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# URJA NEPAL

## DISCUSSION PAPER ON ELECTRICITY DISTRIBUTION TARIFF

For Electricity Regulatory Commission, Nepal

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# I INTRODUCTION

## I.1 OBJECTIVE OF DISCUSSION PAPER

The objective of this discussion paper is to inform Nepal’s Electricity Regulatory Commission (ERC) about the broad options available to it in the design of various elements in the next version of Distribution/Retail tariff directives. Together with the listing of possible options, the discussion paper provides information on the relevant international examples, and identifies potential fits in the context of Nepal’s requirements.

It is hoped that this discussion paper will enable ERC to finalize its own discussion / consultation paper on distribution/retail tariff directives, and publish it in the public domain, for stakeholder consultation and feedback.

*Note: As the distribution and retail supply business continues to be performed by the same distribution licensee, any reference to ‘Distribution tariff directives’ in this document shall refer both to distribution and retail supply businesses.*

## I.2 CONTEXT

The “Electricity Consumer Tariff Fixation Directives, 2019”, issued by ERC in November 2019, represented the first independent tariff sub-legislation issued by Nepal’s new regulatory commission. As the Commission (ERC) was in its initial months of operation, and considering the urgency of a tariff revision, those directives were structured broadly and comprised only the broad principles of tariff determination, procedures for filing, and the Commission’s determination.

### **SUMMARY OF THE EXISTING “ELECTRICITY CONSUMER TARIFF FIXATION DIRECTIVES, 2019”**

- Tariff determination based on the tariff filing of licensee, after prudence review by ERC.
- Licensee’s tariff filing was based on the tariff filing format specified by ERC in the directives.
- Expense and revenue projections were analyzed by ERC based on past trends (based on audited accounts), and supporting rationale, if provided by the licensee, for any significant deviation from past trends.
- Consumers were given an opportunity to challenge the tariff filings and tariff proposals, through online and physical modes.
- No specific norms for expense and performance parameters were specified.

By now, both the Commission and the utility – Nepal Electricity Authority (NEA) have gained considerable experience working within a regulated framework for electricity. The sector is also changing, with a new Electricity Act introduced before the Parliament and plans to reorganize the electricity sector in line with constitutional provisions under discussion. Therefore, there is a need for a new comprehensive tariff directive to guide the determination of electricity distribution tariffs going forward.

A new Distribution Tariff Directive can direct Nepal’s electricity regulation towards more progressive measures. Some of the key areas where a new Distribution Tariff Directive is expected to bring about a positive impact in Nepal’s Electricity sector are listed below.

1. Provide more clarity on the basis and principles of tariff determination;
2. Provide a more accurate understanding of function-wise costs;
3. Align the principles and procedures for the tariff determination process in line with leading international practices;
4. Propose benchmark norms that will allow for performance-based regulation;
5. Propose a performance-based incentive and penalty mechanism for utilities;
6. Promote proactive planning — by including a capital investment plan in the tariff process;
7. Propose guidance on improving the utility’s accounting procedures, including those related to assets and loans;
8. Drive the licensee towards compliance of ERC’s directions issued in the previous tariff order;
9. Explore options to rationalize tariff setting with demand side management; and
10. Explore options to address the concerns of stakeholders, including consumers, and community electricity suppliers.

### **I.3 KEY ASSUMPTIONS AND CONSTRAINTS**

This discussion paper is drafted under the assumption that the ERC will continue with the broad design principles of ‘Aggregate Revenue Requirement (ARR)’ based tariff, which is also adopted in neighboring countries, including India and Bhutan. This assumption is based on the review of Nepal’s readiness for various tariff methodologies, and preliminary discussions with ERC officials. Further details on tariff methodologies are presented in ‘Annexure I: Comparison of distribution tariff methodologies’. Any fundamental variation in the overarching tariff framework may necessitate the revision of this discussion paper.

For the review of international experience, examples are taken from India, Bhutan, Pakistan, Bangladesh, and Sri Lanka, wherever they may be relevant. Within India, as the distribution tariff is approved by the respective state electricity regulatory commissions (SERC), three states are chosen, out of which one is a hydro rich state (Himachal Pradesh) and other two (Maharashtra and Karnataka) are among the progressive state regulators in India.

## 2 DISCUSSION ON OVERALL TARIFF METHODOLOGY

### 2.1 PERIODICITY OF ARR AND TARIFF REVISION

A key decision in the design of tariff methodology is related to how often the ARR and tariff needs to be determined by ERC. For example, some ERCs may determine tariffs for a multi-year period (typically three to seven years), while some may undertake the same on an annual basis.

A multi-year mechanism provides better predictability to all the stakeholders, while also reducing the regulatory efforts required during the years in between. However, multi-year mechanisms also require a certain minimum maturity in regulatory framework.

#### 2.1.1 INTERNATIONAL EXPERIENCE

A review of the periodicity of ARR and tariff revision by electricity regulators in some of the geographies are listed below. It can be seen that most of the regulators have adopted a three- to seven-year control period for approval of ARR. However, that needs to be viewed in the context of the corresponding regulatory evolution. A decade back, many of the regulators were still approving ARR on an annual basis.

**TABLE 1: INTERNATIONAL EXPERIENCE ON PERIODICITY OF ARR AND TARIFF REVISION**

COUNTRY / REGION	ARR REVISION	TARIFF REVISION *
India – Maharashtra	Five-year control period	Predetermined tariff for each year of five-year control period.
India – Karnataka	Three-year control period	Annual.
India – Himachal Pradesh	Five-year control period	Annual.
Bhutan	Three-year control period	Predetermined tariff for each year of three-year control period.
Pakistan	Seven-year control period	Monthly, quarterly and annual revisions through various indexation mechanisms.

*\* As per regulations and multi-year tariff (MYT) orders. In reality, the revision frequency may also be different.*

#### 2.1.2 ANALYSIS IN THE CONTEXT OF NEPAL

Even for those countries / regions which have adopted a longer ARR and tariff control periods exceeding three years, it can be seen that in the initial stages of regulatory evolution, they also started with single year processes. Further, predictability of forecasts become a key area of concern, when the forecast period is more than three years. Thus, the key choice for Nepal is between a single year ARR and a three-year ARR.

While some of the regulators also approve end user tariff for multiple years in a single multi-year tariff order, this approach may be too advanced for Nepal in the current context. Therefore, irrespective of single or multi-year ARR approval, retail tariff revision may continue as an annual exercise.

### 2.1.3 OPTIONS FOR DISCUSSION

- I. Shall Nepal undertake revision of distribution ARR on a single year basis, or on a three-year basis?

## 2.2 TIMELINE FOR TRUE-UP OF PAST PERIOD

Since ERC started issuing distribution tariff order in 2020, the timeline for undertaking true-up of expenses and revenues for that year onwards need to be decided. True-up is the process of comparing actual expenses and revenues of the utility, with those approved by ERC for the relevant tariff period, and to decide how much of the variation is to be allowed to be retained by utility, and how much of the variation is to be passed on to a future tariff. Therefore, this is typically undertaken together with the tariff exercise.

### 2.2.1 INTERNATIONAL EXPERIENCE

There are two broad variations in the timeline on undertaking true-up. True-up is typically undertaken along with the tariff determination process for the years during which audited accounts are available. However, in some places, a provisional true-up of the immediate preceding years, based on provisional accounts/estimates are also allowed.

