Guidance Paper

Finance Structure and its Management for a Rural Electrification NAMA

A model approach to financing the development, implementation, and operation of a sector-wide programme for renewable energy rural electrification as a Nationally Appropriate Mitigation Action

Disclaimer: The Guidance Paper is not the official opinion of the UNDP.

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United Nations Development Programme

ENVIRONMENT AND ENERGY

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ACRONYMS

CFL	Compact Fluorescent Lights
CMF	Concept Model of Finance
COO	Community Owned and Operated business model
FPS	Full Private Sector business model
EPC	Engineering, Procurement, and Construction
ESP	Energy Service Provider
GHG	Greenhouse Gas
kWh	Kilowatt hour
kWp	Kilowatt peak
LED	light emitting diode
PPP	Public Private Partnership business model
MRV	Monitoring, Reporting and Verification
NAMA	National Appropriate Mitigation Action
OBA	Output Based Aid
ODA	Official Development Assistance
O&M	Operation and Maintenance
OMM	Operation, Maintenance, and Management
RPZ	Rural Productivity Zone
PV	Photovoltaics (solar)
UNFCCC	United National Framework Convention on Climate Change
US$	US dollars

1 INTRODUCTION

It has been widely acknowledged by the international community that access to electricity is one of the main drivers in the process of sustainable development. Taking words from Helen Clark, UNDP's Administrator, access to energy "transforms the lives of people, communities, and nations. No country ever developed without access to energy" (Clark 2012). In this context one of the main issues facing developing countries is the lack of electricity access by their population, and it is often the rural population which is most affected by a lack of affordable and reliable electricity supply. Therefore, the main objective of this Guidance Paper is to facilitate greater access to electricity by rural communities through the provision of climate finance under a National Appropriate Mitigation Action ("NAMA").

	Population Without Electricity[1]	Currently Installed Capacity (MW)[2]
Gambia	65%	65
Ghana	28%	1,985
Kenya	81%	1,698
Namibia	40%	487
Rwanda	84%	57
Vanuatu	72%	28

Table 1: *Lack of Electricity Access in Select Developing Countries*

Rural electrification is the process of bringing electricity supply to rural and remote areas. The challenge of rural electrification is how to make electricity available to areas and communities which lack access to a grid based power supply. The primary constraints as to why a large number of people in the world remain unconnected to the grid are typically financial and physical. While the latter deals with the challenges of geography (e.g. hilly areas, large tracts of dense forest land, long distances to reach remote areas) and availability of resources (e.g. oil/gas, water, sunlight, biomass), the former refers to the economic challenges which developing countries face in investment funding, service costs, and revenues & collection. It is noted that it is often financially prohibitive to extend existing power infrastructure into rural areas, via power grid extensions. Cost effectiveness is particularly a problem in sparsely populated countries where distances may be long and therefore grid extension costs high, with the extension resulting in the provision of grid access to a limited number of remote communities (consumers). Therefore, mini-grids (e.g. grids which power one village) are often used as a least-cost long term solution for rural electrification and the use of renewable energy to power mini-grids is becoming increasingly popular. Such mini-grids also encourage further growth in rural economies, especially when efforts target parallel tracks of power and economic development as described in "Integrated Sustainable Rural Development: Renewable Energy Electrification and Rural Productivity Zones" (UNDP MDG Carbon, 2014).

Such rural electrification projects are not normally "bankable" under fully private sector commercial conditions since the rural poor have limited financial resources. Thus, subsidy programs are required to ensure establishment and, potentially, long term viability of these projects. Although subsidies for rural electrification from many international development partner- and multi-lateral finance organizations are available, each funder has their own targets, criteria, and processes for the allocation and disbursement of funds to developing countries. Taking this funder diversity into consideration, this Guidance Paper presents a generalized method for the financing structure of a rural electrification NAMA.

UNDP MDG-Carbon Actions for Rural Electrification:

*The **UNDP MDG-Carbon** program has started efforts for promoting the use of new climate finance actions to reach those who are often the poorest in developing countries, e.g. the rural poor. MDG-Carbon is encouraging finance through the design of for NAMAs in several African, Asian and Pacific countries. The target is to encourage sources of international climate finance to utilize their funds to leverage efforts for capacity development and physical establishment and operation of rural electrification projects involving electricity generation through renewable energy.*

1.1 Objectives and Audience of this Guidance Paper

The objective of this Guidance Paper is to present a bottom-up approach to using a NAMA as a vehicle to finance renewable energy rural electrification. In doing so, this Guidance Paper provides stakeholders with a Concept Model for Finance ("CMF") for renewable energy NAMAs in the energy sector. This Guidance Paper focuses on the CMF, as well as on addressing the overall theme of sustainable development for the rural communities.

"Sustainable energy can revitalize our economies, strengthen social equity, and catalyse a clean energy revolution that benefits all humanity. Acting together, we can open new horizons today and help power a brighter tomorrow."

Ban Ki-Moon,
UN Secretary-General

This Guidance Paper does not offer an in-depth explanation of NAMAs' overall governance structure or context of applicability under current international conventions. To gain more information on governance structure or context of applicability, please refer to the **Suggested Resources** section **(pg. 43)** of this Guidance Paper.

In presenting the bottom-up approach, this Guidance Paper defines a physical part of NAMA implementation which leads to the physical GHG mitigation, as a "venture". Further to this, in addressing NAMA financing and the CMF, this Guidance Note defines a theoretical individual renewable energy mini-grid and its boundary as a "model venture". Though it is recognized that there are other means to achieve rural electrification, such as grid extensions, pico-systems, and energy services, this Guidance Paper will focus on the renewable energy mini-grid.

This Guidance Paper targets policy makers, regulators and those implementing the individual ventures in developing countries who have a clear priority for the development of rural electrification as a driver for poverty reduction and climate action through income generation and mitigation of GHG emissions. The CMF is meant to facilitate the involvement of multilateral and bilateral financing institutions in the capacity development and financing of renewable energy rural electrification, particularly through the utilization of a NAMA framework which applies the concept of Output Based Aid ("OBA"). Ideally, this Guidance Paper will encourage policy makers, regulators and investors to conceptualize a national and international government co-financing scheme which supports the establishment of renewable power generation and mini-grids in rural communities. Such a financing scheme will be designed in a country specific context and, where development aid is directed, and policy and administrative changes are initiated.

