

Republic of the Philippines  
**ENERGY REGULATORY COMMISSION**  
San Miguel Avenue, Pasig City



RESOLUTION NO. 43, SERIES OF 2006

**ADOPTING THE FINAL ASSET VALUATION POLICY  
GUIDELINES FOR PRIVATELY OWNED DISTRIBUTION  
UTILITIES SUBJECT TO PERFORMANCE BASED REGULATION**

**WHEREAS**, on December 10, 2004, the Commission adopted Resolution No. 12-02, Series of 2004, entitled "Adopting a Methodology for Setting Distribution Wheeling Rates" thereby promulgating the Distribution Wheeling Rates Guidelines (DWRG);

**WHEREAS**, the DWRG provides for a new methodology for setting the distribution rates of private distribution utilities (DUs) denominated as Performance Based Regulation (PBR);

**WHEREAS**, for purposes of determining regulated network prices, the Commission prepared a draft "Asset Valuation Guidelines" (Guidelines) which will be used in the valuation of network assets of privately owned Distribution Utilities (PUs) that are subject to PBR;

**WHEREAS**, on various dates, the said Guidelines were subjected to public consultations in each of the franchise areas of the initial entrants to PBR, namely: 1) Manila Electric Company (MERALCO), 2) Dagupan Electric Corporation (DECORP) and 3) Cagayan Electric Power & Light Company, Inc. (CEPALCO);


**WHEREAS**, after due consideration and incorporation of the comments made and clarifications sought, the Commission now finds the final version of the Guidelines as appropriate reference for the first entrants in the PBR process;

**NOW, THEREFORE**, be it **RESOLVED**, as the Commission hereby **RESOLVES**, to **APPROVE** and **ADOPT**, as it hereby **APPROVES** and **ADOPTS**, the "**FINAL ASSET VALUATION POLICY GUIDELINES FOR PRIVATELY OWNED DISTRIBUTION UTILITIES SUBJECT TO PERFORMANCE BASED**

**REGULATION** " hereto attached as Annex "A" and made an integral part of this Resolution.

This Resolution shall take effect immediately. This resolution is hereby ordered to be posted on the website, filed with the University of the Philippines Law Center Office of the National Administrative Register (ONAR) and published in a newspaper of general circulation.

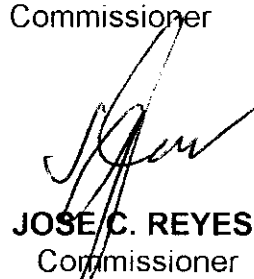
Pasig City, August 9, 2006.

  
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Chairman

  
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Commissioner

**ASSET VALUATION POLICY GUIDELINES  
FOR PRIVATELY OWNED DISTRIBUTION UTILITIES  
SUBJECT TO PERFORMANCE BASED REGULATION**

**FINAL**

***ENERGY REGULATORY COMMISSION***



**AUGUST 9, 2006**

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- Appendix B: Setting Standard Replacement Costs & Asset Lives**
- Appendix C: Philippines Assets In Use & Asset Lives**

## 1. INTRODUCTION

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### 1.1 GENERAL

The purpose of this Asset Valuation Guidelines (“The Guidelines”) is to provide practical guidance for the valuation of the network assets of privately owned Distribution Utilities (DUs) that are subject to performance based regulation (PBR). The Guidelines describe a consistent and transparent approach to network asset valuation based on independently determined and generally accepted valuation principles, using the optimized depreciated replacement cost (ODRC) approach as described in the Distribution Wheeling Rate Guidelines (DWRG)<sup>1</sup>. The Guidelines will be used in the preparation of valuations as part of the application to the Energy Regulatory Commission (ERC) in its determination of regulated network prices for DUs subject to PBR.

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<sup>1</sup> ERC document titled “*Guidelines on the Methodology for Setting Distribution Wheeling Rates : Privately Owned Distribution Utilities*” dated December 10, 2004

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## 2. GENERAL PRINCIPLES

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### 2.1 INTRODUCTION

The purpose of the Guidelines is to provide practical guidance for the valuation of network assets of electricity DUs for regulatory pricing purposes under PBR. The Guidelines are designed to achieve a consistent and transparent application of the ODRC<sup>2</sup> approach to asset valuations.

#### 2.1.1 Background

Due to the capital-intensive nature of electricity networks, capital-related costs represent a significant proportion of the DU's annual revenue requirement (ARR). Return on and return of capital typically constitutes over 70% of electricity distributors' base revenue requirement. The value of the Regulatory Asset Base is, therefore, a critical input into the determination of regulated charges and provides an important signal for efficient pricing and future investment.

A well-defined asset valuation methodology is required in order that the regulatory objectives of transparency and consistency are achieved.

The aim of the ERC is to adopt a regulatory process which eliminates monopoly pricing, provides a fair return to network owners, and creates incentives for managers to pursue ongoing efficiency gains through cost reductions.

Regulators permit DUs to earn a reasonable (risk adjusted) return on their investment capital, provided that the market continues to value the services produced with that capital. It is therefore necessary to assess the value of system and non-system network supply assets so that an appropriate return on assets can be calculated.

The arrangements for the valuation of the RAB are set out in the DWRG. The terms of reference for the DWRG are pursuant to Section 43(f) of Republic Act No. 9136, otherwise known as the Electric Power Industry Reform Act of 2001 (EPIRA), and Rule 15, Section 5(a) of the Implementing Rules and Regulations issued pursuant to that Act.

The DWRG establishes the procedure for determining the ARR of each distribution network provider and sets out the requirements for valuing the initial capital base.

#### 2.1.2 Regulatory Framework

The objective of the PBR regulatory framework is to balance the interest of network owners and users. The framework is based on establishing a price cap determined using the building block approach which involves estimating the overall cost of service to the entity. This framework ensures positive incentives

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<sup>2</sup> The Optimised Depreciated Replacement Cost (ODRC) is also referred to as the Depreciated Optimised Replacement Cost (DORC) approach.

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for owners and protects the value of businesses in line with the objectives of the DWRG.

The building block approach that has been adopted by the ERC is described in the DWRG (section 4.6 of the DWRG). The return on capital, which requires the valuation of the RAB, is one of the key building blocks described.

The Guidelines have been formulated to calculate the value of the initial asset base component for the regulatory process. This includes the valuation of network system assets, non-system assets, land, easements and capital contributions as at the date of the Initial Re-valuation (described in section 4.8 of the DWRG).

### 2.1.3 Valuation Methodologies

For most standard asset valuations, the International Valuation Standards as published by the International Valuation Standards Committee (IVSC) outlines a number of approaches.

The three most commonly used approaches are;

- i) the market comparison approach
- ii) the income approach (or cash flow approach)
- iii) the (optimised) depreciated replacement cost approach.

The market comparison approach seeks to determine the current value of an asset by reference to recent comparable transactions involving the sale of similar assets. The market comparison approach is not suitable for an electricity distribution network as such networks in their entirety are not bought and sold on a regular basis.

Where it is not possible to determine values for assets using a market comparison approach the valuer seeks to replicate the thought processes of an informed potential purchaser acting without compulsion in assessing the market value of the assets (the income approach). The income approach is not particularly suitable for an electricity distribution network as the forecast of income is problematic.

The ODRC is a valuation approach used to assess the value of assets where:

- The base value of assets can be based on historical asset costs, indexed replacement costs or on a modern equivalent asset base (MEA); and
- An optimization component is introduced to ensure that assets are constructed in the most efficient manner possible while maintaining required service standards.

The ODRC is an approach normally applied to specialised assets such as electricity transmission and distribution networks.

It is also a methodology considered consistent with the building block approach used for rate setting purposes, and is the method specified under the DWRG.

#### 2.1.4 Valuation of Assets Under DWRG

The DWRG provides guidance and sets out requirements for the valuation of assets. The base valuation methodology is specified in Clauses 4.8.4 and 4.8.5 of the DWRG as follows:

**Clause 4.8.4.** For the purposes of the Initial Re-valuation in relation to a Regulated Distribution System, and in the circumstances specified below in connection with them, the following methods of re-valuation may be used for different Asset Categories (as specified in, or in accordance with, Section 4.8.5):

(a) **Indexation** - this method is appropriate for assets where there has been little technological change and most, if not all, direct costs that have been incurred and capitalised in respect of those assets would have to be incurred if they were replaced. This method has the feature that the valuation is directly linked to the historical value of the relevant assets, thereby ensuring that all relevant costs are included in the valuation.

(b) **Absolute valuation by replacement cost analysis** - this method of valuation involves valuing the relevant assets at their current unit prices multiplied by their volumes. Such prices may be verified by reference to the purchase price of like assets within the last twelve (12) months or by reference to recent documented arm's length quotations for the sale of those (or similar) assets. Such prices should include the discounts available from purchasing in the volumes which have been used in the normal course of business and must be increased to cover relevant costs arising from design, procurement, mobilisation, construction and commissioning. This approach may be used in valuing an asset where there has not been significant technological change and where it has not been possible to develop an appropriate index for the valuation of that asset for the purposes of the re-valuation method referred to in paragraph (a).

(c) **Absolute valuation using modern equivalent asset analysis** – this method of valuation involves valuing the relevant assets at the cost of a modern equivalent asset with similar service potential (for example, an asset which replicates at least their current capacity and functionality). It may be used when it is not possible to determine the current replacement cost for an asset, e.g. because that asset is no longer manufactured.

With regard to (c), the modern equivalent asset can be considered as an asset that has not been introduced as a DU standard, but is considered elsewhere as a proven technology that is more cost efficient with similar service potential.

Each of the above methods can be used to determine the Gross Current Replacement Costs of an asset (refer Section 3.2).