**TABLE 2: INTERNATIONAL EXPERIENCE ON TIMELINE FOR TRUE-UP**

COUNTRY / REGION	TRUE UP BASED ON AUDITED ACCOUNTS	TRUE UP BASED ON PROVISIONAL ACCOUNTS / ESTIMATES
India – Maharashtra	Yes	Yes.
India – Karnataka	Yes	No.
India – Himachal Pradesh	Yes	No.
Bhutan	No true-up	No true-up.
Pakistan	No true-up. Instead there are monthly, quarterly and annual indexations.	No true-up. Instead there are monthly, quarterly and annual indexations.

### 2.2.2 ANALYSIS IN THE CONTEXT OF NEPAL

In Nepal, the annual report and accounts of the utility for the past financial year is typically available by March/April, which corresponds with potential tariff application filing period. Thus, there does not seem to be any constraint in insisting on availability of audited accounts for the true up.

## 2.3 MONTHLY / QUARTERLY ESCALATIONS OR INDEXATIONS

In countries/regions where there is no practice of annual tariff revisions, an alternate practice of indexing tariff with inflation indices, or approval of tariff surcharge / correction factors is adopted. In some countries/regions, such adjustments co-exist with annual tariff revisions.

### 2.3.1 INTERNATIONAL EXPERIENCE

While tariff indexations with various parameters is comparatively rare in distribution, most regulators allow a monthly / quarterly surcharge to adjust for variations in generation, power purchase and sales cost/mix variation.



**TABLE 3: INTERNATIONAL EXPERIENCE ON INDEXATIONS AND SURCHARGES**

COUNTRY / REGION	TARIFF INDEXATIONS	TARIFF SURCHARGES
India – Maharashtra	Nil	Fuel Adjustment Charge (FAC) is allowed to be levied on a monthly basis as an adjustment in tariff against variation in cost of fuel and power purchase.
India – Karnataka	Nil	Fuel Adjustment Charge (FAC) is allowed on quarterly basis, with no prior approval required for FAC of up to 0.10 INR per kWh.
India – Himachal Pradesh	Nil	Nil.
Bhutan	Nil	Nil.
Pakistan	Tariff has indexation formula with inflation, increase in asset base etc. approved for some of the distribution licensees.	Fuel Charge Adjustment (FCA) approved by the regulator.

### 2.3.2 ANALYSIS IN THE CONTEXT OF NEPAL

A formula-based indexed tariff may not be suitable taking into account the existing level of maturity and evolution of power market and regulatory framework in Nepal. The relevance of a quarterly surcharge adjustment is also debatable, as two-thirds of the power is procured from hydropower plants with a fixed PPA rate. As long as the tariff determination and true-up process is undertaken annually, there will be no need for any quarterly surcharge-based adjustments. On the other hand, if there is a possibility of the tariff process getting delayed, a surcharge mechanism can help the utility in incurring any cost increase due to increase in cost of generation/power purchase, or any revenue shortfall due to sales reduction or change in sales mix.

### 2.3.3 OPTIONS FOR DISCUSSION

1. Should the tariff be revised only on an annual basis, or should any quarterly revisions to adjustment for generation mix/power purchase cost/sales mix variations be allowed?

## 2.4 CAPITAL INVESTMENT PLAN AND BUSINESS PLAN

In most countries/regions, the utilities submit a detailed “business plan” or at least an “investment plan” along with or before each tariff period. The purpose of such plans is to clearly specify the investment priorities in a scheme wise manner, supported by cost-benefit analysis and analysis of alternate options wherever applicable. Thus, capital expenditure (CAPEX) related costs of the utilities flow into the tariff from the approved business plan / investment plan.

### 2.4.1 INTERNATIONAL EXPERIENCE

All the identified countries/regions have the practice of requiring utility to submit multiyear investment plan or business plan for the approval of regulator.

**TABLE 4: INTERNATIONAL EXPERIENCE ON INVESTMENT/BUSINESS PLANS**

COUNTRY / REGION	INVESTMENT/BUSINESS PLAN
India – Maharashtra	Business plan submitted by utility for 5-year period.
India – Karnataka	Capital investment plan submitted as part of MYT petition.
India – Himachal Pradesh	Multiyear business plan to be submitted by utility for the control period.
Bhutan	Multiyear investment plan submitted by utility.
Pakistan	Integrated Generation, Transmission and Distribution expansion and Investment Program (IGTDP) to be submitted by utility for each control period.

### 2.4.2 ANALYSIS IN THE CONTEXT OF NEPAL

Considering that Nepal is still in the initial stage of regulatory evolution, a full-fledged business plan submission may be difficult. However, at least a multi-year investment planning process can be encouraged. This will allow the regulator and other stakeholders to review the prudence of planned investments, before such investments are undertaken. The timeline for submission of an investment plan is open for discussion. In mature regulated markets, it is possible to insist on having the investment plan approved prior to the tariff process.

### 2.4.3 OPTIONS FOR DISCUSSION

- I. If a capital investment plan is to be submitted by the licensees, shall that plan be reviewed and approved concurrently with the tariff process, or before the tariff process?

## 3 DISCUSSION ON KEY ARR COMPONENTS

### 3.1 OPERATION AND MAINTENANCE EXPENSES

The Operation and maintenance (O&M) expense is the most significant operational expenditure component of the revenue requirement of utilities. It typically consists of employee expense, repair & maintenance expense (R&M), and administrative & general (A&G) expense. Typically, a base year O&M figure is initially calculated, and thereafter, a static or dynamic annual indexation is provided, linked to parameters such as inflation indices.

#### 3.1.1 INTERNATIONAL EXPERIENCE

The approach for calculating base year O&M expenses is typically similar across international practices, which is usually based on a past period's actual O&M expenses, after prudence check by the regulator. However, there is a wide variation in the annual escalation strategy adopted thereafter. While most of the regulators use inflation index as one of the key parameters for calculation of annual escalation for O&M, there are a few key variations:

1. Some regulators [Karnataka ERC, Bhutan Electricity Authority (BEA), National Electric Power Regulatory Agency (NEPRA) in Pakistan] consider an efficiency factor, to limit the inflation-based escalation of O&M. The key reasoning behind such an approach is that there will be efficiency improvements in O&M as new assets are added, and due to factors, including information technology (IT) based automation.
2. There may also be linkages to an increase in asset base or consumer base. In case of Himachal Pradesh ERC (HPERC), the repair and maintenance expense component of O&M is approved as a percentage of Gross Fixed Assets (GFA). In case of Karnataka ERC, O&M escalation is also linked to growth rate in number of consumers. BEA in Bhutan allows additional O&M expense towards new asset addition.

The variations in approach on O&M expenses is summarized in the following table.

