



**Performance Based Regulation of
Privately Owned Electricity Distribution Utilities
(First Entry Point)**

**PRELIMINARY CALCULATION OF THE CONSTRUCTION
WORK IN PROGRESS FACTOR THAT WILL APPLY DURING
THE SECOND REGULATORY PERIOD**

August 28, 2006

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1. INTRODUCTION

Clause 4.8.9 of the Rules for setting Distribution Wheeling Rates (RDWR)¹ describes the Construction Work in Progress (CWIP) factor that would be applied to the value of assets to compensate utilities for the investment cost (the time value of money) of funds tied up during construction projects. The ERC indicated in the Position Paper² (section 4.1.10) that it will apply a general CWIP factor to all assets. This factor would be determined by a Regulatory Reset Expert retained by the ERC.

This report describes the preliminary calculation of the CWIP factor and the method used to determine this. The same method will be used by the ERC to determine the CWIP factor for the draft and final determinations of the price-caps that will apply to privately owned electricity distribution utilities during the Second Regulatory Period.³

The report was prepared by the ERC's RDWR team, supported by their regulatory reset expert.⁴

2. THEORETICAL UNDERPINNING FOR A CWIP FACTOR

Expenditure on major construction projects commences well in advance of the final commissioning of the project and in most cases well in advance of the start of construction. From practical experience built up by project managers over decades, it has been found that the cumulative cash-flow patterns for major projects generally resemble an S-curve over the duration of the project implementation period.⁵ Such an S-curve is illustrated in figure 1. Intuitively, it is easy to understand why an S-curve arises:

- During the preliminary phase of a typical project, there are usually costs related to planning and design, the tendering process, project set-up and obtaining the necessary approvals, rights-of-way, licenses etc. In the context of an overall construction project, these costs are usually relatively low.
- Once the necessary approvals have been obtained, the second, or construction phase of a project typically commences. Project expenditure then usually accelerates rapidly, reflecting the purchasing of material, and the labour and equipment costs associated with the physical implementation of the works. This phase normally represents the bulk of project expenditure.

¹ The final version of these rules for the utilities entering Performance Based Regulation at the first entry point was published by the ERC on August 1, 2006. These rules replace the Distribution Wheeling Rates Guidelines (DWRG) published on December 9, 2004.

² ERC, "Regulatory Reset for the Privately Owned Distribution Utilities subject to Performance Based Regulation - Position Paper on the Regulatory Reset for the Second Regulatory Period", December 9, 2005

³ The draft determination is scheduled for February 16, 2007 and the final determination for May 31, 2007.

⁴ PB Associates has been retained to assist the ERC with the project management of the regulatory reset process and to advise on various regulatory matters.

⁵ For example, refer to Section 7.3.3 of the "A Guide to the Project Management Body of Knowledge", PMI Standards Committee, Project Management Institute, 1996.

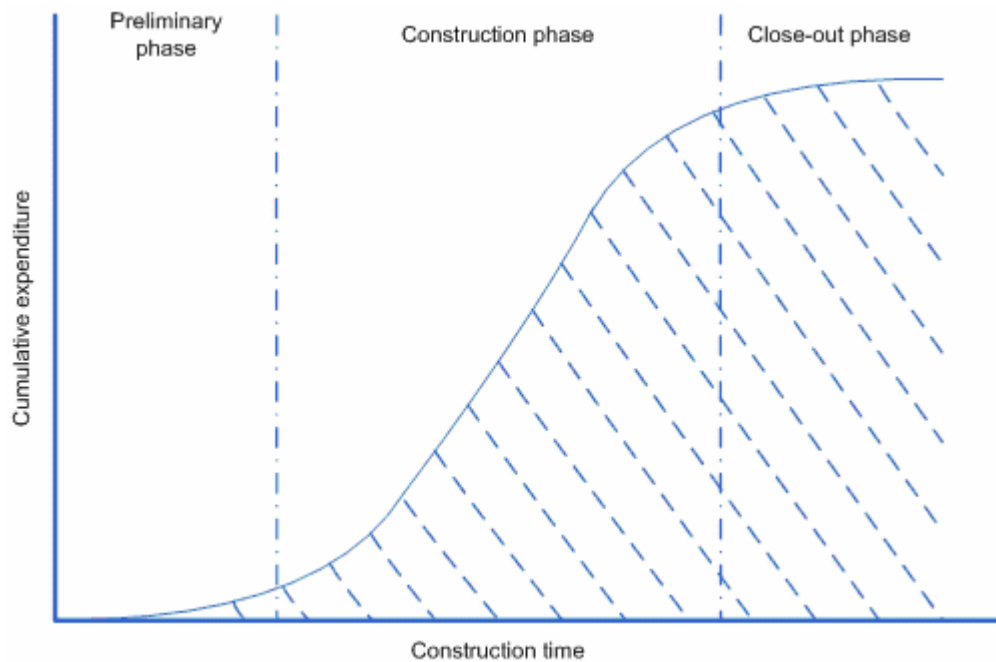


Figure 1 : Typical S-curve for construction projects

- During the last, or close-out phase of a typical project, all material would have been purchased and the construction activities reduce to finalizing the works. The focus at this stage is usually on testing and commissioning of installations, final documentation, training and hand-over. Again the costs of these activities are relatively low in the overall project context.

For most types of construction projects, utilities have little or no benefit from the works until they are finally commissioned. In addition, under most forms of regulation that allow a return on the value of the regulatory asset base, such as performance based regulation in the Philippines, utilities are not entitled to include assets in the regulatory asset base before these are put in operation.⁶ The implication is that for the duration of a standard construction project, capital will be tied up in the project on which a utility will not be entitled to a return as part of its regulatory asset base.