According to the DWRG, the Gross Current Replacement Costs must also be depreciated and optimized, so that the final form of the valuation is the Optimised Depreciated Replacement Cost (ODRC) valuation.

#### 2.1.5 Regulatory Period

An asset revaluation must be undertaken for each Regulated Distribution System, which will culminate in an Initial Revaluation Report for each Regulated Distribution System. This is to be completed at least eleven (11) months before

the start of the Second Regulatory Period, on 1 July 2007. Accordingly, the asset revaluation must be completed before **1 August 2006**. However, to allow the DUs sufficient time to prepare their rate applications under PBR and for the public consultation process to follow, the ERC requires the Initial Re-valuation to be completed on June 30, 2006.<sup>3</sup>

Following the Initial Revaluation Report, the Regulatory Asset Base for a Regulated Distribution System for any Regulatory Year will be derived from a roll-forward calculation of the value of each Asset Category.

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<sup>3</sup> This is the date accepted in the ERC's "*Position Paper on the Regulatory Reset Process for the Second Regulatory period*", dated December 9, 2005, following a public consultation process on an "*Issues Paper*" published by the ERC on September 30, 2005.

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### 3. OPTIMISED DEPRECIATED REPLACEMENT COST (ODRC)

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#### 3.1 CONCEPTUAL FRAMEWORK

The ODRC is calculated based on the gross current replacement cost (GCRC) of assets (which can be similar to historically used assets where there has been little technological change) that are adjusted for over-design, over-capacity and/or redundant assets, less an allowance for depreciation.

The ODRC valuation approach is used to determine a hypothetical value of the assets. This hypothetical value is a surrogate for market value in circumstances where it is not possible to determine values for specialised assets using a market comparison approach.

It follows therefore that the valuation approach should seek to reflect market behaviour, or put another way, the application of the approach should seek to replicate the thought process that would be followed by an informed potential purchaser acting without compulsion.

Where market evidence is readily available it is possible to establish a relationship between market value and replacement cost. Where market evidence is available for the same broad asset at varying ages, it becomes possible to establish a loss in value or depreciation profile. By its very nature, such a profile takes into account supply/demand characteristics and the impact of all other factors on value.

Conversely, in the absence of suitable market data, the valuer should seek to construct a loss in value or depreciation profile by measuring by other means, the various factors that impact on value.

In respect of the optimisation part of this measurement process, the valuer attempts to assess value by reference to the concept of substitution. It is logical to assume that the maximum amount a potential purchaser would be prepared to pay for an asset is represented by the purchaser's lowest alternative cost to replicate the asset. In assessing what represents the lowest alternative cost, consideration must be given to the optimum set of assets that would be required to provide the reasonably foreseeable services required to be delivered by the assets, at reasonably expected quality levels.

If the existing asset does not represent the lowest cost alternative asset to provide the reasonably foreseeable services, then the potential purchaser will adopt the replacement cost of the lowest cost alternative in place of the reproduction cost of the existing asset.

The ODRC of electricity transmission and distribution assets has been described as representing the minimum cost of replacing or replicating the service potential embodied in the network with modern equivalent assets in the most efficient way possible from an engineering perspective, given the service requirements, the age and condition of the existing assets and replacement in the normal course of business.

This concept is consistent with the principles of fairness and equity required in assessing access charges in that users only pay for those assets that are

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required in a commercial context and therefore are not required to pay for any excess capacity or over-engineering embodied in the existing assets.

As outlined above, the ODRC approach involves three main steps:

1. Establishing the GCRC of the gross service potential embodied in the existing assets (with consideration to modern equivalent assets).
2. Adjusting the gross current replacement cost determined above for over-design, over-capacity and redundant assets.
3. Depreciating this value to reflect the anticipated effective working life of the asset from new, the age of the asset and the estimated residual value at the end of the asset's working life.

### **3.2 ESTABLISHMENT OF GROSS CURRENT REPLACEMENT COST**

The GCRC can be established:

- By reference to historical costs, adjusted for inflationary increases since construction (the indexation method);
- By comparison with recent costs of similar assets (the replacement cost method);
- By reference to technologically advanced assets in use elsewhere (the modern equivalent asset method).

Where the indexation method is used, a suitable index must be employed (using a Retail or Consumer Price Index).

Where the GCRC is based on the replacement cost method, the efficient current cost is determined by contacting suppliers, manufacturers or their agents, or by reference to recently published prices.

Where the GCRC is based on modern equivalent assets, it is determined by reference to the current market buying price, current reproduction cost or replacement cost of modern equivalent assets.

In respect of specialised assets, such as most network infrastructure, the appropriate cost is the lower of the current replacement cost and the current reproduction cost of the gross service potential of the existing asset.

#### **3.2.1 Modern Equivalent Asset**

A commonly accepted principle in determining replacement costs is that the replacement cost to be used is the "lowest cost per unit at which the gross service potential could be obtained in the normal course of business".

GCRC of a modern equivalent asset is defined as:

"The minimum that it would cost, in the normal course of business, to replace the existing asset with a technologically modern equivalent new asset with the same service potential, allowing for any differences in the quantity and quality of output and in operating costs".

The statement above requires the valuer to measure the gross service potential of an existing asset by reference to its modern equivalent asset. Reference to the modern equivalent asset is only made so as to obtain a current replacement cost for the asset already held, regardless of whether the modern equivalent asset will ever be purchased, or whether the existing assets will ever be replaced.

Further:

“In determining current cost with reference to the most appropriate modern facility the capacity of that facility should not be such as would exceed materially ... the scale of the entity’s existing operations. The modern facility should be of commercially available technology and should not require a redesign or re-engineering of an entity’s existing plant “.

### **3.2.2 Expected Capacity in Use**

The replacement costs of individual assets should be based on the “expected capacity in use” of the existing assets. “Expected capacity in use” is the required level of service potential or output consistent with both the future growth in demand and the objective of minimising the whole of life cost of assets under ‘total asset management’ concepts and business planning horizons. As systems expand and change a degree of suboptimality at any one time is inevitable and is part of the total cost of output.

Where the modern equivalent asset has a different capacity, a pro-rata adjustment is necessary to value the expected capacity in use of the existing asset.

This determination of the modern equivalent asset that would replace existing individual components of the network should not be confused with the process of optimisation.

### **3.2.3 Cost Basis**

Current costs can be determined on a ‘Greenfields’ or ‘Brownfields’ basis. The ‘Greenfields’ cost basis assumes construction occurs in an area free of development. The ‘Brownfields’ cost basis assumes construction occurs around all existing infrastructure and development.

The ‘Brownfields’ cost basis has been adopted by the ERC and is considered appropriate because it is consistent with the concept of establishing the potential purchaser’s lowest alternative cost to replicate the network (i.e., a duplicate network would need to be built in the existing environment). The current cost estimates should reflect the current state of land use development.

The ‘Brownfields’ cost structure is widely used for ODRC valuations including electricity, gas and water infrastructure assets in most countries adopting ODRC or ODV valuation method.

### 3.2.4 Direct Costs

The direct costs applied include any applicable indirect taxes in accordance with current tax legislation. Such indirect taxes are to be explicitly identified as a percentage of the replacement cost determined for each asset type.

### 3.2.5 Indirect Costs

Due allowance must be made for indirect costs associated with the acquisition and/or creation of the asset such as on-costs, design and engineering costs, freight, duty, local delivery, interest during construction, etc.

## 3.3 OPTIMISED REPLACEMENT COST ADJUSTMENTS

Because the ODRC of the network assets is based on determining the value of the service potential embodied in the assets, it is necessary to adjust the gross replacement cost of the existing assets for overdesign, overcapacity and redundant assets.

The Independent Pricing & Regulatory Tribunal of New South Wales, Australia (IPART) states that *“an optimised system is a reconfigured system using modern technology designed to serve the current load with current technology, with some allowances for growth. This method excludes any unused or under utilised assets and allows for potential cost savings that may have resulted from technological improvement.”*<sup>4</sup>

Therefore, when adopting the ODRC approach the valuer must establish whether the asset in its current form represents the optimum replacement given technological and functional changes since construction. By way of example optimisation may be required in situations where:

- the existing asset has a greater capacity than is required for existing and reasonably foreseeable use;
- the capacity or service potential embodied in the existing asset could be replaced more cheaply than the cost of reproduction of the existing asset due to improvements in construction techniques, economies of scale, etc.

In assessing the level of optimisation, it is important to recognise that it is not intended that a complete redesign or “greenfields optimisation” of the network be undertaken. Instead “incremental optimisation” is adopted, which allows progressive optimisation to the extent that it occurs in the normal course of business.

Incremental optimisation places a limiting constraint on the extent of optimisation. It denies a valuation based on optimal replacement of an entity’s entire asset network. This latter approach is known as “greenfields optimisation”.

The incremental ODRC approach recognises that there is always some degree of suboptimality and allowance for growth in future demand, and it reflects the historical development of the existing business, the time lag in asset planning and construction, the very long lives of the assets, and the replacement of its

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<sup>4</sup> IPART, Aspects of the NSW Rail Access Regime, Draft Report, February 1999

components, in the normal course of business. As systems expand and change, a degree of sub-optimality at any point of time is inevitable and is part of the total cost of output.

The issue of re-designing the complete network layout is not considered appropriate for ODRC valuations of infrastructure. This is consistent with ODRC valuations undertaken for regulatory pricing purposes in respect of the electricity transmission and distribution networks in Australia, United Kingdom and New Zealand.

### **3.3.1 Identifying Over-Capacity**

The optimisation should be based on the reasonably expected level of use of the asset. The reasonably expected level of use will be determined by reference to the required level of service potential or output consistent with both the reasonably foreseeable future demand and the objective of minimising the whole of life costs of assets.