**TABLE 5: INTERNATIONAL EXPERIENCE ON O&M EXPENSES**

COUNTRY / REGION	BASE YEAR O&M EXPENSES	O&M ANNUAL ESCALATION
India – Maharashtra*	Average of actuals of past three years + one-third of efficiency gain/loss due to difference between approved and actual figures in the last three years	Escalation factor calculated for a control period based on inflation of previous control period, considering 30% weightage for Wholesale Price Index (WPI) and 70% weightage for Consumer Price Index (CPI). Escalation rate of 3.83% approved for FY21 to FY25. Additional expenses towards specific OPEX schemes for system automation, new technology and IT Implementation are separately approved based on details submitted by the utility.
India – Karnataka*	Based on latest available audited accounts at the time of start of control period	O&M escalation allowed at a percentage which is the sum of consumer growth rate and inflation index (80% CPI and 20% WPI) and reduced by an efficiency factor of 1%.
India – Himachal Pradesh*	Separate base figures determined for employee expenses (EMP), R&M and A&G; based on the latest available audited accounts at the time of start of control period, after prudence check	$R\&M_n = K * GFA_{n-1}$ $EMP_n = (EMP_{n-1}) * (1 + G_n) * (CPI)$ $A\&G_n = (A\&G_{n-1}) * (WPI)$ <p>K is calculated based on the average of actual R&amp;M expense for distribution business in the last three years. Taken as 1.19% by HPERC in the latest control period.</p> <p>G<sub>n</sub> is a growth factor for the nth year. Value of G<sub>n</sub> shall be determined by the Commission in the MYT tariff order for meeting the additional</p>

		manpower requirement based on licensee's filings, benchmarking, approved cost by the Commission in past and any other factor that the Commission feels appropriate. Taken as 0 by HPERC in the latest control period, due to lack of supporting data submitted by the utility.  CPI and WPI inflation figures taken based on actuals of past three years.
Bhutan	Average of past three years, determined at the time of start of control period	On the previous year's O&M expenses, escalation is allowed at the rate of (Inflation – Efficiency Factor).  Efficiency factor approved as 2% in the tariff order dated December 2019.  In addition, 3% of capital expenditure is allowed towards O&M expenses for new capital expenditure.
Pakistan	Based on the latest available audited accounts at the time of start of control period	O&M escalation allowed at a percentage which is the change in consumer price index, reduced by an efficiency factor.  Revised O&M = $Reference\ O\&M \times \left( 1 + \frac{New\ CPI - Reference\ CPI}{Reference\ CPI} - XFactor \right)$  X factor is the lower of 3%, or 30% change in CPI

\* There could also be exceptional case of additional O&M expense approval, to handle aspects such as terminal benefits of employees, and a sudden increase in pay scale of employees.

### 3.1.2 ANALYSIS IN THE CONTEXT OF NEPAL

For Nepal, any of the above identified approaches can work, as they are all designed primarily on the basis of a base year estimate linked to actual expenses, and an indexed inflation number. The base year O&M expenses can be taken as per average of past three years, after adjusting for inflation.

However, a few key aspects remain open for discussion in Nepal, the most important of which is the appropriate inflation index to be adopted. It may be noted that regulators in India use a weighted inflation rate based on wholesale and consumer price indices. In Nepal's case, the appropriate weightage for WPI and CPI for calculating weighted inflation rate needs to be determined. However, if O&M is determined separately based on the subcomponents of employee expenses, A&G and R&M expenses, there is an alternate possibility of linking employee expenses with CPI and A&G expenses with WPI. Another key aspect to determine is whether O&M expenses will also need to be linked with an efficiency factor.

### 3.1.3 OPTIONS FOR DISCUSSION

1. If a weighted average inflation rate is to be calculated for O&M expenses, what shall be the weights for CPI and WPI?
2. What should be the appropriate deduction towards efficiency gain on the inflation rate, that may be considered in Nepal?

## 3.2 DEPRECIATION

Depreciation is approved in order to provide for a reduction in the value of an asset over time, due usually to wear and tear. In the regulatory context, depreciation provides a reserve which can meet the debt service obligation used for buying the asset. While the manner of calculation of depreciation and the applicable depreciation rate varies from country to country, there could even be variations within the same country. For example, in India, different depreciation regimes are

defined in Companies Act, the Income Tax Act, and the regulations of Electricity Regulatory Commissions.

Depreciation can be calculated under a straight-line method (SLM) or Written Down Value (WDV) method. Regulators also prefer SLM since the depreciation remains constant over the life of the asset, and as such, is easy to apply. The WDV method also has its benefits such as higher depreciation in the earlier years coinciding with high efficiency of the equipment in the early period of economic life and when cost of repairs is low. This balances the overall revenue requirement of the utilities over the entire span of the asset life. The assessment of both these methods could be a matter for discussion.

### 3.2.1 INTERNATIONAL EXPERIENCE

In India, regulators adopt SLM for calculation of depreciation. Land is not considered as a depreciable asset, in the context of distribution licensees. Depreciation is allowed up to 90% of asset value, with the remaining 10% considered as salvage value. However, there are exceptions. For example, MERC in Maharashtra and KERC in Karnataka, India allows 100% depreciation for IT assets and computer software. The regulators specify asset class wise depreciation rates, which is applicable for a typical loan repayment duration, so that around 70% of asset cost is recovered in the initial 12-15 years. Thereafter, the remaining depreciable value is equally spread over the remaining economic life of asset.

Some states in India allow a higher rate of depreciation in the initial years. For example, in case of HPERC in Himachal Pradesh, India, the distribution licensees are entitled to an advance against depreciation (AAD), if the cumulative repayment of long term loan up to a particular year exceeds the cumulative depreciation up to that year (subject to maximum of difference between cumulative repayment and cumulative depreciation computed).

In Bhutan, the Tariff Determination Regulations, 2016 specify the asset class wise depreciation rates. The regulation does not explicitly mention whether depreciation is to be calculated under SLM or WDV method. The regulator follows SLM in practice. The regulations allow for accelerated depreciation in specific cases where the licensees are not able to meet the debt service obligation.

In Sri Lanka, the depreciation method is SLM and the depreciation rates are the rates used in the statutory accounts of the licensees. Depreciation is based on the reasonable useful life of the asset and the investment cost approved by the regulator. Once an asset is fully depreciated, it is removed from the gross value of the assets. The regulations in Bangladesh and Pakistan do not explicitly mention the depreciation methodology or the rates. The utilities file depreciation allowance as per their statutory accounts, which is checked by the regulator for prudent allowance.

While the table below summarizes the approach of various regulators in approving depreciation, a comparison of asset class wise depreciation rates is provided in annexure, in section 8.

**TABLE 6: INTERNATIONAL EXPERIENCE ON DEPRECIATION**

COUNTRY / REGION	DEPRECIATION RULES
India – Maharashtra	Based on Straight Line Method; Depreciation Rates defined.
India – Karnataka	Based on Straight Line Method; Depreciation Rates defined.

India – Himachal Pradesh	Based on Straight Line Method; Depreciation Rates defined. Advance against depreciation allowed.
Bhutan	Regulations do not specify the method, through SLM is adopted in practice. Accelerated Depreciation also allowed in specific cases.
Sri Lanka	Based on Straight Line Method; Depreciation Rates as per statutory accounts.
Bangladesh	Depreciation methodology not defined; No rates defined in the regulations,
Pakistan	Depreciation methodology not defined; No rates defined in the regulations.

### 3.2.2 ANALYSIS IN THE CONTEXT OF NEPAL

Most of the companies in Nepal follow the depreciation method prescribed by Income Tax Act, 2058 (2002) which follows the WDV method. The Act has categorized the fixed assets (including intangible assets) into five categories and prescribed depreciation rates for each asset category. In the utility sector, there is no common methodology. Also, depreciation rates on the fixed assets pursuant to the income tax method is quite high – around 15%.

