titled Interim National Distribution Tariffs Systems (hereunder referred to as “INDTS”), was thereafter presented to the National Electricity Regulator and endorsed as an NER-approved guideline on electricity pricing in the South African Electricity Distribution Industry.

The INDTS document built on the work of the Tariffs and Finance Working Group of the National Electrification Forum and specifically its recommendations in respect of national residential electricity tariffs. The INDTS was called “interim” because the document was meant to broadly define the construction of tariffs during the interim period until the National Distribution Tariff System Working Group (hereunder referred to as “NDTS working group”) had completed its task of developing detailed national electricity costing and tariffing.

It should be noted that the INDTS guideline document had been intended to be a living document to be revised periodically. The expectation was for the NDTS working group to meet at least twice a year to consider revisions to the document, but that did not happen. The NER has been using INDTS as the industry guideline for tariff making, as well as a reference point when approving the tariffs of electricity distributors. With the prevalence of innovation by electricity distributors in designing their tariffs, while being judged against the 1995 document when they apply to NER for approval of their tariffs, the NER realised that some aspects of the INDTS may have become outdated, and the document has long been due for revision. Hence, its acknowledgement in 2002 by deciding to undertake a process of reviewing the guideline document that is used as basis for setting tariffs in the South African electricity distribution industry (hereafter referred to as EDI).

The NER process involved review of the INDTS document to identify areas that need to be updated, as well as those areas that are not covered in that document. The NER, thereafter, invited participation of all relevant stakeholders in the process of revamping the industry guideline document, through written comments and through discussions in a workshop that was held at NER. The aim of the stakeholder consultation has been to ensure that this new guideline document, which has come out of the review process, encompasses all issues of importance in tariff setting and costing.

Although there are some changes that have been made when developing this new guideline document, it was agreed that most aspects of INDTS (including all objectives) are still relevant and those are therefore retained in this document. There has been a consensus view that the name of this new industry guideline document should be changed to “National Retail Tariff Guideline”.

This document begins with a description of the philosophy, policy and objectives of the national electricity tariff system. This is followed by a brief exposé on electricity distribution industry cost behaviour and cost definitions. Then the recommended tariff structures and the customers to whom they are applicable, is discussed. This is followed by a brief overview of the basis of cost allocations into the various tariff charges. Non-tariff charges, benchmark electricity tariffs, the issues of cross-subsidies and the taxation of electricity are then dealt with. A section on the most important recommendations completes the document.

It is important to note the role of this document against the background of other NER processes of regulation of electricity prices. The NER, in regulating electricity prices, has two distinct processes: revenue determination and approval of tariff structures and levels. The two processes can be easily confused, hence the distinction being made.

The revenue determination refers to the process undertaken by NER when deciding on the “popular” annual price increase for Eskom, which is normally published in the media every year. This annual process is about using an internationally recognised rate of return methodology to inform NER’s determination of the total amount of revenue that the utility (Eskom in this case), is allowed to recover from its electricity customers. Simply said, it is about determining the size of the “cake” (revenue in this case).

There is a second process, approval of structural adjustments, which is undertaken by the utility to determine how the allowed revenue will be recovered from various customer categories. This process is like “cutting the cake into several slices”, where each “slice” represents the proportion of total revenue that will be recovered by the utility from each customer group. The utility is supposed to remain revenue neutral after doing this exercise of setting its tariff structures and levels for each of its customer categories. In case of Eskom, this process normally results in various customer categories seeing different increases in their bills although the NER-approved average price increase is published in the media as one figure (normally a percentage).

This document guides how the second process is reached by the utility. It is meant to set out objectives; philosophy and principles to be followed in designing the recommended standard distribution tariff structures, and to provide guidance for licensed distributors when setting tariff structures and levels for their electricity customers. Tariffs that fall outside the standard tariff schedule, that may be entered into on a contractual agreement between the licensee and the customer, may be considered if they conform to the NER Negotiated Pricing Agreements guidelines. It also touches briefly on the issues of allocating electricity supply costs to various tariffs. Detailed guidelines on customer segmentation and how costs should be allocated to various tariffs, as mentioned above, are being developed in a separate NER process and will supplement this document once they are completed.
2. ELECTRICITY PRICING PHILOSOPHY, POLICY & OBJECTIVES

The most important attributes of an electricity tariff system that were determined by the NDTS working group are upheld in this document, with some amendments and additions. The licensed distributors should strive to attain the following attributes (in order of importance) when setting their electricity tariffs:

2.1 Tariffs should enhance economic efficiency in the allocation of the country’s resources. An important step in satisfying this criterion is that the structure of tariffs should be cost-reflective. Tariffs should also be cost-reflective in terms of their level, though under special circumstances deviations in structure and level may be necessary so as to provide for other considerations. Such considerations that need to be made by distributors in setting their tariff levels and structure are affordability by customers, simplicity and practicality of their implementation.

An example of such a case is the domestic tariff for customers with low electricity consumption, which may not always be cost-reflective in its structure and level as it is often offered on prepayment basis. In that case, it becomes easy to implement. Customers on such a tariff are normally the poor people; and issues of affordability, understandability and simplicity become important. Hence, this tariff is often targeted by government as a tool for implementation of socio-economic policies for poverty relief such as South African policy on provision of free basic electricity (FBE).

2.2 Within limits, customers should be free to choose from a range of applicable tariffs. Tariffs should be based and defined on the cost of supply to the customer and not on the customer’s usage of electricity. This would mean that, for example, an industrial/manufacturing customer and a commercial customer should have access to the same tariffs if their cost of supply is the same.

2.3 All distributors should apply a defined national cost of supply methodology so as to ensure equity and fairness between customers serviced by different suppliers. In absence of an approved industry cost of supply methodology, all distributors are required to conduct a detailed cost of supply study that will form basis of their tariffs. Some guidance in this regard can be received from the NRS058 cost of supply methodology available on the NER website: http://www.ner.org.za, although not an approved industry document. Wide tariff differentials between different/neighbouring suppliers must be prevented and where they occur they will have to be justified.