2 THE CONCEPT MODEL FOR FINANCE

2.1 The CMF structure

The CMF's foundation is built upon four main building blocks, presented bottom-up:

1) Venture Business Models
2) Financial Flows and Management
3) Renewable Energy Policies and Actions
4) Institutional and Sectoral Capacity Building

This Guidance Paper focuses not just on the building blocks as individual components but also on the interlinkages of the components and the thread of sustainable development which weaves through the four components. This thread helps to build a strong model for financing rural electrification in developing countries, ultimately resulting in host of benefits, including greenhouse gas (GHG) emissions.

As indicated previously, the CMF is based on the concept of OBA, in so far that funds are targeting increasing the output of electricity in remote areas; this electricity is then provided to individuals who lack the financial means to pay the full cost of electricity and public and private sectors cannot bare (or transfer) the cost of change. To increase the electricity output, funds in an OBA scheme facilitate the establishment and operation of the NAMA and most importantly the individual ventures for renewable energy rural electrification, which provide electricity to the rural consumers / individuals. In this manner the CMF receives funds (or costs reductions) which cover the entire life time of the NAMA, and the funds originate from low consumer service payments, national government measures or programs, and from development partner country and multilateral institution programs. This approach creats two primary tracks of NAMA finance which are external to the ventures business boundary, specifically national and international finance as shown in Figure 1. Note that the ventures business boundary brings in community finance through consumer payments.

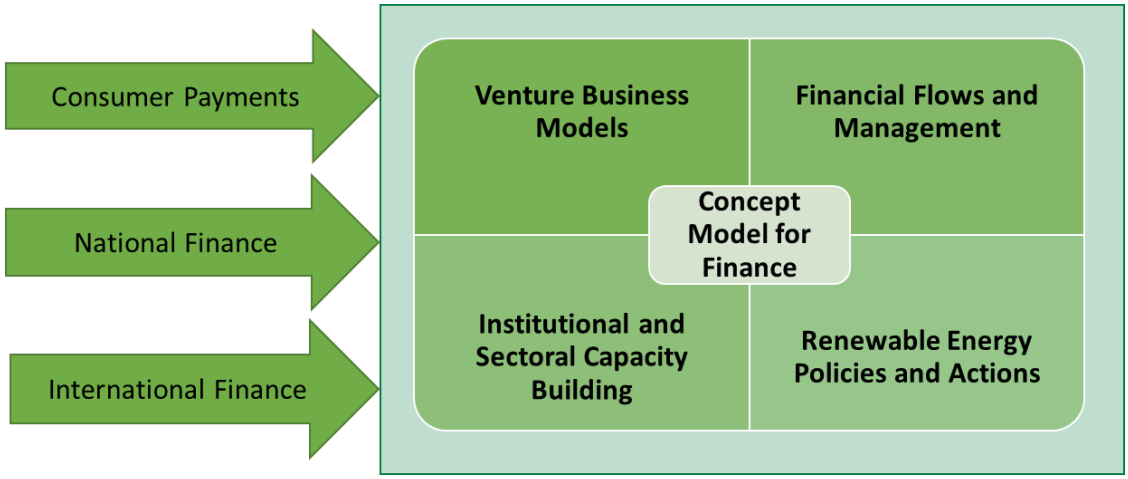

Figure 1: *Building blocks and funds of the Concept Model for Finance (CMF)*

Financing a NAMA is not only about directly financing the implementation and operation of individual ventures, but also about financing the actions needed for transformational change in the sector and the cost of operating the NAMA. In the context of a renewable energy rural electrification NAMA, it is foreseen that the two primary tracks of external finance will need to fund several parallel bodies, actions, and incentives in order to ensure long term sustainability.. These bodies, actions and incentives may include:

- Bodies: NAMA Approval Committee, NAMA Coordinating Authority, NAMA Venture Approval Expert Group, etc.;
- Actions: Institutional and sectoral capacity development;

  Incentives: Grant and subsidy schemes; cost reduction schemes; and/or loan schemes.

The building blocks and interlinkage of the CMF are further described in the following sections of this Guidance Paper.

2.2 Venture Business Models for Rural Electrification Mini-Grids

There are numerous options for business models for rural electrification with mini-grids involving renewable energy electricity generation and distribution (ARE 2011a). Most of these business models revolve around a central entity, referred to in this Guidance Note as Energy Service Providers ("ESPs"). In this manner, ESPs are legal or social entities consisting of an individual rural community cooperative, a public or semi-public utility company, or purely private companies. For the purpose of this Guidance Note and NAMA finance, ESPs in business models are encouraged to be legally established entities in order to allow for transparent financial transactions and accountability at the venture level.

In the case of rural electrification with mini-grids, especially those involving renewable energy, in developing countries, there exists a general paradox between the affordability of the consumed electricity and the cost of the consumed electricity: the cost of consumed electricity often much higher than the level of affordability within a rural community. It is this paradox that must be taken into account in business models and venture finance, in terms of short and long term risks and sustainability.

A private sector based business model for rural electrification mini-grids, where private sector ESPs invest in and operate the mini-grids on a long term basis, faces resistance due to perceived and real risks leading to what are often referred to as market failures. These market failures in developing countries amongst others include the lack of: established revenue mechanisms for renewable energy, guarantee mechanisms of payment for services, financing from the domestic banking sector, local technical know-how and, in some cases, political instability. In short, the wide spread implementation of a fully private sector based business model can only be viable once the perceived and real market failures no longer exist. The establishment and functioning of enabling mechanisms which overcome such market failures eventually encourage viable private sector activities in the energy sector. These enabling mechanisms require a significant level of sectoral and institutional development, economic activity, and rural individual income generation.

