

Preliminary Guidelines

Case U-0003-14

**In the matter of developing regulatory guidelines for
Independent Power Producers and Power Purchase
Agreements**

June 2014

Notice of Request for Comments and Public Consultation

All stakeholders including utilities, the Government, existing electricity customers and other members of the public are invited to comment on these Preliminary Guidelines. Responses and information received will be considered in the development of the final Commission Decision and Guidelines.

Written comments should be submitted to the URA by

4th July 2014

Submissions can be:

- made in person at:
Office of the Utilities Regulatory Authority
VNPF Investment Building, NPF Compound
Crn Pierre Lamy & Andre Ballande Street
- mailed to:
Utilities Regulatory Authority
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Port Vila, Vanuatu
- emailed to:
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Any submission should be accompanied by a signed cover letter and address, indicating case no. (scanned material is accepted) addressed to Hasso Bhatia, PhD, CEO.

Submissions shall be posted on the URA's website in accordance with the URA submission policy. Any information you may consider confidential should be marked as such, providing a brief explanation of the nature of the confidentiality.

The URA office can be contacted by telephone at +678 23335.

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1. Introduction

1.1 Purpose of this document

These Preliminary Guidelines are being provided to all interested persons in the matter of developing regulatory guidelines for Independent Power Producers (IPPs) and Power Purchase Agreements (PPAs). Feedback will be collected by the URA Staff through written submissions and follow-up meetings with Government, utilities and other interested persons. Based on this input, the URA Commission shall render its Final Decision establishing the Guidelines. All interested persons are encouraged to submit comments to assist the Commission in arriving at a fair and just Final Decision.

This document provides an initial proposal on how IPPs and PPAs will be regulated by the URA. Interested persons are encouraged to read this document before making comments on the Preliminary Guidelines.

1.2 Background

The electricity networks in Vanuatu are currently vertically integrated, meaning that the generation, transmission, distribution and supply of electricity are all performed by the same company. In 2010 the Electricity Supply Act was amended to, amongst others, specifically allow for electricity to be generated by other parties for sale to the utility concessionaire. To date, no major projects have resulted in such an arrangement. However three significant IPP projects are currently under serious consideration:

- 4MW (expandable to 8MW) geothermal power station at Takara in North Efate
- 1.1MW photovoltaic power plant at Teouma River, South-East Efate
- 500.8kW photovoltaic array on Parliament House and Meteo Building, donated by UAE.

In order to address these potential projects and other future projects, the URA wishes to set out the regulatory framework for IPP and PPA arrangements.

1.3 Legal context

The legal framework of the energy industry in Vanuatu is primarily based on the following legislation and contracts:

- Utilities Regulatory Authority Act (URA Act)
- Electricity Supply Act
- Geothermal Energy Act
- Concession for the Generation and Public Supply of Electric Power in Port Vila
- MOU for management and operation of Luganville electricity network
- Concession contract for the Generation and Public Supply of Electric Power in Tanna island
- Concession contract for the Generation and Public Supply of Electric Power in Malekula island

2. Electricity generation market

2.1 Market context and background

The current market situation in each of the four electricity networks in Vanuatu is of a single, vertically-integrated company that carries out all electricity generation, transmission, distribution, supply, and customer services. In 2010, the Electricity Supply Act was amended to explicitly enable any person to generate electricity and sell wholesale electricity to the concessionaire.

2.2 Definition

An IPP is defined as a relatively large scale generation facility owned by a person unaffiliated to the network operator, for commercial sale of energy through the grid. This definition does not include small-scale generation by customers, such as with home solar systems as discussed in detail in U-0002-14 Preliminary Decision April 2014. Power sold by an IPP to a network or an end-use customer is referred to as wholesale power, and the price at which it is sold as the wholesale price.

2.3 Market impact and role of the regulator

Admitting IPPs into an electricity market creates competition in generation, and as such can create incentives for efficiencies and cost reductions in the long run. If an independent company is able to generate electricity at a lower cost, then the concessionaire should have an incentive (in fact an obligation) to purchase the electricity and reduce generation costs which can then be passed on to customers through lower tariffs.

