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Zambia Renewable Feed-in Tariff (REFIT) Program

REFIT GUIDELINES: Support Mechanisms and Draft Regulations

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1. REFIT Support Mechanisms

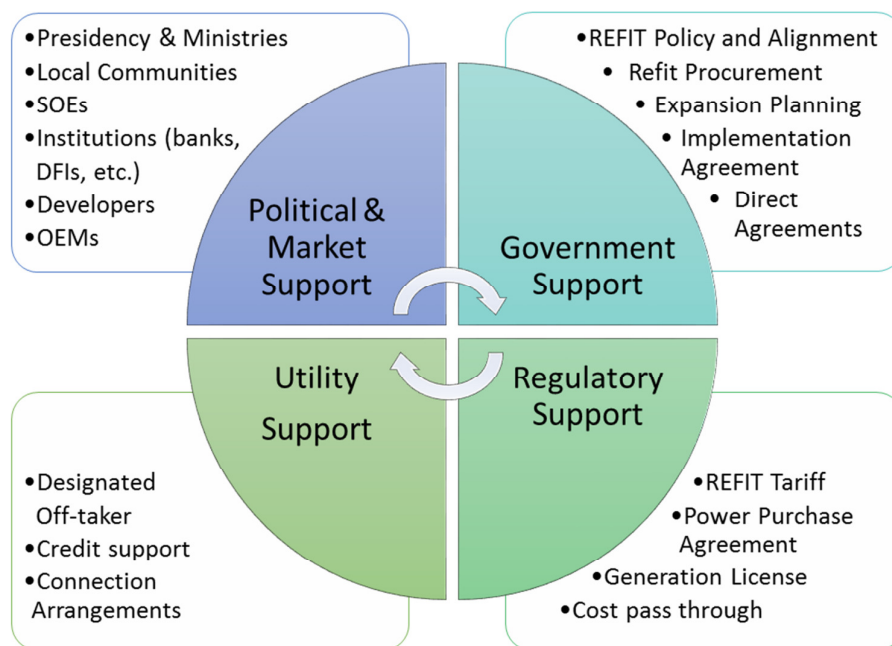
1.1. Critical Success Factors for REFIT

The successful deployment of renewable energy projects, whether via a REFIT program (as envisaged for Zambia) or other alternative procurement approaches, is contingent upon a range of factors. These factors span, political, socio-economic, technological and commercial/economic dimensions.

These critical success factors (or REFIT building blocks) are central to the successful deployment of a REFIT program. Although the implementation of a REFIT program is possible without all the building blocks in place the rollout will arguably take longer and be more expensive. While it is not within the scope of this assignment to develop all the building blocks it is important to identify the success factors and pivotal for the different institutions to share a clear plan for the development of these building blocks.

The typical success factors for a REFIT program are summarized below. The list reflects the learning experiences from the deployment of multiple renewable energy programs internationally and within the region. The list is not intended as a prerequisite for the roll-out of the REFIT program in Zambia but rather as a reference for the design of the program.

Figure 1: Typical Success Factors of a REFIT Program



Several of these success factors are discussed more fully in subsequent sections of the report. In addition to the success factors listed there are also key lessons, which can be learned from other countries that have implemented renewable energy programs.

By all accounts South Africa has embarked on the roll-out of a highly successful renewable energy program. Although the South African program is much larger in scope than the Zambian REFIT program, it contains significant and relevant lessons which can benefit the REFIT initiatives in Zambia. The key lessons learned are noted below.

- (a) **Policy and Political Support** – including policy certainty in terms of the role that renewable energy should play, clarity on the investment strategy (i.e. the role of the private sector), alignment of policy with the legislative and regulatory environment and coherent high level support from all relevant spheres of government for the desired outcomes and agreed procurement process(es).
- (b) **Institutional Arrangements** – effectively translating the Policy and Political Support under (a) above into an enabling framework (comprising legal, procedural and contractual certainty) coupled to strong institutional leadership and political will to take and implement decisions. Such enabling framework, moreover addressed other critical aspects such as government guarantees, licensing and permitting, funding and standardized project agreements.
- (c) **Market Readiness** – program success was built around previous (arguably premature) initiatives and schemes, which, although they stalled, contributed to preparing both domestic and international private developers for their entry into the electricity market.
- (d) **Fair, transparent and consistent evaluation criteria** - the publication of transparent, consistent and independently reviewed evaluation criteria upfront and adherence to this process is considered to be central to the success of the program.
- (e) **Competent transaction advisors** - experienced local and international transaction advisors were appointed and were able to transfer international best practice in renewable energy procurement to local environment. Different advisors were required to cooperate closely in drafting quality procurement and project documentation.
- (f) **Bankable PPA** – standardized PPA was drafted such that banks got the assurance that deals could be structured around reasonable and sensible terms with appropriate risk allocation between the parties and aligned with their lending and investment mandates. Furthermore, under the Direct Agreement, government effectively provided a guarantee to take on payments if the counterparty (Eskom) defaulted on PPA payments.
- (g) **Getting the price right** – the price and approach to price setting was such that it was high enough to attract investors but not so high as to burden the system/consumers and lose political support. It is worth noting that South

Africa followed a competitive bidding process rather than a standard REFIT approach but did set a ceiling price per technology.

- (h) **Maximizing local economic development** - Economic development objectives focused on ensuring local participation in ownership and benefits from renewable energy activities in the country and the program structure facilitated this explicitly.
- (i) **Program Funding** – this entails ensuring that there is adequate funding to design, implement and administer the program.

These critical success factors and lessons learnt, together with the newly accepted REFIT Policy for Zambia were applied to establish a set of design criteria for the establishment and implementation of a robust REFIT Program that will maximize the prospects of success. This is done under three broad themes namely; Government Support, Regulatory Support and Utility Support

1.2. Government Support

A REFIT program by definition entails some form of Government initiated¹ support on various levels:

(a) REFIT Policy

On the policy level, a conscious decision is taken to support renewable energy, often through a dedicated policy mechanism, and this is expressed via a dedicated renewable energy policy paper, or generally as part of the overarching energy policy. The policy typically contains the renewable energy resources that form part thereof, the mechanisms imposed to facilitate its uptake (e.g. REFIT, REBID, GET FIT) programs, renewable energy targets or quotas, and how these fit into the country's broader integrated resource plan.

