



**Asset Valuation Guidelines for
National Grid Corporation of the Philippines’
(NGCP) Assets**

ENERGY REGULATORY COMMISSION

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1. Introduction	4
1.1. General	4
2. General Principles	5
2.1. Background	5
2.2. Regulatory Framework	5
2.3. Valuation Methodology	6
2.4. Valuation of Assets under the RTWR	6
2.5. Regulatory Period	7
3. Application Guidelines for the Regulated Transmission Entity	9
3.1. Conceptual Framework	9
3.2. Defining and Identifying System Network Assets	10
3.2.1. Boundaries for Identifying Network Assets	10
3.2.2. Asset Classifications	11
3.2.3. Data Requirement	12
3.2.4. Data Verification and Site Inspections	13
3.3. Assessing the Replacement Cost of Network System Assets	14
3.3.1. Background	14
3.3.2. Standard Replacement Costs	17
3.4. Optimization of the Network Configuration and its Component Assets	19
3.4.1. Introduction	19
3.4.2. Optimization Principles	20
3.4.3. Optimization Process	22
3.5. Determining the ODRC Value	28
3.5.1. Establishment of Regulatory Lives	29
3.5.2. Refurbishment	29
3.5.3. Residual Values	30
3.5.4. Materiality	30
3.5.5. Value Added Tax (VAT)	30
4. Non System Assets	31
4.1. Background	31
4.2. Valuation Methodology	31
4.2.1. Specialised Assets and Non-Specialised Assets	31
5. Valuation of Land and Easements	33
5.1. Land Valuation	33
5.1.1. Land in Use by the Regulated Transmission Entity	33
5.1.2. Land with Limited Use to the Regulated Transmission Entity	34
5.1.3. Surplus Land	34
5.2. Easement Valuation	34
Recommended Economic Service Lives for Transmission Assets	36
Reference	38

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1. Introduction

1.1. General

The purpose of this Transmission Asset Valuation Policy Guidelines (Guidelines) is to provide practical guidance for the valuation of assets used for the provision of Regulated Transmission Services¹ by the Regulated Transmission Entity. The Guidelines describe a consistent and transparent approach to transmission network asset valuations based on independently determined and generally accepted valuation principles, using the optimised depreciated replacement cost (ODRC) approach as described in the Rules for Setting Transmission Wheeling Rates² (RTWR). The RTWR will be used as part of the process of setting the maximum transmission wheeling rates that may be charged for the provision of Regulated Transmission Services by the Regulated Transmission Entity.

¹ As stipulated in the RTWR, refer to General Provisions, 1.3, Page 6.

² Guidelines on the Methodology for Setting Transmission Wheeling Rates for 2003 to around 2027, ERC Case No. 2003-34, 19 May 2003.

2. General Principles

2.1. Background

Capital related costs represent a significant proportion of the Regulated Transmission Entity's annual revenue requirement (ARR) which is due to the capital intensive nature of typical electricity networks. The value of the Regulatory Asset Base (RAB) therefore forms a critical input into determining the regulated charges and serves as an important indicator of efficient pricing and future investment.

Due to the importance of the value of the RAB as highlighted above, a well-defined asset valuation methodology is required in order to achieve the regulatory objective of transparency and consistency. The aim of the ERC is to adopt a regulatory process which eliminates monopoly pricing and creates incentives to pursue ongoing efficiency gains through cost reductions.

The arrangements for the valuation of the RAB are set out in Section 5.6 of the RTWR. The terms of reference for the RTWR are pursuant to Section 43(f) of Republic Act No. 9136, otherwise known as the Electric Power Industry Reform Act of 2001 (EPIRA), and Section 5(a) of Rule 15 of the Implementing Rules and Regulations issued pursuant to the EPIRA.

The RTWR establishes the procedure for determining the ARR of the Regulated Transmission Entity and sets out the requirements for valuing the initial capital base.

2.2. Regulatory Framework

The objective of the performance based regulation (PBR) 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 Regulated Transmission Entity. This framework ensures positive incentives for the Regulated Transmission Entity and protects the value of its business in line with the objectives of the RTWR.

The building block approach that has been adopted by the ERC is described in Section 5.4 of the RTWR. 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 and easements as at the date of the re-valuation.

2.3. Valuation Methodology

Two asset valuation methodologies are to be applied to provide two alternate valuations for the Transmission Assets prior to the commencement of the Third Regulatory Period. A roll forward valuation will be generated based on escalation or indexation of the previous asset valuation, adjusted for retired assets and additional assets installed. The second valuation approach will be the application of an Optimised Depreciated Replacement Cost (ODRC) methodology.

ERC's preferred valuation methodology is the ODRC approach.

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

The 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 RTWR.

The ODRC approach is further discussed in the succeeding section, refer to Section 3.

2.4. Valuation of Assets under the RTWR

The RTWR provides guidance and sets out requirements for the valuation of assets. The base valuation methodology is specified in Clause 4.6.4 of the RTWR as follows:

4.6.4. For the purposes of the Initial Re-valuation, and in the circumstances specified below in connection with them, the following methods of re-valuation may be used for different Asset Categories (as defined in, or otherwise approved by ERC pursuant to, Section 4.6.5):

- (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 of 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.

According to the RTWR, the Gross Current Replacement Costs must also be depreciated and optimised, so that the final form of the valuation is the ODRC valuation.