Whilst reliably projecting load growth has its own problems, the issue of what represents a reasonable timeframe is also problematic. This is because both elements have a degree of subjectivity in their determination.

Given the fact that many infrastructure assets are long lived and have a high capital cost, adopting an artificially short timeframe can have a distorting effect on the valuation. Furthermore the incremental cost of providing additional capacity at initial construction rather than on an incremental basis in response to actual demand growth often makes good commercial sense when considered over the longer term.

Under the DWRG, the basic rules established by the ERC for the optimized network are that it should:

- a) provide a quality of supply similar to that which currently exists, except where this exceeds the approved standard quality of supply criteria; and
- b) have a capacity similar to that of the existing network, except where this exceeds allowed future load growth over the forecast periods allowed.

### **3.3.2 Identifying Over-Engineering**

One of the key features to consider in respect of whether a distribution network is over-engineered is the required reliability and security of the power system supplies.

The reliability of supply in a power system is a measure of its ability to survive a contingency (such as the failure of a generator) without interrupting supply to customers. Power system supply reliability is therefore related to the amount of spare or reserve capacity available to cover contingencies and the probability of contingencies occurring.

The required level of service for distribution networks is defined in terms of currently accepted service standards in the electricity supply industry in Philippines and countries with similar conditions.

### **3.3.3 Over-Designed, Excess Capacity, Redundant and Standby Assets**

Where assets are over designed, have excess capacity, or are redundant, then an adjustment needs to be made to the valuation. The adjustment is made so the resulting valuation reflects the cost of replacing the existing service potential of the assets based on an efficient set of modern equivalent assets to achieve the required level of service output ("capacity in use") within the entity's planning horizon.

Overcapacity or redundant assets may be defined as assets with a greater service capacity than is necessary to meet the service delivery outputs within the entity's business and total asset management planning horizon.

Severable components of an integrated network that are redundant should be regarded as surplus assets and excluded from the valuation. Non-severable components, which are redundant or represent overcapacity, should also be excluded from the valuation.

Overdesigned assets are assets with features unnecessary for the goods or services the assets provide. Measuring the service potential embodied in these assets, based on modern equivalent assets, automatically excludes attributing any value to the overdesigned features.

Standby assets are assets kept as back up to an operating asset in the normal course of business to minimise disruption of production when prime assets are temporarily out of service. As such, they are an integral part of the operating asset and should be valued in the same way as other assets subject to service and quality standards.

## **3.4 DETERMINING THE ODRC OF ASSETS**

### **3.4.1 Introduction**

The optimised gross replacement cost of an asset must be depreciated where the existing asset's remaining useful life is less than the life of a new asset. Depreciation recognises the limited remaining useful life of an asset.

### **3.4.2 Principles in Determining Depreciation**

The principles to be applied in determining depreciation are detailed in Section 4.10.1 of the DWRG. The fundamental principle is that straight-line depreciation is to be adopted.

### **3.4.3 Establishment of Effective Lives**

The effective working life of an asset is its estimated life, assuming continued use in its present function as part of a continuing business. It is considered to be at an end when profitability is exceeded by operating and maintenance costs.

The standard and frequency of maintenance is a significant factor in the determination of effective lives. All other things being equal, a regularly and well-

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maintained asset will have a longer effective life than an identical asset, which is subjected to poor and infrequent maintenance.

Some of the factors, which must be considered when assessing effective lives, are:

- Service utility of the assets;
- Maintenance levels implemented by the owner or operator;
- The environment in which the assets reside;
- External factors such as supply/demand characteristics, changes in legislation, etc;
- Physical, technological, functional and economic obsolescence.

In addition to these generic factors that impact on effective lives, assets of the same type within a network may have different lives due to different service conditions. Such factors might include:

- Environmental conditions;
- Level of use;
- Level of maintenance.

#### **3.4.4 Residual Values**

The residual value of an asset must be estimated to perform a depreciation calculation. This residual value reflects the fact that the asset may no longer be an economic proposition in its present role, however, it may remain in use but with profitability impaired due to increased maintenance costs and lack of efficiency compared with more modern assets. Alternatively it may be possible to sell the assets to a secondary user or for salvage value.

In principle when an asset reaches the end of its category or class life it has zero value under the straight-line depreciation method. Assets however remain in service beyond this period. It is reasonable to allocate a value to these assets in order to recognise their value to the network and to provide an incentive for DUs to extend the useful lives of assets. In the Position Paper<sup>5</sup> the approach was adopted to allocate a residual value of 5% of the optimised replacement cost of assets used beyond their regulatory lives to such assets.

Note that while the residual value will be included in the RAB for the purposes of calculating the return on assets building block, there will be no further depreciation of the asset once it reaches the end of its regulatory life.

#### **3.4.5 Obsolescence**

There are four forms of obsolescence that can impact upon the value of an asset. They are:

- Physical

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<sup>5</sup> Supra note 3

- Technological
- Functional
- Economic

Infrastructure assets are often considered to be less susceptible to the last three forms of obsolescence than other assets, however in reality, at some stage in an asset's life these forces can and do impact on value.

Physical obsolescence measures the consumption of service potential. It can be measured by using straight-line depreciation, that is, life consumed over total life.

Technological obsolescence results from changes in the design and materials of construction of currently available assets. As manufacturing techniques, materials and processes improve; manufacturers are able to construct assets with equivalent or improved output at lower cost levels. This form of obsolescence is particularly apparent in new or emerging technologies.

Improvements in technology and construction techniques commonly impact on infrastructure assets, especially because they are often long-lived. Normally infrastructure assets experience organic growth that matches the growth of a community over time. Assets are often built to a size that matches the needs of the community at the time. As the community grows the asset becomes outgrown by the needs of the community it serves. Additional assets are created that meet those additional needs. When viewed from the standpoint of current needs, the composite group of assets can often represent an inefficient set of assets for the task at hand.

Functional obsolescence also results from changes in the design and materials of construction of currently available assets, however the impact on value is measured by reference to changes in operating and maintenance costs, or improvement in service quality (including reduction in lost income due to unserved energy), rather than reductions in capital costs.

As discussed above, the size, capacity and or performance of a particular type of asset may have been constrained due to design and manufacturing techniques and materials of construction available at the time of construction. As these design and manufacturing techniques and materials of construction are developed and improved over time, it often becomes possible to create assets of a greater size and/or capacity than had been possible in the past. A small number of large assets usually attract lower operating and maintenance costs than a large number of small assets with an equivalent combined capacity or service potential. Also, it often becomes possible to improve the service quality which may match with customer expectations.

Economic obsolescence results from external economic factors. It is defined as the impairment of desirability or useful life arising from economic forces, such as changes in optimum use, legislative enactments which restrict and impair the right to use the assets for their intended use, and changes in supply and demand relationships.

### **3.5 MATERIALITY**

Valuations are to be determined having regard to the principles of materiality defined as follows:

*“Materiality means, in relation to information, that information which if omitted, misstated or not disclosed has the potential to adversely affect decisions about the allocation of scarce resources made by users of the financial report or the discharge of accountability by the management or governing body of the entity”.*

Materiality in the context of valuations is generally considered to be of the order of  $\pm 5\%$  in gross asset value.

### **3.6 VALUE ADDED TAX (VAT)**

The Value Added Tax (VAT) should be excluded from all regulatory asset base valuations unless the Regulated Entity does not have an exemption from VAT. In which latter case refer to Section 3.2.4.

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## 4. APPLICATION GUIDELINES FOR DISTRIBUTION UTILITIES

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### 4.1 OVERVIEW

These Application Guidelines provide the specific methodology to be followed by DUs in determining the ODRC values of their network assets.

The application of the ODRC valuation methodology involves the following steps:

- (a) defining and identifying the network system assets;
- (b) assessing the replacement cost of those assets (GCRC);
- (c) optimising the network configurations and its components asset and
- (d) determining the “optimised depreciated replacement cost (ODRC)” value of the assets.

The ODRC is based on the engineering optimisation of the network configurations and its component assets following which an appropriate allowance is made for depreciation. It measures the minimum cost of replicating the system in the most efficient way possible, from an engineering perspective, given its service requirements and the age of the existing assets. The valuation is built up as the sum of the values of individual asset groups. The valuation should be based on an optimal network, built to modern efficient designs, that:

- meets the same service requirements as the existing network; and
- is depreciated to the same remaining life as the existing network

### 4.2 DEFINING AND IDENTIFYING NETWORK SYSTEM ASSETS

The first step in determining the valuation of network system assets is to determine the quantities of the assets (lines, substations etc).

#### 4.2.1 Boundaries for Identifying Network Assets

For the purpose of the Guidelines, network assets exclude those assets used for the generation of electricity.

Within the Philippines the DUs operate subtransmission and distribution networks generally at voltages of 220kV or less and are responsible for the delivery of energy in their franchise areas as well as the connection of any embedded generators in these areas.

For the purpose of the Guidelines, DUs are to exclude any Generation, or Ancillary business assets not forming part of their network activities.

For the purpose of determining the interface with generation plant, the high voltage terminals of the generating unit transformer are considered to be the point at which energy enters the network. Any equipment between the point of

entry and to the point in the network which is shared with others is considered as dedicated generator entry equipment.

For the purpose of determining the interface with customer equipment, the connection to the customer's assets or customer's premises is considered to be the point at which power exits from the network. Equipment beyond this point is considered as dedicated customer connection equipment.

The boundary between TransCo and the DUs is to be determined in accordance with the ownership of the assets.