There exist two other potential business models which require direct financing by international development partners and multilateral institutions; these models help lead to the development of, and pave the way for, new rural electrification enabling mechanisms in target countries. These business models are the Community Owned and Operated ("COO") and Public Private Partnerships ("PPP") models which are further described in Sections 2.2.2 and 2.2.3. When addressing the different business models, what is noteworthy is the

potential difference in unit cost (US$/kWh) of electricity in delivered by a mini-grid. The COO business model often has the lowest unit cost, followed by the PPP, and after this the Full Private Sector ("FPS") with the highest cost. The difference in unit cost is derived due to the level of profits required by private companies to operate and/or make investment in the ventures, plus the cost of servicing debt. To illustrate this and give a rough idea of unit cost difference a simple explanation of a FPS business model is provided in Section 2.2.4.

In terms of implementing the CMF in a NAMA, it is highly recommended that a phased implementation approach be utilized as follows:

PHASE 1: In the first years of the NAMA, focus is placed on implementing the four main building blocks to the operational level, and piloting approximately 5 to 10 ventures under the COO business model, or the PPP if viable;

PHASE 2: In the remaining years of the NAMA, focus is placed on operation, inclusion of new ventures, and in allowing greater access to the private sector through the FPS business model, if enabled mechanisms can cover the higher unit cost or, preferably, help to reduce the unit cost.

2.2.1 Rural Productlity Zone (RPZ)

A major sustainability component of the CMF is the creation of a Rural Productivity Zone (RPZ) at the venture level. The PRZ is based on a paradigm of an integrated approach to sustainable rural development. It consists of setting up an 'Energy System' and 'Associated Infrastructure' in a rural area that provides power for a range of activities that leads to income enhancement and social development. Economic activity results in money being generated, which in part goes into paying for the investment, operation and maintenance of the energy system and infrastructure. In this manner RPZs increase the ability of consummers to make consumer payments, by allow for more community level income generation. In addition to economic aaactivites RPZ offer the provision to potentially include social infrastructure for healthcare and education, which builds a sense of ownership and supports local capacity development leading to the community's sustainable development (UNDP MDG Carbon 2014).

2.2.2 Community Owned and Operated (COO):

A COO business model operates a mini-grid as a cooperative and is established in rural communities where the private sector is not willing to operate or where the community wishes to handle all ESP activities. The community's activities under a COO model include ownership, operation, maintenance, and management services. The short-comings of the COO model include the lack of community: awareness, buy-in, technical skills, business development & operation skills, and financing. This means that the application of a COO model requires significant capacity development support in addition to traditional project finance support (ARE 2011b).

Figure 2 presents a financial flow diagram for a conceptual COO venture business model and is followed by a brief explanation of the key components and flows.

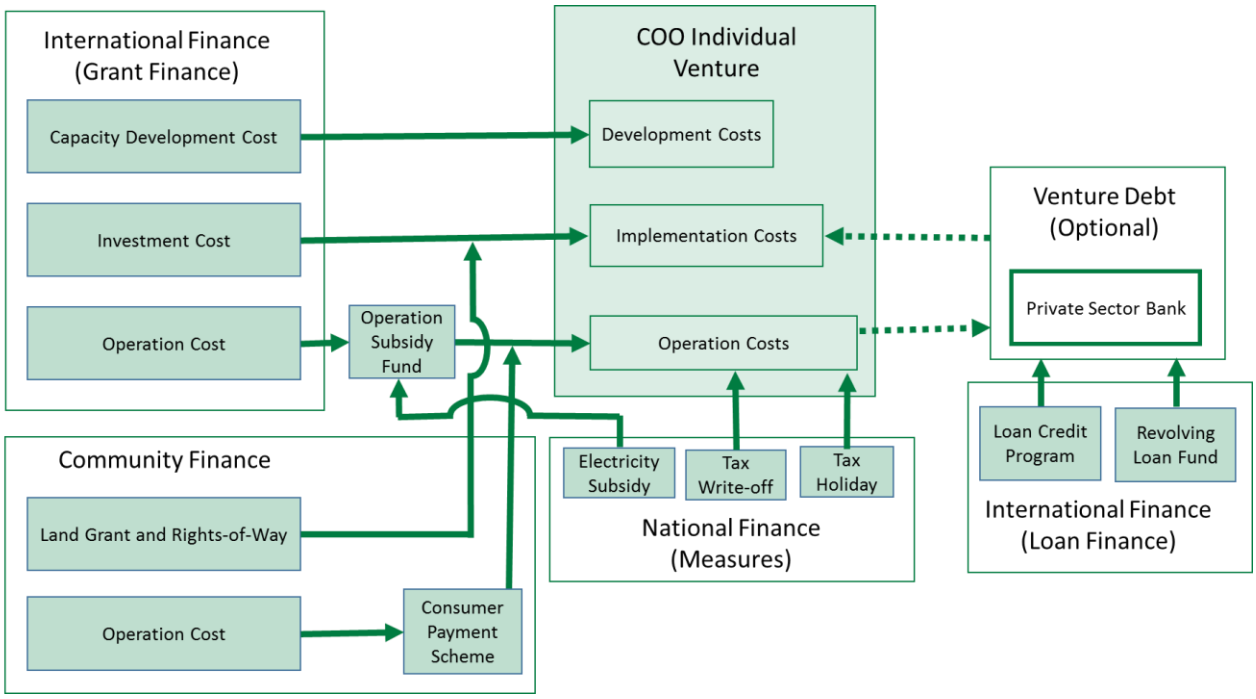

***Figure 2**: flow diagram for a conceptual COO venture business model*

The basis of the conceptual COO venture business model is a legally established community cooperative company acting as the ESP which owns all assets of the power generation and distribution system. Under this business model, the cooperative has the responsibility for technical operation, maintenance of both the generation and distribution systems, collection of consumer payments, management, and financial operations. The cooperative can choose to hire local labor for performing these activities and/or contract private sector services to perform one or more of these activities on a case by case basis. At a minimum, the cooperative should have an appointed manager and a community level oversight committee/board.