In order to realize the overall market benefits of IPPs, the following issues need to be addressed:

- The wholesale price should be reasonable, meaning that it reflects the cost of efficient generation, and
- IPP generation should contribute to Least Cost Generation for the concessionaire (defined later in this paper)
- If the price is set at a reasonable level, an IPP should be confident that it will be able to sell the power it can generate subject to the system needs
- Customers should benefit from lower generation costs as a result of the entry of IPPs into the market

The regulator has the responsibility to establish a regulatory framework such that these outcomes are achieved. In addition, the regulator plays the role of ensuring safety, reliability, a level playing field for competition, and protection from anti-competitive activities such as collusion and discrimination.

2.3.1 Regulation of IPPs

The URA Act defines a regulated service as “the supply of electricity or water to a consumer **and includes all processes leading up to that supply**” (emphasis added). The generation of electricity by an IPP is therefore a regulated service, subjecting IPPs to the URA Act. Therefore, IPPs are subject to the same safety and reliability standards and reporting requirements as utility companies, as well as to the same anti-competitive protections laid out in the URA Act. The pricing powers of the URA also extend to wholesale

pricing. At this time, however, the URA's primary concern is to ensure a fair consumer price, and to allow the PPA parties to negotiate the terms of the PPA. To that end, the URA will currently take an advisory role to both parties, and issue relevant guidelines. As and when required in the future, the URA reserves the right to exercise its wholesale pricing powers under the URA Act. However a party to a PPA transaction may request the URA to approve a-priori the PPA terms as a condition of the project going forward. In that case the URA shall entertain an application filed singly or severally by the parties.

The URA is aware that a clearly-defined enforceable PPA supported by the regulator is an essential element in order for the IPP project to proceed. Lenders and investors, typically, would not seriously consider a project until they see a bankable PPA that would generate a revenue stream sufficient to cover the cost of operations and debt service. On the buyer side, it is equally important that the off-taker has sufficient regulatory approval that it will be able to pass on the IPP-related PPA costs to the consumers after the commissioning of the IPP. The URA, therefore, has responsibility to provide a clear set of principles and a framework with sufficient detail to enable participants (e.g. developer/operator, investor, utility, etc.) to engage in a meaningful sustainable IPP/PPA transaction.

Further regulatory approval once granted and relied upon by the parties cannot be subject to second-guessing post-fact. For example, the regulator, having granted approval based on facts and assumptions at the time of approval, should not then withdraw or alter the terms of the approval simply because the circumstances have changed, not within control of the one or the other party, save in cases where such variations are clearly stated in the approval. For this reason, the URA must take great care to research, analyze and investigate the issues prior to granting such approval. This includes ascertaining the URAs authority on the matter. Also, in any case, the URA has the right to review a proposed PPA before it is signed.

2.3.2 Monopsony power of concessionaire

Under present arrangements in Vanuatu, all existing electricity customers are covered by one of the existing concession areas. Under current concessions, the provision of IPPs shall result in a wholesale market comprising a single buyer with potentially multiple sellers. This is termed a monopsony. This is a position of considerable market power for the distribution company, especially one with sufficient (or excess) generation capacity in relation to demand. It is possible that such a position could be abused by choosing not to purchase more economic power which undermines the ability of the IPP to survive while also denying consumers the advantages of an IPP.

It is the role of the regulator to ensure fair market practices and competition to bring consumer benefits, and as such can:

- **Set consumer prices taking into account Least Cost Generation.** If the consumer price is set imputing lower IPP cost, assuming that IPP power is available and should be used, then the concessionaire would lose profit if it chooses not to purchase from the IPP (see section 3 below for a definition of Least Cost Generation).
- **Investigate anti-competitive behavior.** For example, a distributor choosing not to purchase cheaper energy on offer from an IPP is a form of discriminatory behavior, which is unacceptable.
- **Review industry structure, including unbundling.** As the energy market in Vanuatu develops, in the longer term separation of generation and distribution functions would create a more level playing field and reduce the incentives for market abuse.