2.5. Regulatory Period

An asset re-valuation must be undertaken for the Regulated Transmission Entity which will culminate in a re-valuation report for the Regulated Transmission System. The Regulated Transmission Entity is required to prepare their rate application under the PBR and file this application with the ERC by December 1, 2009. To facilitate this timeline, the ERC requires the re-valuation to be completed on October 31, 2009.

Current advice suggests that the Transmission Asset Register to be provided will be current to December 31, 2008. Therefore a roll forward based on actual and forecast capital expenditure will be required for a two year period to provide the

starting asset base valuation immediately prior to the start of the Third Regulatory Period, on January 1, 2011.

Following the re-valuation report, the RAB for the Regulated Transmission Entity for any Regulatory Year will be derived from a roll forward calculation of the value of each Asset Category.

3. Application Guidelines for the Regulated Transmission Entity

These Application Guidelines provide the specific methodology to be followed by the Regulated Transmission Entity in determining the ODRC values of assets used for the provision of Regulated Transmission Services.

The ODRC methodology follows generally accepted valuation principles which have been articulated in a number of publicly available documents and these sources are acknowledged in **Error! Reference source not found.**

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 the identified assets;
- c) optimising the network configurations and its component assets; and
- d) by utilising the standard asset lives, determine the "optimised depreciated replacement cost (ODRC)" value.

3.1. Conceptual Framework

The ODRC method measures the economic value of system assets to an entity on the basis that the entity operates in an efficient manner that is sustainable over time and is not able to generate monopoly income. The method determines a hypothetical value of the assets which is a surrogate for market value in circumstances where it is not possible to determine values for specialised assets using a market comparison approach.

From the above, the valuation approach should therefore 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.

The ODRC is calculated based on the gross current replacement cost (GCRC) of assets that are adjusted for over-design, over-capacity and/or redundancy and includes a deduction for depreciation.

It is typical that some of the assets for which the GCRC is required will have a market value if there is an active market for the purchase and sale of used assets of the same nature, for example land, motor vehicles and certain items of plant and machinery. However, in general, the Regulated Transmission Entity's assets are transmission specific, therefore, either there is no market or the market is illiquid and thus not appropriate for valuation.

As noted above, there are a range of assets operated and maintained by the Regulated Transmission Entity for which there is a quoted price and/or an active and liquid market. The assets for which a market GCRC is appropriate will be valued based upon market evidence of prices for similar assets i.e. market value. In cases where there is no market value, the ODRC value assumes 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, given its existing age and condition. The ODRC of electricity transmission assets could also be 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 requirement, the age and condition of the assets and the replacement in the normal course of business.

The GCRC 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. As systems expand and change, a degree of sub-optimality at any one time is inevitable and is part of the total cost of output.

The concepts above are consistent with the principles of fairness and equity required in assessing access charges in that users only pay for those assets that are required in a commercial context and therefore are not required to pay for any excess capacity or over-engineering embodied in the existing assets.

3.2. Defining and Identifying System Network Assets

The following section provides guidance on defining, identifying and reporting on assets that will form part of the ODRC valuation of system network assets.

3.2.1. Boundaries for Identifying Network Assets

System fixed assets owned by the Regulated Transmission Entity or subject to finance lease are to be included in the ODRC valuation. System fixed assets are assets that are tangible in nature, have relatively long useful lives, and are used, or intended to be used, for the provision of Regulated Transmission Services (refer to the RTWR for a definition of these services). Spares held in stock that can be used in the network in place of existing network assets may be included in the ODRC

valuation to the extent that the quantities of items included in the valuation are realistic.³

Also note that the boundary between the Regulated Transmission Entity and the Distribution Utilities is to be determined in accordance with the ownership of the assets.

3.2.2. Asset Classifications

The main System assets of the Regulated Transmission Entity are classified based on their function and includes transmission lines, substation components and communication plant. Assets relating to system operations and non-system assets are discussed in section 4.

The RTWR, in section 4.6.5, states that the following asset categories should be applied for purposes of reporting to the ERC:

Transmission Lines

- Buildings, civil works and establishment;
- Towers and associated lines;
- Poles and associated lines;
- Underground cables;
- Sub-sea cables;
- Easements owned by the Regulated Transmission Entity;
- Other; and
- Spares.

Substation Components

- Buildings, civil works and establishment;
- Transformers;
- Circuit Breakers;
- Instrument transformers;
- Meters and protection;
- Reactors;
- Buswork;
- Others; and
- Spares.

Communications Plant

³ The types and quantities of spares in the store should relate to the functions performed and assets owned by the Transmission Entity. Please refer to section on optimisation of spares.

Buildings, civil works and establishment;
Communications plant and infrastructure;
Ancillary infrastructure;
Other; and
Spares.

System Operations

Buildings, civil works and establishment;
Control room and control infrastructure;
Ancillary infrastructure; and
Other.

Non-network Assets

Computers and office equipment;
Plant, tools and equipment;
Furniture and fittings;
Commercial buildings;
Land; and
Other.

3.2.3. Data Requirement

In order to prepare the required asset registers for the PBR process, the Regulated Transmission Entity's asset registers must include all the information required on each individual asset to complete the re-valuation. This information includes:

Historic Cost of the asset (original cost of purchase);
Commissioning Date (date of first installation);
Asset Location;
Asset Description; and
Asset Quantity.