Community Finance contribution under the conceptual COO venture business model consists of the cooperative providing two types of in-kind contribution during the development phase and one type of contribution during the operational phase.

1) The first of the in-kind contributions is the existence of a local community representative who will work for the community and with external consultants during the development phase of the venture. The development phase scope of activities for the representative will be to establish community buy in, technical and financial feasibility, and establish agreements with the government and development partners.
2) The second in-kind finance is for the community to provide the land for the power generation system, rights-of-way for the distribution system, and land for any additional facilities directly or indirectly supported under the venture (e.g. RPZ units consisting of small industy shops / busiensses, village level kiosk, community center…) to include expansion.
3) The operational finance contribution will be the existence of a representative to collect revenues under the Consumer Payment Scheme (see Section 2.2.5), where it is expected that consumer based revenues will be equal to a minor portion of venture operating costs (e.g. 20%).

National Finance contribution should at a minimum consist of Cost Reduction Measures (see Section 2.3) for the ESP which may include tax exemptions, deductions, and write-offs. These can also include any effectively operated electricity or rural development subsidies if they exist in the country, and/or contributions to the *Operation Subsidy Fund* (see Section 2.3.1) which is controlled by the Trustee (see International Finance below).

International Finance is controlled and managed by the Trustee, and expected to at least fund the bulk of the Phase 1 costs and the first lifecycle (15 yrs.) cost of the pilot ventures, and to setup funds. International finance provides direct grant finance to the *Capacity Development Costs* of ventures and oversight or technical support for various capacity development efforts at the venture level, including but not limited to:

- project feasibility,
- project design,
- engineering supervision of installation and commissioning,
- operation and maintenance (O&M) training including community skills building,
- community cooperative business development and training,
- consumer payment scheme development and establishment (e.g. local business model implementation).

International Finance is expected to cover most if not all of the *Investment Cost* for the venture implementation through direct grant finance (paid directly to the Engineering and Procurement Contracts contractor or technology supplier), with budgets based on the feasibility study. Where realistically possible, International Finance can be used to set up a *Loan Credit Program* to provide credit backing to the local communities for securing loans from private sector banks, or though the creation and seeding of a *Revolving Loan Fund* which would be administered by a private sector bank providing direct loans. Both loan programs can be established for addressing initial venture investment costs if debt is included, or for financing growth and expansion of a venture. Here it should be noted that should the ESP need to service debt under the initial investment, then the unit cost of power will increase due to loan interest and fees which effectively transfer into operation costs.

A key component of operational revenues in the COO venture business model is that International Finance can be used to provide grants, as defined and agreed by the development partner and recipient country, covering the envisioned first lifecycle (15 yrs.) of the pilot ventures, through the *Operation Subsidy Fund*. The *Operation Subsidy Fund* will be co-financed by National Finance, and have as its objective to provide funds for the annual operating cost gap between the net Operating Costs and Consumer Payment Scheme revenues. The *Operation Subsidy Fund* is further described in Section 2.3.1.

The question ultimately raised is what happens financially to the community cooperative and venture at the end of the envisioned first lifecycle (15 yrs.) of the pilot venture. Since a NAMA and the provision International Finance are time limited, it is hoped that each venture will have achieved a level of sustainably within the national context. This means that:

- a RPZ has been created, allowing the community to generate new revenue streams and income, employment and increase demand which reduces unit cost and net cost of electricity per household;
- the competitive cost of electricity produced by the venture for the community is lower than alternatives at the time;
- the national government has the ability to take over and continue to finance the *Operation Subsidy Fund* either as a stand-alone fund or rolled into a matured national tariff scheme.

2.2.3 Public Private Partnership (PPP):

The PPP business model takes as a foundation the COO business model, with the following key changes:

- **PPP Agreement**: The community owns the generation and distribution assets, but enters into a long term PPP agreement (of at least 15 years to ensure long term financial stability) with a private partner which grants the private partner the concession & obligation to operate, maintain, and manage generation and transmission assets, to collect consumer based revenues, and make new connections and expansions. The private partner also holds the responsibility for monitoring & reporting and regulatory compliance.
- **PPP Tariff**: The PPP agreement should include a tariff setting mechanism which allows for a viable internal rate of return (IRR) for the private partner, and higher for any capital investments made by the private partner. This of course will increase the net cost of electricity and should be accounted for under the *Operational Subsidy Fund* and the *Consumer Payment Scheme*.
- **Performance**: Reasonable penalties should be placed on the private partner for non-performance and incentives should be introduced to encourage growth and good-performance.
- **Revenues:** *Operational Subsidy Fund* and the *Consumer Payment Scheme* revenues go directly to the private partner, and the partner may assume any of the ventures incurred debt (or be assigned the debt) at the point of entering into the PPP.
- **Cost Reduction Measures**: The private partner should also benefit from the National Finance Cost Reduction Measures and any rural development subsidies.
- **Selection Process**: The private partner should be selected through a tender process to ensure competitive costs and technical ability, as well as transparency of selection. It is suggested that several ventures (> 5) be tendered out as a package to reduce administrative costs and to make it financaily attractive for single priavet partners though economies of scale.
- The PPP business model has several advantages over the COO business model, with the main disadvantage being the increased net cost of electricity. Some of the most notable advantages are:
    - **Know How Retention**: There is a higher likelihood that the private partner, compared to the community, will garner and retain the required technical skills and capacity to perform at a better level of quality in relation of management, operation, and maintenance.
    - **Economies of Scale**: If several ventures are operated by the same private partner then economies of scale can be gained under operation, likely leading to timely availabilityof services.
    - **Brain Drain**: Limits the risk of "brain drain" commonly found in rural communities, where persons are trained in new skills and later move to the city were high wages and opportunities are gained.

- **Access to Finance**: The private partner may likely have better ability than community members to access finance investing in new connections and expansion.