2.4 Direct access

In open markets, IPPs are able to sell their available power directly to individual customers, and the network distributor is required to deliver the power for a regulator-approved transmission and distribution charge. Under open access, participant behavior is described by market rules and monitored by an independent system Operator. The ability to sell directly to some customers means that an IPP is less reliant on a single PPA in order to sell its capacity, and can thus optimize its output and costs. It also provides some competition in supply between the IPP and the concessionaire to serve a consumer. In a direct access arrangement, a standby tariff would also be available to the consumer for periods when the IPP was unable to generate sufficient energy (downtime, maintenance, etc).

Direct access is currently not explicitly stated in the Electricity Supply Act. The concessionaire is the sole provider of electricity within a concession area. It should be explored if, to enable direct access, the legislation or certain concession contract(s) need to be amended. Enabling direct access in a limited way could enable certain eligible larger customers to receive competitive energy supply from the source of their choice. Direct access also enables an IPP to sell surplus power over and above the concessionaire off-takes, thereby realizing economies of scale benefits that could be shared among the parties. Direct Access may also mitigate the issue of a PPA term exceeding the concession term as there will be alternative buyers.

The URA intends to propose limited Direct Access guidelines, eligibility criteria and suitable regulatory framework, while minimizing impact on the networks of the distribution utility; for example eligibility may be limited to new high-voltage customers of a certain size.

2.5 Licensing

It is commonly prevalent practice that any entity supplying power into a regulated market be licensed to conduct business. The license generally spells out the terms and conditions under which the supplier (e.g. an IPP) can operate, market behavior, financial viability etc. In case of UNELCO and VUI, they operate as concessionaires pursuant to the concession agreement or management contract. The URA recommends that a licensing scheme be adopted for defining the terms and conditions of operations by an IPP offering to supply power into the regulated networks. At this time there is inadequate legislation in place, for example an exploration and production licenses for the Geothermal project. The URA proposes to initiate a request to the Government and draft suitable legislation to amend the URA Act allowing the URA to issue and authorize licensees wishing to generate and supply power. Terms and conditions of the license shall be developed and monitored by the URA pursuant to the legislation.

2.6 Carbon credits

It is possible that an IPP project may be eligible for carbon credits. The URA will act to ensure that the benefits of any credits are assigned to the appropriate party.

3. Least cost generation

The URA Act specifies that the customer price of electricity “must take into account least cost generation for that utility”. The URA broadly interprets Least Cost Generation (LCG) in two ways:

- Ensuring the existing generation capacity is used efficiently by optimising the dispatch operation. This means minimizing short-run marginal costs.
- Ensuring investment in available and feasible technologies that will reduce the cost of generation in the future. This means minimizing long-run incremental (marginal) costs.

The first aim is simple: the existing generation capacity should be utilised as efficiently as possible in order to minimize the variable cost of generation, i.e. fuel cost. This means maximising the use of existing renewable capacity (hydro, wind and solar), and selecting the lowest cost fuels among available options (currently diesel or copra oil) on merit order basis, along the entire load curve. The URA proposes that the generation cost element of the tariff be set according to the lowest variable cost combination of generation mix (taking into account technical constraints).

To achieve LCG in the longer term, one must perform system planning based on available options and generation investments that would optimize capacity mix to minimize the total generation costs delivered at the load centres. This may include procuring future generation through IPPs.

The introduction of IPPs into the market increases the incentive for efficient longer term investments. If there is technology available that is likely to reduce the cost of generation, then the market should have the incentive to invest in the cheaper technology, either by the concessionaire or an IPP.

URA does not interpret LCG to mean an absolute least cost at all times. Rather it views that providers strive to achieve increasingly lower costs by selecting efficient investments in feasible generation options while maintaining the requisite level of reliability

3.1 LCG and demand forecast

A utility has the responsibility to meet all its demand and in a least-cost manner. To achieve this it may have to re-optimize its generation capacity from time to time. Additions to generation capacity may thus be necessitated by two factors: increasing system demand, or to reduce total generation costs by adding lower cost efficient generation.