#### 4.2.2 Types of Network Assets

The principal network assets of a DU are the network of power lines, transformers, associated switchgear and ancillary items linking customers to the points of supply where the DU takes delivery of the electricity. The system assets include control and communications systems and emergency spares. Depots, motor vehicles, office buildings, furniture and equipment, information technology systems for asset control, tools, plant, machinery and inventories are non-system assets. Valuation of non-system assets is dealt with in section 5 of the Guidelines.

Network assets are classified according to the function that they perform as follows:

**Connection Assets** – comprise assets as follows

- Connections assets supporting the provision of capability at a Connection Point in respect of a Regulated Distribution System to deliver electricity to or take electricity from that Connection Point. At a Connection Point, the following assets shall be treated as network assets where they are the property of the DU - service fuses, service connections, meters and load control relays.
- Connection Assets spares.

**Network Assets** – comprising the following asset subsystems:

- EHV Network - comprising systems operating at voltages of 220 kV and above.
- EHV Network spares.
- Subtransmission Networks - comprising systems operating at voltages of 115kV, 34.5 kV to 69 kV, except for those assets supporting the meshed EHV network.
- Subtransmission Network spares.
- Distribution Networks comprising:

High Voltage Distribution Networks - operating at 13.8 kV or possibly 34.5 kV and distributing power throughout the area supplied. Many large customers take direct supply at this level.

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Distribution Substations and Transformers - erected on poles or ground mounted, installed along the lines to break the voltage down for reticulation at Low Voltage. Some distribution substations are installed in or on customers' premises and in these cases the transformers and other items of equipment may be owned by the customer.

Low Voltage Distribution Networks - operating at 440/220V and providing supply to the great majority of customers.

Public Lighting Assets - may include street lighting where owned by the DU.

Ancillary Equipment - forming part of the network or its operating hardware. These include system control facilities, communications equipment and lines, substation buildings and rights of way (easements).

#### Distribution Network **Spares**

Network owners are to be responsible for determining the elements of their system that fall into these categories.

### 4.2.3 Minimum Classifications

As a minimum, the ERC has specified that the fixed asset registers of DUs include the following network system asset categories:

#### **Distribution Plant**

- Land and Land Rights (dedicated to distribution purposes)
- Structures and Improvements (dedicated to distribution purposes)
- Station Equipment
  - Power transformers
  - Switchgear
  - Protective equipment
  - Metering and control equipment
  - Communications equipment
  - Other station equipment
- Poles, Towers and Fixtures – Distribution; Customer
- Overhead Conductors and Devices – Distribution; Customer
- Underground Conduits – Distribution; Customer
- Underground Conductors and Devices – Distribution; Customer
- Line Transformers – Distribution; Customer

- Power conditioning equipment
- Services
- Meters, Metering Instruments & Metering Transformers – Distribution, Customer
- Information technology equipment (dedicated to distribution purposes)
- Regulated Entity property on Consumers' Premises
- Street Lights and Signal Systems
- Submarine Cables

### **Materials and Supplies, including spares**

**Transferred Subtransmission Assets** – assets transferred as of the valuation date must be included as a separate category.

The Initial Revaluation Report must indicate the weighted average age of the assets in each asset category.

With regard to connection assets, the following extract from Section 4.1.3 of the Position Paper should be noted:

*“Distribution Connection Service will eventually be an excluded service, after the promulgation of the OADS Rules. Hence Distribution Connection Assets will eventually be excluded from the Regulatory Asset Base. For the present however, these assets are to remain included under the Regulatory Asset Base on which Regulated Entities are entitled to a return under the PBR.”*

(Note that following the publication of the Position Paper, the title of the OADS rules were changed to the Distribution System Open Access Rules (DSOAR), but the principle remains the same.)

#### **4.2.4 Asset Categories & Subcategories**

Network assets can be grouped for costing purposes. Proposed categories and subcategories are set out in Appendix A to these Guidelines.

#### **4.2.5 Minimum Data Requirement**

To conduct an accurate and valid valuation, the following are the minimum data requirements.

- Asset register database. There may be more than one database to cover different asset types. There should be verifiable processes used to populate and keep the database up to date.

- The asset register database should contain as a minimum the asset categories outlined in this Guideline and sufficient attributes and other data available to value and assign residual lives.
- The minimum attributes classification of assets necessary for valuations are material types, sizes, quantities, year constructed/refurbished and condition.
- External attributes impacting on construction and asset performance should also be recorded. They are typically ground type, development density, failure histories and operating environment.

#### **4.2.6 Data Verification**

To ensure the information available in the database is accurate and complete, records should be verified by sampling.

The key components of the verification process should include:

- Verification of asset records for location and length.
- Completeness of records in relation to timing of assets being added or removed.
- Assessment of construction date and capitalised rehabilitation.

The number of samples is usually selected so as to provide analysis results with 95% confidence.<sup>6</sup>The significance of items should also be considered in terms of its effect on accuracy and materiality of the overall valuation.

### **4.3 ASSESSING THE REPLACEMENT COST OF NETWORK SYSTEM ASSETS**

The second step in determining the ODRC of network system assets is to ascertain the replacement cost of the identified assets, not on the basis of the particular assets installed, but on the basis of replacement with modern equivalent assets.

The following Guidelines on standard replacement costs are provided to achieve a consistent and cost efficient approach to valuation.

#### **4.3.1 Standard Costs**

Each of the asset groups and subgroups should be allocated a per unit replacement cost for its modern equivalent.

Since cost efficiency and consistency of valuation between DUs is an important objective, it is appropriate that a common approach to determining a set of standard costs be applied by all DUs. Appendix B includes explanatory notes on how the standard costs should be determined. The standard costs should be

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<sup>6</sup> This confidence level is applied in New South Wales, Australia (NSW Government Treasury Guidelines). In New Zealand (Commerce Commission Optimisation Handbook) a statistically robust method must be applied and in practice it is observed that a 95% confidence level is adopted.

applied unless there is good reason to do otherwise. Justifications for all departures from the standard costs should be documented with a clear audit trail.

#### **4.3.2 Non Standard Costs**

The standard costs do not cover every type of construction and site condition, but their use should allow the majority of the assets to be assessed. Appendix B provides guidance on how costs should be determined for those assets for which no standard costs are given.

#### **4.3.3 Variation of Costs**

There may be considerable variation in the unit costs of lines depending on the region, general topography, diversity of development and accessibility. The costing methodology outlined in Appendix B indicates how to make allowance for such variations.

#### **4.3.4 Valuation of Land and Easements**

Land and easements are to be valued in accordance with Section 5 of these Guidelines.

### **4.4 OPTIMISATION OF THE NETWORK CONFIGURATION AND ITS COMPONENT ASSETS**

#### **4.4.1 Introduction**

The third step in determining the ORDC Valuation is to undertake an optimisation of the network configurations and its component assets to enable the optimised replacement cost value (ORC) of the network system assets to be derived. The purpose is to ensure the valuation reflects the replacement costs of an efficient set of modern equivalent assets that would be able to achieve the required level of service.

An “incremental optimisation” approach is to be followed in which the existing network is examined and changes made to ratings, configurations, designs or materials to optimise the network configuration and its component assets having regard to such issues as excess capacity, redundancy and over-design. Distribution utilities adopt standard sizes / ratings on the basis of least cost considerations and optimisation also takes this practice into account.

The optimisation for purpose of ODRC valuation is not concerned with improving the system from its current state. Optimisation cannot result in an increased network system asset replacement cost.

The steps in the optimisation process are specified by the ERC:

- a) exclude stranded assets;
- b) optimize the configuration of the network;

- 
- c) optimize the capacity of elements in the network;
  - d) optimize network engineering; and
  - e) optimize stores and spares.

Guidance regarding the optimisation process, its standards, constraints and scope follows in this section.

#### 4.4.2 Optimisation Principles

The capacity of a subtransmission and distribution networks may depend on thermal, voltage and stability considerations. Individual network elements cannot be considered in isolation from each other. A rigorous review of optimisation of the network therefore requires detailed computer analysis of the network and knowledge of the operational difficulties applicable to the system. Optimisation studies are usually performed by the asset owner and subsequently reviewed by the valuer.

The optimisation should be based on the reasonably expected level of use of the asset, which is determined by reference to the required level of service potential or output consistent with both the reasonably foreseeable future demand and the objective of minimising the whole of life costs.

The optimisation should also be based on the required reliability and security of the power system supplies.

The optimisation should assume the following constraints:

- The location of generating plants and points of bulk supply should be assumed as fixed;
- The location of customers should not be varied;
- The existing boundaries of other network businesses should not be varied;
- Only existing easements, line and cable routes should be assumed;
- The optimised network should have an import/export capacity similar to that of the existing system; and
- The optimised system should have inherent stability, reactive power support and fault level ratings sufficient for the business planning and Total Asset Management planning period but not more than the existing system.

The required level of service for distribution networks will be defined in terms of currently accepted service standards in the electricity supply industry in Philippines and countries with similar conditions. The level of service include:

- Acceptable reliability of supply based on industry accepted indices for proportions of customers subject to interruptions, the number and duration of outages and types of customers affected;

- Safety requirements where these influence the choice of materials or type of construction;
- Voltage stability and other quality of supply issues; and
- Degree of security of supply considered appropriate in different circumstance such as urban and rural, residential and industrial. This is assessed by reference to the level of in-built redundancy such as n, n-1, n-2 etc.

In assessing the levels of optimisation consideration needs to be given to efficiencies undertaken by the DU such as:

- The economic value placed on electrical losses;
- Least cost considerations, taking into account operating and maintenance costs as well as capital costs;
- The cost of demand not served; and
- Energy not supplied.

System designs, particularly those related to long lead times, are usually completed in steps in anticipation of load forecasts. The design follows the system augmentation steps, usually with a long planning horizon of at least 10 years. Optimisation should be based on the 'excess capacity' available through over design, i.e. 'the excess augmentation steps'. This is illustrated in the following diagram.