2.4 An effort should be made to establish and publicise the average level of cross subsidy between customer categories so that customers are made aware of it. The distributors should minimise such cross-subsidies as much as possible. More guidance regarding cross-subsidies will be provided once the framework that is currently being developed an NER-led industry working group has been finalised and approved as an industry document.
2.5 Tariffs should take account of a number of other factors, such as the need to be easy and economical to administer, the need to reflect the cost of differing levels of quality of supply, the need to facilitate the use of appropriate technologies and the need to ensure stability, simplicity and understandability.
3. ELECTRICITY INDUSTRY COST BEHAVIOUR AND COST DEFINITIONS

Electricity distribution business is an asset driven business, with high fixed costs, in short run, in terms of the infrastructure. Distributors are therefore expected to reasonably reflect this in setting their tariffs as much as possible.

3.1 Costs seen from the demand-side of the industry

The costs incurred by different types of customers are dependent on various “cost-drivers”. The principal cost drivers for the majority of the costs (power, transmission, distribution wires) are the volume and timing of demand. Such cost drivers include:

1. The quantity of energy (kWh) used by customer
2. The maximum demand (kW) of the customer
3. The customer's time-of-use pattern
4. The load factor of the customer's consumption (the ratio of peak demand to average demand)
5. The customer's diversity with other customers on the reticulation, distribution and transmission networks (the degree to which their load curves coincide).
6. The location of the customer
7. The customer's voltage of supply
8. The customer's power factor (the amount of real power versus inductive power)
9. The customer's required quality of supply and service (voltage/frequency dips, harmonic content, customer service standards).

A truly cost-reflective tariff should ultimately reflect all of these cost-drivers through various charges. However, for tariffs that are applied to many customers it is necessary to balance the need for cost-reflectiveness with the practical constraints of cost-effective implementation, simplicity and understandability.

3.2 Costs seen from the supply-side of the industry

The electricity industry is a highly capital-intensive industry. The cost drivers of an electricity distribution business include the length of the network at each voltage level, the number of connections at each voltage level and the growth in demand. In addition there may be certain additional factors relating to issues such as asset condition, geography and climate. To the extent that customers demand and are willing to pay for a change in service performance (availability and reliability of supply), or that the existing service performance is at risk, then
this will constitute a further cost driver. This is especially relevant where there is a backlog of asset replacement, asset refurbishment and maintenance work that is reflected in declining service performance. For municipal distributors in South Africa, a large part of the costs is bulk purchase costs at Eskom tariffs.

The cost behaviour is illustrated in graph 1.

**Graph 1: Total costs versus consistency of usage**

This cost structure and behaviour indicates that the total costs to supply a specific customer has a slower increase as the consistency of usage increases (from point A to B). When calculated on the basis of cost per kWh supplied this means that a cost-reflective tariff should ensure that a customer who purchases electricity consistently (high load factor) should pay a lower average price per kWh than a customer who purchases electricity inconsistently (low load factor). A graph representing this relationship between the load factor (consistency of usage) and unit cost (cents per kWh) is shown in Graph 2:

**Graph 2: Cost per kWh (unit) versus load factor**

In addition to these general cost relationships, it is necessary to make special mention of the issue of relating the tariff to the capacity of supply. In the case of
the larger customers for whom a demand tariff would be applicable, the tariff is clearly related to the capacity of the supply. However, in the case of small, for example, residential customers for whom a demand tariff is not applicable, it is necessary to ensure that the capacity of the supply which is made available is taken into consideration. This issue has specific relevance to the electrification of rural communities where, up to now, a standard high capacity supply (~ 60 Amps) is made available and in many cases the low level of consumption by these customers means that a lower capacity at a considerably lower capital cost would, from an economic point of view be more appropriate. In this circumstance, the formulation of appropriate tariff structures should be used to promote correct decision-making on the capacity of the supply made available to individual customers.

3.3. Cost classifications and allocations

This document describes tariff construction in the distribution industry. In this section of the industry, costs can be grouped under three headings: purchase cost, capital cost and support cost. “Purchase cost” represents the cost of buying electricity in bulk. “Capital cost” is the finance cost (interest and redemption) relating to the construction and refurbishment (but not routine operations and maintenance) of the distribution and reticulation infrastructure as well as related fixed assets. It should be noted that in the case that customers have paid the capital cost of the network in full, it would obviously not be legitimate to charge such customers in respect of the capital costs of the network. “Support cost” is the cost of actually operating the distribution utility. Such cost includes the cost of routine maintenance, operations, administration etc.

Having pooled the costs into the three groups, it is then necessary to divide the group cost into elements that can be defined as capacity costs, variable costs and customer specific costs. Each of these different costs are then expressed as Rands/kVA/month, cents/kWh and Rands/customer/month respectively. A table to briefly illustrate this cost allocation system, is set out below:

<table>
<thead>
<tr>
<th>Cost Groupings</th>
<th>Customer Specific Costs: Expressed as Rands/customer/month</th>
<th>Variable Costs: Expressed as Cents/kWh</th>
<th>Capacity Costs: Expressed as Rands/kVA/month</th>
<th>Capacity Costs: Expressed as Rands/kW/month</th>
<th>Other costs: Charged as a %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Purchases active energy*</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>- Losses</td>
<td></td>
<td></td>
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<td></td>
<td>X</td>
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</tbody>
</table>

*Active energy refers to the energy consumed by the customer.
<table>
<thead>
<tr>
<th>Transmission Costs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Network</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>- Ancillary services</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>- Transmission zones</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distribution network Costs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Capital</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>- O &amp; M</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>- Overheads</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>- Return and taxes</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Retail costs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Service and administration</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>- Return and taxes</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

The above table attempts to reflect the basis of cost allocations. Such a table needs to be constructed for each different category of customers. Once the cost allocation process is complete, the costs need to be converted into actual tariff charges. This document does not deal with this process further. The detailed allocations, apportionments and cost calculations will be dealt with in the documents that will be produced in the work that is currently done by NER to develop guidelines for network charges (i.e. Distribution Use of system charges), cross-subsidies and benchmarking. The NRS058 cost of supply methodology also provides guidance on this matter.