NEA follows SLM with zero salvage value, with rates as provided below:

S.N.	CATEGORY OF ASSET	DEPRECIATION RATE
1.	Land	0%
2.	Building	2%
3.	Distribution Line	4%
4.	Distribution Substation	4%
5.	Solar Power Equipment	3%
6.	Meter and Equipment	10%
7.	Consumer Service	7%
8.	Public Lighting	3%
9.	Tools and Equipment	20%
10.	Workshop equipment	20%
11.	Vehicles and earth movers	20%
12.	Furniture	20%
13.	Office Equipment	15%
14.	Miscellaneous	50%
15.	Addition to current fiscal year	50% of the applicable rate

The country benchmarking conducted above shows that globally, SLM is more prevalent among regulators, as it is simple to use and implement. Considering the evolving nature of the regulations in Nepal, and NEA’s own adoption, the SLM method could be looked at for the licensees. However, aspects such as rate of depreciation, and allowing additional/advanced depreciation to meet loan repayment obligations will need to be looked into.

### 3.2.3 OPTIONS FOR DISCUSSION

1. Should depreciation rates be taken as per NEA’s depreciation rate schedule, or as per any other reference?
2. Should the distribution licensee be allowed additional depreciation for assets where the debt repayment schedule makes it unviable to justify investments at standard depreciation rates?

### 3.3 INTEREST ON LONG-TERM LOANS

The cost of debt is the cost incurred by the utility in the form of interest payments and upfront fee for raising finances through debt. While repayment is recovered in tariff through depreciation, interest on long-term loans are recovered through a separate component.

#### 3.3.1 INTERNATIONAL EXPERIENCE

In India, regulators typically allow interest on loans, after a prudence check on the loan portfolio. Thereafter, weighted average interest rate of the actual long-term loan portfolio is applied. Some regulators such as KERC in Karnataka, India also mention an upper limit on the rate of loan (200 basis points over base rate of State Bank of India).

A debt-equity ratio of 70:30 is considered, for computation of cost of debt related to assets/investments. If the equity actually deployed is more than 30% of the capital cost, any equity in excess of 30% is treated as normative loan. Further, where equity actually deployed is less than 30% of the capital cost, the actual equity is considered as part of the capital structure. Interest on loan is typically not allowed for assets funded by consumer contribution, deposit works, grants or capital subsidy.

In Bhutan, the regulator allows a composite Return on Asset (RoA) considering the Weighted Average Cost of Capital (WACC) and a defined gearing ratio (ratio of debt to total net fixed assets). The distribution licensee is allowed to recover the of actual cost of debt derived using the weighted average interest rate of the licensee’s loans with suitable allowance made for currency risk of any loans not made in local currency. The cost of debt should not exceed reasonable national benchmarks. The gearing ratio approved by BEA is 65-70%.

In Bangladesh, the interest rate on long term loans is the weighted average interest rate of the total loan book. For the utilities that are fully owned by Government of Bangladesh (GoB), the interest rates applicable on the loans provided by the Government shall be applicable to all the other loans sourced from non-GoB sources even if the interest rates on such loans is lower than the GoB rates. Further the interest rate is allowed for preferred stocks issued at the weighted average interest rate of the entire preferred stock portfolio,

In Sri Lanka, the distribution licensees are allowed to claim their actual cost of debt on their approved loan books. The regulator conducts a prudence check while approving the tariffs.

**TABLE 8: INTEREST ON LONG TERM LOANS**

COUNTRY / REGION	INTEREST RATES RULES
India – Maharashtra	Interest rate taken as per the weighted average interest rate of the loan portfolio.
India – Karnataka	For new capital investment, capital structure with debt-equity ratio of 70:30 is considered.
India – Himachal Pradesh	For overall capital structure, equity in excess of 30% is also considered as a normative loan.
Bhutan	Allowed at weighted average interest rate subject to gearing ratio of 65-70% on the asset portfolio.
Bangladesh	For 100% GoB owned entities – Interest rate applicable to GoB financed loans on the entire loan portfolio. For other entities – Weighted average interest rate of loan portfolio.

### 3.3.2 ANALYSIS IN THE CONTEXT OF NEPAL

In Nepal, undertaking prudence check on the long-term borrowings of NEA is a challenge, as not all debts are directly relatable to asset / project related investments. On the existing outstanding loan, it becomes difficult to analyze whether any of the loans are not related to capital investment, but rather, are used to meet revenue expenses or working capital requirements. This also gets linked to the question of fixing a normative debt-equity ratio for investments.

In terms of rate of interest, while a weighted rate of interest can be calculated, there is also the question of whether a ceiling interest rate can be specified.

### 3.3.3 OPTIONS FOR DISCUSSION

1. What are the safeguards and checkpoints that the regulator can consider, to verify the prudence of long-term loans taken by the licensees?
2. Should there be a ceiling rate for interest rate on long term loans?
3. For new investments, can a normative debt-equity ratio of 70:30 be considered, or is there any alternate figure to be considered in the context of Nepal?

## 3.4 INTEREST ON WORKING CAPITAL

The interest on working capital provides an opportunity to the licensee to recover the short-term cost of capital incurred to operate their business. For distribution business, a large amount of short-term working capital requirement can be generally met by the consumer security deposits, leaving a very short requirement for additional working capital. Most regulators allow cost recovery of the short-term debt on the national base rate or marginal cost of lending, plus a premium.

### 3.4.1 INTERNATIONAL EXPERIENCE

The regulators in India typically allow working capital based on one month of operation and maintenance expenses, maintenance spares (linked to GFA or O&M expenses), and one to two months of receivables. However, from this amount, some regulators deduct the consumer security deposit retained by the licensee, and in some cases expenses such as power purchase which need not be paid for in advance.

In Maharashtra ERC in India allows working capital as the sum of one month of O&M expenses, maintenance spares at 1% of GFA and 1.5 months of receivables, after deducting consumer security deposit and one month of power purchase, transmission and system operation charges. Karnataka ERC in India allows working capital as the sum of one month of O&M expenses, maintenance spares at 1% of GFA and two months of receivables. In Himachal Pradesh, India HPERC allows working capital as the sum of one month of O&M expenses, maintenance spares at 15% of O&M expenses and two months of receivables, after deducting consumer security deposit and one month of power purchase charges.

In Bhutan, the regulator (BEA) allocates working capital cost separately to each customer group considering the asset and receivable day variations. The allowed working capital for the licensee can be denoted by:



$$\text{Working capital} = \{(\mathbf{O}_m + \mathbf{D}_A + \mathbf{R}_A) \times (\mathbf{A}_r / 365) + (\mathbf{INV}_t \times \mathbf{A}_c)\}$$

where,

- $\mathbf{O}_m$  = Operating and maintenance cost allowance for the particular customer group;
- $\mathbf{D}_A$  = Depreciation allowance for the particular customer group;
- $\mathbf{R}_A$  = Return on Fixed Assets allowance for the particular customer group;
- $\mathbf{A}_r$  = Allowed days receivables for the particular customer group;
- $\mathbf{INV}_t$  = Allowance for the value of inventory for the licensee; and
- $\mathbf{A}_c$  = Allocation Factor for the particular customer group as defined by the regulator.