2.2.4 Full Private Sector (FPS):

The FPS business model takes as a foundation the key components of the PPP business model, with the following key differences:

- **Investment**: The private company will invest equity and take on debt to cover both the Development and Implementation Costs of a venture. This can eliminate the need for International Finance to cover equity and/or debt needed to implement the venture. However, this comes at a cost, as the need to service debt (interest and fees) and obtain private sector equity returns on investment increases the unit cost. This cost increase must then be covered by the *Operational Subsidy Fund* and/or the *Consumer Payment Scheme*.
- **Concession Agreement**: The private company owns the generation and distribution assets of the venture, but enters into a long term Concession Agreement (of at least 15 years) with the community and any required government body. This concession grants the private company the exclusive right to generate and distribute power within the boundary of the community. Further the private company has the obligation to operate, maintain, and manage the generation and distribution assets. The private company has the right to collect consumer based revenues and allowable subsidies, and to make new connections and expansions. The private company as well holds the responsibility for monitoring & reporting and regulatory compliance.
- **Tariff**: The concession should include a tariff setting mechanism which allows for a level of IRR agreed to between the community and private company and authorizes, and should include all lifecycle costs.
- **Performance**: Reasonable penalties should be placed on the private company for non-performance; incentives should be introduced to encourage growth and good-performance.
- **Revenues:** *Operational Subsidy Fund* and the *Consumer Payment Scheme* revenues go directly to the private company.
- **Cost Reduction Measures**: The private partner should also benefit from the National Finance Cost Reduction Measures and any rural development subsidies.
- **Selection Process**: The private company should be selected through a tender process, or valued against a cost / quality benchmark, to ensure competitive costs and technical ability. It is suggested that several ventures (5 to 10) be tendered out at a time, based on unit price and quality.
- **Advantages / Disadvantages**: The FPS business model holds the same advantages as the PPP business model, with the main disadvantage being the increased net cost of electricity. With the added advantage that the private company covers all or part of the investment costs, but disadvantage that the unit price will be higher than the PPP and COO business models.

2.2.5 Consumer Payment Schemes

Consumer payment for electricity consumed is crucial in terms of sustainability for any energy related venture and especially a mini-grid system. A *Consumer Payment Scheme* ensures some form of payment for services by the end user, and encourages a sense ownership and responsibility of consumers, and also accountability for the Energy Provider in delivering a reliable energy supply to the community. In this manner, the method for setting and collection of consumer payments should be extensively addressed in stakeholder

consultations in the initial development stage of each venture, as buy-in to this economic aspect is critical. A socially acceptable and financially viable collection method should be devised with the community, and include legal principles such as contracts and actions against default. As a basis, any consumer payment scheme should take into account the net costs of electricity in the community and the need for further investment in system expansion in the future. Additionally, the social acceptability of connection fees or consumer / account deposits should be considered.

Three consumer payment schemes are envisioned as being sustainable for mini-grids in rural communities; the schemes are Fixed Price, Consumption Based Price, and Pre-payment.

Fixed Price:

A fixed price consumer payment scheme sets a fixed monthly payment per consumer connection, based on consumer type. The price is determined based on the net annual costs of generation and delivering electricity to the consumer types or the total community (thus gross costs minus subsidies and other financial support), and is derived based on the net cost in US$ / kWh and the estimated consumer limit for electricity per month. For example US$ 5 per month per connected household with an estimated consumer limit of 25 kWh. One issue to address with a fixed price consumer payment scheme is the option to limit consumption (using special Ready Boards) or to allow for open (unlimited) use. Use can be controlled at a community level by shutting off supply, and at the consumer level by electricity dispensers built into Ready Boards.

Consumption Based Price:

A consumption based consumer payment scheme, sets a fixed price on kWh consumed at the consumer / connection level. The price is determined similar to that of a fixed price, insofar that the net cost in US$ / kWh is estimated by the Energy Provider at the consumer level, usually on an annual basis. Care should be taken when setting a consumer based price, as it must take into account electricity losses in the generation and distribution system and changes in operating costs. A consumption based consumer payment scheme requires continuous metering of electricity use and regular data collection & reporting. In some cases this can be done on a monthly basis, with the alternative being quarterly or annually reporting with bill balancing (e.g. + or – what was actually consumed in the period). A consumption based consumer payment scheme does require direct metering, and connections be done with specially designed Ready Boards.

Pre-payment:

Mobile pay consumer payment schemes are a growing concept in the developing world, where services or commodities are paid for via mobile money. Services paid for via mobile money are wide ranging but include telecommunications, water, and electricity. This is typically done through a mobile service provider's money transfer infrastructure. In terms of paying for electricity consumption on a mini-grid, the Mobile Pay acts as a "top-up" services insofar that electricity is pre-paid through a mobile transaction. Electricity can also be purchased at nearby shops. Once the transaction to purchase electricity is complete, the consumer receives an activation code which is entered into prepaid meters on the consumer's Ready Board. The consumer then tops-up as needed, and prices are set similar to a consumption based price but payments based on volume-class (e.g. US$ per 25 kWh).

Advantages and disadvantages of the three payments schemes are described in the following table.

Consumer Payment Scheme	Advantage	Disadvantage
Fixed Price	▪ Easy to administer at the community level and transparent in terms of cost per consumer ▪ Easy to set fixed rates based on consumer class (e.g. households, businesses) based on weighted consumption ▪ No need for metering	▪ Does not account for actual consumption for each consumer, and could lead to social conflicts as some consumers will use more electricity than others ▪ Encourages less efficient energy consumption, and may require community wide control (e.g. time limits on energy supply)
Consumption Based Price	▪ Encourages efficient energy consumption ▪ Less social conflict	▪ Additional O&M costs due to the need for meter reading (in equipment and labor)
Pre-payment	▪ Encourages efficient energy consumption ▪ Less social conflict ▪ Opens new payment methods ▪ Easier to "tank-up" to what the consumer can afford ▪ Less payment risk for Energy Providers	▪ Minimal but additional O&M costs due to the need for maintaining a prepayment system (in equipment and mobile transactions)

*Table 2: **Advantages and Disadvantages for Consumer Payment Schemes***

Ready Boards (for rural households):

A "Ready Board" is common terminology for an installed piece of electrical connection equipment for low consumption homes and buildings. A Ready Board commonly contains a voltage transformer, circuit breaker, and electricity plugs or outlet. They can be built for single-, double-, or three- phase systems. In addition, Ready Boards can be manufactured to include a low voltage digital meters, electricity dispensers, and/or prepaid meters (in order of cost respectively). Thus, household electricity consumption can be measured, limited, or paid for as one goes. An example of the use of Ready Boards for prepaid metering is seen in the program established by ESKOM in South Africa (http://www.prepayment.eskom.co.za).