The regulator has an interest in both aspects in order to ensure that the utility has sufficient installed capacity to meet customer demand at all times, including new customers. The regulator also wants to ensure that the demand is met at overall least cost to the consumers.

Therefore when reviewing an IPP/PPA the URA will investigate the utility’s customer usage and demand pattern (load curve) to estimate how much and what type of capacity would be needed. Next, the regulator wants to ensure that any new additional capacity promotes the least cost generation objectives. While renewables would be a preferred choice for capacity additions, it cannot be at the expense of reliability or disregard the costs to the consumers.

3.2 Assessing IPP against LCG

The first test of the competitiveness of a proposed IPP arrangement is to compare the estimated levelized cost of energy of the IPP with the highest variable costs of existing generation capacity, which currently comprises primarily the cost of diesel fuel. If the IPP costs are lower, then it is likely that IPP generation will contribute to least cost generation. The optimum generation mix can be estimated by performing re-dispatch, with and without the IPP, indicating whether or not generation costs can be reduced in the short or long term.

Other considerations taken into account when reviewing the LCG-impact of an IPP include:

- Impact on spinning reserves of intermittent power sources
- Distance to load centres and cost of additional transmission network
- Network strengthening and reinforcement
- Impact on system losses
- Assets stranded
- Subsidies (e.g. grants, below-cost loans, etc.)

In order to proactively plan the future development of electricity generation in Vanuatu, the URA proposes to carry out a periodic (e.g. every one or two years) forward-looking assessment of Least Cost Generation for each of the major electricity networks. This will enable the Government, the utility and potential IPPs to assess when new generation capacity is required and what kind of technology will be feasible to minimize costs while maintaining reliability. The URA will expect that the utilities shall view this development plan as a guide to their generation planning.

3.3 Treatment of stranded assets

With the introduction of IPPs, it is possible that the increase in available capacity may result in some less efficient generation units becoming a stranded asset (economically obsolete), i.e. it is no longer required for LCG even if the asset has not yet reached the end of its physical life. Should this be the case, the concessionaire should be allowed an appropriate amount of time to dispose of the assets as efficiently as possible. This will create additional incentive for the utility to modernise its generation mix. The URA proposes that the costs of any generation assets that become stranded as a result of the IPP, because they are no longer economically viable (i.e. used and useful) be amortized and given appropriate rate-making treatment, with the amortization period to be determined on a case by case basis.

3.4 Procuring new generation

The process described in this paper should encourage the market to deliver efficient system generation. It may, however, also require occasional active intervention to ensure this result is achieved. When there is a need to invest in new generation capacity (i.e. when demand grows or when existing generation approaches the end of its economic or physical life), the URA recommends that future generation capacity should be secured through a competitive bidding process. This allows for transparency, price disclosure and arms-length transactions. Based on the demand projections performed by the utility and reviewed by the URA, the utility should announce the type, size and timing of when such capacity is needed for the system, using the URA generation development plan as a guide. Government could run such an open tender, based on parameters

set in consultation with the utility and the URA. Affiliated utility generation may be allowed to bid into the tender which is supervised by an independent panel. Interested persons could either bid on construction cost to install the capacity, or on the PPA price, reverse auction, etc., depending on the technology. Experience shows that open bidding process results in low cost power procurement even for small systems. This process would enable the Government, URA and the utility company and interested IPPs to participate in long-term plan for least cost generation in Vanuatu.

3.5 Affiliated IPP

If there is any form of affiliation between a third party power producer and the utility, it will not be considered a true independent for ratemaking purposes. This means that the project would be considered in the same way as any proposed expansion of the utility's own generation capacity. If the concessionaire or an affiliate wish to participate in a tender process such as that described above, the URA will assist the Government and tender panel to ensure it is carried out fairly and in the best long-term interests of customers. URA does not discourage partnership arrangements between an investor/IPP and the utility if the arrangement is prior disclosed. If the utility functions are unbundled as described above, then an affiliate of the distribution company can fully participate in the power procurement as an IPP, observing norms of related-party transactions.