Given that invested funds have an opportunity cost, rational investors would reasonably require a fair return on funds tied up in a construction project. Finance theory states that, assuming alternative investment opportunities exist as they do in a reasonably operating market, a rational investor will only invest money in a venture that provides a return commensurate with its risk profile. If, by disallowing a return on capital invested during construction, the overall return on a construction project does not reflect the commensurate risk, a rational investor would therefore not invest in such construction projects.

A key feature of performance based regulation is to support the sustainable, efficient supply of electricity to consumers. In order to do so, it is essential to ensure adequate levels of investment in infrastructure and the manner in which this is achieved is to ensure that investors in such projects receive a reasonable return on their investments. This reasonable return includes an appropriate allowance for the capital tied up during construction.

⁶ This is with the exception of the allowance made in terms of the RDWR (Section 4.8.8) for a reasonable quantity of spares to be included in the Regulatory Asset Base.

To compensate for the capital tied up during construction, regulators often allow a factor to add to the direct expenditure on the asset. This is the so-called construction-work-in-progress or CWIP factor. This factor applies both to new capital projects, as well as in the valuation of existing assets.

The quantum of funds tied up during construction is represented by the shaded area under the curve in figure 1. A return is required on funds from the moment it is expended until the project is commissioned and the asset is included in the regulatory asset base. This return will typically be calculated as follows:

$$IDC = \sum \{CF_n \times [(1 + i)^{\frac{m_n}{12}} - 1]\} \dots\dots\dots (1)$$

$$CWIP = \frac{IDC}{TC} \dots\dots\dots (2)$$

- where IDC = interest during construction;
i = rate of return allowed;
CF_n = cash-flow in month n;
m_n = number of months to commissioning, from month n forward;
CWIP= Construction-work-in-progress factor; and
TC = Total project cost.

Under ideal circumstances, the CWIP factor would be based on a representative S-curve for distribution projects, or by taking account of such a curve for various project categories. However for the following reasons, it is not always practical to establish a representative S-curve.

- Distribution utilities typically embark on a many different types of construction projects, for which the cash-flow patterns tend to vary significantly.
- Even within a project category, wide variances in the cash-flow pattern are often observed.⁷ This makes the establishment of a representative S-curve within categories problematic.
- Most distribution type projects would fall in the minor category, where the S-factor is less pronounced. (For these projects, the construction period is generally too short to demonstrate a true S-curve and expenditure would be more closely approximated by a straight-line.)
- At present the ERC has insufficient information at its disposal on which to accurately determine a standard, representative S-curve.⁸

In the absence of a sound universal S-curve, cash-flow during construction is often approximated as a straight-line, from the start to the commissioning date, which is also the approach the ERC intends to adopt for distribution projects. This is illustrated in figure 2.

⁷ See the cash-flow patterns attached in appendix A.

⁸ The ERC intends to collect more detailed information on capital expenditure patterns over the Second Regulatory Period and will use this in its review of the CWIP-factor during future regulatory resets.

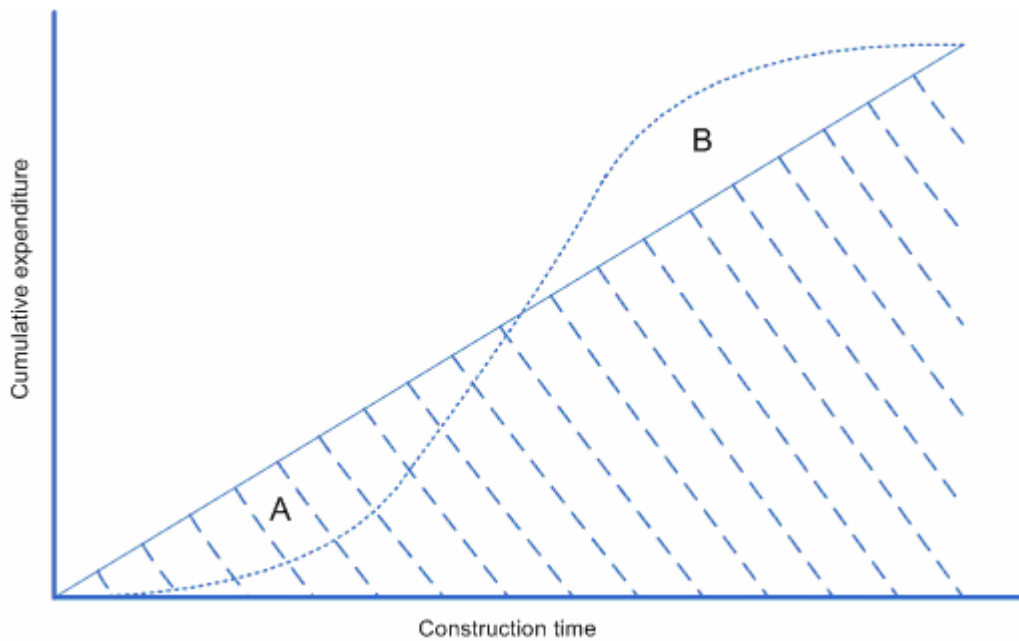


Figure 2 : Straight-line approximation of construction cash-flow

By observing this graph, it will be noted that for an ideal S-curve, the overall funds tied up during construction (the shaded area under the straight line) will be identical to that under the S-curve – area A is equal to area B. However, because of the time value of money, allowing for interest on funds on a straight-line cash-flow basis could overstate the overall interest, by allowing for extra cash-flow (and interest on this cash-flow) early on in the construction period (area A), while excluding cash-flow towards the end (area B).

Because perfectly symmetrical S-curves are seldom found in practice, it means that a straight-line can in some cases also understate the time-value of money. (See some of the examples in appendix B.)

When using the straight-line cash-flow approximation, the calculation of the interest during construction is as follows :

$$IDC = \sum_{p=1 to n} \left\{ \frac{TC}{n} [(1+i)^{\frac{n-p}{12}} - 1] \right\} \dots\dots\dots (3)$$

$$CWIP = \frac{IDC}{TC} \dots\dots\dots (4)$$

- where IDC = interest during construction;
- TC = total project cost;
- i = rate of return allowed; and
- n = project duration (months).