Until such a time that a cost of supply methodology has been developed and approved by NER, distributors are expected to diligently examine their costs and make the necessary tariff adjustments to ensure that tariffs accurately reflect the cost of supply, thereby ensuring that their tariff systems can claim to be in accordance with the broad recommendations made in this document.
4. RECOMMENDED TARIFF STRUCTURES

The improvement in technology over time has made it possible to have electronic metering technologies that are cheaper, which allows for more innovative ways to design tariffs. There has been increasing numbers of distributors that introduce seasonal and time of use tariffs because with advanced metering technologies, it is now possible to measure time of use and amount of energy used in each time period. Distributors are increasingly moving towards unbundling, since unbundled and seasonal tariffs are more cost reflective.

The NER does not intend to force the smaller municipal distributors that have not unbundled their tariffs to do so, since unbundling implies more administrative costs and more complex billing systems. However, in the interest of rationalisation of tariffs throughout the country (especially within the future Regional Electricity Distributor’s areas of supply) in preparation for the EDI restructuring, all distributors are encouraged to unbundle their tariffs as much as practically possible.

In designing a tariff structure it is necessary to find a compromise between:

- The need to accurately reflect costs so as to achieve economic efficiency.
- The need to ensure equity and fairness between different types of customers.
- The need for a practically implementable tariff that is also sustainable.
- The need to utilise appropriate metering and supply technology.
- The need for an understandable tariff.
- The customer’s ability to pay.

It is believed that the 5 standard tariff structures are still valid because even those tariffs that are unbundled still conform to these structures. The difference is that there has been an increasing trend towards unbundled and seasonalised tariffs in an effort to be more cost reflective. Unbundled and seasonalised tariffs still reflect various elements of the three standard tariff components. For example, some distributors split the fixed charge (in Rands/customer/month into service charge, administration and network charge for large customers. For some distributors, the levels of these charges differ in winter and summer seasons.

The five standard tariff structures are illustrated in the table below:

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>One-part single energy rate tariff (Lifeline tariff)</td>
<td></td>
<td></td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Two-part tariff</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-part time-of-use tariff</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three-part tariff</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
</tbody>
</table>
The special tariff structure is intended to cater for specific customised price agreements and thus the structure of such tariff will vary from case to case. It should be noted that like all other tariffs, such customised agreements should be approved by the NER. The distributors should ensure that their special tariff conform to the guidelines specified in the NER policy for negotiated pricing agreements, which is available on the NER website.

There are currently a number of distributors in South Africa whose customer base is so small that offering all the different tariff structures as described above, would be unnecessary. It is not expected that in these cases, all five standard tariff structures should be used. In the case of those distributors that have a large enough customer base to merit the full range of tariffs, but who do not currently offer the above tariff structures, it is expected that in time the tariff system will be redesigned in accordance with the above recommended structures.

The NER acknowledges the fact that, in addition to the above recommended standard tariff structures; there are also other charges that are normally levied by distributors as percentage. These include surcharges and charges for transmission losses, among other things. Distributors should reflect all such charges on their standard schedule of tariffs.

The One-part single energy rate tariff (Lifeline Tariff)

A one-part single energy rate tariff is suitable for small, low consumption (< 400 kWh per month) (generally residential) customers. Such customers mainly use electricity for lighting, various low consumption electronic devices and a limited amount of refrigeration and cooking. Load factors are generally very low. The one-part single energy rate tariff is not cost-reflective (it does not separately recover the fixed charges) but is very easy to implement specifically where prepayment meters are used. It is also suitable for conventional kWh meter installations. With the one-part single energy rate tariff, all costs must be recovered through a single cents/kWh charge at the level of break-even monthly consumption.

Since the one-part single energy rate tariff is designed specifically for low consumption customers only, there must be a level of consumption at which the two-part tariff becomes a more economical tariff and which consumers will therefore choose. It is recommended that the break-even point between the one-part single energy rate tariff and the more cost-reflective two-part tariff be set at a level of not more than 400 kWh per month. This is a much higher level of monthly consumption than could be considered to be a life-line level, but by setting it at such a level, it will allow for a substantial degree of cross-subsidy for consumers whose ability to pay leads to low consumption. The amount of the subsidy received on the one-part single energy rate tariff decreases as the level of consumption increases. This relationship is illustrated in graph 3 below:
Customers should be able to convert from the one-part tariff to the two-part tariff or vice versa at specified intervals (say annually) and at a reasonable fee.

Graph 3: One-part tariff versus the two-part tariff

A concern that has been expressed with this tariffing regime is that customers will have a choice between two different tariffs and will therefore chop-and-change between tariffs based on their monthly consumption (if the consumption is less than 400 kWh per month, the one-part tariff is cheaper and if the consumption is more than 400 kWh per month, the two-part tariff is cheaper.) Should this occur it could become an administrative burden. This problem can be overcome if customers are required to choose between one tariff or the other for a fixed period, for example one year, after which they will be allowed to change tariffs should they so choose. It would obviously be reasonable to levy a fee to cover the administrative costs involved.

It should be noted that the discourse thus far has presented a residential tariff structure system which is applicable in the circumstance that both the low income and high income residential customers are receiving a similar capacity and hence similar cost supply and the tariff structures are set accordingly. It is clear however, that in attempting to meet the country’s electrification needs, the resulting financial stress will mean that it will be necessary to provide supplies which are differentiated according to the capacity/quality of supply: lower capacity supplies obviously being cheaper than higher capacity supplies. Cost-reflective tariffing in this circumstance could mean a “menu” of supply options and resulting tariffs ranging from, for example, a 2.5 Amp unmetered “flat-rate” supply to a three-phase high capacity “time-of-use” supply.

The Two-Part tariff

This tariff is suitable for residential customers with high consumption (> 400 kWh per month) generally supplied at 240V or 400V. Such customers use electricity for a wide range of applications such as cooking, heating (space and water), refrigeration, cleaning and entertainment.
The tariff would also be suitable for small commercial and agricultural customers. When conventional kWh meters are used, the one-part single energy rate tariff and two-part tariff are easily interchangeable. With a prepayment metering system, it is possible to convert from a one-part to a two-part tariff by levying a fixed charge, which could be expressed as a monthly charge per meter, for example.