(b) Legislation

Legislation gives effect to policy. The legislative measures should aim to introduce a conducive legal and regulatory regime for renewable energy for those matters that need to be dealt with under legislation or regulations. This covers, for example:

- (i) Ensuring that the tariff methodology envisaged for renewable energy can be implemented under the current legislation (e.g. allow price escalations

¹ Or Government directed, such as via the regulator or incumbent utility

under PPAs, provide for automatic cost-pass through of utility renewable energy purchase costs to the customer);

- (ii) Providing for renewable energy specific licenses or ensuring that the existing licensing framework can accommodate renewable energy licensed activities (i.e. license conditions specific to renewable energy generation and supply, off-grid licensing approach where applicable);
- (iii) Ensuring grid access and use by renewable energy generators (compulsory third party access to the national grid on equitable terms);
- (iv) Ensuring subordinate legislation (e.g. Grid Codes, quality or service and supply, standards) are aligned to renewable energy requirements.
- (v) Ensuring that there is internal consistency and alignment with other legislation so that there are no conflicts or areas of overlapping jurisdiction (e.g. government procurement legislation, competition policy).

In practice, Zambia already has legislation and regulations in place to regulate the Electricity Supply Industry. Hence the focus would be to align the present framework with what is needed to support the proposed REFIT program, and propose amendments as required.

(c) Structure and Term of REFIT program

- (i) Define the start and end dates of the REFIT program, including phasing (i.e. Phase 1 and Phase 2)
 - (1) Phase 1 of the REFIT program shall have a term of 3 years – in other words, the published Phase 1 tariffs shall be made available to potential RE projects for 3 years (subject to the program ceilings noted under 2 below).
 - (2) Phase 2 – term to be determined prior to the end of the Phase 1
- (ii) Confirm Eligible Technologies
 - (1) Solar power
 - (2) Geothermal power
 - (3) Hydro power
 - (4) Biomass
- (iii) Size of program
 - (1) Phase 1 – Capacity ceilings per technology to be defined
 - (2) Phase 2 – Capacity ceilings per technology to be defined prior to the end of Phase 1

(d) REFIT Procurement Process

- (i) **Responsibility** - It is vital to define who is responsible to design, implement and oversee the REFIT procurement process. It is assumed that this will be MMEWD with support from competent and experienced advisors.
- (ii) **Clear Process and Timelines** - The procurement process should have clearly defined phases and timing of procurement, including, for example (detail to be firmed up during program design):
 - (1) Development and publication of REFIT program Terms of Reference (TOR)
 - (2) Solicitation of Expressions of Interest (EOI) from prospective bidders
 - (3) Pre-Qualification of prospective bidders against defined screening criteria
 - (4) Request for Tenders from pre-qualified bidders
 - (5) Evaluation of Tenders against defined criteria
 - (6) Notification of successful and unsuccessful bidders
 - (7) Issuing of licenses
 - (8) Conclusion of PPA and other project agreements.

(e) Evaluation Criteria

In order to provide clarity and certainty it is important to develop, publish up-front and apply a clear and logical set of evaluation criteria to be applied to ensure that potential projects are technically, environmentally, economically and legally viable and meet the financing criteria of the respective creditors and investors. In addition the criteria should indicate how capacity will be allocated if the capacity ceilings per technology are exceeded. The detailed REFIT program design will identify criteria to be applied to the pre-qualification and final evaluation stages of the program respectively. Such evaluation should cover the following dimensions:

- (i) Pre-feasibility and/or full feasibility study
 - (1) Technical
 - (2) Environmental
 - (3) Legal/regulatory
 - (4) Commercial & Financial (including funding)
- (ii) Ease of Grid Integration
 - (1) Only projects that do not impose any additional cost on the utility shall be eligible for REFIT phase 1
 - (2) Off-taker may decline to accept an offer due to technical system integration concerns

- (iii) Environmental Approval(s)
- (iv) Other Permits and Authorizations
 - (1) License,
 - (2) Servitudes,
 - (3) Land use,
 - (4) Water use,
 - (5) etc.
- (v) Social support
 - (1) Electricity access to social services (schools and health centers)
 - (2) Local community and equity allocation and profit sharing
 - (3) Expanded rural electrification
 - (4) Agricultural development
- (vi) Sponsors and Developers
 - (1) Background and experience
 - (2) Audited statements
 - (3) Tax compliance
 - (4) Registered offices
 - (5) Technical capability with same technology

(f) Integrated Resource Planning

The purpose of the Integrated Resource Plan (IRP) would be to define Zambia's preferred generation expansion options. The plan typically recommends which new power generation facilities will be build, the size of the facilities as well as when they should be commissioned.

In light of the above it is recommended that Zambia updates its IRP to clearly provide for the capacity that is to be developed under the REFIT program. This will facilitate the implementation of the program.

(g) Implementation Agreement

Government support in this context relates to supportive measures that Government can provide to ensure that the renewable energy policy can be adopted within the framework of suitably aligned legislation. Typically these measures are not necessarily statutory in nature, but in this instance relate to the indirect financial and other support that could be provided by the Government of Zambia to make its renewable energy program a success. These support measure include:

- (i) Land rights, lease and use. Also, access to and use of government-owned land could be made available free of charge to the developer under a the REFIT program.

- (ii) Water access and usage arrangements
- (iii) Mining rights (if relevant)
- (iv) Labor requirements
- (v) Local community and socio-economic support plans
- (vi) Taxation and Currency Exchange which details the relevant taxation and currency exchange requirements including special dispensations.
- (vii) Obtaining Environmental Consent through Environmental Impact Assessments (Record of Decisions)
- (viii) Economic stabilization to deal with adverse economic situations including change in law
- (ix) Support for a cost-pass through arrangement of renewable energy purchase costs by the off-taker to its customers
- (x) Assistance with obtaining permits and authorizations
- (xi) Government Credit Support

In order to facilitate the finance-ability (bankability) of renewable energy projects under their REFIT programs, many governments offer various credit enhancement arrangements. There are a range of measures that could be deployed to assist the project developers but it is beyond the scope of this assignment to provide specific advice on whether Zambia should offer these mechanisms and if so, which are appropriate for Zambia.

However, based on regional experiences these government credit support mechanism may include - letters of comfort, letters of credit, guarantees to support off-take obligations and commitments, including for events such as change in law and termination. In this instance the role of other institutions such as the World Bank, MIGA, etc. may be required to provide bankable credit enhancement options.

(h) Direct Agreement

- (i) Government may be required to enter into an agreement with the lenders to clearly define the roles and responsibilities of the parties to safeguard the

lender's rights under certain conditions². The willingness to enter into this Agreement and similar related obligations, such as guarantees, letters of undertaking needs to be clear.

1.3. Regulatory Support

(a) REFIT Tariff

The determination of a reasonable REFIT is a key component in unlocking Zambia's renewable energy potential, by providing investor certainty. The REFIT policy provides broad guidance on the tariff criteria, approach and design. The proposed tariff methodology is discussed more fully in section 3.1.