### ASSET OPTIMIZATION

Optimisation should be based on the asset configuration and size necessary to meet the load predicted in the tariff period or the 'planning horizon' necessary for that asset type having regard to the largest predicted load.

The planning horizons for the network components are:

Network Components	Planning Horizon
Sub-transmission lines Substations (excluding transformers) Primary distribution circuits Points of connection to transmission network	15 years
Substation Transformers	10 years

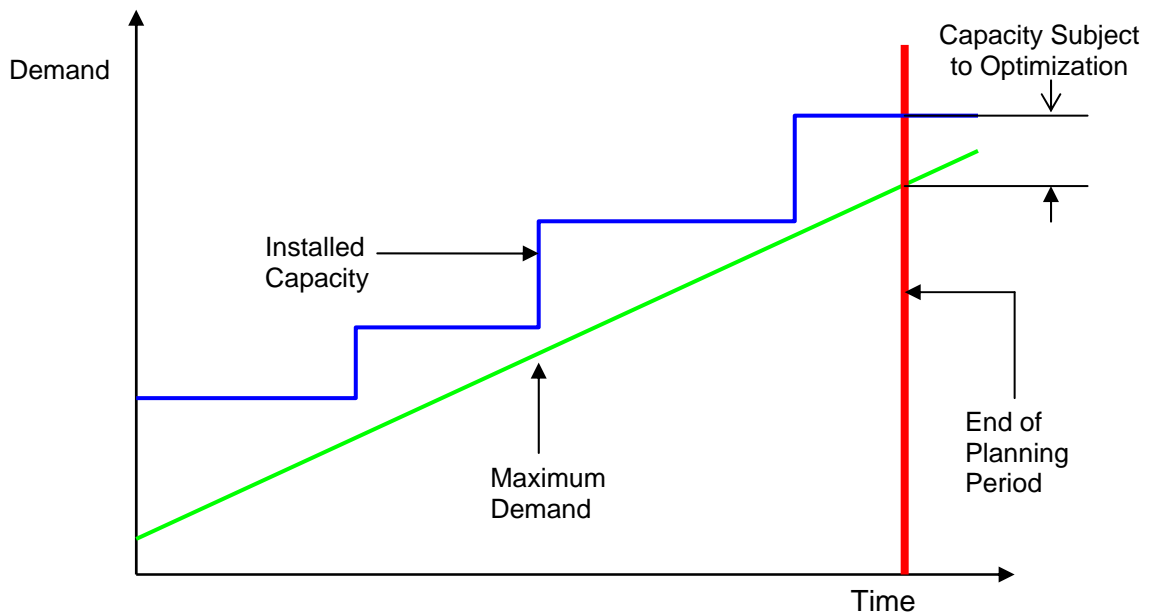
Network Components	Planning Horizon
Distribution Line Transformers Secondary distribution circuits Low voltage network Other distribution assets	5 years

In practical terms, optimisation is to take into account the growth in demand over the planning horizon and the installed capacity (after allowing for security of supply considerations).

Figure 1 is a stylised example of the relationship between demand growth and capacity – the capacity subject to optimisation is shown at the end of the planning horizon (the red vertical line).

While this example shows that capacity may be optimised out, such optimisation must take into account the next lowest unit of capacity. In practical terms, the next lowest unit may be insufficient to meet the projected demand, in which case the asset is not to be optimised out.

An asset that is optimised out may be optimised in at a subsequent valuation.



**Figure 1: Capacity Subject to Optimization**

#### 4.4.3 Optimisation Network Configurations and Assets

The following criteria are to be applied to determine the optimisation to be applied for the ODRC valuation. An overriding criterion is that the value of the optimised system cannot be greater than the value of the existing network.

##### **Quality Levels**

A key component of the optimization methodology is the planning horizon allowed for various distribution network components when considering future load growth.

Quality Category	Network Components	Quality Level
Degree of Network Security	<ul style="list-style-type: none"> <li>• Points of connection to transmission network</li> <li>• Sub-transmission network</li> <li>• Substations Primary Switching stations</li> <li>• Primary distribution feeders</li> </ul>	N - 1
	<ul style="list-style-type: none"> <li>• Secondary distribution feeders</li> <li>• Low Voltage network</li> </ul>	N - 0
Power Factor	<ul style="list-style-type: none"> <li>• All</li> </ul>	> 85% lagging
Voltage variations	<ul style="list-style-type: none"> <li>• All</li> </ul>	> 90% of nominal voltage level <110% of nominal voltage level
Signal distortion	<ul style="list-style-type: none"> <li>• All</li> </ul>	Total Harmonic Distortion < 5%
Technical System Losses	<ul style="list-style-type: none"> <li>• All</li> </ul>	< = 6.5% of energy conveyed

The quality levels may provide additional justification for assets (for previous capital investment), and they are not to be used to optimize assets such that minimum quality standards are met.

### **Substations**

Each substation is to be examined for optimisation:

- Reliability criteria

This will be based on the requirements to meet reliability criteria as defined in the table above.

- Redundancy

Any substations considered redundant should be excluded (notwithstanding N-1 considerations).

- Transformer capacity

Based on the accepted planning horizon, supportable load growth projections, voltage stability, fault levels, reliability criteria and cyclic ratings, each transformer shall be examined for suitable rating.

Where the existing rating exceeds the predicted rating, the transformer shall be optimised down to the nearest modern equivalent standard rating.

As a guide, the projected maximum demand on each substation at the end of the chosen planning period should not be less than 70% of the total installed capacity of the substation.

- Spare equipment

Any spare equipment such as circuit breakers shall be optimised out where they will not be required in the accepted planning horizon.

- Configuration

Any bus configuration that is above the required reliability criteria shall be optimised to an applicable configuration e.g. a double bus selectable configuration originally built for n-1 criteria that no longer applies would be optimised to single bus configuration.

Any equipment that becomes redundant due to sub transmission line/cable optimisation shall be excluded.

- Buildings

Optimise if over-designed for the application. In assessing the over-design, take into account that community expectations and local regulations often require the buildings to be designed to fit into the surrounding environment, resulting in physical configurations that may not be the optimum engineering design.

### ***Subtransmission Lines and Cables***

Using the maximum demand growth projections, planning horizon, fault level and thermal ratings as well as considering reliability criteria and voltage performance / stability, the conductor shall be optimised to the nearest rating standard size that is suitable for the optimised rating.

Where a line has been built to a higher voltage configuration but energised at a lower voltage it shall be optimised to the lower voltage if the higher voltage will not be needed in the accepted planning horizon. Any circuits considered unnecessary should be excluded.

### ***Line Transformers (DTs)***

The total installed distribution line transformer capacity shall be optimised down if considered excessive.

The aggregated utilization of distribution line transformers expressed as the non-coincident maximum demand of the LV system divided by the total installed distribution line transformer capacity in MVA should not be less than 50%.

$$\text{Energy Utilisation} = \frac{\text{LV Customers Peak Month (in MWh)}}{\text{Installed Dist Transformer Capacity (in MVA) * 8760 * LF}} = 50\%$$

The utilisation should take into account load factor. As a guide a typical load factor of 0.4 should be assumed.

This optimisation method is separated into two alternatives according to the availability of robust historical DT utilization data.

*Method 1 – Where there is sufficient data on customers and transformers*

Where robust historical DT utilization data is available, the optimisation for the utilisation of distribution transformers shall be set based on computed historical DT utilization factors.

Underutilised DTs shall be optimised to the next lowest DT capacity unless it can be demonstrated that this would result in an increase in overall value.

The exception is distribution line transformers of less than 15kVA capacity. These small size line transformers shall not be optimised down.

*Method 2 – Where there is insufficient data on customers and transformers*

Where robust historical utilization data is not available, the aggregate utilisation shall be determined per DU using the given formula.

Where the utilisation does not meet the 50% target, the number of distribution transformers should be optimised down. This would typically be done on a PhP/kVA basis, whereby this metric would be determined on a weighted average replacement cost basis for all line transformers in use at the valuation date.

**Distribution Feeders**

Ideally distribution feeders would be optimised on an individual basis along similar lines to subtransmission feeders. As this is not practical due to the number of feeders and the operational requirements that can change loads on a frequent basis, optimisation is to be carried out on a sample basis. The framework for the optimisation is:

- DUs to stipulate the planning and design criteria for the distribution feeders, including planning horizon, voltage stability, fault levels, reliability criteria, switching criteria, losses, thermal ratings and current levels. These criteria are to be assessed for reasonableness.
- An audit of a sample of actual feeders based on the criteria in the above point. This would use loads projected to the planning horizon using known demand growth rates for the zone substation that the feeder is connected to.
- The factor of optimisation determined from the above process would be then applied to all the DU's distribution feeders.

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### **Underground Reticulation**

In developed countries, underground reticulation is largely driven by community environmental expectations (aesthetics). As such, local planning guidelines and prudent commercial operators reticulate systems underground.

Accordingly, any existing underground reticulation should be valued on the basis of replacement cost of underground assets. Valuing underground assets at the replacement cost of equivalent overhead reticulation should only be carried out where it can be clearly demonstrated that community standards would accept overhead assets.

Optimisation for ducts will need to take into account economic and outside body constraints e.g. local Government requirements in city areas requiring installation of ducts ahead of the planning horizons nominated above.

### **Spare Equipment**

An assessment should be made of spares where these are material to the overall valuation. Those assets which are of inappropriate type, or which for whatever reason are unlikely to be used by the DU within the relevant planning horizon, should be optimised out. The likelihood of use will be referenced to such classifications as critical contingency spares (for N-1 security), emergency spares and routine spares (for maintenance) and their associated lead times for operational purposes. The stores history pertaining to spares shall be taken into account when assessing reasonable levels of spares.