2.3 Financial Flows and Management of the NAMA

Financial Flows and Management is likely the most critical cornerstone for a renewable energy rural electrification NAMA, as it ties together many of the main NAMA components such as management, MRV, and finance. In the context of this Guidance Paper, the main focus will be on how to build and integrate a reliable and transparent structure of financial governance into a renewable energy rural electrification NAMA and how to manage the financial flows and controls required to ensure a sustainable use of funds. To address financial flows and management, it is important to consider the two primary tracks of finance in a renewable energy rural electrification NAMA, notably:

- (Track-A) National Finance
- (Track-B) International Finance

National Finance: For the purpose of this Guidance Paper, national finance is defined as financial flows or monies directly influencing the ventures and incentives designed under the NAMA, and which are within the operational control of the national government. Many of these monies are linked directly to Renewable Energy Policies and Actions, described later in this Guidance Paper; these policies and actions may already exist or may need to be designed as a part of NAMA implementation. The national finance may include flows of monies which pay for incentives such as subsidies, but can also consist of cost reduction measures such as removed duties, tax breaks, soft loans, and other financial incentives. It should be noted that these monies may also contribute to funding the direct operation of the NAMA Secretariat and NAMA Coordinating Authority of the national government, as well as contributing to capacity development under the NAMA, often on an in-kind basis.

International Finance: For the purpose of this Guidance Paper, international finance is defined as financial flows or monies directly influencing the ventures and incentives designed under the NAMA and which originate and are controlled by multilateral financing institutions and/or multilateral/bilateral programs. Many of these monies are linked directly to capacity development actions, direct grants, and loan schemes, constituting "International Support" in the context of NAMA guidance.[3] Under this CMF, international finance which goes directly to venture entities (through subsidies or grants), and capacity development, is managed by a single Trustee charged with oversight of the monies.

In the context of NAMA finance, what is undefined at this point in time (October 2014) is the location of the dividing line between the Domestic and International Supported NAMAs, in terms of funding technology, project finance, and capacity building support. This creates a "grey area", at what point or magnitude does traditional official development assistance (ODA) support to developing countries tip the scale from Domestic to International Supported NAMA? The vast majority of current ODA support to NAMAs has been for consultancy at the feasibility, design, and pilot stage of NAMAs. This suggests that the tipping point would be international support of the core mitigation efforts (transferring technology, venture financing, MRV operation, and capacity building at certain levels) and not in setting up the NAMA structures and processes.

[3] UNFCCC / CP / 2009 / 11 /Add.1, "Decision 2/CP.15 Copenhagen Accord" Point 5

Note that this Guidance Paper does not focus on private capital funds and finance, as the use of this in renewable energy rural electrification potential component of finance is acknowledged to be difficult in terms of sustainable infusion. One could argue that in many developing countries, the existing energy sector policies and structures do not lead to a viable business models in terms of purely private sector financing. In fact, it should be a goal within any related NAMA to implement measures and enabling mechanisms which will encourage private capital funds and finance to enter into and stay in the renewable energy rural electrification sub-sector. Thus, Phase 1 of such a NAMA may not directly include private capital funds and finance in the form of the FPS, but encourage FPS inclusion at the venture level in Phase 2 of the NAMA once foundations are in place.

For each of the tracks of finance, there are two components, one being the management and governance of funds and the second being the disbursement of funds. This means that there must be established bodies to provide for strategy, oversight and governance, implementation and operation. Figure 3 offers a flow chart for the example CMF structure; following Figure 3 is an explanation of the functions assigned to the different components of the structure. In between the two tracks is the "grey area".