(b) Power Purchase Agreement

The sale of electricity should be contracted via a fixed-term, legally enforceable agreement (Power Purchase Agreement). Bankability is determined in terms of the extent that the project meets the financing criteria of the respective lenders, and is thus linked to project viability screening noted above as well as appropriate risk allocation between the parties. The provision of a standardized PPA (with some variation permitted between different technologies) is also a key success factor in managing the speed, complexity and costs associated with the negotiation/transaction process and the risks for the contracting parties.

(c) Generation License

The generation license essentially grants the producer the right to develop finance, construct and operate the power plant and the right to sell the electricity to the off-taker.

(d) Cost pass through Mechanism

There must be a clear mechanism that allows the off-taker to pass through the purchasing cost from REFIT projects (including any connection or Use of System costs if applicable).

² For example, in the South African REIPPP the Direct Agreement between the government and the lenders commits the government to taking on payments due to the project company should Eskom, as the PPA counterparty, default on payments.

1.4. Utility Support

(a) Power Purchase Agreement

The REFIT Program must designate an entity to procure the energy generated from a RE project. The off-taker must be creditworthy and have the financial liquidity to fulfill its off-take payment obligations for the amounts of electricity agreed, at the REFIT price specified, for the duration of the PPA signed between the off-taker and the RE project. Such creditworthiness may need to be secured or complemented by various mechanisms including, for example, Letters of Credit, Escrow accounts, sovereign guarantees with possible support from institutions such as World Bank, DFI's or export credit agencies.

The Consultant has developed a draft standardized PPA for projects that qualify under Zambia's REFIT program. The PPA is currently being updated following a stakeholder workshop.

(b) Connection Agreement

Grid connection is a vital consideration in bringing renewable energy options into the interconnected system, from the perspectives of proximity to the existing grid, spare grid capacity available and impact on system stability/reliability.

Often the best sites for new renewable generation projects are widely distributed geographically which means that it might not be viable to connect the site to the grid at this stage. It is therefore imperative that the technical and commercial viability screening should take account of ease of grid integration.

The role of the utility in assessing and arranging a connection to the grid should not be underestimated. The utility should clearly indicate the following:

- (i) The process to apply for a connection to the grid.
- (ii) Provide the RE project with a reasonably accurate cost and time estimate to connect the facility to the grid within a specified period.
- (iii) The technical standards that the RE Project must comply with before connecting the facility to the national grid.

(c) Direct Agreement

Similar to the requirement that Government is expected to enter into an agreement with lenders, the utility may also be required to enter into an

agreement with the lenders to clearly define the roles and responsibilities of the parties to safeguard the lender's rights under certain conditions³.

2. Alignment with relevant Policy and Legislation

2.1. Introduction

In terms of the newly accepted Renewable Energy Policy, the Government has already accepted the implementation of renewable energy feed in tariffs. Accordingly, on a high level, official Government policy now provides for the enabling and implementation of such programs. However, policy must be followed by careful operationalization through various mechanisms at Government's disposal (such as the support mechanisms referred to in section 1.2), linked to conducive legal and regulatory frameworks.

2.2. Policy jurisdiction in terms of REFIT

Government is the custodian of energy policy in Zambia and accordingly has the mandate to design and implement a REFIT policy. Once the policy is determined, it needs to be implemented – and the first question that arises is who should be responsible for the required activities to do so.

2.3. Procurement of RE Energy under REFIT

Typically, the procurement of “normal” new generation capacity would fall onto ZESCO, who, as the supplier of last resort, has the primary responsibility of ensuring that there is sufficient electricity available in Zambia to meet demand. However, as a commercial entity that needs to conduct its business prudently whilst ensuring customers do not pay excessive prices - and whose activities are subject to ERB oversight and control, including tariff regulation – it would quickly become clear that there is no particular incentive for it to enter into any PPA unless it makes good commercial and/or operational sense.

The whole purpose of designing a REFIT scheme is to ensure that PPAs that would possibly otherwise not be entered into are successfully concluded, and hence ZESCO may not be best placed to procure REFIT RE projects. There then also needs to be some mechanism in place that would ensure ZESCO would enter into PPAs that it would otherwise possibly not enter into.

³ For example, in the South African REIPPP the Direct Agreement between the government and the lenders commits the government to taking on payments due to the project company should Eskom, as the PPA counterparty, default on payments.

Typically this potential conflict is resolved by Government fulfilling the role of facilitating the process of purchasing RE under REFIT (in the sense of accepting accountability for the procurement process or by running a bidding process) and then ensuring that the Government-owned utility enters into a PPA with successful bidders.

Needless to say such a bidding program needs to be carefully designed in order to be successful, and the necessary supporting and incentive Schemes need to be in place. In other words, a dedicated procurement regime should be designed that goes outside the typical Government procurement exercises, and includes the aspects referred to in section 1.2.

Once the procurement process is completed, the off-taker should be obliged to enter into a PPA with the RE project. Often this aspect is not completely transparent, in that Government may be the shareholder of the utility - but that does not in itself mean that the utility can be forced to enter into a PPA. On the other hand, the rights of the utility should also be safeguarded, e.g. if there are good technical reasons why it cannot enter into a PPA, such as grid constraints, the RE procurement and award process should take this into consideration.

There is no provision in current legislation that specifically provides for the procurement of new generation, including RE generation, and we believe that this is a gap that should be addressed. The legislation (preferable the Electricity Act) should be suitably amended to reflect the following:

- (a) Provision for the development of an integrated resource plan in order to vest the need, sources and quantity of RE generation that will be sourced (amongst other sources of generation).
- (b) That RE projects will be procured under a dedicated REFIT procurement program coordinated under the auspices of the Ministry/ERB.
- (c) That the REFIT program will provide for REFIT Rules that will set out or describe exactly how the refit program will work – these can be promulgated as subordinate guidelines or rules under the Act.
- (d) That following the establishment of the REFIT Rules, a procurement bidding exercise will be held to procure REFIT projects in terms of REFIT Bidding Rules that will be established under the Refit Rules – these Bidding Rules would include all aspects necessary to enable bidders to successfully bid for the program, including Government support, draft Implementation Agreement, Draft PPA, Draft TCA and so forth.
- (e) That ZESCO will be obliged to enter into REFIT PPAs – although by signing up to the standard PPA ZESCO will in any event be forced to do so, entering into the agreement in the first place should preferably also be an obligation. On the other hand, ZESCO should only be obliged to do so if technically feasible.