2.1 Project duration

The CWIP factor is intended to compensate utilities only for cash expended on capital projects in a reasonable and efficient manner. The project duration considered in

determining the factor therefore also assumes that projects will be implemented in an efficient manner.

Efficient projects are considered to be executed in one contiguous period, without excessive delays between any of the project activities.⁹

The starting date for a project will normally be taken when the first material amount is expended on the project, which will usually be for planning, design, negotiations, or project-set-up purposes. In certain cases the ordering of material for a project may also constitute a starting date, as long as construction proceeds directly upon delivery of such material. In determining the CWIP-factor, the following are not considered as starting dates for a project.

- Advance ordering of material because this is expedient or the company has access to funds that allow it to purchase material in anticipation of later projects, where construction does not commence directly after delivery of the material.
- Early strategic planning in which potential projects are identified.
- Preliminary investigations to consider whether a project is feasible or required, or to compare it with other project options.
- Acquisition of land or easements in anticipation of future projects, where such projects do not commence immediately after the acquisition.
- Acquisition of options or rights to purchase material or land at a later stage, or initial deposits on such purchases where such deposits are used to secure the right to later complete the purchase.¹⁰

The closing date for a project will normally be taken as the date when the project is substantially commissioned or the asset is put into use, which for an efficient project will be as soon as practically possible after construction is substantially complete. In determining the CWIP-factor, the following are not considered as an end date for a project.

- The date when an asset is finally recorded in the fixed asset registers or in the utility's technical recordkeeping system, where this date does not correspond with the date of (substantial) commissioning.
- Carrying out or final tests or issuing final test certificates, where an installation has been livened or put into use prior to the date.
- Delayed completion due to contractual or similar disputes that prevent the project from being completed or handed over as scheduled.

⁹ Instances may arise where a project or a project phase cannot commence because of external factors, such as failure to obtain the necessary permissions, interference by third parties or due to unforeseen physical factors preventing construction. While these factors may be outside the control of utilities and capital will be tied up longer because of the delays, such delays are not be considered part of an efficient project and no allowance is therefore made for this in the CWIP factor. It is not reasonable that consumers should bear the cost for such delays, since utilities are better placed to mitigate these risks by effective planning, by purchasing project insurance or taking preventative actions.

¹⁰ This does not include a deposit paid on placing an order for material, where such deposit is paid in the normal course of transactions as part of a guarantee to suppliers.

2.2 The rate of return

The regulatory WACC is considered the appropriate rate of return for capital tied up during construction. The reasons for this are as follows:

- While funding may be raised specifically for a project, the actual cost of such funding should not be confused with the cost of capital for the company. The real cost of capital is based on the average, weighted cost of capital for a company – investors are concerned with the return on their funds invested in a company and not necessarily with the return on a specific project. This overall return is based on the mix of debt and equity held in the company and the risk profile of the company. Under performance based regulation the allowed cost of capital, for an efficient company, is represented by the regulatory WACC.
- The rate of return for evaluating a specific project is sometimes considered on its own, to reflect project-specific risk. However, in a regulated environment, investments have to be shown to be efficient and economically sound before being approved and included in the asset base on which a return is allowed. The risk profiles for approved regulatory projects are therefore essentially identical, and the same as that of the overall regulated business. This is reflected by the regulatory WACC.
- Under performance based regulation, the regulatory WACC is considered the reasonable return on capital for completed assets. Investors do not distinguish between funds tied up in construction works or in completed assets and the return provided on both should therefore be the same.

2.3 Using more than one CWIP factor

The duration of capital projects is influenced by a variety of factors, the main ones being:

- the size or scope of the project;
- the complexity of the project;
- the nature of the project;
- delivery times of material;
- availability of material and resources;
- the environment in which the project is to be executed; and
- the requirement for licenses, approvals, easements and consents.

The capital tied up during construction is influenced by the duration and the size of the project. Ideally it is therefore appropriate to distinguish between various types and/or size of projects and to determine CWIP factors for each category.

However, it is not unusual among regulators from other jurisdictions to apply a single CWIP factor to all capital projects. The reasons for this are :

- little material difference exist between the CWIP factors for various project categories with relatively short duration;
- to avoid unnecessary complexity, especially where the difference between factors is not material;

- to reduce the regulatory burden imposed on the regulator and the regulated entities by having to analyze and justify various factors, to differentiate between different asset and project types for the CWIP factor and to justify the categorization of projects; and
- to avoid contention in classifying projects or assets which extend over more than one category.

It is also often found that the available project cash-flow evidence and the highly diverse nature of projects over time make it difficult to establish consistent factors with an acceptable degree of accuracy.

Other considerations that influence the consideration of setting a single or multiple CWIP factors for distribution utilities are:

- the duration of most utility capital projects, which include all minor refurbishment and small modifications or additions, are relatively short, often less than three months¹¹;
- on average, electricity distribution projects tend to be of smaller size and shorter duration than those of other major infrastructure providers (e.g. electricity transmission, water and road utilities); and
- capital expenditure includes a portion of direct, off-the-shelf purchases for which no, or very little capital is tied up for a substantial period.

¹¹ This does not necessarily apply if the duration times are weighted according to project values.

3. EVIDENCE CONSIDERED

In undertaking this study, the ERC requested information from five major private distribution utilities in the Philippines on large capital projects they have completed over the last three years. However, only Cepalco, Meralco and Decorp provided the requested information. While the data received provides a good representative cross-section of construction projects undertaken, the sample size available is not sufficient to support robust conclusions purely based on the statistics provided.

In table 1 below, a summary is provided of the statistics drawn from the construction information provided. Four main categories of projects were described.