Consistent with Section 2.4.2 of the Position Paper, the Regulated Transmission Entity should separate its asset base into three primary asset types as follows:

Connection Assets;
Sub-transmission assets (not yet sold); and
The RAB subject to revenue cap under the RTWR.

The asset categorisation in the asset registers of the three primary asset types should follow the asset categories in Section 4.6.5 of the RTWR and Appendix A of the Position Paper.

3.2.4. Data Verification and Site Inspections

A data verification process should be carried out to check the accuracy and completeness of the asset registers which form the basis of the re-valuation.

3.2.4.1. Extent of Verification

Data verification is required to confirm the accuracy and robustness of the Regulated Transmission Entity's data set provided for the purposes of the asset valuation. Where possible, a sample of the asset base should be checked to help understand any assumptions or business rules that may have been applied in developing the asset data.

3.2.4.2. Extent of Site Inspections

Given that the volume of data stored in the asset registers is very significant, a sampling technique⁴ should be used to verify the data for the purpose of the re-valuation. The sample assets should be chosen at random from the asset registers and verified in the field as to existence, age and condition. Moreover, a sample of assets identified from the field should be located in the asset registers.

Only asset categories that are material to the RAB of the Regulated Transmission Entity should be subject to detailed physical verification procedures. In theory, a statistically significant sample should be inspected to provide an appropriate level of confidence in the data set provided. The appropriate number of random samples that will be taken in each asset category⁵, identified to be subject to site inspection should provide a minimum level of confidence of 95% with a margin of error agreed with the ERC. In the case of conductors, a minimum sample of 10% of the total circuit length should be taken whereby the inspection should include randomly selected locations, per major area, and per voltage level.

3.2.4.3. Verification Procedures

The verification procedures during the site inspections for substations should comprise a review of the condition of the substation assets as an indicator of age

⁴ The ERC retains the right to dictate a sampling method other than the one proposed in this section.

⁵ This will be performed for all major areas including North Luzon, South Luzon, Visayas and Mindanao.

and the prospective remaining economic life. The verification process should also note substations that have been decommissioned in which case should be deleted from the asset register.

Discrepancies noted during the verification process should be assessed for their potential impact on the overall re-valuation assessment. Consequently, discrepancies in the asset registers with potential material impact should be adjusted accordingly.

3.3. Assessing the Replacement Cost of Network System Assets

3.3.1. Background

The RTWR provides guidance with regards to the methods used in obtaining the GCRC, refer to Section 2.4. The base valuation methodology is specified in Clauses 4.6.4 of the RTWR and identifies three methods that could be applied to establish the GCRC including:

- By reference to historical costs, adjusted for inflationary increases since construction (the indexation method). This method employs a suitable index which may include a Retail or Consumer Price Index, or indices related to movements in commodity or labour rates;
- By comparison with recent costs of similar assets (the replacement cost method). For this method, the efficient current cost is determined by contacting suppliers, manufacturers or their agents, or by reference to recently published prices; and
- By reference to technologically advanced assets in use elsewhere (the modern equivalent asset method). For this method the current cost is determined by reference to the current market buying price, current reproduction cost or replacement cost of modern equivalent assets.

In determining the GCRC, a combination of all three methods highlighted above is considered appropriate.⁶

Each of the suggested methodologies has particular benefits and drawbacks.⁷ In particular:

⁶ Refer section 2.1.2 of "Regulatory Reset of Regulated Transmission Services for 2011 to 2015, Position Paper" dated 9 September 2009.

⁷ Refer section 2.2 of "Regulatory Reset of Regulated Transmission Services for 2011 to 2015, Position Paper" dated 9 September 2009.

- Indexation is easy to apply where good historical records of installations exist. It takes into account actual expenditure. However:
 - it may be difficult to establish the appropriate escalation index to use, given that this would rely on a mix of factors, including CPI changes, exchange rate changes and productivity changes;
 - accurate records of the historical cost or age of assets may not be readily available; and
 - the original expenditure on an asset may not have been efficient and such inefficiency would therefore be carried forward to the re-valued asset base.
- Replacement cost analysis provides an up-to-date assessment of current asset replacement costs without having to rely on historical records, or accounting for past inefficiencies, but:
 - it may be difficult to obtain sufficient recent evidence of actual replacement costs for all asset types;
 - the methodology is inappropriate where asset types are no longer available;
 - estimating the impact of economies of scale on replacement costs may introduce an element of uncertainty; and
 - estimating the other direct costs associated with the establishment of an asset may introduce a further element of uncertainty.
- Modern equivalent asset analysis provides an up-to-date assessment of current asset replacement costs without having to rely on historical records, or accounting for past inefficiencies, but:
 - it may be difficult to obtain sufficient evidence of actual modern equivalent replacement costs for all asset types;
 - modern equivalent assets often have different characteristics or capacity to those they (notionally) replace and correcting for this may introduce uncertainty;
 - estimating the impact of economies of scale on replacement costs may introduce an element of uncertainty; and
 - estimating the other direct costs associated with the establishment of an asset may introduce a further element of uncertainty.

Modern Equivalent Assets

A MEA is the asset that, in the normal course of a transmission entity's business, would be used to replace an existing asset. The MEA may differ from an existing asset as a result of a combination of:

changes in technology;
changes in the life-cycle cost of alternative assets;
availability of assets; and
a combination of unnecessary small and immaterial graduations between asset types and sizes.

The MEA replacement cost is determined by reference to the current market buying price, current reproduction cost or replacement cost of the MEA.