- (f) That Government will enter into the necessary support agreements or undertakings with the developer and/or ZESCO as may be needed to facilitate bankability of the project

The Energy Regulator (ERB) does not presently have the jurisdiction to implement the REFIT policy. It's only true mandate in terms of the Energy Regulatory Act and the Electricity Act relates to governing or regulating the electricity supply industry, in the forms of licenses and economic regulation. In other words, the ERB issues licenses to generators (and ZESCO as off-taker), and in terms of these licenses, it can approve the tariffs or prices set out therein, which could include the REFIT.

ERB however, does not have the jurisdiction to:

- (g) Procure new generation from RE projects or manage/co-ordinate a bidding process for such generation;
- (h) Force ZESCO to enter into PPAs;
- (i) Establish REFIT rules.

It is proposed that the Electricity Act be clarified to provide for the above, i.e. that new empowering provisions be inserted to make the roles and responsibilities of especially Government, ZESCO and the ERB in the REFIT process very clear.

2.4. Key electricity legislation applicable to REFIT

The principal legislative provisions dealing with electricity generation and supply include the Energy Regulation Act, which deals with licensing of undertakings and the Electricity Act, which, amongst others, provides for tariff determination (economic regulation) of supply licensees.

2.5. Generation Licensing

The Energy Regulation Act (ERA) requires in section 8(1) that -

"...A person shall not establish or operate an undertaking except in accordance with this Act and under the authority of a licence issued under this Act."

For purposes of electricity, an "undertaking" is defined as –

"undertaking" means any commercial undertaking, whether public or private, for (a) the production, generation, transmission, distribution or supply of energy."

It is thus evident that a licensee is required by RE projects to generate electricity and supply this to ZESCO as the designated off-taker.

Generation License Application Process

All RE projects under the REFIT program will need a license issued by Energy Regulatory Board (ERB) to generate and supply electricity.

The license application process is prescribed in the Energy Regulation Act.

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"...9(2) A licence application shall be made in such form as may be prescribed by the Minister by statutory instrument, and shall be accompanied by the application fee so prescribed.

(3) The Board shall first determine whether, in its opinion, there is any reason why the application should, in the public interest, be rejected without further proceedings under this section.

(4) Except where the Board decides to reject the application in the public interest, the Board shall cause a notice to be published in the Gazette

(a) indicating the receipt of each licence application and giving a description of the nature and location of the proposed undertaking;

(b) informing members of the public that the application may be inspected at the offices of the Board; and

(c) inviting any member of the public who objects to the granting of the licence, whether on personal, environmental or other grounds, to lodge an objection with the Board within a time, being not less than thirty days, limited by the notice.

(5) The Board shall allow any person to inspect, or furnish any person with a copy of, an application for a licence, on payment by the person of such fee as may be prescribed by the Minister by statutory instrument in respect of the costs of such inspection or the production of such a copy."

From the above it can be observed that section 9(3) requires the ERB to publish the application for a license for comment, giving at least 30-day notice for objections thereto. Although the REFIT process would imply that bidders have been pre-approved to some extent (in the context that projects have been found to be acceptable via a bid process to be followed) and hence that the license application process would lead from there, it is clear that by law all applications must be published for comment and comments must be duly considered:

"..11(1) In determining any application for a licence, the Board shall take into account

(a) the extent to which the public interest will be served by the undertaking to which the application relates; and

(b) the merits of any objection made to the grant of a licence in pursuance of an application.

(2) The Board may, if it thinks fit, convene a meeting with the applicant and any objectors to discuss the application; and if the number of objectors is large, or if the Board considers that the circumstances warrant such action, the meeting so convened may be opened to the public, but in either case the procedure at any such meeting shall be as the Board may, in its absolute discretion, determine.

(3) The Board may grant or refuse to grant the licence; and where it decides to grant the licence, the Board shall notify the applicant of the conditions intended to be attached to the licence.."

As such this is not particularly problematic, save to ensure that in the procurement process it must be evident that acceptance of a bid does not by itself mean acceptance by the ERB and that it would be subject to the issue of a license following the procedures prescribed in the ERA.

In terms of section 11(3), the ERB may determine license conditions to which a license is subject:

“...11(3) The Board may grant or refuse to grant the licence; and where it decides to grant the licence, the Board shall notify the applicant of the conditions intended to be attached to the licence..”

In theory this section allows the ERB to differentiate between different individual licenses, i.e. it is able to provide individualized license conditions. However, in the case of RE projects under the REFIT program, it is advisable that licenses be similar for different classes of technology, in order to ensure that all licensees are dealt with on the same or a standardized basis. In addition, it is advisable that pro-forma licenses be added to the bidding packs, in order to ensure that bidders are aware of the license conditions that the ERB plans to impose prior to bidding. In this manner it would also facilitate dealing with problematic issues up front, rather than waiting until the formal licensing process commences with a possible negative outcome after significant time, effort and expense has been incurred by all parties involved. This approach, moreover, provides greater investor certainty and reduces risk to the overall program.

The ERB has existing license application procedures that would also apply to RE projects under the ERA. These are contained in the Energy Regulations (Licensing) Regulations, Statutory Instrument No. 2 of 1998, as explained by the “Licensing and Investment Endorsement Guidelines for Projects in the Electricity Sub-sector”

These procedures are not particularly onerous and should be used for RE projects applications as well.

Renewable Energy Generation License Conditions

In terms of the contents of the actual licenses themselves, it is noted that the ERB has license conditions that apply to existing generation plant. Whilst these license conditions are useful for larger plant, they may need to be adapted for RE projects under the REFIT program to facilitate the development of smaller projects. In particular, requirements for ancillary services and tariff approval clauses may need to be revisited. An example of what such a RE license could look like, aligned to the current provisions of the Electricity Act, is attached hereto as Annexure 3

2.6. Tariff Approvals

Under the REFIT program the charges levied by the RE projects (i.e. the prices at which electricity is sold to ZESCO) would be the REFIT price/tariff. Accordingly, there is no explicit price approval required per RE project licensee in the generation pricing process, for REFIT, but the tariffs charged by ZESCO, as the designated off-taker of the energy produced under the REFIT program, are subject to ERB approval. This flows from the following provisions of the Electricity Act:

“...7(1) Subject to section eight, the charges made by an operator of an undertaking that supplies electricity to the public shall be determined in accordance with the licence governing the undertaking.

8. (1) Subject to other provisions of this section, an operator of an undertaking that supplies electricity to the public may, with due regard to any or all of the following circumstances:

(a) the amount of electricity consumed;

(b) the uniformity or regularity of demand;

(c) the time when or during which the electricity is required;

(d) the expenditure of the operator of the undertaking in furnishing supply;

(e) any other circumstances approved by the Board;

vary prices in respect of the supply of electricity to a particular consumer either above or below the charges specified in the licence governing the undertaking and may, from time to time, alter the charges so varied.