3.6 Sale of interest in an IPP

In the same vein and to prevent collusion, the URA may place limitations on an IPP selling the project assets or changing ownership (directly or indirectly) to the concessionaire in the initial years of its operation. The restricted period shall be determined on a case by case bearing in mind that some flexibility is warranted when, for example, system reliability is threatened. An IPP may sell an interest to a third party, subject to the above, with the approval of the URA. The URA will evaluate such a proposal on the experience and financial strength of the buyer, and to ensure the seller has fulfilled all its obligations.

4. Consumer pricing with IPPs

4.1 Fair consumer price

A price that is fair for consumers should also generate sufficient revenue for the energy provider to cover its prudently incurred costs, including reasonable financial costs of capital investment. This cost base should reflect a reasonable level of efficiency. Similarly, a fair PPA price is one that covers the prudently incurred costs of generation of the IPP, including capital costs reflecting risk, while contributing to the least cost generation.

4.2 Tariff unbundling

In order to enable more efficient cost-based pricing and provide better signals to customers, the URA proposes separating the tariff into two parts: generation costs and distribution costs. Each component will be estimated and set for the applicable period of tariff reviews. This is a new approach the URA is considering to perform tariff reviews, and the Commission will investigate how to separate the costs of distribution and generation.

4.3 Adjusting the consumer tariff

When an IPP commences operations, the URA intends to undertake a single issue rate review to adjust the generation costs portion of the tariff to reflect the new conditions of generation immediately so as to pass on the benefits to customers, and not wait for the subsequent tariff review. The utility shall be required to file an application and information providing costs impacts and tariff adjustments pursuant to the IPP operations.

5. Power purchase agreements

A PPA is a contract between an IPP and distributor that defines the terms and conditions of the sale of wholesale power. Often this contract needs to be agreed and signed before financing can be completed for construction of the power plant. A successful PPA, therefore, must provide sufficient surety of revenue to satisfy financial backers, and provide good value for customers through the life of the contract. This requires robust forecasts of demand and costs and a careful balancing of risk between the IPP, distributor, and customers.

It is in the interest of an IPP to receive a PPA that includes a price and volume of power sold (off-take) during the life of the assets providing a reasonable assurance of future cash flows, that can support financing arrangements. It is in the interest of a distributor to only buy power when it is needed and contributes to lowering electricity costs. The distributor also wants certainty that it will be able to recover its PPA costs from the consumers. Therefore, in order to come to an agreement, both parties need to come to a compromise between these two positions. The URA must balance these objectives while also maintaining healthy competition and long term reliability at low costs. The URA can, at the request of the parties, facilitate this PPA arrangement between buyer and the seller. The distributor may seek URA endorsement of a PPA in order to be confident of the pass-through of costs in consumer tariffs.

For now, the role of the URA in the PPA negotiations is to provide advice to both parties on the reasonableness of the assumptions used in the PPA terms and conditions, and to estimate the future impact on the customer price of the PPA arrangement. It may be useful for an IPP to seek a clear endorsement of the PPA from the URA in order to provide confidence to lenders and investors. This could include requesting the URA to endorse a reference price to be included in a PPA. It is likely that different pricing conditions are optimal for different kinds of power production, for example between reliable and predictable sources (e.g. hydro-electric, geothermal and fuel-burning) that can provide base load power, and non-constant and less predictable power sources (e.g. solar and wind). In any case, the URA also has the right to review a proposed PPA prior to signing by the parties. Parties may sign a PPA subject to regulatory approval.

5.1 Wholesale pricing options and methods

In theory there are a variety of ways an IPP's power can be priced. The following subsections describe the main wholesale pricing options and assess their applicability for Vanuatu.

5.1.1 Spot market price:

In a market where there are many different suppliers and IPPs, competition at a wholesale level can be achieved through an energy spot market, where each IPP bids to supply blocks of power at different prices, according to the conditions of demand. An independent system operator then determines the market demand and matches with the supply at the least cost on real-time basis. Typically all incremental power is purchased at the short term marginal cost or system lambda, subject to restrictions such as must-run units.