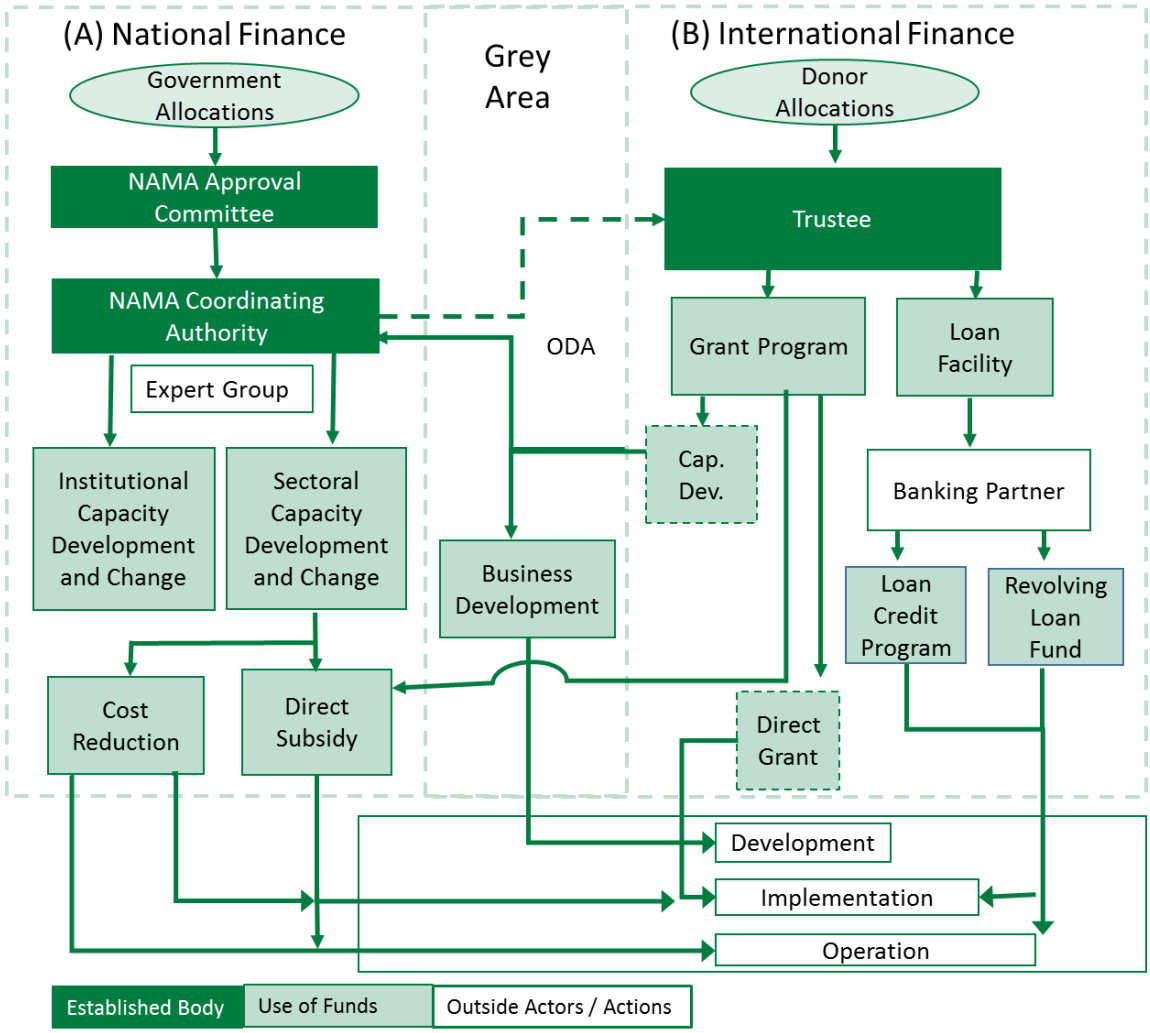

Figure 3: *Flow Chart of Example CMF Structure for National and International Financial Flows and Management*

Presented below are the CMF components presented in the context of the two tracks – national and international finance. Per track, the CMF components are divided into two groups, agencies and activities.

Track-A National Finance: top-down explanation of functions of CMF components:

Agencies

- NAMA Approval Committee: This is a body whose primary role is to provide oversight of the NAMA efforts and whose secondary role to provide strategic vision and to set functional goals. It would have ultimate control of final proposals for the allocation of national and international funds to the NAMA ventures, in terms of what becomes approved for receiving the funds allocated to the NAMA. It should also act as the body holding financial oversight on the use of funds (if there is not already a dedicated government agency mandated for this). In most cases, this body will be composed of representatives from several government ministries and agencies, and possibly have observer positions for key non-government stakeholders.
- NAMA Coordinating Authority: This body is the management team or authority which manages and tracks the operational and financial elements required to implement and operate a NAMA; this body serves a long term function lasting the lifetime of the NAMA. The team would be answerable to the NAMA Approval Committee and, in terms of financing, should act as the coordinating body for the use of both national and international funds, holding the authority to approve (or certify) and audit the use of such allocations. In the case of a NAMA receiving only national finance, the body will also record information regarding the distribution of funds to various entities. Typically the NAMA Coordinating Authority will officially be an operational unit of an existing ministry or agency, which has a mandated roll in climate change or the energy sector. Thus the NAMA Coordinating Authority will consist of public employees and possibly of embedded International Advisor(s). Since many NAMAs will require inter-ministerial actions to implement the design of the NAMA, it should be expected that several agencies will be involved, and the NAMA Coordinating Authority shall coordinate these. (NOTE: The NAMA Coordinating Authority may have other functions such as acting as the overall coordinating and managing entity for the NAMA including overseeing its MRV and promoting the development of NAMAs. In the context of this paper, the focus is on the body's role from a NAMA finance related perspective).
- NAMA Venture Approval Expert Group: Embedded within the NAMA Coordinating Authority is the NAMA Venture Approval Expert Group, which is composed of members of the Authority and any experts providing external assistance as needed on an ad hoc basis. The NAMA Venture Approval Expert Group effectively acts as the technical level of experts in the various implementation processes of the NAMA. This group can be involved for example during the criteria and selection in competitive bidding processes for the first pilot ventures in phase 1, and for the inclusion criteria and evaluation of individual venture in phase 2.

Activities

- Government Allocations: These are funds originating from national, regional, or local government budgets which are to be used in NAMA efforts. These may be direct monies (e.g. gained through taxes or duties), in-kind efforts, or costs saving actions which reduce government revenues (e.g. tax holidays). These funds can be considered co-investments in the NAMA by the national government.
- Cost Reduction Measures: These measures are made of tax based incentives both at the implementation and operational levels. These measures lead to reduced government revenue and result from the implementation of measures such as zero import duties, investment deductions/write-off, and income tax holidays etc.; the incentives provided can have a significant impact on

the commercial viability of any energy related project. The NAMA Coordinating Authority should coordinate the implementation of these measures with the specifically mandated government agencies. As an example of this interaction in terms of finance, is the process of implementing and operating a zero import duties policy on renewable energy technology. This may involve changes at the tax and customs authorities for processing of approvals, efforts at NAMA Coordinating Authority to define an approved technology list, verification by the NAMA Coordinating Authority matching the technology to the approved venture, and certification of the right for the zero import duties.

- Direct Subsidy Measures: These funds are measures predominantly comprised of investment grants at the implementation phase, or per unit subsidies at the operations phase (see Operational Subsidy Fund in Section 2.3.1). The measures are the result of direct government expenditures and/or international grants. These subsidies would need to be coordinated through the NAMA Coordinating Authority and in many cases the ventures would need to gain certification of eligibility from the NAMA Coordinating Authority whether funds are directed from national or international sources.