In respect of specialised assets such as most network infrastructures, 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 if a modern equivalent alternative is available.

The MEA cost can be established:

by comparison with recent costs of similar assets;
by reference to historical costs, adjusted for inflationary increases since construction;
by contacting suppliers, manufacturers or their agents; or
by reference to recently published prices.

Where the MEA has a materially differing capacity than the existing asset, 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 optimization.

Cost Basis

Current costs can be determined on a “greenfields” or “brownfields” basis. The “greenfield” cost basis assumes construction occurs in an area free of development and that the most efficient network, given current usage, is established. The “brownfields” cost basis assumes construction occurs around all existing infrastructure and development (other than the asset being valued) and that the assets are fundamentally replaced in the same location. Accordingly, preliminary costs such as route planning for the network are not included.

The “brownfields” cost basis methodology 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) in the ordinary course of business (as opposed to complete system re-design). 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 methods.

3.3.2. Standard Replacement Costs

This sub section highlights the methodology that should be applied when allocating standard replacement costs to each asset category or sub-category. However, in cases where the proposed method is not applied, justifications for all departures from the standard costs should be documented with a clear audit trail.

This section assists in allocating a per unit replacement cost for each asset category and sub-category which forms the basis of the ODRC Valuation.

Standard Cost Methodology

Standard replacement costs shall be determined for all assets that are used for Regulated Transmission Services and be allocated, at a minimum, to each asset sub-category.⁸

The standard replacement costs shall be based on indexed historical costs, current replacement costs or modern equivalent asset costs in accordance with the principles in the RTWR. Also refer section 2.4.

The Regulated Transmission Entity 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.

⁸ The valuer may identify the need to further disaggregate asset sub-categories for purposes of further refinement. Such newly created sub-categories should be documented.

Growth indexes⁹ shall be determined from historical cost trends for assets in common use. Where such cost trends are not available, independent advice should be sought to determine suitable indexes.

Components of Standard Costs

The standard replacement costs shall be based on industry observed costs and good industry practice and include the following elements:

- costs of materials delivered to store inclusive of any taxes paid (excluding VAT);
- direct labour including survey, design and construction and labour on-costs incorporating holiday pay, actual sick leave, training, other unproductive time, workers compensation payments, superannuation, and payroll tax;
- transport and plant costs for delivery and erection; and
- overhead costs (preparation of strategy plans, use of consultants, capital rationing processes, project approval and budgeting, contract administration, site supervision and construction related corporate administrative overhead, asset register data processing including new asset data input, retirements for replaced assets and associated procedures)

Application of Standard Costs

Developing the Standard Costs

The standard unit rates shall be based on efficient costs. The standard cost should be determined with apposite consideration of efficiency, whereby the replacement of a quantity of repetitive assets totalling at least 3% of the value of the asset type (or a complete substation) under consideration should be considered. When the valuer considers efficient costs, the standard costs are to be determined by reference to materiality.

Where standard unit rates are determined with reference to the price of commodities, the price of such commodities shall be forecast with due consideration of historical and future prices to establish a long term base rate for the commodity in question. The ERC shall approve such commodity base rates prior to their use in replacement cost determination.

⁹ A number relating acquisition costs of an asset or assets to their acquisition cost during an arbitrarily chosen base period.

The standard costs could be determined on average conditions of construction difficulty, or on all conditions of construction difficulty. The current valuation will be based on standard unit rates which reflect average construction difficulty.

Using average condition: Where the standard costs are based on the average conditions of construction difficulty, adjustment factors may be employed to accommodate the construction difficulty associated with different environments and site locations. The regulated transmission entity should provide sufficient evidence to support any proposed adjustments. These adjustments will typically be based on ground/terrain information from a geographic information system which allows the identification of assets affected by unique environment conditions. Where a composite adjustment factor is applicable, it shall be computed by consideration of the impact of each individual factor.

Non Standard Costs

Non-standard assets differ from standard assets in that they are typically not common and / or recent procurement costs are not available. In these cases, the procurement costs should be determined by assessing the indexation of historical asset values against local standard costs or international standard costs, if available. This method should take into consideration currency exchange rates, CPI, base metal prices and other variables related to the cost of equipment procurement.

The value of land and easements should be fixed in accordance with Section 5.

3.4. Optimization of the Network Configuration and its Component Assets

3.4.1. Introduction

Under the ODRC approach¹⁰ an optimised network would use the most cost-efficient design that would provide the required service potential. Such a design conceptually could be undertaken using an approach that disregards completely the design and configuration of the existing asset base. However, the RTWR makes it clear that the analysis of over capacity or excess redundancy will be based on there being no changes to the location of supply and demand, transmission line or cable routes, easements or substation locations, but existing network elements can be re-rated or re-designed in a notional sense to assess their optimised value. Furthermore, in section 2.6.7 of the Position Paper, the following statement is

¹⁰ As highlighted in the RTWR and Position Paper.

made: The ERC does not believe the optimization process should occur in the manner of a “greenfield” study, but rather it should use “brownfield” techniques.

The most cost-efficient design is the one that minimises the present value of the total costs of the system fixed assets and their use over their standard lives. In undertaking life cycle cost analyses to determine the most efficient design, a Regulated Transmission Entity may take into account the capital and operating costs over the life of the asset, other costs that are incurred by the Entity as a result of the use of the asset and the cost of losses to the extent that these are caused by the existing load and the allowed future load growth.