Bangladesh ERC (BERC) allows working capital as the sum of two months of O&M expenses, maintenance spares, prepayment expenses and interest on consumer security deposit.

**TABLE 9: WORKING CAPITAL COMPONENTS**

COUNTRY / REGION	COMPONENTS FOR DETERMINING WORKING CAPITAL	FORMULA FOR WORKING CAPITAL
India – Maharashtra	<ul style="list-style-type: none"> <li>1 month's cost of normative O&amp;M expenses (<math>\mathbf{O}_m</math>)</li> <li>Maintenance spares at the rate of 1% of the opening GFA (<math>\mathbf{M}_s</math>)</li> <li>1.5 month's equivalent of the expected revenue from sale of electricity (<math>\mathbf{R}_s</math>)</li> <li>Amount held as security deposits from retail supply consumers (<math>\mathbf{C}_s</math>)</li> <li>1 month's equivalent cost of power purchased including transmission charges and Load Despatch Center charges (<math>\mathbf{P}_c</math>)</li> </ul>	$\mathbf{O}_m + \mathbf{M}_s + \mathbf{R}_s - \mathbf{C}_s - \mathbf{P}_c$
India – Karnataka	<ul style="list-style-type: none"> <li>1 month's cost of normative O&amp;M expenses (<math>\mathbf{O}_m</math>)</li> <li>Maintenance spares at the rate of 1% of the opening GFA (<math>\mathbf{M}_s</math>)</li> <li>2 month's equivalent of the average revenue (<math>\mathbf{R}_s</math>)</li> </ul>	$\mathbf{O}_m + \mathbf{M}_s + \mathbf{R}_s$
India – Himachal Pradesh	<ul style="list-style-type: none"> <li>1 month's cost of O&amp;M expense (<math>\mathbf{O}_m</math>)</li> <li>Maintenance spares at the rate of 15% of O&amp;M expenses (<math>\mathbf{M}_s</math>)</li> <li>2 months of the revenue from sale of electricity (<math>\mathbf{R}_s</math>)</li> <li>Amount held as consumer security deposits (<math>\mathbf{C}_s</math>)</li> <li>1 month's power purchase cost (<math>\mathbf{P}_c</math>)</li> </ul>	$\mathbf{O}_m + \mathbf{M}_s + \mathbf{R}_s - \mathbf{C}_s - \mathbf{P}_c$
Bhutan	<ul style="list-style-type: none"> <li>O&amp;M cost allowance for the particular customer group (<math>\mathbf{O}_m</math>)</li> <li>Depreciation allowance for the particular customer group (<math>\mathbf{D}_A</math>)</li> <li>Return on Fixed Assets allowance for the particular customer group (<math>\mathbf{R}_A</math>)</li> <li>Allowed days receivables for the particular customer group (<math>\mathbf{A}_r</math>)</li> <li>Allowance for the value of inventory for the licensee (<math>\mathbf{INV}_t</math>)</li> <li>Allocation Factor for the particular customer group (<math>\mathbf{A}_c</math>)</li> </ul>	$((\mathbf{O}_m + \mathbf{D}_A + \mathbf{R}_A) * (\mathbf{A}_r / 365) + \mathbf{INV}_t * \mathbf{A}_c)$
Bangladesh	<ul style="list-style-type: none"> <li>2 months of O&amp;M expense (<math>\mathbf{O}_m</math>)</li> <li>1 month equivalent of the annual material and supplies inventory expense (<math>\mathbf{M}_s</math>)</li> <li>Prepayments including advance rent, tax, insurance etc. (<math>\mathbf{P}_r</math>)</li> <li>Interest paid on consumer deposit, if applicable (<math>\mathbf{C}_i</math>)</li> </ul>	$\mathbf{O}_m + \mathbf{M}_s + \mathbf{P}_r + \mathbf{C}_i$

Similarly, variations also exist in the rate of interest on working capital. Regulators in India typically link the rate of interest on working capital to a defined premium over bank base rate or marginal cost of lending rate. In Bhutan, the short-term lending rate offered by Bank of Bhutan is considered. The following table illustrates the applicable interest rate by the regulator for determining the cost of working capital:

**TABLE 10: RATE OF INTEREST ON WORKING CAPITAL**

COUNTRY / REGION	INTEREST RATE PRINCIPLE	CURRENT PREVALENT INTEREST RATE ON WORKING CAPITAL
India – Maharashtra	1 Year Marginal Cost of Lending Rate by State Bank of India + 150 Basis Points	7.00% + 1.50% = 8.50%
India – Karnataka	National Base Rate + 250 Basis Points	7.40% + 2.50% = 9.90%
	or Weighted average rate of interest on working capital proposed by the licensee whichever is lower	
India – Himachal Pradesh	1 Year Marginal Cost of Lending Rate by State Bank of India + 300 basis points	7.00% + 3.00% = 10.00%
Bhutan	Lowest short-term lending rate of financial institution in Bhutan	~9.99% <sup>1</sup>
Bangladesh	No separate interest rate is defined in the regulations.	Although not explicitly mentioned in the Regulations, the utilities file their actual cost of working capital and the same is checked by the regulator before approval

### 3.4.2 ANALYSIS IN THE CONTEXT OF NEPAL

Currently, NEA, has no short-term loan in its overall debt portfolio. NEA uses internal accruals and probably long-term debt to meet its working capital requirements. However as per regulatory leading practice, the regulations should define the components and allowable interest rates on the working capital requirements.

Interest on working capital is charged by Nepalese banks at base rate plus a premium. The premium varies from 1.25% to 5% for most of the prominent banks. The base rate (BR) is revised on a quarterly basis. Prevailing interest rate of working capital loan of some of the banks in Nepal is given below, which can form the basis for any ceiling rate to be specified by ERC.

<sup>1</sup> Source: Working Capital Interest Rate as offered by Bank of Bhutan - <https://www.bob.bt/loans-interest-rates/>

**TABLE 11: PREVAILING INTEREST RATE ON WORKING CAPITAL LOAN**

BANK	TYPE OF LOAN	BASE RATE	PREMIUM OVER BASE RATE
Nabil Bank	Working Capital Loan (Demand Loan)		Up to 5%
	Multinational	6.18%	Up to 4.75%
	Prime		Up to 5%
	Others		Up to 3.5%
Himalayan Bank	Demand Loan	6.83%	Up to 5%
Everest Bank	Working Capital	6.21%	BR+1.25% to BR+5.00%
Nepal SBI Bank Limited	Working Capital	7.32%	BR + Up to 5%

### 3.4.3 OPTIONS FOR DISCUSSION

1. Should the distribution licensee be allowed a normative cost of working capital or should it be allowed at the rate of actual cost of working capital incurred by the licensee?
2. If the normative working capital requirement is to be allowed, then what should be the components for the working capital?

## 3.5 RETURN ON INVESTMENT

An adequate return on investment needs to be provided to the licensees, either in the form of a return on equity, or in the form of a return on total assets. The amount invested by licensees in the utility business has alternate investment channels. Even in case of government owned utilities, beyond a minimum level of investment for social needs, governments may also have to choose where its limited funds can be invested. At the same time, return cannot be too high, as to result in an unreasonably high tariff, thereby jeopardizing consumers' interest.