The calculation of the CWIP factors is based on an assumed WACC of 16.07%. This is the preliminary figure from a demonstration of the methodology that the ERC will use to calculate the WACC during its price determination and should not be mistaken for the actual WACC that will apply to utilities during the Second Regulatory Period.¹² The CWIP factors provided below are therefore indicative and will only be finalized in the ERC's draft price determination on February 16, 2007 and final price determination on May 31, 2007.¹³

It will be noted that the CWIP factors indicated are based on a straight-line approximation of cash-flow patterns. The reason for this is discussed in section 4. The straight-line CWIP factors were also weighted by project cost and construction duration, as indicated.

Table 1 : Summary of data derived from construction projects

Project type	Count	Cost (PhP'000)			Project duration (months)			CWIP average (straight line)	Weighted CWIP (Cost)	Weighted CWIP (Duration)
		Highest	Lowest	Average	Longest	Shortest	Average			
Communications	4	36,883	2,784	23,750	12	7	10	6.0%	5.2%	5.0%
Overhead lines	26	36,256	384	9,678	26	1	7	4.2%	7.6%	8.3%
Substation	15	671,139	5,105	139,430	30	1	11	6.7%	11.8%	11.5%
Underground cable	2	20,777	4,348	12,563	14	9	12	6.8%	8.0%	7.2%
Total	47	671,139	384	52,409	30	1	9	5.3%	9.3%	11.1%

In table 2, a comparison is provided of the CWIP factors calculated by using the straight-line method and by using the cash-flow curves (S-curves), limited to those projects where monthly cash-flow information was available (12 from the overall sample of 47 projects considered).

Table 2 : Comparison of CWIP calculation methods

Project type	CWIP average (straight line)	CWIP average (S-curve)
Communications	6.0%	5.2%
Overhead lines	6.6%	6.1%
Substation	9.5%	8.9%
Total	7.1%	6.5%

¹² Described in the ERC publication titled "Preliminary Calculation of the Regulatory Weighted Average Cost of Capital that would apply during the Second Regulatory Period", dated May 30, 2006.

¹³ Consultation will be invited on the draft determination, which could include submissions on the final CWIP factor decided by the ERC.

3.1 Discussion of the data received and the results of the analysis

The cash-flow-curves for those projects where this information was available are shown in appendix A. These were slightly amended from the information provided by utilities, to allow for the fact that expenditure in the last month was generally included with that of the second-to-last month. The reason for this is that for most construction projects, actual construction ends and commissioning occurs before the last cash-flow (which may be the last outstanding payments for work completed, material delivered, licenses, etc).

In addition, there were a number of projects with unusual cash-flow patterns, for which the curves were not further considered. A common reason for such anomalies appears to be that material would be purchased well in advance of construction starting, or purchased in batches during a prolonged construction period. Construction in this stop/start fashion is not considered efficient and is not considered in setting the CWIP factor.

In appendix B, the actual project-data provided by the utilities is presented, as well as the derived CWIP-factors, using the cash-flow curves where available and also applying the straight-line approach.

The sample size of projects for which detailed cash-flow-information could be provided to the ERC was limited. While it allows for an illustrative level of analysis, it is not sufficient to allow the establishment of representative S-curves from which CWIP factors could be derived with a sufficient degree of statistical confidence.

From examining the cash-flow-curves, the project data provided and the figures in tables 1 and 2, the following is apparent :

- a) Most projects demonstrate some form of S-curve, but this often seems to be dominated by one single month with a very high level of expenditure. (We assume this expenditure is most likely driven by the delivery of the major equipment for the project.)
- b) From the limited cash-flow data available, there is no clear S-curve that can be derived for the group of projects, or for the sub-categories.
- c) In general, the straight-line calculation of the CWIP-factor provides a reasonable approximation of the same factor using the S-curves, although the former is on average somewhat higher than the latter. When considering only those projects where the S-factor could be derived, the average CWIP factor from the straight-line method is 7.1% as opposed to the average of 6.5% derived from the S-curves.
- d) By applying a weighting to the CWIP factors, using project cost or construction duration as weighting factors, the resulting CWIP factors are higher than with an un-weighted average. This is as expected, since the projects with higher individual CWIP factors are by definition those with higher cost or longer construction periods and therefore have a higher weighting in the group of projects considered.
- e) Project duration and size varied greatly between projects, even within the same category. In figure 3, a scatter-plot of the relationship between project cost and the construction period is provided for all the projects considered. While there is a positive correlation, it is quite weak (with an R^2 value of only 0.206). It should be noted that only major projects were considered in the sample provided.

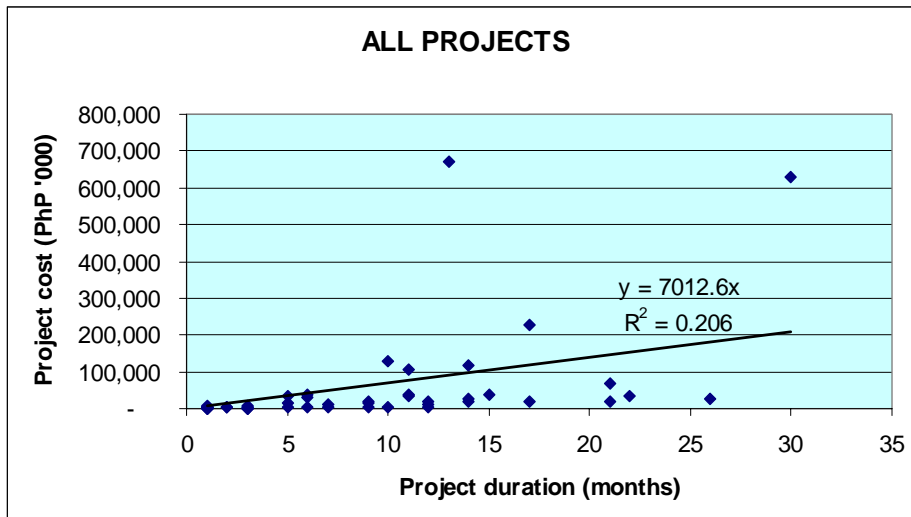


Figure 3 : Correlation between project costs and durations

- f) If similar scatter-plots for substation and overhead line projects are considered¹⁴, a better correlation between cost and construction time is observed, as indicated in figures 4 and 5 below. While not of direct relevance for establishing a representative S-curve, this stronger correlation suggests that dividing the projects into representative categories would provide a more analytically robust approach than treating all projects in one group.