## **4.5 DETERMINING THE ODRC ASSET VALUE**

The fourth step in determining the ODRC valuation is to depreciate the optimised replacement cost value of the network assets where the existing asset's remaining useful life is less than the useful life of a new asset. The depreciation recognises the limited remaining useful life of the asset.

### **4.5.1 Standard Effective Lives**

Since cost efficiency and consistency of valuation between DU's is an important objective, it is appropriate that a set of standard asset effective lives be applied by all DU's. The standard effective lives which should be applied in the valuations are given in Appendix B to these Guidelines.

These standard effective lives have been determined in accordance with the ERC requirement that a weighted average regulatory life must be determined for each asset category (Clause 4.10.1(a) of the DWRG). This should be the weighted average economic life of assets, where the economic life of an asset is deemed to expire when the costs of maintenance and repair of that asset exceed the efficient replacement cost of it on a project comparison basis, using a forward-looking discounted cash flow analysis.

The regulatory asset life must be the same for the same asset category for each Regulated Distribution System. Determining the regulatory lives of asset categories will therefore require that the experience with assets in all the

Regulated Distribution Systems, operated by all Regulated Entities, is taken into account.

The estimate of regulatory asset lives will be based on the economically efficient life of each asset category, based on considering the manner in which such assets are applied in the various Regulated Distribution Systems, the experience of Regulated Entities with regard to the lifespan of assets and the reasonable balance between refurbishment, operating and maintenance expenditure and life-time replacement expenditure.

As the lifespan of assets within an asset category may vary, the weighted average lifespan will be calculated. This will be done by using a weighting proportional to the optimized replacement cost for the assets within that asset category as of the date of the Initial Revaluation.

The weighted average life per asset category thus determined will be used as the standard asset life for that category. These standard lives will be used not only to depreciate the existing asset base as of the start of the Second Regulatory Period, but also for assets acquired thereafter.

Where significant differences exist between the lifespan of assets making up a category, further subcategories will be developed, each of which would then have its own standard (weighted) lifespan. This categorization will be recommended to the ERC by the Valuation Expert.

These Guidelines are intended to provide reliable effective lives for the assets and as a general principle DUs are to use the lives given in Appendix B. However there will always be exceptions. Even identical infrastructure assets decay at different rates and these figures represent an appropriate mean. Some assets will decay at an accelerated rate due to one or more of the following impacts:

- Design faults
- Material faults
- Manufacturing or construction faults
- Inadequate maintenance
- Overstressed operations
- Operating environments
- Accidents or other events

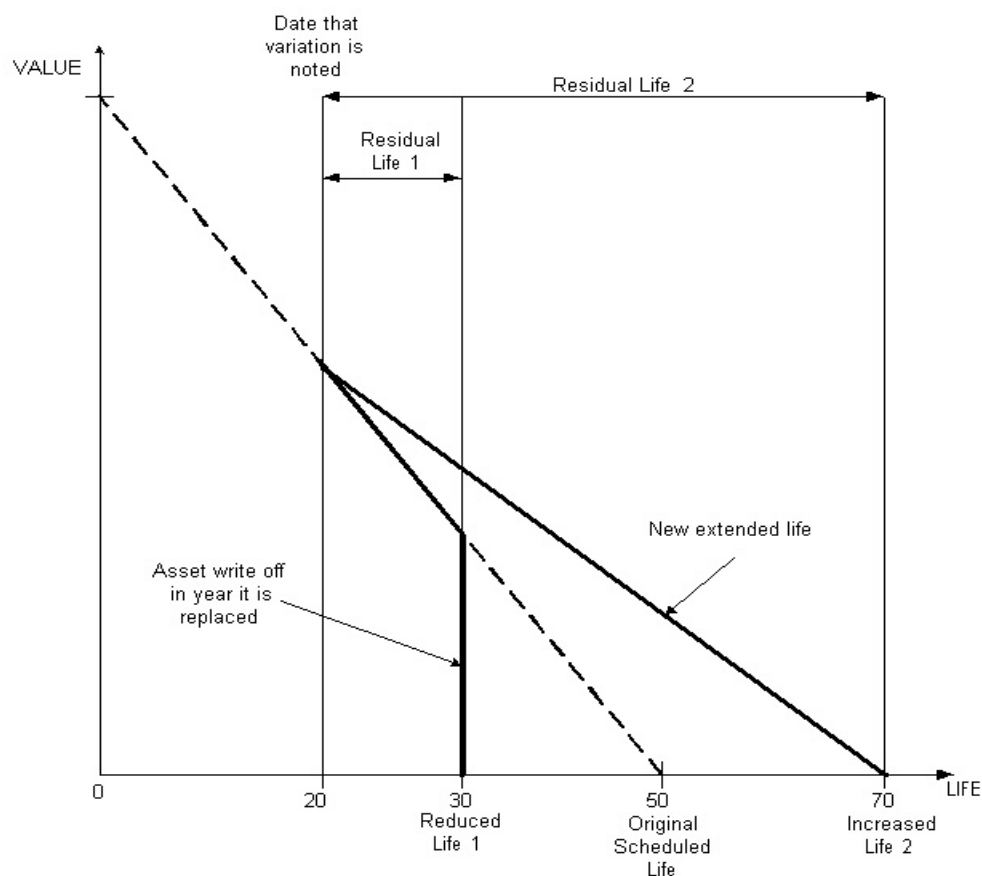
In these instances, where evidence is available that the effective life will deviate significantly from the listed standard effective life, or a standard life does not exist in the schedule DUs can self assess and propose a more appropriate effective life (residual).

In some instances, assets will last significantly longer than the scheduled life because of the nature of the asset and its operating environment.

There are 3 cases where self-assessment will apply:

1. A new technology asset that does not exist in the Guidelines schedule. In this instance, the DU will use manufacturer or other supportable data to establish an effective life for this asset type.
2. Existing assets that will have a predicted shorter life than scheduled e.g. early manufactured XLPE cable, which allowed water ingress. In this instance, the DU will continue to depreciate the asset in accordance with effective life until the date of replacement. At this point this asset will be written off.
3. Existing assets that have predicted longer lives than the Guidelines schedule allows. In this instance, the DU will extend the effective life at the point of self-assessment and write the balance off over the residual life determined.

Cases 2 and 3 are illustrated in the following diagram. It should be noted that the diagram relates to the handling of asset life, not asset revaluation.



**Figure 2: Effect of Life Extension**

In all instances the DUs need to qualify the basis of their claim and provide adequate information to support their self-assessment.

#### 4.5.2 Determining Assets' Remaining Useful Lives and Ages

The age of an asset should be the actual age taken from the asset register database or the best estimate thereof.

The remaining useful life of an asset should be either:

- the total useful life less the life expired to date (the age of the asset); or
- the best estimate of the time to expiry of the total useful life of the asset (only where the life expired to date cannot be accurately determined).

For the purpose of valuations prepared in accordance with these Guidelines, the first method referred to above is preferred.

Where an estimate of the remaining useful life of an asset or group of assets is made, it should be based on:

- the condition of the asset;
- any refurbishment work that has been carried out; and
- the level of past maintenance (from service records and the views of the DU's technical staff).

#### **4.5.3 Determination of Ages**

It may be difficult to establish the history of some assets, thus making it difficult to assign ages for depreciation purposes. It will be necessary to use whatever information the DU can provide including annual expenditures on some items. It may be necessary to carry out field surveys of the condition of selected assets to ensure that the input data is sufficient to produce reliable results.

#### **4.5.4 Minimum Remaining Life**

The ERC has specified that assets used beyond their standard regulatory life-span will retain a book value (for the purposes of calculating the value of the Regulatory Asset Base) of five percent (5%) of the ORC of the asset. Once assets are depreciated to this level, their depreciated value would not fall below that, for as long as they remain in full operation.

Where a particular asset is expected to be retired early from service because it will become redundant as part of a development of the system, this should not be taken into account in assessing the remaining life of that asset but should be adjusted for as part of the valuation process. However, where a subcategory of assets is routinely replaced as part of the evolution of the system before its technical life expires then this should be taken into account in assessing the total useful life for that subcategory of assets.

#### **4.5.5 Depreciation of Group Assets**

In some cases, it may be necessary to group assets for costing purposes. For example, distribution transformers may be grouped and described by the quantity of each kVA rating. They may be of varying ages.

Possible approaches in such cases are:

- An estimate could be made of the average age and therefore remaining life of the category of assets as a whole. The estimate could be based on a sample of records, annual statistics of new construction or other methods. The average should be weighted if the category includes assets with different replacement costs.
- The category could be completely disaggregated into individual assets, or partly disaggregated into subcategories, each depreciated based on its known age.

The most appropriate method for dealing with categories and subcategories of assets will depend on data availability, calculation complexity and the materiality of the group's value in relation to the value of the whole network. The method used will also be defensible in ensuring consistent life/age treatment in subsequent revaluations.

#### **4.5.6 Depreciation Issues**

- Where optimisation notionally replaces an existing asset with an optimised modern equivalent (eg of smaller rating), then the optimised asset should be depreciated as if it was the existing asset.
- Where a category (or subcategory) of assets are notionally replaced with reconfigured assets, the depreciation of the reconfigured assets is less straightforward. In these circumstances the reconfigured assets should be depreciated as a category (or subcategory) to effect the same overall depreciation proportion (ie remaining life/total life) as the category (or subcategory) of existing assets.

#### **4.6 INDEPENDENT OPINIONS**

The ODRC valuation of each DU must be supported by independent opinions that the valuation complies with these Guidelines. The ODRC valuation is to be supported by the opinion of an independent engineer and/or qualified asset valuer.