Distributors should ensure that they recover maximum share of their fixed costs through a fixed charge in Rands per month per customer, instead of using a variable charge in cents per kWh to recover such costs.

The Two-Part Time-of-Use tariff

This tariff would be suitable for large residential, commercial, agricultural, or small industrial customers who are able to shift load out of the peak period and into the cheaper off-peak periods and whose level of consumption would merit the investment in a time-of-use meter necessary to implement such a tariff. However, metering costs should not be prohibiting these days, given that cheaper electronic metering technologies are more readily available. Since a time-of-use energy meter now costs about the same if not less than a conventional energy meter, the two-part time-of-use tariff would be applicable to an increasing number of consumers where such a tariff could be shown to provide mutual economic benefit to the supplier and consumer.

The Three-Part tariff

This tariff is more cost-reflective than the two-part tariff since it charges separately for the customer-specific, variable and capacity costs. The tariff is appropriate to the larger commercial, industrial and agricultural customers whose size would merit the investment in a demand meter.

The Three-Part Time-of-Use tariff

This tariff is more cost-reflective than the standard three-part tariff since the cents/kWh charge varies according to the time of use. The tariff would be appropriate to the larger commercial, industrial and agricultural customers who are able to shift load into the off-peak periods thus effecting mutually beneficial savings to be shared with their supplier.

Pros and cons of the various possible residential tariff structures

In deciding on the above tariff structures, with specific reference to the tariffs applicable to residential customers, a number of different options were considered. These included:

- Inclining-block tariffs
• Declining-block tariffs
• Inclining and declining-block tariffs
• A one-part single energy rate tariff only
• A two-part tariff only

The following are the pros and cons of the various tariffs:

The **inclining-block tariff** was decided against by the NDTS working group for two principle reasons: Firstly it is structurally non-cost-reflective. The average cost of supplying a customer decreases as consumption increases and hence an inclining-block tariff where the tariff rate increases as consumption increases is contrary to the cost of supply and hence contrary to the key elements of the electricity pricing philosophy as described earlier i.e. that tariffs must be structurally cost-reflective. Secondly, the implementation of an inclining-block tariff on prepayment electricity meters - which are widely used - is at best, impractical.

The above arguments that were raised by the NDTS working group are still valid and are therefore upheld by the NER in this document. The distributors should do away with inclining block tariff structures, as these are not acceptable and do not conform to the attributes outlined at the beginning of this section. The NER will therefore not approve such tariffs, except in cases where an inclining block tariff is introduced to implement a specific government’s targeted policy.

In this regard, the provision of free basic electricity is the case at hand. This is a type of inclining block tariff that will be permissible as government’s initiative to address a specific policy objective.

The **declining-block tariff** where the price decreases as consumption increases, does reflect the structure of supply costs, but can not be said to be cost reflective unless a very high unit rate is charged for the first few kWhs in order to recover the fixed costs. A further problem with the declining-block tariff is that it would appear socially unacceptable since the lowest consumption customers (in most cases the less affluent customers) are being charged a higher rate than the high consumption customers (in most cases relatively affluent customers). Finally, the declining block tariff was also rejected by the NDTS working group because of a fault that it shares with the inclining-block tariff i.e. the difficulty of implementing it on prepayment metering systems.

The NER maintains these arguments; the distributors should phase out all declining block tariffs. The NER will not approve any declining block tariff structures, as these distort the pricing signals. They create perverse incentives for customers to use energy excessively, and this discourages energy efficiency and demand side management.
A one-part single energy rate tariff as the only residential tariff structure was rejected in view of the fact that this tariff is a compromise between the need to reflect the structure of supply costs (achievable through a two-part tariff) and the need to cross-subsidise the low income residential customers whose low level of consumption would mean that they would pay an excessively high average rate if they were purchasing electricity on a two-part tariff. The one-part single energy rate tariff is a lifeline tariff and is therefore designed specifically for low consumption (generally low income) residential customers only, and not for all residential customers. Residential customers whose level of consumption is much higher than the break-even consumption level, the lifeline tariff would be paying a tariff considerably in excess of their cost of supply.

It should be noted, as discussed earlier, that a single energy rate tariff may be the most pragmatic compromise for charging for electricity used by customers who choose a lower capacity/lower quality supply.

A two-part tariff as the only residential tariff structure was rejected on the basis that the one-part single energy rate tariff, as the only tariff structure, was rejected i.e. it does not adequately cater for the range of residential customers. While the two-part tariff is the most favoured from the point of view of economically efficient tariffing, it does not allow for a cross-subsidy to the low income customers who are not able to afford the full cost of their supply. The two-part tariff is therefore specifically applicable to those residential customers with a higher average level of consumption and not for the relatively low income (and generally low consumption) lifeline customers.
5. THE ALLOCATION OF COSTS INTO THE RECOMMENDED TARIFF STRUCTURES

The purpose of this section is to provide a very high-level overview of the allocation of costs into the various tariff elements in each of the tariff structures. However, the NER is currently undertaking a separate exercise to develop guidelines for network charges (i.e. distribution use of system charges), which will provide an in-depth focus on appropriate cost allocations.

When allocating costs to various tariffs and unbundling their tariffs, the distributors should use the bulk tariff at which they purchased electricity as a reference point. This will ensure that they reflect their input costs in their rates (i.e. the end-user prices at which they sell electricity to customers) as closely as possible. That way, they can then be able pass on some of the risks to customers.

5.1 The One-part single energy rate tariff

For the one-part single energy rate tariff, all costs are expressed in a single cents/kWh charge. The recommended methodology for allocating costs into this tariff is as follows:

1. The Rands/kVA/month cost must be allocated into a cents/kWh charge through consideration of the average load factor of the types of customer who are likely to use the one-part single energy rate tariff.
2. The Rands/customer/month fixed cost should also be allocated into the cents/kWh charge and allocated to the kWh purchase costs in such a way as to ensure that at a level of monthly consumption of 400 kWh, the full amount of the fixed costs would have been recovered through the cents/kWh charge.

5.2 The Two-Part tariff

1. The Rands/kVA/month charge must be reallocated into different time-of-use cents/kWh charges through consideration of the load curve of the customer in relation to the load curve of the supplier. Such reallocated charges must then be added to the kWh purchase charges, as appropriate.