The result of a successful wholesale spot market should be the lowest possible price in the short term, and efficient investment in lower cost energy sources in the longer term. While such a spot market is not practical for a small network with only a small number of market players, it is useful to consider what the outcome of a spot market would be when defining an outcome to be fair.

In a small market like Vanuatu, it is not practical to establish a spot market at the present time. Therefore IPP pricing cannot be set on a spot market basis.

5.1.2 Avoided Cost

Avoided Cost is defined as the opportunity cost of the buyer (i.e. the utility distributor), for acquiring alternative power that meets the same level of quality as offered by the IPP. This could include the cost at which it could generate its own additional power or the cost of the kWh forgone by the retailer. While intuitively plausible, the use of Avoided Cost for IPP pricing does not work well where the existing generation regime is predominantly diesel-based. Theoretically, Avoided Cost in Vanuatu is the diesel-fuel cost and therefore by definition any alternate source is below this price. A PPA priced at full Avoided Cost would provide no direct cost benefit for customers. Further, Avoided Cost only works where the system operates at the optimal generation mix. However, Avoided Cost determination is useful in that it indicates the maximum cap on the PPA price.

5.1.3 Actual cost of the IPP

URA proposes that in principle the actual cost of generation should be the primary criteria for the wholesale PPA price. Thus the PPA price shall cover all reasonable costs of generation including capital costs, depreciation and adequate equity return commensurate with the risks involved in the project. Normal rate making and cost of service principles shall apply.

5.1.4 URA-endorsed reference price

In order to assist with PPA negotiations, the URA may endorse a reference price to be used in a given PPA prior to the start of construction. This reference price would be calculated based on estimated reasonable construction, operating and capital costs for the technology deployed, taking into account any subsidies. The reference price shall take into account the Avoided Cost. Parties can reasonably rely that the URA-endorsed reference price shall be the allowable costs for tariff making upon project completion subject to the following.

Once the construction is completed, the actual cost of the project will be calculated. If the costs of the project are higher than estimated reference price, the URA would endorse an increase in the reference price only to reflect certain exceptional and unpredictable circumstances. If the project is completed at costs less than reference price, then the price may be adjusted to appropriately share the benefit between the developer and customers. This approach preserves the incentives for IPP to control project costs.

5.2 Pricing Structure

Having agreed to a base PPA price, there are a variety of pricing structures available to the parties negotiating a PPA in order to appropriately balance risk among the parties, including:

- Uniform unit pricing (vatu per kWh) over the term of the PPA
- Available capacity-based charge (fixed charge plus lower unit charge) with take-or-pay provisions
- Time-of-day tariffs (differentiate between peak/base load requirements)
- Front-loading or back-loading of tariff (i.e. where surplus is assigned to fund for maintenance, and released during later stages of PPA term) in order to ensure production continuity

- Volume-based pricing, where price changes for different levels of energy provided, e.g. test energy; excess energy priced at lower cost

The URA position is that the applicable tariff structure should depend on individual case basis factoring in: the technology involved, financing, risk factors, term of the PPA, etc.

5.2.1 Indexation

Indexation may be allowed only against vulnerable inputs, i.e. fuel, O&M, currency which fluctuate over time. However no blanket indexing of whole price or fixed inputs (e.g. capital invested) should be allowed.

5.3 Term of PPA

The term of the PPA is an important factor in project viability assessment. Lenders and investors look for a long-term PPA to ensure capital recovery. The buyer may also insist on a long term agreement to ensure adequate capacity, system reliability and price stability. URA must take these objectives into account in order to enable IPPs to become a reality. The URA has another important goal: to ensure least cost generation goals are achieved, now and in the future. By agreeing to long-term PPAs with fixed prices, the URA is foreclosing its options for seeking cheaper cost alternatives in future. In fact in many developed jurisdictions a long term PPA is considered anti-competitive and frowned upon, as parties lock-in prices and outputs. The URA believes that some balance is required between two conflicting goals, keeping the Vanuatu circumstances in mind.