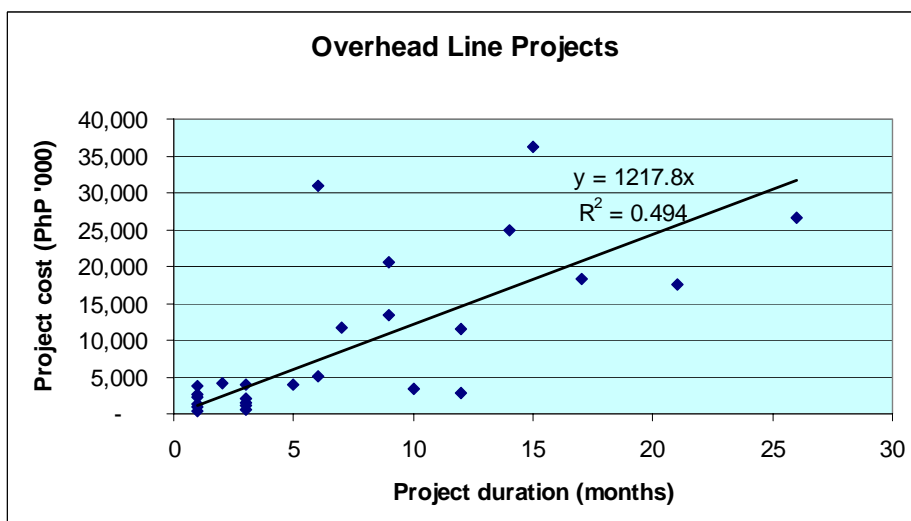


Figure 4 : Correlation between project costs and durations – line projects

¹⁴ The available sample sizes for the other projects are too small to be considered at all

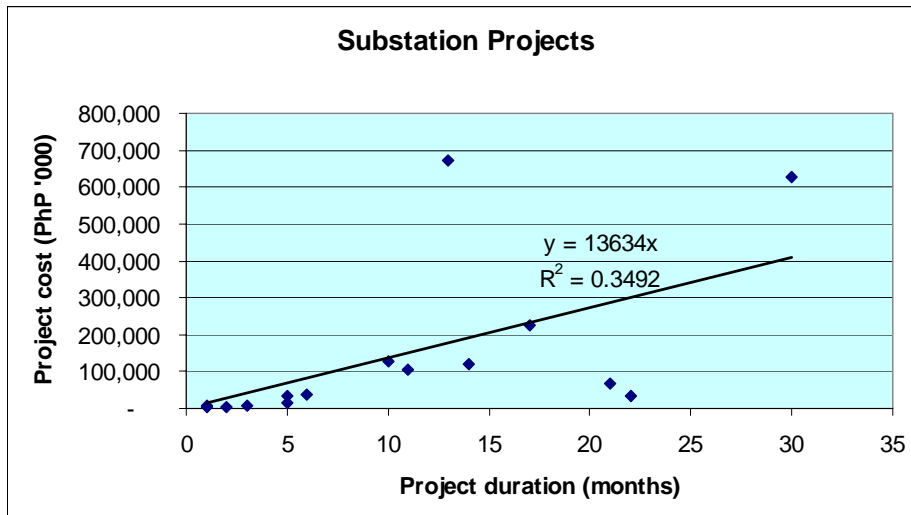


Figure 5 : Correlation between project costs and durations – substation projects

As noted, while the results discussed above provide a good indication of representative cash-flow patterns for distribution projects in the Philippines, the available sample size is too small to draw conclusions with a sufficient statistical level of confidence. Rather than to produce results with a false sense of accuracy, the ERC has therefore decided to adopt a somewhat simplified, but transparent approach to determining the CWIP factor, as discussed in the next section.

4. CONCLUSION ON THE CWIP FACTOR

After considering the data provided by distribution utilities, the ERC intends to calculate the CWIP factors as follows:

- a) A straight-line approximation approach will be used to determine CWIP factors.
 - The ERC recognizes that using this approach does not perfectly mirror actual cash-flow patterns and that it would have been preferable to base the CWIP factor on a large sample of actual construction cash-flow curves. However, as noted before it has insufficient information at its disposal at this stage to be able to determine a representative cash-flow curve (or curves) with a sufficient degree of confidence and has therefore opted for a simplified, but fully transparent and justifiable approach.
 - The ERC views the potential for inaccuracy that may be introduced by using a straight-line rather than an S-curve approximation of cash-flow for distribution type construction projects as relatively minor, in the same or of a lesser order as that which will be introduced by defining a standard S-curve based on an insufficient project sample. It also notes that the majority of distribution projects are of short duration (six months or less), which further reduces the potential inaccuracy introduced by approximating an S-curve with a straight line. This view is supported by observing those projects where the ERC could make a direct comparison between applying a straight-line approach and using the actual cash-flow curves.
 - It is recognized that the straight-line approximation approach may often result in a somewhat higher CWIP factor than using actual S-curves. However, this effect is negated by considering an average project duration for all projects, which is shorter than that for major projects only.
- b) Two CWIP factors will be applied – one for substations and related projects, and another for all other capital construction projects.
 - For the reasons noted in section 2.3, the ERC considered the application of a single CWIP factor for all project types. However, it recognizes that empirical international evidence indicates that substation projects, on average, tend to be larger and take longer to construct than other projects generally undertaken by electricity distribution utilities. This trend is borne out by the local data that the ERC has received, especially if a weighting is allocated to projects based on project cost or duration.
 - The ERC recognizes that there is likely to be a difference in the average size and construction duration of other project categories as well, but the available sample sizes for such projects (excluding overhead line projects) is insufficient to allow conclusions to be drawn with an acceptable degree of confidence. In addition, the difference between the CWIP factors for these different categories is not likely to be material because of their relatively short average construction duration.
 - For the purposes of determining the CWIP factor, substation projects are limited to major substation buildings and structures and the equipment

classified as “Station Equipment” or “Power-Conditioning Equipment” in section 4.1.2 of the Position Paper¹⁵.