5.3 The Two-Part time-of-use tariff

1. The Rands/kVA/month charge must be re-allocated into different time-of-use cents/kWh charges through consideration of the load curve of the customer in relation to the load curve of the supplier. Such reallocated charges must then be added to the kWh purchase charges, as appropriate.
2. The Rands/customer/month charge is not reallocated.

5.4 The Three-Part tariff

1. The Rands/kVA charge recovers the capital cost elements. Some of this cost must be re-allocated into different tariff elements as discussed at the end of this section.
2. The cents/kWh charge therefore recovers the full variable costs as well as a portion of the re-allocated Rands/kVA costs.
3. The Rands/customer/month charge is not reallocated.

5.5 The Three-Part time-of-use tariff

1. As with the standard three-part tariff, a portion of the Rands/kVA/month charge needs to be re-allocated into the various time-of-use cents/kWh charges. Again, the amount of the re-allocation should be with regard to the customer’s load factor. However, it is also necessary to consider the time-variation of the capacity costs in the re-allocation of the Rands/kVA charge into the various time-of-use cents/kWh charges.
2. The cents/kWh charge therefore recovers the full variable costs as well as a portion of the re-allocated Rands/kVA charges.
3. The Rands/customer/month charge is not reallocated.

Load-factor differentiation with three-part tariffs

Since capital costs account for at least 70% of the cost of supplying different customers, if all of this cost was to be recovered through a Rands/kVA/month charge, then such a charge would be excessively high and would thus lead to sub-optimal investment decisions by the consumer. Hence it is necessary to apportion part of the Rands/kVA/month costs into the cents/kWh charge. The amount of this cost that should be re-allocated to the cents/kWh charge, will be dependent on the customer’s load factor: for low load factor customers, more of the Rands/kVA costs should be apportioned into the cents/kWh charge than for high load factor customers. The end result would be a number of distinct three-part tariffs with differing Rands/kVA/month and cents/kWh charges, catering for specific load-factor-based customer classes. The cost of supply methodology currently being developed shall give further guidelines in this regard.

Development of time-of-use tariffs by distributors who do not purchase on TOU tariffs

A difficulty exists in that many local government distributors are currently supplied on Eskom’s non-TOU tariffs (such as Nightsave urban or Nightsave rural), which only has a single energy rate that is seasonalised and not a time-of-use energy rate. This places a discontinuity in the tariff chain and prevents the correct cost-reflective pricing signal being passed on the end-customer. However, the principle of cost reflectiveness requires that such distributors structure time-of-use that reflects the time-variation of their own purchase and distribution costs.
6. NON-TARIFF CHARGES

There are a number of charges, which may be levied in addition to the standard monthly charges. Such charges are meant to recover the costs of amongst others:

- Individual customer connection costs
- Meter-installation/alteration costs
- The cost of network extensions/upgrading in the case of the extension of a distribution/reticulation to the exclusive benefit of a specific customer, or specific group of customers.

It is policy of some distributors to charge for all such non-tariff charges up-front. Other distributors spread the non-tariff charges over a number of years, while others still recover several non-tariff charges by including these charges into the standard tariff elements.

Non-tariff charges are a key element in the tariff package and the way they are handled will obviously have a direct impact on the structure and level of the standard monthly tariff charges. The general principle set out here is that non-tariff costs (i.e. customer-specific costs) should be distinguished from tariff charges (i.e. shared costs) and should preferably be recovered directly from the customer either as an up-front payment or as a monthly/annual amount. Another - less preferable - option is to recover such costs though % surcharges on the standard tariff, payable for a specific period.

However, in the case of tariffs to customers for whom affordability is a key constraint, it may be necessary to include some or all of the individual connection, meter and network charges into the basic tariff and hence recover them through consumption charges as opposed to separate capital contributions. In this case it is important that the tariffs are first calculated to exclude the recovery of such non-tariff costs. The non-tariff costs are then calculated as cents/kWh charges and transparently levied as additional charges to the basic tariff.

It is more adequate to levy such non-tariff charges on customers as a fixed charge because they may have unintended consequences if levied as a cents/kWh charge.
7. BENCH-MARK ELECTRICITY TARIFFS

At present there is no approved thorough cost-of-supply methodology in the South African electricity industry. It is necessary that a thorough cost of supply analysis be performed before a position is taken to promote specific rates as being cost-reflective. This also means that the relationship between tariffs for example to residential customers versus commercial customers can only be established once the cost of supply for average customers in each of these classes have been analysed in detail. It is worth noting however, that in countries where national energy policy has stipulated cost-reflective electricity tariffing the price to commercial customers is approximately 24% lower than the price to residential customers. Similarly, the price paid by large industrial customers in these countries is approximately half the price paid by residential customers.

The NER has a separate process underway to establish suitable benchmarks, based on a rigorous cost analysis, which will be adopted as the South African electricity distribution industry as a yardstick against which distributors can set their tariff structures and levels. The outcome of the NER benchmarking process will help the regulator to make appropriate decisions regarding end-user tariffs. It will also help to guide the tariff rationalisation process, in terms of structure and levels, in preparation for the future REDs.
8. CROSS-SUBSIDIES

This section deals specifically with the issue of cross-subsidies between different types of electricity consumers as opposed to the issue of subsidies between local government electricity departments and the local governments themselves, which is dealt with in the next section under the heading “taxation of electricity”.

Cross-subsidies from commercial and industrial customers in favour of residential customers, is commonplace in the South African electricity industry at present. However, one of the key principles underlying the design of electricity tariffs - as established earlier in this document - is that tariffs should be economically efficient. It was also stated that in order to achieve the economically efficient allocation of resources, tariffs should be cost-reflective in terms of their structure and level. Cross-subsidies by definition reflect distortions from the true cost of supply and while they may be defended on the basis of social considerations, from the point of view of economic efficiency they are undefendable.