One other constraint on the term of a PPA is the length of the concession contract. Currently, a utility company may be unable to sign a PPA that extends beyond the end of its concession contract. This can be a significant constraint on potential investments, especially due to uncertain cash-flows towards the end of the term of a concession contract (it should be noted that cash-flows towards the later years contributes little to the net present value analysis often performed for such projects). In order for a PPA to extend beyond the term of the concession, if the PPA has been approved by the URA, then it may be reasonable to include the PPA as a mandatory part of the tender for persons bidding for the concession. It may be the case that the parties would seek to re-negotiate the terms of any pre-existing PPAs, and in such circumstances, the URA can provide facilitation subject to its regulatory framework.

The URA suggests that one option to facilitate a long-term PPA is that off-take quantities may be pre-defined and agreed for the life of the asset, while setting the price based on market conditions with five year reviews, subject to a minimum price. Each review shall consider market conditions for similar power sources in setting the prices.

The URA believes that the length of the loan period and debt service is the important element in the IPP and PPA terms. Typically lenders extend debt for a period of 10-12 years. This is critical factor in a PPA structuring, cash flows, etc. Therefore, a reasonable approach would be to set the PPA term matching the term of the loan. This encourages the developer to seek and garner longer term loans and thereby lower debt service and cash flow requirements. For depreciation/amortization purposes a straight line method over the life of the project shall still be used.

As has been mentioned above a Direct Access provision can also mitigate the issue of PPA term.

5.4 Transmission and connection point

Transmission planning is an integral part of generation planning when new generation capacity is envisaged—be it utility-owned or an IPP. Primarily it is the obligation of the power producer to plan for and invest in any line extension to connect from bus bar to the nearest grid. This investment is an important factor in evaluating the economic viability and LCG. The line extension and connection costs are separately analyzed as it may have broader impact on system stability, losses, and in some cases locational decisions for the IPP. A Transmission Agreement is a companion to but separate from the PPA. Sometimes the costs of transmission may be rolled into the PPA. In other cases the off-taker may agree to the line and connection investment. A great deal of buyer-seller cooperation is necessary to arrive at a transmission agreement, connection terms, etc. URA shall treat it an integral element of assessing the IPP viability, consumer price impact and the PPA approval process.

Annexe I. Takara geothermal energy project

The proposed project to develop a geothermal power plant at Takara is at an advanced stage of PPA negotiation. In principle the URA's objectives coincide with the NERM goals to encourage renewable base load at Takara. The URA therefore supports and will facilitate development of the project and the PPA. The URA will also attempt to ensure that the project is built and operates in a manner consistent with the Least Cost Generation criteria. This section outlines the application of the proposals in this paper to the specific Geo-thermal case at Takara.

5.5 Geothermal base price

The production licence for the Takara geothermal energy project specifies a base price of 23.9 vatu per kWh, indexed to inflation. This base price has not been endorsed by the URA, nor is URA obliged to consider it binding for ratemaking purposes. If a geothermal producer should wish to provide electricity at below the base price stated in the production licences, then the URA believes it should be allowed to do so.

5.6 Reference price

In order to support the PPA negotiations, the URA proposes developing a reference price for the geothermal plant at Takara. This would be based on:

- Projected costs of project construction and operation and maintenance costs supplied by the Developer;
- Estimated cost of capital (i.e. debt and equity), and capital structure deemed reasonable for the technology and risks assessment;
- Non-price terms of the proposed PPA;
- Applying the cost of service principles and methodology for unit cost calculations as traditionally used in utility rate reviews and tariff setting (n.b. the URA will soon release its paper on Tariff methodology for tariff reviews providing further details);
- For Cost of Capital Estimation: URA shall consider a target capital structure, actual cost of debt and weighted average cost of capital (WACC) as primary parameters using the capital asset pricing method (CAPM). However other return on equity (ROE) estimation methods such as discounted cash flow (DCF), Comparable earnings, P/E ratio, may be used to arrive at a fair rate applicable for the situation;
- Straight line Depreciation over the useful life of the project;
- Grid connection and extension requirements for the project and costs;
- Forecast energy demand and load curve of the buyer;
- Avoided costs of UNELCO's incremental generation including fuel savings, loss reduction, allowing for incremental transmission, net stranded costs if any, etc. Avoided costs may also be estimated for options that UNELCO could consider to procure similar capacity;
- Investigation of any potential stranded assets and associated costs; and

- International benchmarks of geothermal energy delivered prices, adjusting for Takara project conditions.