The Act then describes the procedure to be used in variation of tariffs, ie.

“...8(2) If an operator considers it expedient to vary or alter charges in respect of any supply of electricity, the operator shall give notice to the consumer of the proposal to vary or alter those charges, as the case may be.

(3) If the consumer does not make any application under subsection (4) within thirty days of the date of notice referred to in subsection (2), the variation or alteration, as the case may be, shall, unless the operator of the undertaking and the consumer otherwise agree, come into effect

thirty days after the date of that notice or from such later date as the operator may in that notice fix.

(4) The Board shall, on an application by a consumer, review a proposal referred to in subsection (2), taking into consideration any submissions made by the consumer.

(4A) The Board may, if it considers it appropriate, on its own motion review a notice by an operator of an undertaking to vary or alter charges in respect of any supply of electricity..”

New tariffs only come into operation once approved by the ERB, with or without the variations approved of.

Existing tariffs charged by ZESCO can only be amended once a public consultation process has been concluded (in the event complaints are received) and only once the ERB has approved it.

As RE project contracts under the REFIT would place an obligation on ZESCO to purchase the RE project output in terms of a standardized PPA, and the prices are pre-approved by the ERB (due to the nature of the REFIT), it does not make sense that ZESCO should need further approval of its tariff components reflecting its REFIT purchase costs. Accordingly, it is recommended that the Electricity Act be appropriately amended to allow automatic cost-pass through of ZESCO's REFIT related costs.

3. Alignment with Regulations

3.1. Tariff Methodology

In order to develop a balanced REFIT, various methodologies and options were considered. The different approaches could broadly be categorized as shown below:

Approach	Key Attributes
Cost based	<ul style="list-style-type: none"> • Rate of Return methodology • Payment calculated using costs and return expectations of project investors
Value based	<ul style="list-style-type: none"> • Marginal Cost/ Avoided Cost methodology • Payment calculated on the basis of value of energy delivered
Fixed price incentive based	<ul style="list-style-type: none"> • Provides fixed price incentive to renewable energy generators • Payment is not dependent on energy generation costs or avoided costs

Zambia shall apply a REFIT methodology which follows the Cost Based approach. The approach is described in more detail in the document titled “REFIT Rules for Zambia”

The ERB’s general tariff approach is based on the Rate of Return Methodology which is widely used by regional and international regulators to determine administered prices.

The main principle of the Rate of Return methodology is that revenues of the regulated entity have to cover the operating and maintenance expenses, taxes and depreciation, and have to ensure a fair rate of return (profit) on assets. The generic formula for revenue requirement is shown below:

$$RR = O + D + T + (r*B)$$

Where;

<i>RR</i>	=	<i>Revenue Requirement</i>
<i>O</i>	=	<i>Allowed operating and maintenance expenses</i>
<i>D</i>	=	<i>Depreciation is allowed depreciation expense associated with the Rate Base</i>
<i>T</i>	=	<i>Corporation tax</i>
<i>r</i>	=	<i>Allowed rate of return (WACC or Benchmarked)</i>
<i>B</i>	=	<i>Rate Base (or Regulatory Asset Base)</i>

The above formula clearly shows that the ERB’s Rate of Return methodology is based on the underlying cost of supply including a fair return on investment by the licensee. This approach is consistent with the Cost Based Approach for determining REFIT.

3.2. Cost Pass Through

It is worth noting that the ERB's Rate of Return approach, as discussed above, allows for the cost pass through of ERB approved purchases from IPPs. This arrangement will ensure that ZESCO can recover the cost of RE purchases Under the REFIT program from ZESCO's customers through the sale of electricity at the approved rates.

3.3. Feed in Tariff

(a) Background

There are various tariff elements that need to be considered in defining a tariff structure for Zambia's REFIT program including:

- (i) Tariff components;
- (ii) Currency;
- (iii) Base REFIT, and
- (iv) Tariff indexation

Below is a brief discussion of the options and as well as the rationale for the final stances.

(b) Tariff Components

The main options are either a 'One-Part' energy only tariff or a 'Two-Part' capacity tariff and an energy tariff.

A number of factors were taken into account in determining the single-part REFIT structure including:

- (i) In terms of the REFIT policy the maximum installed capacity of a single REFIT project is limited to 20MW. This is relatively small in the context of the total installed generating capacity in Zambia. Furthermore, Zambia has several large hydro generation sources which are ideally suited for regulation. It is therefore unlikely that the System Operator will elect to subject the relatively small renewable energy generating plant to central dispatch instructions. In other words the renewable energy plants will be self-dispatched, thereby removing the need for a two-part tariff with capacity payments in case the plant is not dispatched by the System Operator.
- (ii) One of the key objectives of the REFIT program is to increase the production from renewable energy facilities and thereby displace fossil-based power generation. The REFIT structure should therefore incentivize the production of renewable based power and not merely the construction of renewable energy facilities that stand idle. A single-part

energy only tariff will provide a strong economic signal to the RE project to maximize production.

- (iii) An important design consideration is, where possible, to avoid a multi-part tariff structure that is not only difficult to implement but that also requires complex testing and measurement procedures and provisions within the PPA.
- (iv) This approach is consistent with regional practice in South Africa and proposals in Namibia.

(c) Currency

The main currency options for REFIT are: Zambian Kwacha, United States Dollar or a combination of the two currencies.

There are several arguments for and against the different options. However, taking all factors into consideration the ERB's position is that the REFIT should be US Dollar denominated. The key motivating factors are:

- (i) Majority of the Engineering Procurement and Construction costs will be incurred in USD.
- (ii) It is anticipated that most the financing of the projects (including debt and equity) will be denominated in USD.
- (iii) USD denominated tariffs will result in a reduction in currency risk as well as liquidity risks for RE projects.
- (iv) The approach should result in the lowest overall REFIT for Zambia.

(d) Base REFIT

The base REFIT will be set by the ERB in consultation with other key stakeholders. The REFIT is set out in the REFIT Rules.

(e) Indexation

The primary options for tariff indexation include: no indexation, partial indexation or full indexation.

It is recognized that the majority of the project costs will most likely be 'fixed' on completion of construction which suggests that there should be either no or at best partial indexation.

However, by adopting a no- or partial-indexation approach it implies that the tariff should be front-loaded (higher real tariffs in the early years) in order to deliver the investors' desired return expectation. Given that Zambia is moving towards cost reflective tariffs it makes practical sense to rather adopt a full

indexation approach. This should reduce the financial stress on ZESCO in the early years.

A further advantage of this approach is that it places a strong incentive on the RE project to ensure that its plant is capable of producing maximum output even towards the end of the term of the PPA.