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## 5. NON SYSTEM ASSETS

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### 5.1 BACKGROUND

The framework to enable the consistent approach to the valuation of non-current assets is provided by various accepted accounting principles, standards and guidelines.

### 5.2 ACCOUNTING STANDARDS

Philippine Accounting Standard (PAS) 16, which corresponds to International Accounting Standard (IAS) 16 – Property, Plant and Equipment, is the primary accounting standard governing the valuation basis adopted for financial reporting.

### 5.3 SPECIALISED ASSETS AND NON-SPECIALISED ASSETS

In the application of these policy guidelines, the non-system assets are to be listed and classified as either Non-Specialised Assets or Specialised Assets.

- Non-Specialised Assets are those assets that are not specific to the industry and would be readily acquired and disposed of in the ordinary course of business.
- Specialised Assets are those that exist for a purpose which is of particular advantage and may be unique to the industry, and/or those assets which are not normally traded in a secondary market place (except as part of a total entity by reason of their physical characteristics).

The valuation of Non Specialised Assets depends upon the manner in which the assets are acquired. The guidelines state that where assets are normally acquired in a secondary market, the price of a second-hand asset is relevant in determining the value. Where assets are not normally acquired in a secondary market, the price of a new asset (adjusted to take account of service potential and the impact of other obsolescence factors) is relevant in determining the value.

For specialised plant, as there is no trading market for such assets, the appropriate value based upon the guidelines is the lower of the current replacement cost and the current reproduction cost. This is consistent with the optimised depreciated replacement cost approach.

Having determined the appropriate classification and categorisation of the assets under the deprival value concept the following approaches should be adopted:

Categorisation	Valuation Approach
Non-Specialised	Market Comparison Approach or Income Approach or Depreciated Replacement Cost Approach depending on availability of data
Specialised	Optimised Depreciated Replacement Cost Approach

#### 5.4 CATEGORISATION OF NON-SYSTEM ASSETS

As a minimum, the ERC has specified that the fixed asset registers of DUs include the following non-system asset categories:

##### **General Plant (Non-network Assets)**

- Structures and Improvements (non-network related)
- Office Furniture and Equipment
- Transportation Equipment
- Stores Equipment
- Tools, Shop and Garage Equipment
- Laboratory Equipment
- Information Systems Equipment (non-network related)
- Power-operated Equipment
- Communication Plant and Equipment
- Miscellaneous Equipment

The Initial Revaluation Report must indicate the weighted average age of the assets in each asset category.

The Non-network Assets will constitute part of the Regulatory Asset Base and have to be included in the revaluation report.

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## 6. VALUATION OF LAND AND EASEMENTS

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### 6.1 LAND VALUATION

Land that is held by a Distribution Utility can be categorised as follows:

1. Land that will continue to be used by the agency for the foreseeable future in support of its business operations (Land in Use by the Distribution Utility).
2. Land that is no longer required to support the agency's business operations (Surplus Land).

#### 6.1.1 Land in Use by the Distribution Utility

Where land is held for continued use and would be replaced if the Distribution Utility was deprived of it, the basis of valuation under the deprival value concept is the current market value for the existing use.

Where land is valued on the basis that it will continue to be used for the existing purpose, there are a number of inherent assumptions:

- The existing use of the land will continue to support the business operations thereon;
- The future service potential of the land will not diminish in the foreseeable future; and
- The business operated on the land is profitable and will continue to be profitable for the foreseeable future.

On the basis of the above criteria, there is no intention that the land would be made available for an alternate use, irrespective of whether an alternate use would provide a higher value.

#### 6.1.2 Land with Limited Use to the Distribution Utility

Land with limited future service potential, that is, the existing use of the land will be discontinued in the relatively near future (say, the next five years) should be valued on the following basis:

- The present value of future net cash inflows for the remaining term of the existing use; and
- The deferred value of the alternate use of the land.

The present value of the future net cash inflows would only be assessed over the anticipated remaining life of the existing use. In those circumstances where cash inflows cannot be clearly identified from the land, then an appropriate yield should be assessed that reflects the continued use by the Distribution Utility. The present value of the potential net income should then be determined for the remainder of the existing use. The alternate use value should be deferred until

the existing use is discontinued. The sum of these two assessments would be the value of the land subject to a limited use requirement by the Distribution Utility.

### **6.1.3 Surplus Land**

Land that is surplus to the current or anticipated needs of a Distribution Utility should be valued at current market value.

Irrespective of the category of the land holding outlined above, the valuation should take into account the nature of the parcel, the legal restrictions on use, the opportunities for and impediments to development that are inherent to the specific parcel of land, other constraints that exist in respect of that land and any other special attributes that the land may possess.

## **6.2 EASEMENT VALUATION**

This is a right, privilege or interest to a specific purpose that one party has in the land of another.

The historical costs charged on this account are the costs of securing permits from local government units and the actual payments if there are any for the right-of-way to landowners, which is covered under Grants of Right-of-way Documents.

Valuation will be based on indexation of the historical easement cost.

## **6.3 STRUCTURES & OTHER LAND IMPROVEMENT VALUATION**

These will be classified as system fixed assets or non-system assets.

Assets that are classified as non-system assets may be further defined as specialized or non-specialized assets.

Pasig City, Philippines, August 9, 2006.



**RODOLFO B. ALBANO**  
Chairman



**RAUF A. TAN**  
Commissioner



**ALEJANDRO Z. BARIN**  
Commissioner



**MARIA TERESA A.R. CASTAÑEDA**  
Commissioner



**JOSE G. REYES**  
Commissioner

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## **Appendix A: Definitions - Asset Categories, Subcategories and Types**

Network assets can be grouped for costing purposes into categories, subcategories and types. The DWRG specifies the asset categories to be used. The sub-categories and types cascade from the DWRG asset categorisation.

Unless otherwise stated all assets are assumed to be valued on a current replacement cost basis. All values are based on the installed cost, including labour, materials and overheads.

To make the valuation as transparent and as reproducible as possible, the following subcategories are to apply for each asset category:

### **CATEGORY A3 – STATION EQUIPMENT**

#### ***Category A3A - Power Transformers***

Power transformers are grouped by voltage level and power ratings. The category shall include foundations, conductors between the HV line and the transformer terminals, HV, LV and control cable terminations at the transformer, and transformer earthing.

#### ***Category A3B - Switchgear***

The switchgear category is broken into two sub-categories: circuit breakers and disconnectors.

Circuit breakers shall be grouped by type, voltage and size. The assets included in the circuit breaker category will vary depending on type. In the case of conventional outdoor circuit breakers the category shall include foundations, control cable terminations and control, metering and protection tests. The equipment design shall be based on SF<sub>6</sub> circuit breaker design standards. The circuit breaker category should exclude the cost of any control panels as these are valued separately. It is typical that for a breaker and a half scheme there would be 1 control panel per bay (controlling three circuit breakers), for a ring bus there would be 1 control panel per bay (controlling two circuit breakers) and there would be 1 control panel per 2 circuit breakers in a single bus scheme.

Metalclad switchgear (34.5 kV and below) would be typically based on a modular standard configuration of seven circuit breakers. This allows for one incomer, five feeder circuit breakers (one to be used for capacitors) and one bus-tie (that can be used as an additional feeder). For calculating the replacement cost of a switchboard with a different number of circuit breaker than the standard unit, the cost shall be pro-rated based on the total number of panels. The category shall include foundations, enclosures, protection and 1 control panel for every 3 breakers.

Conventional outdoor disconnectors shall be considered as separate items and grouped based on voltage and rating. For metalclad switchgear the disconnectors shall be included in the overall cost of the switchgear.

#### ***Category A3C - Protective Equipment***

This category is further divided into sub-categories for current transformers (CTs), potential transformers (PTs), lightning arresters and protection schemes.

The CTs, PTs and lightning arresters categories shall include all foundation, stands, conductor to the main circuit and all cable and conductor terminations.

Electro-mechanical relays shall be replaced on a modern equivalent asset basis with electronic based equivalents and the replacement cost for electro-mechanical relays will reflect this.

### **Category A3D - Metering and Control**

This category should contain all substation metering equipment that is used for power quality and revenue metering. Metering boxes and control panels shall be included. Metering PTs and CTs shall not be included in this section, but in the previous section (Protective Equipment).

Control panels shall include all equipment for the operation of circuit breakers from the control room. They shall also include IED devices for monitoring circuit loads and voltages.

### **Category A3E - Communications Equipment**

This category includes all SCADA and communications equipment.

### **Category A3F - Other Substation Equipment**

Batteries and chargers shall be sub-categorized based on capacity and ratings.

The structure and busbar replacement cost shall include all structures and bus work costs for a given substation configuration. Standard replacement costs shall be used for structure and busbar modules based on voltage and configuration. Where a structure does not fit one of the standard configurations a historic indexation valuation approach shall be taken.

A sub-category shall be created for miscellaneous substation equipment which consists of any substation items that cannot be associated with any particular piece of equipment, such as substation earthing. The valuation approach for these items shall be based on a substation configuration basis where possible. If this cannot be used a historical indexation approach shall be used.

## **CATEGORY A4 & A5 – TOWERS, POLES & FIXTURES (DISTRIBUTION & CUSTOMER)**

This category is sub-categorized based on poles and pole top hardware.

Poles shall be sub-divided based on construction material and height. Due to the unavailability of new woods in the Philippines it is assumed that wood poles would be replaced with concrete poles of an equivalent height and this shall be reflected in the replacement cost for wood poles. The pole category shall include all line hardware required for installing the pole (e.g. foundations, guys, etc).