Furthermore, it is vital that the optimised network should provide a security of supply similar to that which currently exists, except in cases where the supply security exceeds the regulated transmissions entity’s standard criteria. The optimised network should also have a capacity similar to that of the existing network, except in cases where the capacity exceeds that of the allowed future load growth.

It is important to note that the optimization for purpose of ODRC valuation is not concerned with improving the system from its current state. Optimization cannot result in an increased network system asset replacement cost.

The steps in the optimization process are specified by the ERC¹¹:

- a) exclude stranded assets;
- b) optimise the configuration of the network;
- c) optimise the capacity of elements in the network;
- d) optimise network engineering; and
- e) optimise stores and spares.

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

3.4.2. Optimization Principles

In section 4.6.6 of the RTWR, three main optimization principles are highlighted which should be adhered to when performing the optimization process. The first principle states that the optimization 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

¹¹ The Position Paper further provides three aspects relating to the optimisation process, refer 2.6.3.

demand and the objective of minimizing the whole of life costs. Secondly, the RTWR states that the planning horizon used should be 15 years¹² or as otherwise determined by the ERC based on reasonable planning policies in the context of an electricity transmission network in the Philippines. Lastly, while assessing over capacity or excess redundancy of the network and network components the following fundamental constraints should be adhered to:

- the location of supply and demand points on the network should be assumed to be fixed;
- the location of transmission lines or cable routes should be assumed to be fixed;
- the existing easements and substation locations should be assumed to be fixed;
- the value of the optimised system cannot be greater than the value of the existing network; and
- the optimization system should have inherent stability, reactive power support and fault level ratings sufficient for the business planning and total asset management planning period and not more than the existing system.

A series of optimization tests must be systematically applied to the whole network to identify the following:

Over capacity

The optimization 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

¹² The Guideline further states that the ERC retains the right to also determine a different planning horizon based on reasonable planning policies in the context of an electricity transmission network in the Philippines. Refer section 4.6.6 (b) of the Guideline.

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.

Over engineering

Whether an asset is considered to be over-engineered is, to some extent, subjective and changes over time. Over-engineered assets (based upon today's standards) may have either a longer life or lower life cycle costs than the MEA. To determine any level of over engineering consideration will be given to the basic principles of this valuation namely "the minimum cost of replicating the service potential embodied in the network with a modern equivalent asset".

Over-Design, Excess Capacity and Standby Assets

In cases where assets are over designed or have excess capacity, an adjustment needs to be made to the valuation. The adjustment on the valuation should be implemented in such a way as to reflect the cost of replacing the existing service potential of the assets in the valuation which is based on an efficient set of modern equivalent assets to achieve the required level of service output within the entity's planning horizon.

Assets with excess capacity 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.

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, security and quality standards.

3.4.3. Optimization Process

This section focuses on the optimization process, and provides guidance in this regard. An important criterion that will have to be adhered to throughout the process

of optimization is that the value of the optimised system can never be greater than the value of the existing network.

Key Optimization Input - Future Load Growth and Generation Forecasts

The future load growth and generation forecasts forms an integral part of the optimization process due to the fact that it influences the maximum capacity of any part of the optimised network over the allowed planning period (15 years, refer section 3.4.2). It is critical to the process of optimization that the regulated transmission entity provides adequate¹³ load and generation forecast information, which also takes into account any potential to reduce peak demand through the application of cost-effective demand-side management practices. This load and generation forecast information should be clearly justified and provide information regarding the current and future (15 year) maximum demand and generation at a level of aggregation which relate to the level of optimization. It is expected that different growth rates for different parts of the network will exist and this needs to be clearly indicated.

Key Optimization Input - Quality of Supply

The optimised network will not only be designed to supply the existing and future load demand, it will also ensure that the quality of supply does not deteriorate from the existing levels, except where this is found to be better than the quality of supply criteria.

The regulated transmission entity should provide details of their quality of supply criteria that are currently being used which should, at a minimum, include the degree of security in different circumstances or geographic locations, voltage regulation criteria, target reliability indices for different areas of the network and levels of energy losses.

As a guide, the following table¹⁴ provides general security levels for the planning of typical transmission networks. It is proposed that these general security levels should be applied where adequate security criteria are not supplied by the regulated transmission entity.

¹³ The word 'adequate' will also imply a load forecast that is reasonably expected to be supplied by the regulated transmission entity.

¹⁴ Table obtained from "Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses" published 30 August 2004, Commerce Commission, New Zealand.

Load (MW)	Basic Security	Transmission Circuits	Busbars	Transformers
Less than 10	n	One circuit	One bus or bus section	1 x transformer.
(10 to 40, if more than 40km remote and local generation can limit load shed to 25%)	n	One circuit	One bus or bus section	1 x transformer, if backed up from alternative supply point.
From 10 to 300	n-1	Two circuits	Two busbars or bus sections	2 (or more) transformers such that firm supply of peak demand using any short term overload capability.
More than 300	n-2	Three circuits on at least two routes	One redundant bus or bus section, such that supply is not lost after a single contingency while one bus is out of service for maintenance	2 (or more) transformers such that firm supply of peak demand using any short term overload capacity.
More than 600	Loss of station	Supply into region should be diversified across more than one major terminal substation.		

The Philippine Grid Code¹⁵ (Grid Code) provides transmission performance standards and will be used as the basis of the following guide to quality of supply levels for Voltage Variations, Harmonics and Voltage Unbalances.