3.4. Grid Access and Use

(a) Introduction

Reliable access to and use of the integrated electricity network is central to the renewable energy from where it is generated to where it is consumed. The physical connection between the generating facility and ZESCO's network is governed by a Connection Agreement.

The purpose of the Connection Agreement is to:

- (i) Define the obligations and responsibilities of the generator and the network company for the duration of the agreement;
- (ii) Specify the technical standards that the generator must meet in order to be connected and to remain connected to the grid
- (iii) Set the form and level of connection charges that the RE project will have to pay.

Zambia does not have a standardized Connection Agreement but the Consultant had the opportunity to review ZESCO's existing Connection Agreement with the CIZD-Industrial Zone Development Zambia Limited. While this is an agreement between ZESCO and a consumer of power (as appose to a renewable energy generator) it serves as a valuable reference for the development of a standardized Renewable Energy Connection Agreement.

The utility is generally responsible to draft the relevant connection agreement. However, is common practice in many countries that the Connection Agreement is drafted in accordance with the regulator's Grid Connection Guideline. A Grid Connection Guideline serves as an important regulatory instrument to direct grid connection aspects in a clear and transparent manner. A Grid Connection Guideline typically addresses the aspects mentioned below.

- (iv) Grid connection principles for the development of a Connection Agreement
- (v) Application process (including the sequencing and timing of key steps) for obtaining access to (or disconnecting from) the network
- (vi) The definition of connection costs and the methodology for determining the cost to connect to the grid

Furthermore, it is noted that at the moment, Zambia does not have a Grid Connection Guideline, but Annexure 1 provides a more inclusive discussion of the key issues. Furthermore, it is expected that the Grid Connection Guideline will work in tandem with the other regulatory instruments such as the Tariff Methodology, the Grid Code and the Generation license to ensure harmonization of key commercial and technical aspects.

The key point to note, from a technical perspective, is that there should be no duplication between the Connection Agreement and the technical standards set by the Grid Code which could result in conflicting standards and requirements. It is worth highlighting that Zambia's Electricity Grid Code Regulations, 2013, deals with the following main technical requirements:

- (vii) Transmission Connections
- (viii) Metering
- (ix) System Operations
- (x) Information Exchange

3.5. Generation Licenses

(a) License Application Process

The ERB has an established license application procedure for all generators. It is foreseen that RE project licensees need to follow exactly the same application process. However, as certain aspects are determined up-front, namely –

- (i) Standardized PPA, setting out the pre-approved REFIT that ZESCO will pay;
- (ii) Standardized Transmission Connection Agreement,

it is not necessary for the ERB to review these documents (on the understanding that it has essentially pre-approved them).

However, in addition to the normal application requirements the applicant needs to indicate its acceptance of the standard documents – if not, the ECB would need to peruse these and ensure that changes are acceptable.

(b) License Consideration and Award Process

It is suggested that the normal ERB license consideration and award process will be applicable. However, in order to expedite the project development process, it is recommended that the ERB makes licenses conditional on two fronts –

- (i) that the license is provisional on the date of issue and only becomes final upon financial close being reached; and
- (ii) that the licenses lapses upon financial closure not being reached within [12] months from the date of issue.

This will on the one hand ensure that developers have provisional license rights that automatically translate into fully fledged licenses one financial close is reached on the one hand, but on the other that should financial close not be reached, that the provisional rights lapse.

(c) License Fees

Normal license fees payable to the ERB would apply.

(d) Pro-forma license

No dedicated RE generating license presently exists that is aligned to the proposed REFIT program. Accordingly, a Draft Pro-forma License has been prepared as Annexure 4 hereto.

3.6. Carbon Credits

The Kyoto Protocol, which aims to reduce greenhouse gas emissions, created a market in carbon credits. These represent the actual reductions in greenhouse gas emissions achieved by organizations that undertake emissions reduction projects (also known as Clean Development Mechanism (CDM) projects). Certain projects qualify for these credits, such as the proposed REFIT projects in Zambia.

The owner of these credits can sell these credits to entities in developed countries at a market-determined price. Accordingly, depending on the prices, the developer of a renewable energy project may thus get a benefit from such credits over and above the prices it receives for its electricity.

The Africa Carbon Credit Exchange (ACCE) is an African owned and managed marketplace set up for the purpose of increasing Africa's participation in the global carbon markets. ACCE was established in Lusaka, Zambia, by Lloyds Financials Limited as an independent corporate entity and works with a number of public and private sector institutions that support the development of an African carbon market and trading platform.

ACCE aims to unlock finance and investment opportunities in the African carbon market by providing a trading platform for buying and selling compliance and voluntary carbon credits created in Africa, while also enabling a pathway for low carbon and sustainable economic growth for the continent.

ACCE provides a number of services and initiatives in order to achieve this goal and to support project developers in overcoming some of the challenges and barriers they face when setting up carbon credit projects. These include: i) a trading platform for linking carbon credit sellers and buyers and for enabling

efficient transactions across Africa; ii) a Green Knowledge Institute, which provides technical advice and assistance to project developers on technical aspects such as validation and registration with the Clean Development Mechanism (CDM) or voluntary market standards; and iii) a Low Carbon Africa Fund Portfolio, comprising a Low Carbon Africa Fund and a Green Technology and Enhancement Fund, set up to unlock finance for low-carbon projects and to leverage some of the risks associated with investments.

Accordingly, the potential exist that qualifying projects could potentially benefit from carbon credits. However, for the last number of years carbon prices have been relatively low hence the real benefits to projects have been relatively small.

In the REFIT context in Zambia it is not expected that carbon credits will be a major driver for determining developer participation in the renewable energy program, and that it would, at best, be a secondary incentive. Hence it is proposed that developers should be able to freely trade the carbon credits associated with the RE projects, and hence get the potential upside should these deliver additional benefits for the project, but on the clear understanding that all the associated transactional and administrative costs should then also be for the account of the developer.

4. Annexure 1: Key Principles for Grid Connection Guideline

Regulators fulfill an important role in the development of an effective Connection Agreement between generating facilities and the utility. The starting point for the process is a Grid Connection Policy Guideline which acts as reference for the development of key positions. Below is a discussion on the key aspects that are usually addressed in such a policy guideline. The ERB can use these principles in developing a Grid Connection Policy Guideline that is appropriate for Zambia.

4.1. Grid Connection Guideline Principles

In formulating Connection Agreements and associated Connection Charges, the utility should seek to apply the following key principles:

(a) Equality:

This principle requires that there is no unfair discrimination between customers or classes of customers. In practice this means that customers with similar connection arrangements should bear similar charges, subject to considerations of economic efficiency.