### 3.5.1 INTERNATIONAL EXPERIENCE

In India, for distribution utilities, a return on equity approach is allowed, with a rate of return of 14-15.5%, usually on post-tax basis. The rates are mostly based on past practice, rather than any capital market studies. In comparison, most of the other countries in the region adopt a return on asset or a return on total investment approach.

In Maharashtra, RoE of 15.5% is allowed for the wires business, and 17.5% for supply business. However, initially a base RoE of 14% is allowed for wires business and 15.5% for supply business. At the time of true up, based on performance, the additional 1.5% RoE for wires business and 2% RoE for supply business is approved. In comparison, in Karnataka, India RoE is allowed at 15.5%, and in Himachal Pradesh, India it is allowed at 16%. In all cases, prudence check is undertaken on the asset base, including restricting maximum equity to 30%, with any additional equity being considered as a normative loan for which a normative interest rate is allowed instead of RoE.

In Bhutan, return is allowed on the total assets, calculated using cost of equity, cost of debt and gearing ratio. Cost of equity is considered as 13.31%. Cost of debt is considered as per actuals.

Gearing ratio is taken as 60% for high voltage consumer category, and 70% for medium and low voltage consumer category. Return is allowed on the net asset value.

In Pakistan, NEPRA allows a rate of return on asset base, through calculation of weighted average cost of capital, with cost of equity considered as 16.67% for distribution function. The approved rate of return, based on WACC, is applied on the net fixed assets. For example, the rate of return on regulatory asset base allowed for K-Electric in MYT order of 2016 was 13.20%.

In Sri Lanka, another variation is adopted as per Public Utility Commission of Sri Lanka’s (PUCSL) Tariff Methodology, where a return on asset is allowed, based on actual cost of debt of the licensee and a positive return on equity based on the cost of the long-term debt of the Government of Sri Lanka.

**TABLE 12: INTERNATIONAL EXPERIENCE ON RETURN ON INVESTMENT**

COUNTRY / REGION	TYPE OF RETURN	RATE OF RETURN
India – Maharashtra	Return on equity	15.5% for wires business. 17.5% for supply business.
India – Karnataka	Return on equity	15.5%.
India – Himachal Pradesh	Return on equity	16%.
Bhutan	Return on asset	Calculated using cost of equity at 13.31%, actual cost of debt, and gearing ratio of 60%-70%.
Pakistan	Return on regulatory asset base	Calculated using cost of equity at 16.67%, actual cost of debt, and gearing ratio.
Sri Lanka	Return on asset investment	Calculated based on actual cost of debt of the Licensee and a positive return on equity based on the cost of the long-term debt of the Government of Sri Lanka.

### 3.5.2 ANALYSIS IN THE CONTEXT OF NEPAL

In the context of Nepal, there are multiple issues on the determination of return on investment. The determination of a proper regulatory asset base is itself difficult, as the equity share capital declared in the books of licensees itself is more than 40% of the total assets. Even then, a substantial part of those assets is capital work in progress (WIP), for which return cannot be allowed, as return is allowed on investment in assets which are already put to use.

Another issue that need to be dealt with is the applicable rate of return on investment. Quantifying a cost of equity for distribution licensees itself is challenging, as the capital markets in the Nepal are not mature enough. Another complexity is that share capital for NEA is contributed by Government of Nepal, which may not be compared with a commercial entity with an appetite for premium on market rate of returns. Thus, a higher rate of return, such as 17% considered for generation licensees, may not be proper in the context of distribution licensees, as long as the licensee’s ownership and control continue with the Government.

As an alternative, the approach specified in Tariff Methodology of Sri Lanka, which also has a 100% government owned distribution licensee, can be considered. In the case of Sri Lanka, the rate of return on equity is linked to cost of long-term debt of Government. This option can be explored in the case of Nepal, for the distribution function. While the information on Government's cost of long-term debt is not readily available and will require consultations, it may be noted that some of the long term (7-10 year) development bonds raised by Government in the past had interest rates in the range of 4-5%.<sup>2</sup>

### 3.5.3 OPTIONS FOR DISCUSSION

1. Should the return on investment be approved in Nepal, based on the current practice of return on equity, or based on return on investment/asset approach?
2. What should be the primary basis for calculation of base for equity – the equity share capital recorded in books of licensees, or the equity computed by regulator based on prudence check of asset information as per accounts?
3. Should the rate of return on equity be determined based on discussions with the Ministry of Finance, Government of Nepal, or be linked with cost of the long-term debt of the Government.

*Note: There are also parameters, including sales volume, power purchase volume, power purchase costs, losses etc. that contribute to the determination of ARR. However, the approach for review of such parameters is typically decided as part of the tariff order itself and does not flow into the directives. Therefore, the same has not been considered in this discussion.*

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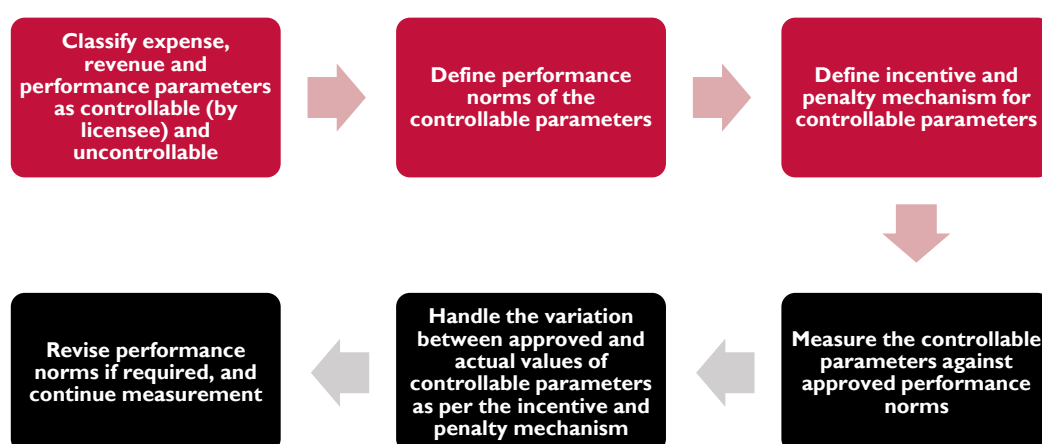
<sup>2</sup> Nepal Rastra Bank (December 2020), Ownership structure of government securities, [https://www.nrb.org.np/contents/uploads/2020/12/Ownership\\_Structure\\_of\\_Government\\_Securities-2077-08Mangsir.pdf](https://www.nrb.org.np/contents/uploads/2020/12/Ownership_Structure_of_Government_Securities-2077-08Mangsir.pdf)

## 4 DISCUSSION ON PERFORMANCE BASED REGULATION

### 4.1 INTRODUCTION TO PERFORMANCE BASED REGULATION

In performance-based regulation (PBR), the licensee is required to perform against defined performance norms on certain controllable parameters, wherein any gain/loss on account of overachievement/underachievement is allowed to be partially or fully retained by the licensee. PBR also recognizes that certain parameters are beyond the control of licensees and need to be passed on to tariff as uncontrollable parameters. PBR provides an incentive to utilities to perform better, so that they can retain the earnings related to such better performance. Performance-based regulation is typically undertaken through the following process:

Figure 1: Typical process of performance-based regulation



### 4.2 CONTROLLABLE AND UNCONTROLLABLE ITEMS

Typically, power purchase costs, generation costs, sales, taxes, and other income are treated as uncontrollable items. Parameters such as O&M expenses, interest on working capital, distribution losses and transmission losses are treated as controllable items. In this classification, there is a wider uniformity among the regulators.