As a further note, existing system fixed assets that provide a security of supply exceeding that of the criteria used in the optimization process, will be optimised out.

Optimising System Configuration

Optimization of the system configurations shall be performed by evaluating alternative configurations, while due consideration is given to the optimization constraints (as provided in section 4.4.2) as well as quality of supply as stipulated in the above section.

A proposed source of information to assist with the review of possible system configuration optimizations includes the regulated transmission entity's network planning criteria. This review should assist in indicating whether the regulated transmission entity is aligning with "good electricity industry practice".

¹⁵ Philippine Grid Code, published by the Energy Regulatory Commission, dated December 2001.

When optimising Transmission Lines, the location and voltage of both the point of supply and the zone substation should be considered to be fixed. The valuer should assess the number of transmission lines in relation to the regulated transmission entity's security of supply criteria and allowed future load growth. If it is found that there are transmission lines that are not required, such line(s) should be optimised out of the ODRC value. Furthermore, when assessing the optimum conductor size for the lines, it is necessary to take account of the increase in losses and the effect of radio interference so as to select the most technically suitable and cost effective conductor. Transmission capacity throughout the system is matched to the predicted power transfers over the planning period.

When optimising Substations, the location should be considered to be fixed. All substations must be tested to determine whether a lower rated network¹⁶ would result if the substation was eliminated and the load supplied from substations in close proximity.

Optimising Network Capacity

Optimization of the network capacity is performed after optimization of the system configuration and is a process by which the capacity and cost efficiency of assets, forming part of the system, are optimised.

Optimising Network Engineering

The engineering of the network should also be optimised if it is found to have been over-engineered. In order to assess the level of engineering, the regulated transmission entity's design and construction standards and standard of engineering for recent projects should be used as a benchmark for this analysis. If it was found that parts of the existing network are engineered to a standard greater than that stipulated in the benchmark design and construction standards, it would then indicate that over-engineering took place and that optimization will be required.

Optimising Stores and Spares

Major equipment spares are allowed in the ODRC valuation as long as the spares are viewed as suitable replacements for assets currently installed in the network and the quantity of spares is reasonable to meet the regulated transmission entity's

¹⁶ The definition of lower rated network is a network that has a quality of supply less than the required level as set by the regulated transmission entity's quality of supply criteria and/or does not provide the customers with the level of service quality that currently exist.

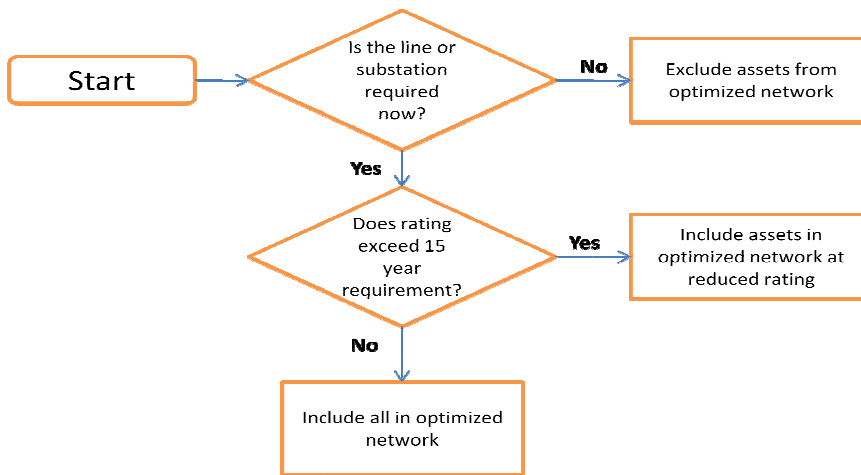
security of supply criteria¹⁷. Typically routine stock and inventory are not included in the asset valuation.

Exclude Stranded Assets

Assets that are not currently used or identified to be used in the forecast period for purposes of providing transmission services will be assigned a zero value for purposes of calculating the ODRC value.

Further Guidance from Position Paper

The Position Paper, refer section 2.6, provides guidance with the optimization process and includes a basic optimization flow chart (included below) and basic steps to assist the valuer in performing the optimization of the network.



Further Guidance from RTWR - Inclusion of previously Optimised assets

Section 5.6 of the RTWR provides principles to be followed in cases where assets that were optimised in previous valuations can be included in subsequent valuations. As stated in the RTWR, these principles, relating to the treatment of these assets, include:

- “(a) the value at which that asset must be included in the regulatory asset base is its regulatory asset base value as at the date of its exclusion from the regulatory asset base; and

¹⁷ Where the security of supply criteria is not supplied by the regulated transmission entity, the security of supply criteria proposed in this guideline should be used.

(b) that asset must be included in the regulatory asset base in the year in the Third Regulatory Period in which the asset is forecasted to be required to support the provision of Regulated Transmission Services by the Regulated Entity, and the asset must be depreciated (in an accelerated manner) over its remaining economic life as if it had never been optimised out of the regulatory asset base.”

Even though the RTWR states that these principles should be applied to the Third Regulatory period, the same principles would have to be applied for any re-valuation and therefore forms part of the guideline.

Specific Guidance - Transformer Optimization

Identifying the degree of over design in transformer capacity requires an assessment of the power supplied through it, taking into account the predicted load growth and power factor.