(b) Efficiency:

Economic efficiency is desirable as it encourages the best use of scarce resources. To this end it is recommended that:

- (i) Prices are based on the cost of supply.
- (ii) Where appropriate, any directly attributable costs are allocated to customers.
- (iii) Use is made of appropriate tariff structures to encourage the efficient use of the infrastructure.

(c) Simplicity:

Any system of connection charges should be simple. This has a number of advantages:

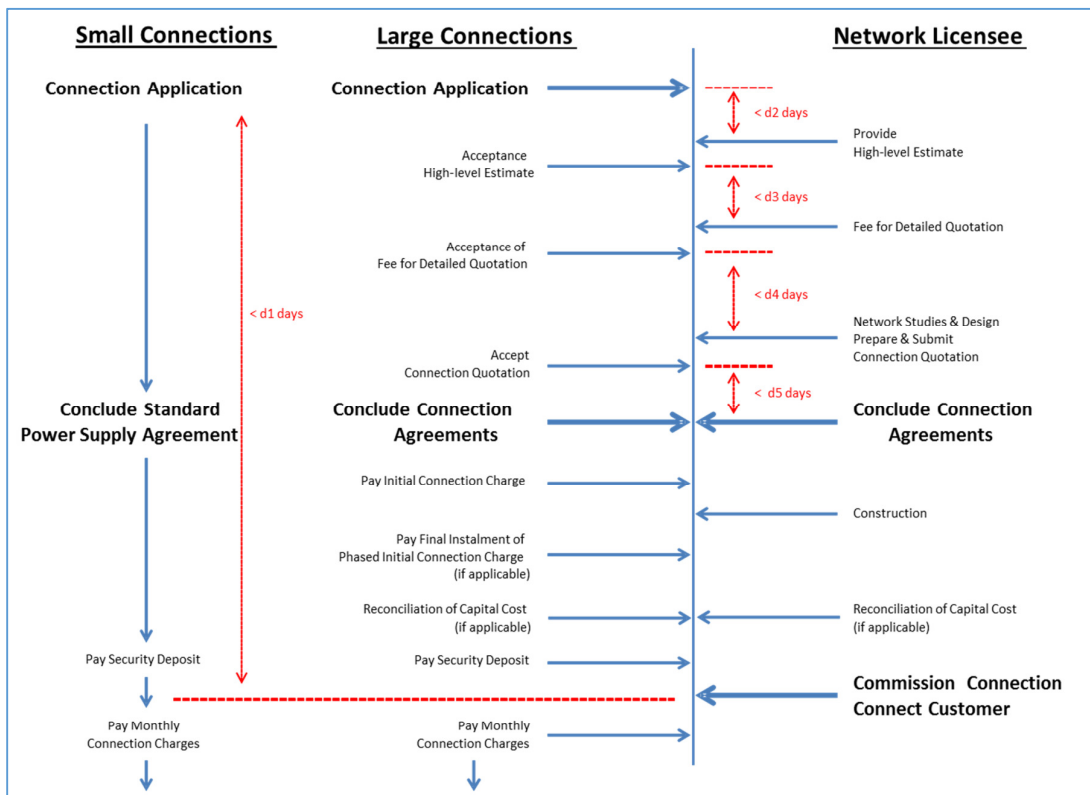
- (i) Faster quotations for customers (and an overall reduced connection time, thereby improving customer service).
- (ii) Easy for the customer to understand.
- (iii) Reduced administrative overheads.
- (iv) Reduction in auditing overheads

4.2. Grid Application Process

At present Zambia do not have a Grid Connection Policy. Given its importance in promoting transparency, fairness, efficiency together with the ability to set expectations and prevent disputes and it is recommended that the ERB establishes a Grid Connection Policy to govern grid connection applications in the future.

One of the reasons why there are frequent unhappiness and disputes regarding grid connections is the lack of clear and transparent process. It is important that the Grid Connection Policy provides clear guidelines to the licensees in terms of the process to follow once a connection application has been submitted. For example the process should define who must do what and by when. The figure below is an illustration of a typical grid application process. It clearly shows the responsibilities of the applicant (RE project) and the utility (e.g. ZESCO) as well as the time in which responses can be expected.

Figure 2: Illustration of a Typical Grid Connection Process



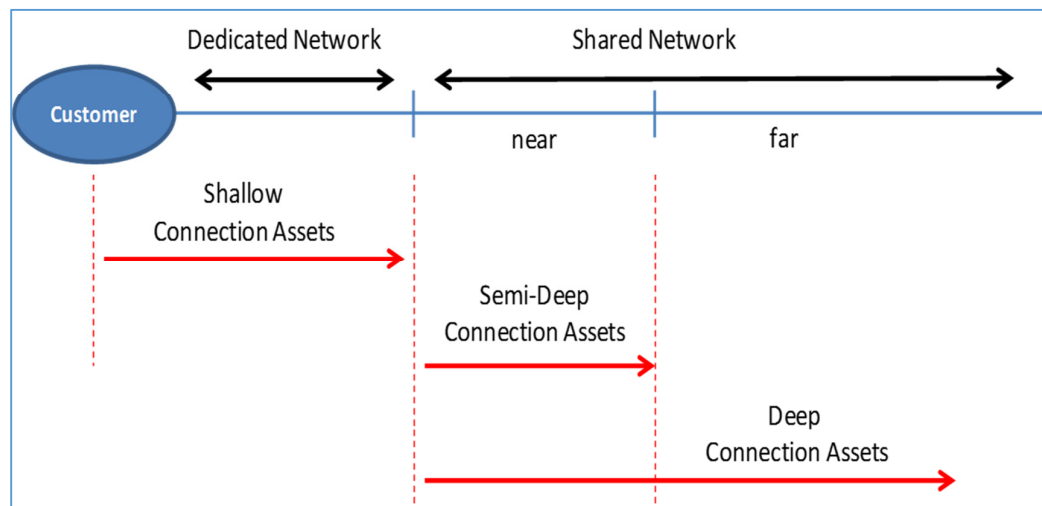
The above process flow shows that:

- (a) The policy can differentiate between small and large connections
- (b) In the case of large connections the responsibilities of the parties are clearly defined with set maximum timelines within which certain tasks must be completed.

4.3. Grid Connection Costs

The Grid Connection Policy provides licensees with direction on which network assets are deemed to form part of Connection costs. There are several approaches which could be adopted, however the main options may be illustrated by way of the following figure.

Figure 3: Different Connection Assets



At the top of the figure it shows that there are two groups of network assets namely:

- Dedicated Networks assets - are those network assets that is used exclusively by the customer seeking a new connection;
- Shared Network assets – are those assets that are shared by a range of customers and whose benefit cannot easily be attributed to a single customers (or group of customers).