TABLE 13: CONTROLLABLE AND UNCONTROLLABLE ITEMS FOR PBR

COUNTRY / REGION	CONTROLLABLE ITEMS	UNCONTROLLABLE ITEMS
India – Maharashtra	O&M expenses, distribution losses, interest on working capital.	Sales, power purchase, fuel costs, market interest rate for long term loans.
India – Karnataka*	O&M, interest and finance charges, other income.	Power purchase, expenses on account of inflation.
India – Himachal Pradesh*	Distribution loss, O&M expenditure.	Sales, power purchase costs.

\* Note: Some of the parameters are may be considered controllable during a control period, but trued-up at the end of control period, such as capital investment, and its associated depreciation and return on equity.

Regulators also specify the treatment of variations in controllable and uncontrollable parameters. Typically, variations on account of uncontrollable items are passed on to consumers, while those on account of controllable items are fully or partly retained by licensees.

**TABLE 14: CONTROLLABLE AND UNCONTROLLABLE ITEMS FOR PBR**

COUNTRY / REGION	TREATMENT OF VARIATIONS ON ACCOUNT OF CONTROLLABLE ITEMS	TREATMENT OF VARIATIONS ON ACCOUNT OF UNCONTROLLABLE ITEMS
India – Maharashtra	2/3 <sup>rd</sup> of gain, and 1/3 <sup>rd</sup> of losses passed on to tariff. Rest to be retained by licensee.	Fully passed on to consumers through tariff.
India – Karnataka	Fully retained by licensee.	Fully passed on to consumers through tariff.
India – Himachal Pradesh	Fully retained by licensee.	Fully passed on to consumers through tariff.

### 4.3 PROPOSED DESIGN OF PBR IN NEPAL

Considering the above examples and the current scenario in Nepal, the following mechanism for PBR is proposed for Nepal.

**TABLE 15: KEY ELEMENTS OF PBR DESIGN FOR NEPAL**

PARAMETER	CONTROLLABLE ITEMS	UNCONTROLLABLE ITEMS
List of items	O&M expenses. Transmission and distribution losses. Interest on working capital.	All other parameters.
Manner of sharing of gains and losses	Fully retained / absorbed by licensee.	Fully passed on to consumers.
Setting of performance targets	O&M expenses – Discussed in section 3.1. Transmission and distribution loss – In line with loss reduction targets agreed between NEA and Government of Nepal. Interest on working capital – Discussed in section 3.4.	Not applicable.

## 5 DISCUSSION ON END-USER TARIFF ASPECTS

Proposals may be invited from the sector stakeholders on potential improvements or suggestions for dealing with the following aspects related to end-user tariff. However, ultimately a decision on these aspects can be taken only at the time of the tariff application. Most of the proposals will also require supporting studies to be undertaken by the licensees.

### 5.1 LIFE-LINE TARIFF

In the current context, there are concerns among some of the sector stakeholders on whether the existing mechanism of life-line tariff is artificially suppressing the consumer demand. Therefore, the following question arises:

1. Should the current form of free electricity for consumers with up to 10 kWh of consumption continue, or should it be replaced with alternative mechanisms for lifeline tariff?

### 5.2 TARIFF DESIGN

Nepal no longer faces the issue of nationwide power shortages. Any seasonal shortage can be managed through imports. The domestic power generation is mostly from run of river hydro, with take or pay PPAs. Therefore, bulk of power purchase expenses will continue to be incurred even if demand drops. Thus, a rethink may be required on the mix of fixed/demand charges and energy charges, and seasonal tariffs in the tariff structure. Thus, the following questions may be discussed.

1. Is there a need to increase the share of revenue recovered through fixed/demand charges vis-à-vis energy charges?
2. Should the time of day tariffs and seasonal tariffs be expanded to more consumer categories?

### 5.3 COMMUNITY ELECTRICITY DISTRIBUTION

The Community Wholesale Consumers are essentially user associations that take power from NEA at a common supply point where it is metered and billed. The meter reading and billing of end consumers within the supply is managed by the Community Consumer. While end consumers are billed at the rate determined by the Commission, the Community Consumer pays to NEA at a rate determined based on number of consumers with up to 10 units of monthly consumption, and number of consumers with more than 10 units of monthly consumption.

However, consumers having up to 10 kWh monthly consumption does not pay any energy charge, and only pay monthly charge of 30 NPR. A higher number of such consumers will result in under recoveries for the Community Consumer. Therefore, a review of the current mechanism for billing of Community Wholesale Consumers may be required.

1. Is there a need for revision in the existing mechanism of billing and recovery of costs for Community Consumers, especially in the context of recovery of electricity costs of lifeline consumers?



## 6 SUMMARY OF DISCUSSION PARAMETERS AND OPTIONS

The purpose of this discussion paper is to invite the comments of key sector stakeholders on the various aspects related to design of distribution tariff framework in Nepal, and also to provide a preview of the potential tariff design.

A summary of key discussion parameters raised in the previous sections of this report are provided below.

### 6.1 DISCUSSION POINTS ON OVERALL TARIFF METHODOLOGY

**TABLE 16: DISCUSSION POINTS ON OVERALL TARIFF METHODOLOGY**

SL NO	PARAMETER	OPTION 1	OPTION 2
1	Periodicity of revision of distribution ARR	Annual basis.	Every three years.
2	Tariff indexations	Tariff to be revised only annually.	Allow a quarterly tariff surcharge, which is indexed to parameters such as power purchase costs and sales mix.
3	Timeline for submission of capital investment plan	Along with tariff application.	Three months before filing of tariff application.

### 6.2 DISCUSSION POINTS ON KEY ARR COMPONENTS

**TABLE 17: DISCUSSION POINTS ON KEY ARR COMPONENTS**

SL NO	PARAMETER	DISCUSSION POINTS
1	Operation and maintenance expenses	<ol style="list-style-type: none"> <li>1. If a weighted average inflation rate is to be calculated for O&amp;M expenses, what shall be the weights for CPI and WPI?</li> <li>2. What should be the appropriate deduction towards efficiency gain on the inflation rate, that may be considered in Nepal?</li> </ol>
2	Depreciation	<ol style="list-style-type: none"> <li>1. Should depreciation rates be taken as per NEA's depreciation rate schedule, or as per any other reference?</li> <li>2. Should the distribution licensee be allowed additional depreciation for assets where the debt repayment schedule makes it unviable to justify investments at standard depreciation rates?</li> </ol>
3	Interest on long term loans	<ol style="list-style-type: none"> <li>1. What are the safeguards and checkpoints that the regulator can consider, to verify the prudence of long-term loans taken by the licensees?</li> <li>2. Should there be a ceiling rate for interest rate on long term loans?</li> <li>3. For new investments, can a normative debt-equity ratio of 70:30 be considered, or is there any alternate figure to be considered in the context of Nepal?</li> </ol>
4	Interest on working capital	<ol style="list-style-type: none"> <li>1. Should the distribution licensee be allowed a normative cost of working capital or should it be allowed at the rate of actual cost of working capital incurred by the licensee?</li> <li>2. If the normative working capital requirement is to be allowed, then what should be the components for the working capital?</li> </ol>
5	Return on investment	<ol style="list-style-type: none"> <li>1. Should the return on investment be approved in Nepal, based on the current practice of return on equity, or based on return on investment/asset approach?</li> <li>2. What should be the primary basis for calculation of base for equity – the equity</li> </ol>

share capital recorded in books of licensees, or the equity computed by regulator based on prudence check of asset information as per accounts?