- c) The same CWIP factors will be applied to all regulated entities.
- The ERC would consider unique CWIP factors for utilities if there are compelling factors outside a utility’s control that indicate that a unique factor may be appropriate. However, no such evidence was found. Such factors would generally be limited to location, societal or environment factors, where these have a major impact on construction times.
 - In practice it is found that actual differences in construction periods between utilities are more heavily influenced by factors within their control. This includes the design and construction methodology adopted, availability of project financing, and the resources applied to projects.
 - As the CWIP factor only makes allowance for efficient projects conducted by a hypothetical efficient entity, inefficiencies through factors that can be controlled by a utility are not considered a valid reason for differentiating between utilities.
- d) The average project duration for substation projects will be taken as 8 (eight) months.
- This period is less than the 11 months average indicated by the data received from utilities. However, the utilities were requested to provide information related to major projects only. If smaller projects are also taken into account (as is the case for asset valuations and expenditure forecasting), the average project duration will be substantially less.
 - The ERC considers an average substation project duration of 8 months to provide a good balance between the (larger number of) small substation projects and the large projects a distribution utility is likely to undertake over time.
- e) The average project duration for other construction projects will be taken as 6 (six) months.
- This period is less than the 8 months average indicated for all projects, excluding substation projects, by the data received from utilities. As for the substation projects, however, the utilities provided information on major projects only and if smaller projects were taken into account, the average project duration will be substantially less.
 - The ERC considers an average construction duration of 6 months for projects other than substations, to provide a good balance between the (larger number of) small projects and the large projects a distribution utility is likely to undertake over time.
- f) In special cases, the ERC may allow a project-specific CWIP factor if a utility applies for this and demonstrates why it is appropriate. This will only apply to assets created through projects of exceptional size and/or construction duration.¹⁶

¹⁵ Supra note 2

4.1 Indicative CWIP factors

Based on the above considerations and an indicative regulatory WACC of 16.07%, the preliminary CWIP factors are indicated as follows. For the calculation, equations (3) and (4) are combined as follows :

$$CWIP = \sum_{p=1 \text{ to } n} \left\{ \frac{1}{n} [(1+i)^{\frac{n-p}{12}} - 1] \right\} \dots\dots\dots (5)$$

where for substation projects,

$$\begin{aligned} n &= 8 \\ i &= 0.1607 \end{aligned}$$

and hence, the CWIP is calculated as 4.5%, and

where for other construction projects,

$$\begin{aligned} n &= 6 \\ i &= 0.1607 \end{aligned}$$

and hence, the CWIP is calculated as 3.2%.

The results are summarized in table 3 below.

Table 3 : Preliminary CWIP factors

Project category	Preliminary CWIP factor
Substations	4.5%
All other capital projects	3.2%

It is stressed again that these figures are indicative only and that final values will be determined for the ERC's draft and final price determinations.

4.2 Application of the CWIP factors

The CWIP factors indicated above, as finalized during the final price determination, will be added to all distribution plant when valuing the regulatory asset base.¹⁷

In addition, the CWIP factors will also be added to all capital expenditure forecasts for distribution plant during the Second Regulatory Period, as well as those assets acquired during the period between the valuation of the regulatory asset base and the start of the Second Regulatory Period.

¹⁶ It should be specifically noted that the mere fact that a project is large and of longer duration than the averages assumed will not be sufficient grounds for allowing a special CWIP factor. Such longer projects will be offset by shorter projects included in a utility's construction program.

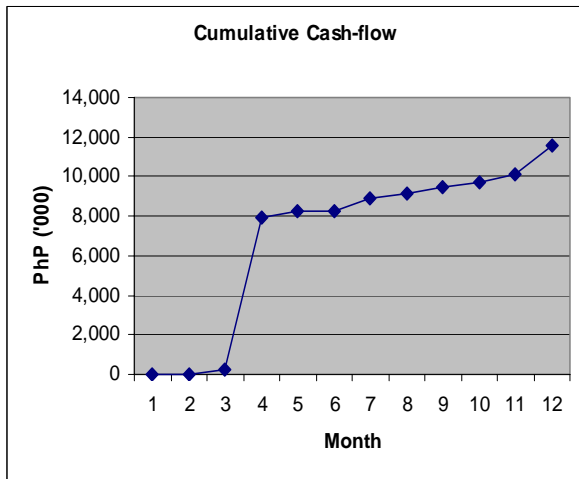
¹⁷ Note that this excludes non-system assets, spares or inventory.