However, the problem of affordability which is particularly prevalent in South Africa’s developing communities can only be addressed by providing some form of assistance. It was apparent from the NELF process that there is broad consensus on the need for some form of cross-subsidy to needy consumers. There is also agreement on the need to ensure that such cross-subsidies are transparently calculated and widely known. As discussed in detail earlier in the document, the one part single energy rate tariff is a suitable tariff to facilitate a subsidy to needy, low consumption consumers.

The Department of Minerals and Energy Affairs (DME) is busy developing a National Electricity Pricing policy, which was recently published for public comments in the Government Gazette (in May 2004). That policy will give a high-level guidance on the issues of cross-subsidisation and other issues relating to electricity pricing. The NER has also initiated a process of developing a cross-subsidies framework through a working group made up of various stakeholders. The purpose of the NER process is to provide detailed guidance to the industry on operational issues pertaining to the cross-subsidies, which will not necessarily be spelt out in detail in the DME policy (which will give high level guidance). The framework that is being developed will supplement the DME policy and it will be read within the context of the government.

This working group is lead by NER, with representatives from National Treasury, AMEU, SALGA, Department of Provincial and Local Government (DPLG), Energy intensive Users Group (EIUG), and Eskom.
9. TAXATION OF ELECTRICITY

It is common practice for local government distributors to transfer trading surpluses from their electricity accounts to other, non-electricity-related activities. This practice amounts to taxation of electricity usage. The NELF tariff working group expressed serious concern over the practice of taxing electricity - which is used as an input commodity by industry and commerce. The NDTS working group shared that concern, in the 1995 INDTs document. The NDTS working group also raised concerns about electricity being used by local government to subsidise other services while at the same time inadequate attention also concerned that electricity is used to subsidise other services while at the same time inadequate funds are available for the electrification needs of the local government’s own communities.

The NER shares those concerns, as they are still valid. Heavy cross-subsidisation of other non-electricity-related services by electricity customers is not justified, considering the fact that electricity is a basic service. The need for local governments to fund their various activities and to provide essential services is not disputed. It is the manner of such funding that is found unacceptable. In line with the pricing objectives to ensure that electricity is supplied in an efficient manner and at minimum cost to all consumers, the NER’s stance is that unreasonable taxes on electricity supply are not acceptable. Such taxes result in money flowing out of the industry and thus weakening the industry’s ability to meet the needs of all its existing and potential future customers, at least cost.

While the NER has no direct jurisdiction over the issue of local government taxation of electricity supply, it is an absolutely necessary requirement where local governments tax electricity, that such taxes should be levied transparently. Any taxes levied on electricity should be reflected separately on the customer’s bill and not appear as part of the cost. Furthermore, an effort should be made by distributors to limit such taxation to the minimum.

The manner in which taxes are levied determines what impact such taxes will have on customers. Since electricity supply is not only volume related and has other factors such as load factor, a tax levied in c/kWh may have unintended consequences on some customers. It will have a higher impact on high load factor customers than on customers with low load factors. A percentage on the other hand may impact more on low load factor customers, who are also poorer. It is therefore very important for electricity distributors to ensure that any taxes levied on electricity are levied appropriately, to avoid unintended consequences.

The distributors should therefore determine the purpose of such taxes as well as identify the customers they intend to impose such taxes before deciding on how they will levy such a tax. Thereafter, they can decide whether it will be levied as a percentage of the total customer bill, percentage of the tariff components, a fixed amount in Rands per customer per month, or as a c/kWh amount added to the tariffs.
10. RECOMMENDATIONS

The recommendations are as follows:

1. The most important attributes of an electricity tariff system are that (ranked in order of importance):
   - Tariffs should enhance economic efficiency in the allocation of the country’s resources. An important step in satisfying this criterion is that the structure of tariffs should be cost-reflective. Tariffs should also be cost-reflective in terms of their level, though under special circumstances deviations in structure and level may be necessary so as to provide for other considerations. Such considerations that need to be made by distributors in setting their tariff levels and structure are affordability by customers, simplicity and practicality of their implementation.
   - Within limits, customers should be free to choose from a range of applicable tariffs. Tariffs should be based and defined on the cost of supply to the customer and not on the customer’s usage of electricity. This would mean that, for example, an industrial/manufacturing customer and a commercial customer should have access to the same tariffs if their cost of supply is the same.
   - All distributors should apply a defined national cost of supply methodology so as to ensure equity and fairness between customers serviced by different suppliers. In absence of an approved industry cost of supply methodology, all distributors are required to conduct a detailed cost of supply study that will form basis of their tariffs. Some guidance in this regard can be received from the NRS058 cost of supply methodology, although not an approved industry document. Wide tariff differentials between different/neighbouring suppliers must be prevented and where they occur they will have to be justified.
   - An effort should be made to establish and publicise the average level of cross subsidy between customer categories so that customers are made aware of it. The distributors should minimise.
   - Tariffs should take account of a number of other factors, such as the need to be easy and economical to administer, the need to reflect the cost of differing levels of quality of supply, the need to facilitate the use of appropriate technologies and the need to ensure stability, simplicity and understandability.

2. That the five standard tariff structures and one special tariff structure as described in Section 4 of this document be recommended as the tariff structures of the National Retail Tariff Guideline.

3. That modification of any of the above standard tariff structures by means of unbundling and introducing seasonality in some or all the tariff components be allowed, subject to NER approval, where this implies more cost-reflectivity.
Unbundled and seasonised tariffs are considered to still reflect various elements of the three standard tariff components. For example, some distributors split the fixed charge (in Rands/customer/month into service charge, administration and network charge for large customers. For some distributors, the levels of these charges differ in winter and summer seasons.

4. That in the absence of a comprehensive national cost of supply methodology, the distributors should conduct detailed cost of study that they can use as a basis in the determining their tariffs.

5. That this document National Retail Tariff Guideline be approved and adopted as a national tariff system that provides guidance to electricity distributors for setting levels and structures of their standard tariffs. This national tariff system must be implemented in the electricity industry with distributors being allowed to continue adjusting their tariffs progressively over a period (say 2-5 years) to the defined standard structures. Such tariff rationalisation should be aided through the proposed rationalisation of the distribution industry.