In cases where the estimated load exceeds that of the capacity of installed transformers, and where reinforcements are required to provide the required transmission service, the transformer capacity will not be increased for purposes of the ODRC valuation.

When optimising transformers, full use should be made of any forced cooling capability and short-term ratings and should be optimised down so that the transformer will require 100% of its capacity to meet the required security level and future load demand (as based on the planning horizon). When optimising the size of transformers down, it should be optimised to the nearest standard size used by the regulated transmission entity and retain the same primary and secondary voltage levels. Transformer size optimization upwards is not allowed for this ODRC Valuation process.

The peak load at the individual supply points will be used when performing supply transformer optimization. This peak load should also be compared with the downstream diversified load, in cases where the primary level transformer supplies more than one load. In cases where there is no information regarding the diversity factors, the sum of peak load should be used.

The number of transformers in a substation should be optimised if a reduction in overall replacement cost of the transformers could be achieved by optimising the

number and arrangement of transformers that will meet and not exceed the regulated transmission entity's security of supply criteria.

Specific Guidance – Transmission Line Optimization

When optimising transmission lines, the system peak load should be used as the base case for analysis purposes. The only exception to the base case will be when analysis is performed on regional bases, in which case the peak load scenario for that particular region should be applied in the analysis. For spur lines the peak load should also be compared with the downstream diversified load, in cases where the feeder supplies more than one load. In cases where there is no information regarding the diversity factors, the sum of peak load should be used.

By using the load forecast as stipulated above, the size of conductors or cables should be optimised down to the smallest standard size that meets the required capacity, utilising the short term ratings and which meets the quality of supply criteria of the regulated transmission entity.

Specific Guidance – Substation Optimization

When optimising substations, the substation design should be optimised to the minimum while the required security of supply criteria is met with the future load growth catered for. Switchgear at each substation should be arranged to reduce complexity while providing a switching flexibility that is compatible with the satisfactory operation of the system.

Substation equipment not required to meet the security of supply criteria and allowed future load growth should be optimised out. Substation equipment size should be optimised to the nearest standard rating which meets the allowed future load growth.

3.5. Determining the ODRC Value

An asset shall be depreciated when the existing asset's remaining life (RL) is less than the regulatory life that would normally be expected from a new asset. The depreciation effectively recognises the limited remaining life. The ORC of an asset shall be depreciated according to the RL of the existing asset. The straight-line method of depreciation shall be used as specified in Section 4.8 of the RTWR such that the ODRC of an asset is determined as:

$$\text{ODRC} = \text{ORC} \times \text{RL/Regulatory Life}$$

The ORC is multiplied by the RL of the asset and that product is divided by the regulatory life of the asset to provide the ODRC. The RLs and regulatory life need to be established for all system fixed assets (except for land and easements, which are not depreciated).

3.5.1. Establishment of Regulatory Lives

The Regulatory Life of an asset is its economic life, assuming continued use in its present function as part of a continuing business. The standard Regulatory Lives for different asset categories are set out in the tables in Appendix A.

In general, Regulatory Lives will be applied for classes of assets based on generally accepted industry estimates of economic life. The regulatory life of a class of assets is by definition, and average or typically expected life. It could be expected that some individual assets will fail or be replaced for other reasons before they reach their regulatory life. Other individual assets will continue to provide service well past the regulatory life of their asset category. Generally the regulatory life will be applied to all assets in a particular asset class unless condition assessment data warrants individual treatment. Similarly where the Regulated Transmission Entity can demonstrate substantial refurbishment beyond normal maintenance has been undertaken to extend the life of an individual asset, then the valuer may adjust the RL for that specific asset.

In any case, the Regulatory Life of an asset shall be reviewed every regulatory period in order to account for differing expectations from previous estimates.

3.5.2. Refurbishment

Refurbishment is defined as work done on an asset, or group of assets, that result in a material extension of its service life beyond its standard Regulatory life (as stipulated in section 3.5.1 above). It must be noted that refurbishment differ from maintenance work, which is done to ensure that an asset is able to perform its designated function for its standard Regulatory life.

For refurbished assets, the valuer, after receiving adequate supporting information from the Regulated Transmission Entity, can assign a new Remaining Life from the time of the refurbishment. As a general rule, newly assigned Remaining Lives should not be greater than the standard Regulatory life (as stipulated in section 3.5.1 above).

3.5.3. Residual Values

There will be no further depreciation for assets that have reached the end of their regulatory life instead the residual value will be included in the RAB for the purposes of calculating the return on assets building block.

The residual value reflects the fact that if an asset continues to provide the required service, then it has an economic value regardless of financial accounting value. It is then reasonable to allocate a value to assets that have reached the end of its regulatory life in order to recognise their value to the network and to provide an incentive to the Regulated Transmission Entity to extend the useful life of an asset.

Assets that are approaching their regulatory life shall be deemed to have a residual life of 5 years for the calculation of the GCRC. For assets that have shorter asset lives such as SCADA and Communication equipment, and revenue meters, a residual life of one year will be assigned.

3.5.4. Materiality

The ERC considers an overall value variance of more than 5% to be material. This level of materiality is to be taken into account in the re-valuation of the assets of the Regulated Transmission Entity. Materiality shall be 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”.

3.5.5. Value Added Tax (VAT)

Unless the Regulated Transmission Entity does not have an exemption from Value Added Tax (VAT), VAT should be excluded from all RAB valuations. In which former case, direct costs applied include only 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.