APPENDIX A : CASH-FLOW CURVES FOR CONSTRUCTION PROJECTS

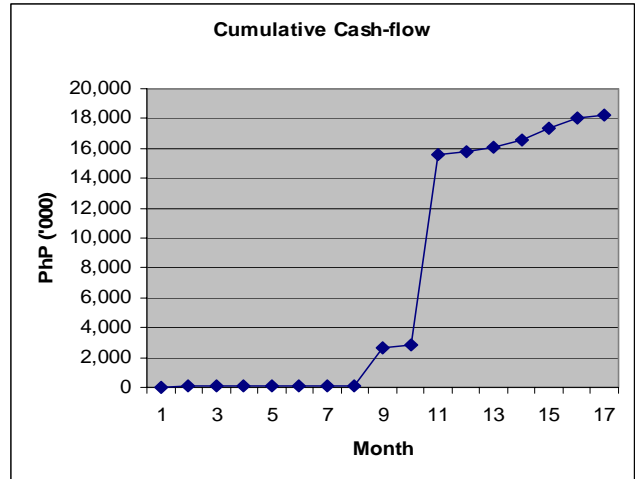
The curves below indicate the actual cumulative cash-flow patterns as provided by distribution utilities for major construction projects over the last three years.

In most cases the expenditure indicated during the last month was added to the second-to-last, which then became the last. The reason for this is that for most construction projects, actual construction ends and commissioning occurs before the last cash-flow (which may be the last outstanding payments for work completed, material delivered, licenses, etc).