6. On the issue of the taxation of electricity by local governments, it is clearly understood however, that profits from the sale of electricity have provided an essential revenue source to a number of local governments and the immediate withdrawal of such a revenue source will simply collapse such local governments. This is obviously unacceptable. While the NER has no direct jurisdiction over the issue of local government taxation of electricity supply, it stressed that where electricity is taxed by local governments, that such tax should be levied transparently; clearly reflected separately from costs and furthermore that an effort should be made to limit such taxation to the minimum. The distributors should ensure that the taxes they levy do not have unintended consequences for customers.

7. Electricity pricing is a dynamic field and the development of an electricity pricing policy and its application, should be reactive to the needs of the industry, to its customers and to society at large. This document is a living document and shall be up-dated periodically to reflect new ideas and new developments.

8. That the outputs of the benchmarking exercise currently undertaken by NER, once completed and approved, be adopted as supplement to this document and be used industry as basis for rationalisation of tariff structures and levels.

9. That outputs of other NER processes to develop guidelines on network charges (DUOS), system losses, connection charges and cross-subsidies framework be adopted as supplements to this industry document, upon their completion and approval by the NER.

10. That this document, with its attachments that will be produced in the DUOS, tariff rationalisation and benchmarking processes of the NER, be used as an enforcement tool to direct licensed distributors on how they should determine their tariffs.
ANNEXURE 2: KEY TERMS AND DEFINITIONS

1 CHARGES, PRICES OR RATES

Charges, prices or rates are the amounts that the customer will be expected to pay for various products and services related to the supply of electricity. The product is electrical energy, for which one or more energy charges (or prices or rates) may be levied. One service is transportation of the product via the high-voltage transmission network. Another is the transportation of the product over the medium- and low-voltage distribution networks. A third is the services provided to customers by the retailers (connection to the respective networks, metering, billing, complaint resolution, marketing and sales, etc.). These charges are defined in more detail in the WEPS document on the NER website.

2 CONTESTABLE CUSTOMERS

Contestable customers are large end-use customers currently consuming more than 100 GWh of electricity on average per annum at a single contiguous site. These customers would eventually be entitled to select their retailer of choice or purchase their electricity supplies at wholesale level. Customers will be assessed on their actual usage in the preceding year. For the purpose of the second phase of WEPS contiguous is defined as a single operational entity under a single management structure. Exceptions will be considered by the NER.

3 WEPS SURCHARGE

WEPS surcharges are imposed for a regulated period of time, to compensate the distributor for a loss of revenue, or the customer for an increase in charges due to conversion to WEPS. Revenue changes due to changes in load profile after conversion is not included.

Suppliers may impose a WEPS surcharge or customers may receive a WEPS rebate, subject to NER approval, in accordance with approved frameworks.

4 COST OF SUPPLY

The full economic cost of each cost component to supply a defined class of customer, excluding taxes, levies and surcharges. For the purposes of implementing WEPS, cost of supply shall be calculated in accordance with NER approved methodology. Currently the NER supports the use of the NRS 058 methodology – agreed to by the ESLC (technical committee comprising Eskom, AMEU, and SABS Customers - in determining the costs.

5 COST REFLECTIVE TARIFFS

A tariff that reflects the cost of supply in both the structure and rates charged.
6 CROSS-SUBSIDIES - EXPLICIT
Explicit cross-subsidies arise when quantified subsidies are deliberately allocated to particular customers or customer classes.

7 CROSS-SUBSIDIES - GOVERNMENT LEVY OR TAX
Any component in a tariff the revenue of which is not used in the supply of electricity will be called a Government Levy and reflected separately in the tariff. Such Government Levies must be approved and received by government.

8 CROSS-SUBSIDIES - IMPLICIT
Implicit cross-subsidies arise when un-quantified subsidies are allocated to particular customers or customer classes, mostly as a result of inaccuracies in the cost-of-supply methodology or as a result of the tariff structure that is used.

9 CROSS-SUBSIDISATION
The over-recovery of revenue from some customers relative to cost of supply (i.e. electricity levies) and the simultaneous under-recovery of revenue from other customers relative to cost (i.e. electricity subsidies).

10 CROSS-SUBSIDISATION - ELECTRICITY LEVY
The negative difference between the cost of supply and the actual price paid, excluding any tax, is called an electricity levy. Any category of customer who pays more than the cost of supply pays an electricity levy.

11 CROSS-SUBSIDISATION - ELECTRICITY SUBSIDY
The positive difference between the cost of supply and the actual price paid, excluding any tax, is called an electricity subsidy.

Certain categories of customers, at a particular time due to combinations of their unique social, locality or consumption circumstances pay less than the cost of supply and therefore receive an electricity subsidy.

12 CROSS-SUBSIDISATION - INTER-TARIFF
Inter-tariff cross-subsidisation is the subsidisation of customers on a particular tariff by customers on a different tariff. This form of subsidisation arises from the fact that, on average, certain tariffs do not recover the true cost of their supply, while other tariffs over-recover with respect to the average cost of supply of the customers on those tariffs.
13 CROSS-SUBSIDISATION - VOLTAGE (PART OF INTRA TARIFF)

This subsidisation is identified from a pooling of costs at different voltage levels in accordance with NRS 058. Eskom’s tariffs include a significant subsidy to low voltage customers from high voltage customers on the same tariff.

14 CROSS-SUBSIDISATION - GEOGRAPHIC (CONTAINED IN INTER AND INTRA - TARIFF CROSS-SUBSIDIES)

Geographic cross-subsidisation refers to the fact that tariffs do not accurately reflect the true cost of supply in the different geographic regions of the country. Geographic cost-differences are the result of two main reasons:

The higher capital investment and operational costs that results from transporting electricity over different distances to reach the customers. The increase in technical losses with an increase in transportation distance.

15 CROSS-SUBSIDISATION - INTRA-TARIFF

Intra-tariff cross-subsidisation results from over-charging some customers on a tariff and under-charging other customers on the same tariff. The main cause of this form of cross-subsidisation is the tariff structure and cost allocation methodology, e.g. the pooling of network costs for differing customer load profiles.

16 CUSTOMER SERVICES AND ADMINISTRATION CHARGES:

These are the charges designed to recover the costs of providing services to customers such as metering, billing, marketing, selling, administration, counselling, etc.