4. Non System Assets

4.1. Background

Non system assets comprise those assets owned and utilised by the Regulated Transmission Entity in the transmission operations but which do not form part of the physical plant and equipment network infrastructure. In particular, the following, as per Section 4.6.5 of the RTWR and Appendix A of the Position Paper form part of the non system assets:

Computers and office equipment

Plant, tools and equipment

Furniture and fittings

Commercial buildings

Other¹⁸

The non system assets will form part of the RAB and will therefore be included in the re-valuation report.

4.2. Valuation Methodology

The methodology of the valuation of non system assets should be consistent with the Philippine Accounting Standard (PAS) 16, which corresponds to International Accounting Standard (IAS) 16 – Property, Plant and Equipment, the primary accounting standard governing the valuation basis adopted for financial reporting.

4.2.1. Specialised Assets and Non-Specialised Assets

In the application of these Guidelines, the non system assets are to be identified as either specialised assets or non-specialised assets.

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 approach for specialised assets should be the ODRC.

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. The valuation approach for non-specialised assets should be the market comparison

¹⁸ Land was excluded from the list and shall be discussed in Section 5 of the Guidelines

approach or the income approach or the depreciated replacement cost approach depending on availability of data.

5. Valuation of Land and Easements

5.1. Land Valuation

Land assets owned and utilised by the Regulated Transmission Entity shall be categorised according to Section 4.6.5 of the RTWR. In order to ensure transparency of the assets the ERC further requires the Regulated Transmission Entity, as indicated in Section 2.5 of the Position Paper, to include the land assets associated with each asset category in the valuation of that asset category.

The revised list of asset categories can be found in Appendix A of the Position Paper.

The valuation methodology for land differs depending on its utilisation. Land that is held by the Regulated Transmission Entity can be differentiated as follows:

- (a) Land that will continue to be used by the Regulated Transmission Entity for the foreseeable future in support of its business operations (Land in Use by the Regulated Transmission Entity);
- (b) Land with limited use to the Regulated Transmission Entity; and
- (c) Land that is no longer required to support the Regulated Transmission Entity's business operations (Surplus Land).

5.1.1. Land in Use by the Regulated Transmission Entity

Where land is held for continued use and would be replaced if the Regulated Transmission Entity was deprived of it, the basis of valuation is the current market value for 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 options:

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.

5.1.2. Land with Limited Use to the Regulated Transmission Entity

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 Regulated Transmission Entity. 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 Regulated Transmission Entity.

5.1.3. Surplus Land

Land that is surplus to the current or anticipated needs of a Regulated Transmission Entity should be valued at current market value.

Irrespective of the category of the land holding outlined in Section 5.1, 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.

5.2. Easement Valuation

Easement is a right, privilege or interest given to another person or entity to trespass upon a land that person or entity does not own. Easements given to the Regulated Transmission Entity include the right to bury cables or access

transmission lines. The historical costs associated with easements 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.

The valuation methodology for easements should be indexation of the historical easement cost.

Pasig City, October 5, 2009.

ZENAIDA G. CRUZ-DUCUT

Chairperson

ALEJANDRO Z. BARIN

Commissioner

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Commissioner

MARIA TERESA A.R. CASTAÑEDA

Commissioner

JOSE C. REYES

Commissioner

Recommended Economic Service Lives for Transmission Assets

Category	Description	Life (years)	Notes
Transmission Lines	Lattice steel tower lines	50	
	Wood pole lines	25	
	Concrete pole lines	50	
	Steel pole lines	50	
Power Cables	Submarine HVDC	50	
	Submarine HVAC	50	
Outdoor Substations - MEAs	Transformers 500kV	45	N-1 security
	Transformers 230kV	35	Without N-1 security
		45	With N-1 security
	Transformers 115kV	35	Without N-1 security
		45	With N-1 security
	Reactors	35	
	Capacitor banks	40	
	Outdoor switchbays	40	500 kV, 230 kV, 138/115 kV, 69 kV outdoor assemblies (see Note 1)
Substation establishment assets	50	See Note 2	
Outdoor Substations- individual equipment	Circuit breakers	40	500 kV, 230 kV, 138/115 kV, 69 kV
Indoor GIS Substations	500 kV GIS switchbay	45	
	230 kV GIS switchbay	45	
	115 kV GIS switchbay	45	

Substations Secondary	Protective relays and controls	15	
	Metering equipment	30	
	RTUs, SCADA systems	15	
Communications	OPGW links	50	
	PLC links	35	
	Radio links	15	
System Control		15	

Notes:

1. A switchgear bay includes the primary equipment, buswork, foundations, equipment supports and other structures, protective and control equipment and cabling directly associated with the bay.
2. Substation establishment assets include earthworks, roads, fencing, drainage, earth grid, auxiliary AC and DC power supplies, batteries, cabling not specific to a bay, auxiliary mechanical services, protection and control equipment not specific to a bay.

Reference

Guidelines on the Methodology for Setting Transmission Wheeling Rates for 2003 to around 2027 – ERC Case No 2003-34; May 29, 2003.

Regulatory Reset of the Regulated Transmission Services for 2011 to 2015 – Position Paper; ERC; September 9, 2009.

Valuation of Electricity Network Assets – A Policy Guideline for NSW DNSPs – NSW Treasury; July 2001.

Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses – Commerce Commission of New Zealand; August 30, 2004.