This reference price would define the allowable price of the project for ratemaking. If the project is completed under budget, then a benefit sharing arrangement would be defined. Cost overruns will be considered recoverable only in exceptional situations

For the project the reference price need not be a simple flat rate per kWh. Rather, the reference price would be a suggested set of pricing terms (i.e. take or pay provision, availability based price, minimum and maximum ranges, excess energy discounts) that the URA considers an appropriate balancing of risk between the project developer, the utility, and customers.

Specifics shall be determined based on the IPP operations information submitted by the parties.

5.7 Ensuring long-term project viability

It is important that measures are taken to mitigate the risk of the project failing for unforeseen reasons. To this end the URA may include a requirement for the IPP to put aside a certain amount of allowable revenue as a provision to cover for unexpected costs, or in the worst case, compensate customers due to total project failure. Set-aside provisions may also include capital maintenance, environment upgrading as the operation progresses. This set aside requirement would apply in the early stages of the PPA (e.g. 5 years), and could be drawn down in later stages, effectively back-loading the equity returns of the project. The level of the provision would be set after ensuring that the available IPP revenues would be sufficient to cover operational costs and debt servicing. A set-aside provision is generally viewed favorably by the lenders as it may protect their interest in the project and lower risks. URA believes it is a credit enhancement measure.

5.8 Decommissioning

Once the geothermal facility has exhausted its useful life the facility has to be decommissioned. This means all equipment is safely removed, site cleaned and land reclaimed. Cost of decommissioning for a Geo-thermal plant could be substantial. It is important that provision is made upfront to reserve funds for decommissioning and included as component of pricing and the PPA. The developer should provide data and estimates on decommissioning.

The above guidelines are set out to receive suggestions and input from interested persons before formal final guidelines are issued by the URA

Annexe II. Teouma solar project

The URA has received from UNELCO a proposed draft PPA under discussion with Vanuatu Sun Power for a 1.1MW solar farm to be situated at Teouma River. URA supports the development of this renewable project based on the following principles:

- The project helps to reduce the cost of electricity generation, i.e. it is step to Least Cost Generation
- The increase in solar penetration fits with the goals to balance the generation portfolio including solar being added through the proposed Feed-in scheme (see U-0002-14 Preliminary Decision April 2014) and maintains network stability.
- The terms of the PPA represent good value for UNELCO and customers over the longer term
- URA has provided initial feed-back to UNELCO along the lines enunciated in this Guidelines

To date, neither of the parties has formally requested the URA to provide a reference price to assist with the PPA negotiation. The URA suggests that this may be a useful step in order to progress this project.

Annexe III. UAE solar project

The URA has been informed of an intended project to install 500.8kWp of solar panels on and around the Meteo building and Parliament House. This project is funded through a grant from the United Arab Emirates (UAE) Pacific Partnership Fund, which will pay the full cost of initial construction of the solar installation.

The URA will continue to work with all parties concerned to ensure that the power purchase arrangements provide for:

- Adequate funding for the maintenance and renewal of the solar installation
- Appropriate benefits to the Government, in the form of reduced electricity bills and sales of electricity produced
- Benefits to electricity customers through cheaper energy being provided to the network.

Utilities Regulatory Authority

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You can access the U-0003-14 Preliminary Guidelines June 2014 on our website www.ura.gov.vu or by contacting us by telephone (+678) 23335, email: breuben@ura.gov.vu or regular mail at U-0002-14, Utilities Regulatory Authority, PMB 9093, Port Vila, Vanuatu.