17 DISTRIBUTION CONNECTION CHARGES:

These are the charges designed to recover the costs of connecting customers to the nearest distribution network, calculated in accordance with NER- approved policy, and include the costs of customer-dedicated lines, transformation, meters, servitudes, etc.

18 DISTRIBUTION USE OF SYSTEM CHARGES:

These are the charges designed to recover the residual costs of the distribution network infrastructure, as well as the energy losses in that network and the operational costs of the distributor, all of them shared by all customers, and include the costs of lines, transformation, meters, servitudes, etc. as well as the cost of the electrical energy lost in the lines.
19 **ELECTRICITY DISTRIBUTION INDUSTRY (EDI)**

The Electricity Distribution Industry (EDI) is that part of the electricity industry which distributes, reticulates and retails the electricity at distribution voltages to end-use customers. The players in the EDI consist of distributors, retailers and traders, either separately or in the form of bundled utilities. The various businesses in the industry may be either state-owned or privately owned. Currently licensees in the EDI are Eskom Distribution and some 237 Municipal Electricity Undertakings (MEUs), as well as some private sector distributors (e.g. Sasol, AECI, mines).

The Distribution Network is defined as networks operating at 132 kV and below.

20 **ELECTRICITY SUPPLY INDUSTRY (ESI)**

The Electricity Supply Industry (ESI) are those components of the electricity industry that deals with the wholesale generation and supply of electricity. It would therefore include generators, the transmission system and bulk purchasers of electricity such as traders and retailers.

21 **ENERGY CHARGES**

These are the charges designed to recover the costs of generating electrical energy, at various periods during the day (peak, off-peak and standard periods) and at various seasons during the year (summer and winter seasons). There are thus six energy charges corresponding to these three daily periods and two annual seasons. These are amended from time to time.

22 **EMBEDDED CUSTOMERS (MUNICIPAL)**

Embedded customers are contestable customers connected to the distribution networks of municipal electricity suppliers.

23 **ENERGY POLICY WHITE PAPER (EPWP)**

The Energy Policy White Paper was published by the Department of Minerals and Energy in December 1998. It spells out Government imperatives for the energy sector, and in particular for the electricity industry. One of these imperatives is unbundled, cost-reflective and transparent tariffs (including levies or subsidies).

24 **NATIONAL ELECTRICITY REGULATOR (NER)**

The National Electricity Regulator is the regulator established in terms of the Electricity Act, Act 41 of 1987 as amended.

25 **PRICING SIGNALS**

Pricing signals are signals designed into the tariff structures and levels which aim to make generators, end-use customers and intermediaries aware of the cost of
generating, transmitting, distributing or retailing electricity so that they will respond to the signals appropriately through demand-side management (DSM), appropriate location, etc. The behaviour of customers is thus influenced so as to achieve an economically efficient outcome that benefits both the customers and the suppliers.

26 REACTIVE ENERGY CHARGES
These are the charges designed to recover the costs of infrastructure required to compensate for poor power factor, and forms part of the distribution Use-of-System charges.

27 REGIONAL ELECTRICITY DISTRIBUTORS (REDS)
The regional electricity distributors (REDS) are new distribution and retailing utilities that Government plans to create from the amalgamation of the Municipal Electricity Undertakings and Eskom distribution in six adjacent areas covering the whole of South Africa.

28 RETAILER
An entity, either licensed or registered, conducting wholesale purchasing for own use or for selling to end-use customers. Distributors would be required to ringfence this activity.

29 TARIFF LEVEL
Tariff levels refer to the value of each component of the tariff; for example, in a two-part tariff structure for domestic customers this would be the energy charge in cents per kWh and the basic charge in Rands per customer per month. The customers’ bill for the month is thus determined by multiplying his or her kWh reading for the month by the energy charge in c/kWh and adding the basic charge plus any associated taxes, such as VAT.

30 TARIFF STRUCTURE
The tariff structure defines all the components of price and the relationships to consumption. For example, in a two-part tariff structure for domestic customers there may be two components: a single flat energy charge in cents per kWh and a fixed monthly basic charge in Rands per customer. For a large industrial customer, there may be a three-part time-of-use tariff (TOU) structure consisting of six TOU-related energy charges, a network capacity-related demand charge in Rands per kVA, and a fixed monthly basic charge in Rands per customer.

31 TARIFFS
Tariffs are the combination of charges or prices or rates paid by particular customer classes or sub-classes (i.e. tariff classes). These tariffs are defined by a tariff structure and a tariff level (i.e. a set of price levels).
32 TRANSMISSION CONNECTION CHARGES:
These are the charges designed to recover the customer-specific costs of connecting distributors or large end-use customers to the transmission system, as defined in the Grid Code.

33 TRANSMISSION USE OF SYSTEM CHARGES:
These are the charges designed to recover the costs of the transmission system infrastructure, the reliability services and the energy losses in that network and the operational costs of the transmitter, all of them shared by all customers, and include the costs of lines, transformation, meters, servitudes, etc., reserve capacity and reactive energy, as well as the cost of the electrical energy technical losses.

34 UNBUNDLED TARIFFS
A tariff is unbundled when all the unique cost components that are contained in that tariff are charged for separately

35 WEPS ADMINISTRATION:
The activity that ensures the collection of WEPS revenue and the appropriate allocation of these funds to the relevant service providers. In WEPS-phase 2 Eskom will perform this function. For phases 3(a) and 3(b) the appropriate administration function still needs to be defined.

36 WEPS REGULATORY FRAMEWORK:
The framework that governs the implementation of WEPS as approved by the NER.

37 WHOLESALE ELECTRICITY PRICING SYSTEM (WEPS)
The wholesale electricity pricing system is a set of tariffs for generation, transmission and distribution of electricity at wholesale level. The transactions will take place amongst these entities, retailers and competing contestable customers.

In a competitive market the tariffs for energy will be replaced by market prices and will depend on market design and other trading mechanisms. It is the intention of government to introduce a competitive market, therefore WEPS customers will be subjected to the phasing-out of WEPS as directed by the NER, in accordance with the industry restructuring initiative of government.