Pole top hardware is a sub-category and shall include cross-arms, insulators, braces, clamps, nuts and bolts for securing the cross-arms and insulators to the pole. The subcategory shall also include any materials required to secure the conductors to the insulators.

## **CATEGORY A6 & A7 – OVERHEAD CONDUCTORS & DEVICES**

This category is sub-categorized based on overhead conductors and devices.

The overhead conductor sub-category shall be further divided based on conductor material and cross sectional area. The conductor replacement cost shall be based on a per km rate and include the conductor and installation costs only.

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The overhead distribution devices subcategory shall include fuse cut-outs, surge arresters, line switches, line sectionalizers and reclosers. All costs associated with installing the above equipment is included in the replacement costs.

#### **CATEGORY A8 & A9 – UNDERGROUND CONDUITS (DISTRIBUTION & CUSTOMERS)**

The replacement cost for underground conduits shall be based on historical indexation.

#### **CATEGORY A10 & A11 – UNDERGROUND CONDUCTORS & DEVICES (DISTRIBUTION & CUSTOMERS)**

This category is sub-categorized based on underground conductors and devices.

Underground conductor sub-categories shall be based on conductor type. The replacement cost for underground cables shall include cable joints and terminations along with all trenching and reinstatement. This shall be determined on a per km basis.

Underground devices shall include ground mounted switching devices, further sub-divided based on voltage and rating. The replacement cost shall include the foundations, cable terminations and earthing costs.

#### **CATEGORY A12 & A13 – LINE TRANSFORMERS (DISTRIBUTION & CUSTOMERS)**

Line transformers shall be sub-categorized based on voltage and rating. The distribution transformer cost shall include the brackets for mounting on poles (or foundations if ground mounted), the conductor between the fuse unit and the transformer terminals, all connectors and terminations and the transformer earthing costs.

#### **CATEGORY A14 – POWER CONDITIONING EQUIPMENT**

Power conditioning equipment shall include capacitors and voltage regulators. Capacitors should be further subcategorized as substation capacitors and line capacitors. Substation capacitors are installed in sub-transmission and distribution substations and generally of a larger capacitor. The cost for these items shall include all foundations, structures, earthing, switching reactors and potential transformers.

Line capacitors are installed on distribution circuits and the cost for all control equipment (if switched), brackets for installation on the poles, and conductors required shall be included in the subcategory.

#### **CATEGORY A15 – SERVICES**

Service cables shall be grouped based on cross sectional area and valued on a per km basis. This category should also include termination costs for the cable at the transformer and the customer premises.

#### **CATEGORY A16 – METERS, INSTRUMENTS & METERING TRANSFORMERS (DISTRIBUTION)**

This category shall include all meters used at customers metering point. Further sub-categorization shall be performed per metering point basis. A metering unit replacement cost shall include the cost of the meter, instrument transformers (if any), metering cabinets, sockets and seals.

**CATEGORY A17 – METERS, INSTRUMENTS & METERING TRANSFORMERS (CUSTOMER)**

This category shall include all meters used and owned by the customer. This sub-categorization shall be performed on a per metering point basis. A metering unit replacement cost shall include the cost of the meter, instrument transformers (if any), metering cabinets, sockets and seals.

**CATEGORY A18 – INFORMATION TECHNOLOGY EQUIPMENT (DISTRIBUTION)**

This category shall be valued as a specialised asset in accordance with Section 5 of the Guidelines.

**CATEGORY A19 – REGULATED ENTITY PROPERTY ON CONSUMER PREMISES**

This category shall include any regulated entity property on consumer premises.

**CATEGORY A20 – STREET LIGHTS & SIGNAL SYSTEMS**

This category shall be further sub-divided according to voltage for cables and wattage for street lights. For each standalone streetlight pole the replacement cost shall consist of a pole, an outreach arm and a fitting complete with luminaire. For the street lights installed on existing power poles the replacement costs shall consist only of an outreach arm and fitting with luminaire.

**CATEGORY A21 – SUBMARINE CABLES**

There are no submarine cables in the Philippines DUs to be valued as of 30 June 2006.

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## **Appendix B: Setting Standard Replacement Costs and Asset Lives**

This Appendix sets out a detailed methodology for determining standard replacement costs. It sets out the methodology to be followed for items where no standard cost is given. It also contains principles governing the application of standard asset lives.

### **Standard Cost Methodology**

- B.1 Standard replacement costs shall be determined for many of the asset types in use in the Philippines and found within the DWRG asset categories. The asset types are listed in Table 1.
- B.2 The standard replacement costs shall be based upon indexed historical costs, current replacement costs or modern equivalent assets costs in accordance with the principles in the DWRG.
- B.3 Standard costs shall apply to those assets in common use - 5% of a subcategory by physical count or total value - while historical cost indexation will in general be applicable to those assets comprising less than 5% provided it can be demonstrated that historical cost data is robust. DUs may use their self-assessed values for any standard or non-standard asset provided there is evidence to justify the proposed value. Where an asset is made up of a number of items that have differing lives, a weighted average life is to be applied. The reasons shall be stated and adequate information shall be provided to support the self-assessment.
- B.4 Growth indexes shall be determined from historical cost trends for assets in common use. Where such cost trends are not available, independent expertise should be sought to determine suitable indexes.

### **Components of Standard Costs**

- B.5 The standard replacement costs shall be based on industry observed costs and best achievable practice in the Philippines and include the following elements:
- a. costs of materials delivered to store inclusive of any taxes paid.
  - b. direct labour including survey, design and construction and labour on-costs incorporating holiday pay, actual sick leave (not sick leave allowances), training, other unproductive time, workers compensation payments, superannuation, and payroll tax.
  - c. transport and plant costs for delivery and erection.
  - d. overhead costs as defined in Clause B.6.
- B.6 For the purpose of network valuation, overhead costs should be limited to all corporate and administrative costs associated with the capital planning process and should include all costs associated with
- Preparation of strategy plans
  - Use of consultants
  - Capital rationing processes; project approval and budgeting

- Contract Administration
- Site Supervision
- Construction related corporate administration overhead; asset register data processing including new asset data input, retirements for replaced assets and associated procedures

Overhead costs for support systems and tools should not be included in network valuations since these systems may be capitalised at time of purchase, implementation or redevelopment. They should be valued as non-system assets.

## Application of Standard Costs

### *Developing the Unit Rate*

- B.7 The standard unit rates shall be based on efficient costs. While the DWRG specifies that the valuation is to apply at the level of component assets, e.g. poles, conductors, the standard unit rate shall not be the average replacement cost of a single component or conductor span so determined. In consideration of efficiency, the standard rates are to be determined by reference to materiality. In practical terms the standard unit rate would be that applicable to 1) the replacement of a quantity of repetitive assets totalling at least 3% of the value of the asset type under consideration; 2) the construction of a complete standard substation.
- B.8 Where standard unit rates are determined with reference to the price of commodities, e.g. metal prices, the price of such commodities shall be forecast with due consideration of historical and futures prices to establish a long term base rate for the commodity in question. The Energy Regulatory Commission shall approve such commodity base rates prior to their use in replacement cost determination.
- B.9 The standard unit rates shall be determined on average conditions of construction difficulty, or on all conditions of construction difficulty.
- B.10 If the standard unit rates are based on average conditions of construction difficulty, the unit rates to be applied in valuing the DU assets need to reflect the diversity of ground/terrain conditions, the construction difficulty associated with the different environments and geographic / locational factors.

The adopted unit rate then equals:

Adopted unit rate = Base Rate (Table 1) x Composite Adjustment Factor (clause B.11).

- B.11 Where environmental conditions affect the base rate, the DU can propose to adjust the standard rates. The basis for adjustments and the final rates need to be supported by the DU. Where environmental conditions apply this would normally be achieved by overlaying geographical / terrain areas on a Geographic Information System map and extracting the pertinent quantities of assets to which adjustments would apply. Where a composite adjustment factor is applicable it shall be computed by multiplying individual adjustment factors as relevant for each area within the distribution and subtransmission networks.

- B.12 If the standard unit rates are based on all conditions of construction difficulty, the unit rates to be applied in valuing the DU assets must be based on long term historical cost trends and statistics covering all such construction conditions.

### **Costs for Items for Which No Standard Costs Given**

- B.13 In assessing costs for asset categories for which no standard costs can be determined, historical cost indexation shall be applied using suitable growth indexes.

Such costs should be verified on the basis of competitive pricing or estimates thereof; not necessarily the cost of self construction, and shall reflect 'brownfields' construction. The cost elements set out in clauses B.5 & B.6 shall be included in accordance with the following clauses.

- B.14 Where information on competitive prices is not available, costs may be constructed on the basis of prime costs plus on-costs in accordance with the following formula:

Replacement Cost

$$= [\text{Direct materials} + \text{Plant costs} + \text{Direct Labour} (1 + \text{LOC})] / (1 - \text{OH})$$

Where: LOC = Labour on-cost

OH = Overhead cost

- B.15 The LOC should not reflect any labour market conditions to which private construction contractors are not subjected.
- B.16 A profit margin should be incorporated only to the extent that the LOC and OH and all other elements in the replacement cost make-up represent industry best practice and competitive market conditions.
- B.17 The value of land and easements should be fixed in accordance with Section 5 of the Guidelines.

### **Standard Asset Lives**

- B.18 Standard asset lives are given in Tables 1, 2 and 3<sup>7</sup> in Appendix C of these Guidelines.
- B.19 Asset Lives for assets that are not listed in these Tables, or where lives can be otherwise justified, should be established in accordance with Section 4.5.3 above in these Guidelines.
- B.20 The life of each asset commences when the equipment is commissioned for the first time or refurbished. If the year of first commissioning or refurbishment is unknown, a reasonable estimate shall be made.
- B.21 Where life extension is applied e.