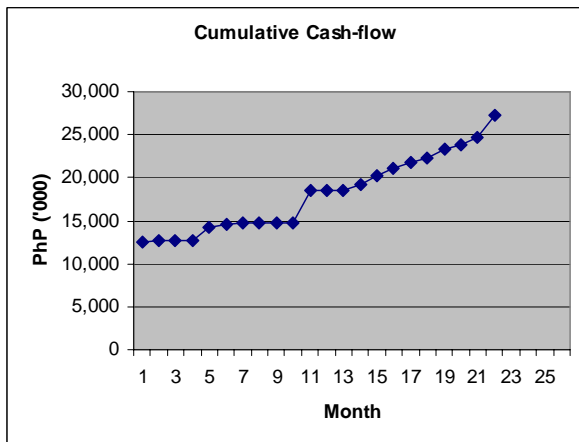
Overhead line project 1



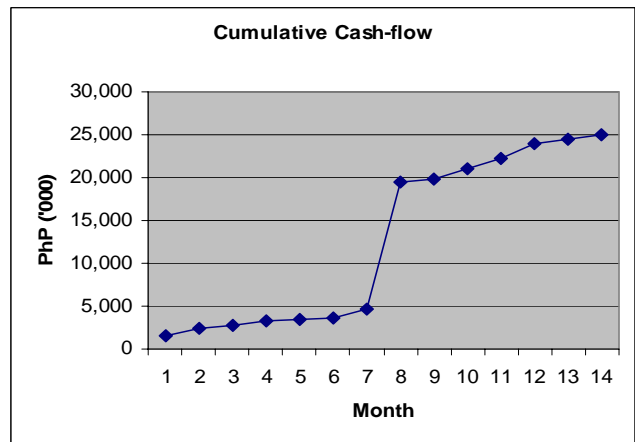
Overhead line project 2



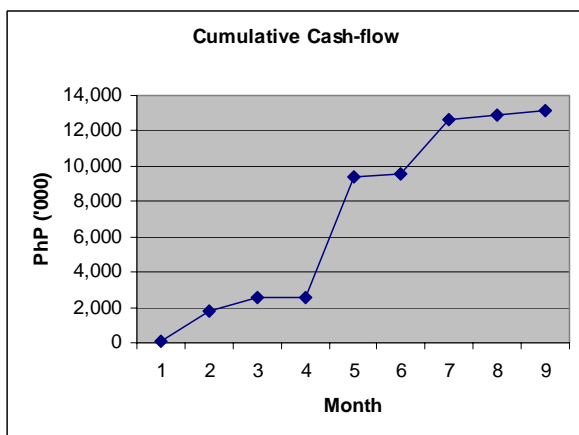
Substation project 1



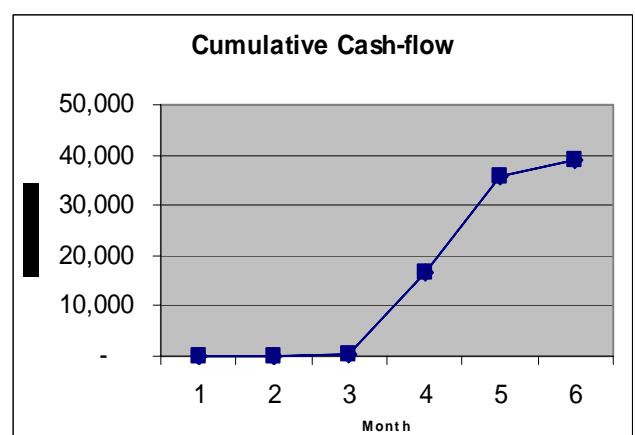
Overhead line project 3



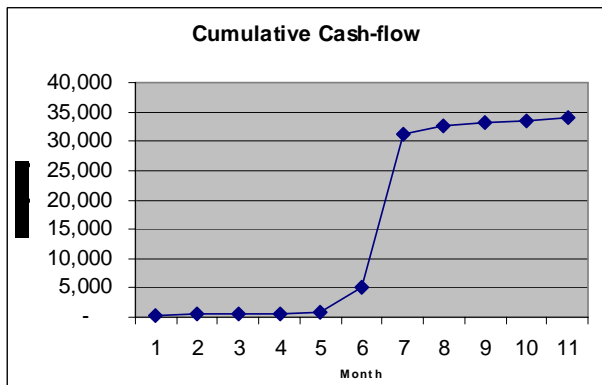
Overhead line project 4



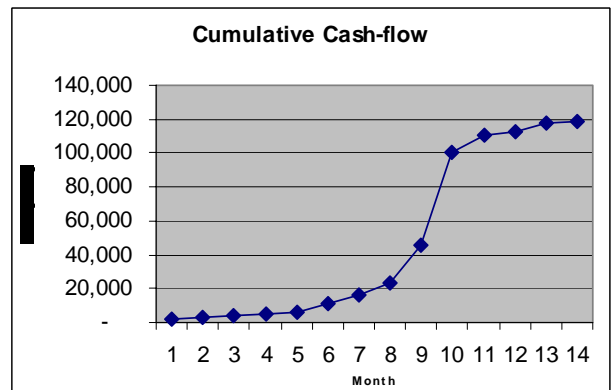
Substation project 2



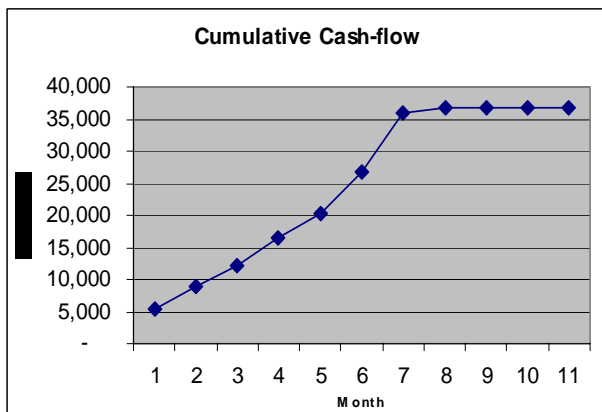
Communications project 1



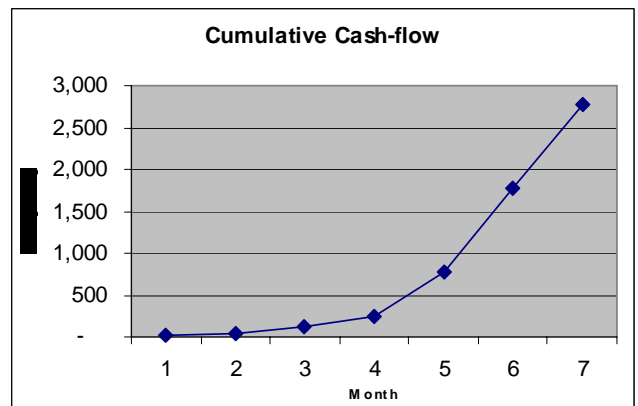
Substation project 3



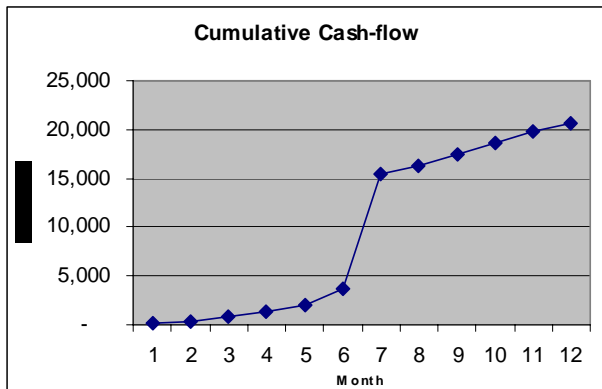
Communications project 2



Communications project 3



Communications project 4



APPENDIX B : PROJECT DATA CONSIDERED

Utility	Project type	Total cost (PhP '000)	Construction period (mnts)	CWIP factor (straight-line)	CWIP factor (S-curve)
Meralco	Comms	34,714	11	6.5%	5.2%
Meralco	Comms	2,784	7	3.8%	1.3%
Meralco	Comms	36,883	11	6.5%	8.3%
Meralco	Comms	20,620	12	7.2%	6.0%
Cepalco	Overhead line	18,266	17	10.6%	7.5%
Cepalco	Overhead line	11,551	12	7.2%	8.1%
Cepalco	Overhead line	24,977	14	8.5%	8.0%
Cepalco	Overhead line	13,392	9	5.1%	4.9%
Meralco	Overhead line	3,953	5	2.5%	
Meralco	Overhead line	20,559	9	5.1%	
Meralco	Overhead line	17,563	21	13.5%	
Meralco	Overhead line	11,609	7	3.8%	
Meralco	Overhead line	26,599	26	17.3%	
Meralco	Overhead line	30,921	6	3.2%	
Meralco	Overhead line	5,001	6	3.2%	
Meralco	Overhead line	4,225	2	0.6%	
Meralco	Overhead line	36,256	15	9.2%	
Meralco	Overhead line	3,995	3	1.3%	1.9%
Decorp	Overhead line	1,097	3	1.3%	
Decorp	Overhead line	2,286	1	0.0%	
Decorp	Overhead line	1,448	3	1.3%	
Decorp	Overhead line	989	1	0.0%	
Decorp	Overhead line	1,386	1	0.0%	
Decorp	Overhead line	493	3	1.3%	
Decorp	Overhead line	3,786	1	0.0%	
Decorp	Overhead line	3,438	10	5.8%	
Decorp	Overhead line	2,687	1	0.0%	
Decorp	Overhead line	2,026	3	1.3%	
Decorp	Overhead line	2,737	12	7.2%	
Decorp	Overhead line	384	1	0.0%	
Cepalco	Substation	32,288	22	16.9%	18.9%
Meralco	Substation	105,437	11	6.5%	
Meralco	Substation	671,139	13	7.9%	
Meralco	Substation	628,880	30	20.4%	
Meralco	Substation	66,821	21	13.5%	
Meralco	Substation	33,510	5	2.5%	
Meralco	Substation	128,879	10	5.8%	
Meralco	Substation	5,575	2	0.6%	
Meralco	Substation	226,595	17	10.6%	
Meralco	Substation	38,957	6	3.2%	1.7%
Meralco	Substation	119,008	14	8.5%	6.0%
Meralco	Substation	13,343	5	2.5%	
Meralco	Substation	8,886	3	1.3%	
Meralco	Substation	5,105	1	0.0%	
Meralco	Substation	7,032	1	0.0%	
Meralco	Underground cable	20,777	14	8.5%	
Meralco	Underground cable	4,348	9	5.1%	