Figure 3 also illustrates that Shared Network assets could be further divided into there are generally three types of connection assets namely:

(a) Shallow Connection Assets

Those assets which are situated in the immediate vicinity of the customer's point of connection and are solely for the purpose of connecting a Customer or specific group of Customers with common interest on a Dedicated Network

(b) Semi-Deep Connection Assets

Means those assets within the Shared Network located at or near the customer's point of connection that need to be reinforced or strengthened in order to connect the Customer and enable the Customer to inject power (in the case of a generator) or take supply (in the case of a load) up to a specified

maximum injection or off-take limit (capacity). Assets that fall within in this grouping include:

- (i) Located at or near the Customer's point of connection,
- (ii) Would not otherwise have been required in the absence of the Customer connection in question,
- (iii) Do not fall within the definition of Shallow Connection Assets,
- (iv) Shall not include assets beyond the next point of voltage transformation (voltage change)
- (v) Are easily identifiable and their costs can be apportioned without difficulty.

(c) Deep Network Assets

New assets within the Shared Network that are required to connect the Customer where such assets may be located at or near the customer's point of connection, or may be located far within the network

In addition to the above there are also unique connection assets that fall outside the above groupings and may include:

(d) Special Connection Assets

- (i) Assets or equipment that may become stranded (i.e. made redundant before the end of their economic lives) or
- (ii) Assets that are specifically designed and constructed to the custom needs of the customer, which are not standard equipment of the network entity and cannot be used elsewhere in the system (e.g. required to deliver a "premium supply" that exceeds the quality of supply standards applicable to the rest of the network)

(e) Temporary Connection Assets

Connection assets that are required for a connection period of shorter than say eighteen months (e.g. a temporary connection that is mainly used for the purpose of construction supply, whilst the network entity is constructing the permanent connection)

The debate regarding the appropriate definition of Connection Costs usually revolves around to what extent or degree should the applicant be responsible for shouldering the burden of incremental network costs imposed by the applicant's request for a connection. This debate is made more complex due a range of factors including:

- (i) Network investments are “lumpy” investments in nature. It means that networks are often oversized to cater for future growth in electricity sales. If this is not done networks will have to be expanded or even replaced on a frequent basis which increases costs significantly. The question is should a customer who’s request for a grid connection be required to contribute to the oversizing of the network which is essentially intended for future customers.
- (ii) To ensure that quality of supply and network integrity is maintained network assets are sometimes required deep inside the “shared or integrated network”. In many instances these assets would have been created at some time in the future. The debatable is whether these costs should be absorbed by the customer seeking a new connection or not.

The Grid Connection policy will assess the different options within the context of the Zambia electricity supply industry before it recommends a preferred industry position.

4.4. Grid Connection Charges

There are several ways in which connection cost can be recovered from customers. However the first step is clearly define the different network cost and charge elements and then to develop a shared understanding of is meant by Connection Costs. The following figure summarizes the typical relationships between the main costs and charges for a transmission or distribution network entity.

Figure 4: Typical Network Costs and Charges and their relationships

Network Costs and Charges		
Network Costs	= Network Charges	
Connection costs	↔	Connection Charges
Energy Trading costs (losses)	↔	Usage Charges (losses)
Customer Services costs	↔	Customer Service Charges
Network O&M costs	↔	Use of System Charges
Network costs	↔	<ul style="list-style-type: none"> • Access Charges • Demand Charges • Capacity Charges

The main points to note are:

- Connection costs are recovered from the customer via specific Connection charges.

- Connection charges is one of potentially several charges that form part of the network entity’s revenues.

The significance from a policy and regulatory perspective is that that the regulator must ensure that customer’s do not pay twice for the same assets. The practice of “double counting” of connection costs happens surprisingly often not because of deliberate actions but rather due to insufficient policy and tariff methodology. Double counting occurs when:

- A customer pays for connection costs via connection charges, and
- Customers pay for network costs (which in many instances include connection assets in the rate base).

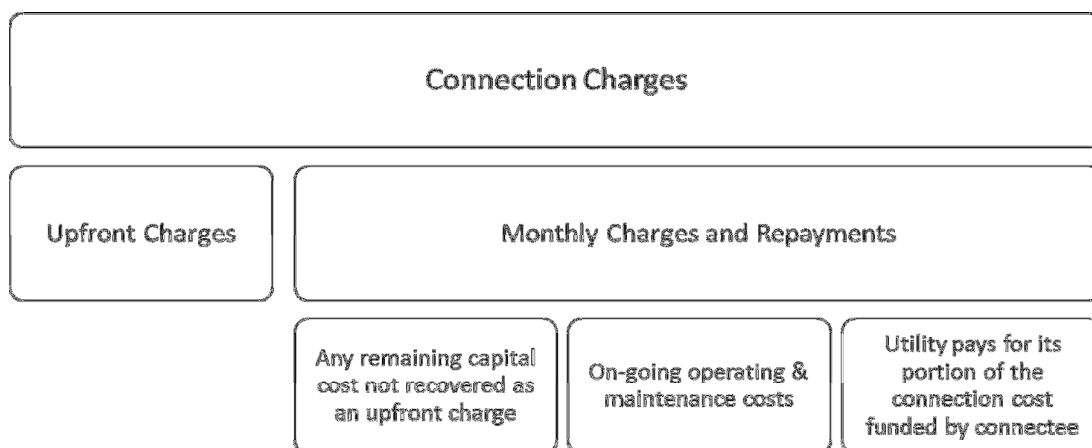
Once through connection charges and then again through Network Usage Charges Connection assets must be excluded from Rate of Return and Depreciation calculations.

Income from monthly O&M Connection charges must be subtracted from Revenue Requirement

In practice this means that that the definition of Connection costs must be acknowledged not only in the Connection Policy and subsequent connection charges but also on the Regulator’s tariff methodology. More specifically the tariff methodology must provide clear guidance on whether the utility is allowed to include or exclude the connection assets from the rate base.

There are several ways in which the parties can agree to pay for the connection costs. The most common Connection Charge options are depicted in the following figure.

Figure 5: Connection Charge Options



The above figure shows that:

- A connectee could pay either an upfront charge and or a monthly charge for the allocated connection cost. The Grid Code policy will define the parameters of the split between upfront and monthly charges
- In some jurisdictions the connectee may also be liable for ongoing monthly operating and maintenance costs
- The utility and the licensee may enter into a special arrangement whereby the connectee will pay for all connection costs (including the utility's share) via an upfront payment. In return the utility will compensate the connectee by way of agreed monthly repayments