3. Should the rate of return on equity be determined based on discussions with the Ministry of Finance, Government of Nepal, or be linked with cost of the long-term debt of the Government.

### 6.3 DISCUSSION POINTS ON END-USER TARIFF

**TABLE 18: DISCUSSION POINTS ON END-USER TARIFF**

SL NO	PARAMETER	DISCUSSION POINTS
1	Life-line tariff	1. Should the current form of free electricity for consumers with up to 10 kWh of consumption continue, or should it be replaced with alternative mechanisms for lifeline tariff?
2	Tariff design	1. Is there a need to increase the share of revenue recovered through fixed/demand charges vis-à-vis energy charges? 2. Should the time of day tariffs and seasonal tariffs be expanded to more consumer categories?
3	Community electricity distribution	1. Is there a need for revision in the existing mechanism of billing and recovery of costs for Community Consumers, especially in the context of recovery of electricity costs of lifeline consumers?

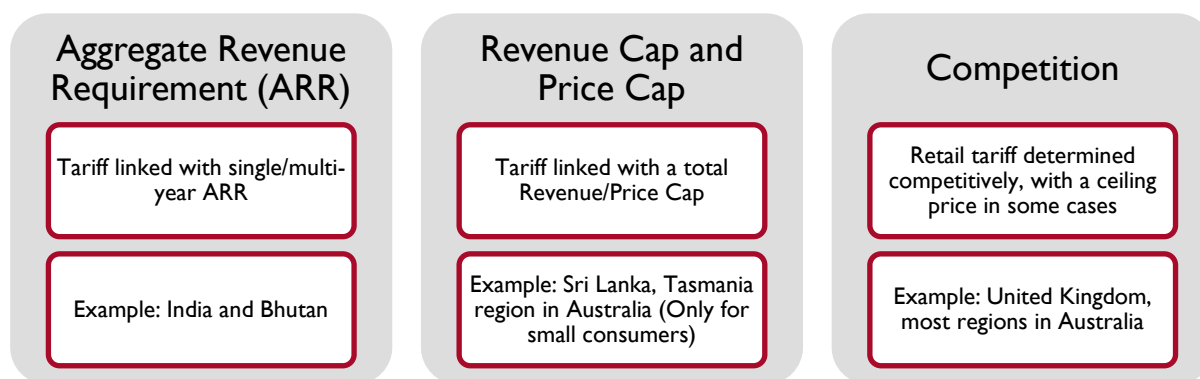
### 6.4 WAY FORWARD

After finalization of its own discussion paper by ERC based on this report and internal discussions, the same can be shared with NEA for its comments. Thereafter, the modified version can be shared with a wider audience, for obtaining stakeholder comments. Based on the responses of NEA and other stakeholders on the discussion paper, the design of draft distribution tariff directives can be undertaken.

## 7 ANNEXURE I: COMPARISON OF DISTRIBUTION TARIFF METHODOLOGIES

Based on international practices, there are three broad options for distribution/retail tariff determination.

Figure 2: Broad options for distribution/retail tariff determination



An analysis of the comparative advantages and disadvantages of each methodology, and their overall suitability in Nepal's context is summarized below.

TABLE 19: COMPARISON OF TARIFF METHODOLOGIES

TARIFF METHODOLOGY	ADVANTAGES	DISADVANTAGES	SUITABILITY IN NEPAL CONTEXT
<b>Aggregate Revenue Requirement (ARR) based on rate of return</b>	Easier to implement. Adopted in nearby countries – India and Bhutan. Works well in regulated markets.	Time intensive process, with high level of involvement required from regulator.	High. A simpler variation already in practice.
<b>Revenue Cap and Price Cap</b>	Allows for formula-based indexing, to automatically adjust the cap with parameters such as number of consumers, and inflation.	Initial design of revenue/price cap mechanism requires substantial time and effort. Regulators have less flexibility.	Medium. Market reforms are underway, and revenue control formula may get outdated soon.
<b>Competition</b>	More choice to consumers.	Will work only in competitive markets.	Low. Associated power market reforms are not in place.

Considering the stage of market evolution and the maturity of regulatory environment, an ARR-based methodology may be more appropriate for Nepal. Revenue/price cap mechanisms will require substantial time and effort, and even then, the designed mechanism may quickly become outdated as market reforms gain traction. The introduction of competition will probably start with the wholesale market, rather than the retail market. In comparison, an ARR-based tariff, with rate of return regulation is expected to provide the optimum combination of flexibility and adequacy in the current context. However, at a later stage of market reforms, this aspect can be revisited.

## 8 ANNEXURE 2: DEPRECIATION RATES ADOPTED BY VARIOUS REGULATORS

No..	ASSET CLASSIFICATION	Nepal (NEA)	India - Maharashtra	India – Karnataka	India – Himachal	Bhutan	Sri Lanka
1	Land owned full title	-	-	-	-	-	-
2	Land held under lease	-	3.34%	3.34%	-	NA	NA
3	Building & civil engineering works of permanent character	2%	3.34%	3.34%	1.80%	3.33%	2.5%
4	Temporary erections such as wooden structures	-	100%	100%	100%	NA	
5	Transformers, transformer (Kiosk) sub-Station equipment & other fixed apparatus (including plant foundations)	4%	5.28%	5.28%	3.60%	3.33%	2.85%
6	Switchgear including cable connections, Lightning arrestors	4%	5.28%	5.28%	3.60%	3.33%	
7	Batteries	-	18%	5.28%	18%	NA	NA
8	Underground Cable including joint boxes and disconnected boxes, cable duct systems	4%	5.28%	5.28%	2.57%	3.33%	2.85%
9	Overhead lines including support, meters	4%	5.28%	5.28%	2.57% - 9%	3.33%	
10	Self-propelled vehicle	20%	9.50%	9.50%	18%	15%	14.28%
11	Air conditioning plants	-	5.28% - 9.50%	5.28% - 9.50%	6% - 18%	10%	
12	Office furniture and fittings, equipments, internal wirings including fittings and apparatus	20%	6.33%	6.33%	6%	10%	20%
13	Street Light fittings	3%	5.28%	5.28%	6%	NA	2.85%
14	Communication equipment:	-	6.33%	6.33%	6%	20%	NA
15	IT Equipment	-	15%	15%	15%	20%	20%
16	Software	-	30%	15%	15%	20%	NA
17	Any other asset not covered above		5.28%	5.28%	Determined by Commission	NA	NA

# **USAID's Urja Nepal Project**

**Kathmandu, Nepal**