Track-B International Finance: top-down explanation of functions of CMF components:

Agencies

- Trustee: This entity has the primary role of providing oversight of the funds being used for the NAMA in terms of OBA and a secondary role of providing strategic advice and development partner coordination for NAMA efforts. Ideally entity will consist of one group / committee for several sources of international finance pledged to the NAMA. The Trustee will have ultimate control of deciding where to allocate funds to proposals provided by the NAMA Coordinating Authority for the allocation of funds to the NAMA actions. It should also act as the body holding financial oversight of the use of development partner funds and mandate a monitoring and evaluation mechanism for use of funds to be integrated into the NAMA MRV (see the section entitled "MRV Integration within NAMA Finance" in this Guidance Paper). Typically the Trustee will officially be an operational unit of the development partner under any bilateral supported NAMA or an existing multilateral institution like UNDP, ADB, World Bank….etc.

Activities

- Provision of Development Partner Allocations: This is the provision of funds originating from the foreign government agencies and multilateral institutions to be used in NAMA efforts. These funds are directly allocated by the international parties to the NAMA, usually under an agreement with the national government. These funds can be considered co-investments in the NAMA by the international community.
- Use of a Grant Program: A grant program is one of the two types of funds expected to be financed by international finance. The grant program will provide finance to three types of efforts in relation to NAMA implementation and operation. The first effort funded is *Capacity Development; capacity development efforts should be* co-financed by the national government. The second effort is the provision of *Direct Grants* to individual ventures; these grants act as a form of equity finance in the mitigation projects. The third effort is to provide funds for the *Operational Subsidy Fund* which pays ventures directly for their outputs (see Section 2.3.1).
- Application of a Loan Facility: A loan facility is the other type of funds expected to be institutionalized using international finance. The Loan Facility will deposit international funds into the account of a *Banking Partner* (a regional or national level bank which meets required fiduciary standards), and the funds will be used as collateral for loans taken out by individual ventures

approved by the NAMA Coordinating Authority. The Loan Facility could provide two types of loan funds in this respect. The first is a *Revolving Loan Fund* which is established through the deposits of international funds, with the purpose to provide low or no-interest loans to individual ventures under the NAMA. Under a Revolving Loan Fund, loans are issued and loan payments are made by ventures on a continual basis. As payments are deposited the fund capital replenishes and, upon accumulation of sufficient funds, can offer new loans to ventures. The second loan fund is a *Loan Credit Program*, which is a credit facility which will provide collateral insurance. This means that ventures would not need to provide collateral for taking out the loans but will provide to the financial institution providing the loan proof of insurance form the fund. In the situation where the private sector company does not pay back its loan, the Loan Credit Program will pay the financial institution the required collateral costs.

Grey Area:

Activities

- Provision of other Development Partner Aid Typically funds are provided to governments developing NAMAs by bilateral and multilateral development agencies for the purpose of capacity development within National Implementing Agencies. The purpose of these funds is to cover the cost of assessing the feasibility of, designing, and implementing the changes needed in the various ministries and agencies to implement measures envisioned under a NAMA. Know-how needed to address these changes is commonly gained from external national and local consultants and stationed international advisors. In some cases, new ministry and agency management staff are co-financed by these funds. Traditional development partner aid can also finance physical efforts such as pilot projects.
- Business Development: This refers to the provision of funds needed to develop the capacity of the community or private sector to implement and operate renewable energy rural electrification projects, preferably through a hands-on learning-by-doing process. These funds can be split into two, (1) support the technical implementation and operation of rural electrification projects, and (2) support the business side of development and long-term management of such projects. Funds commonly are used to address technical support services, business services (e.g. management, legal, tax), and business-to-business efforts.

To implement the cornerstone of Financial Flows and Management for a NAMA, a significant amount of organizational planning will be required. First steps should include overall mapping of the NAMA financing structures and defining the basic roles of stakeholders. Next steps are at the national level and include the setting up of the institutions required to implement and operationalize the NAMA and the defining of the actions needed to establish policies or decrees. At the International level, efforts should address coordination between development partners to define international finance needs for the NAMA and available sources of finance. Once a few available sources of finance are identified and the holders of the finance have expressed interest in the NAMA, the planning for financial governance and management can be completed and mandates for the international finance management bodies (Trustee) can be gained.

2.3.1 Operations Subsidy Fund

Due to the high unit cost of electricity generation and distribution within rural areas and the low consumption and ability to pay of rural consumers, long term financial viability cannot be sustained without some form of subsidy and actions such as the setting up of RPZs. Even in developed countries, many forms of renewable electricity are heavily subsidized through various forms incentives, such as feed-in-tariffs and renewable energy credits & trading for grid connected systems.

In the case of rural electrification mini-grids located in low-income developing country communities, the policy of providing subsidies directly to the ESP is arguably the one of the best options. This policy is particularly effective when the subsidies are based on performance, applying the OBA model. With a performance based subsidy (provided in terms of US$ / kWh) focusing on payments per unit of produced and consumed electricity and incentives improved sustainable development impacts or increased consumer connections. In the case of the COO and PPP business models, the subsidy can be designed based on the Operational Costs in later investments of a venture and, in the case of an FPS business model, the subsidy will have to be designed based on the total costs of a venture (e.g. Investment and Operational Costs).

The *Operations Subsidy Fund* should be established under a Trustee with a long term mandate by the national government and one or more international development partner(s). The Trustee is in charge of granting the funds needed to cover the gap between costs of and revenues from the venture. Included in the fund should be the expected gap funding for the first lifecycle, contingency funds for venture over-performance and funds for management costs. At the International Finance level, the *Operations Subsidy Fund* should at a minimum be seeded with enough capital from grants to cover first lifecycle costs, in total or at least the first five years of subsidies for each venture and thereafter should be pledges for enough additional grant funds to cover the remainder of the first lifecycle. At the National Finance level, funds can be contributed to the *Operations Subsidy Fund* annually via a special national budget line item or through directing new revenue generation from small surcharges on grid-connected electricity or fossil fuels. Figure 4 shows a schematic diagram of these capital flows.

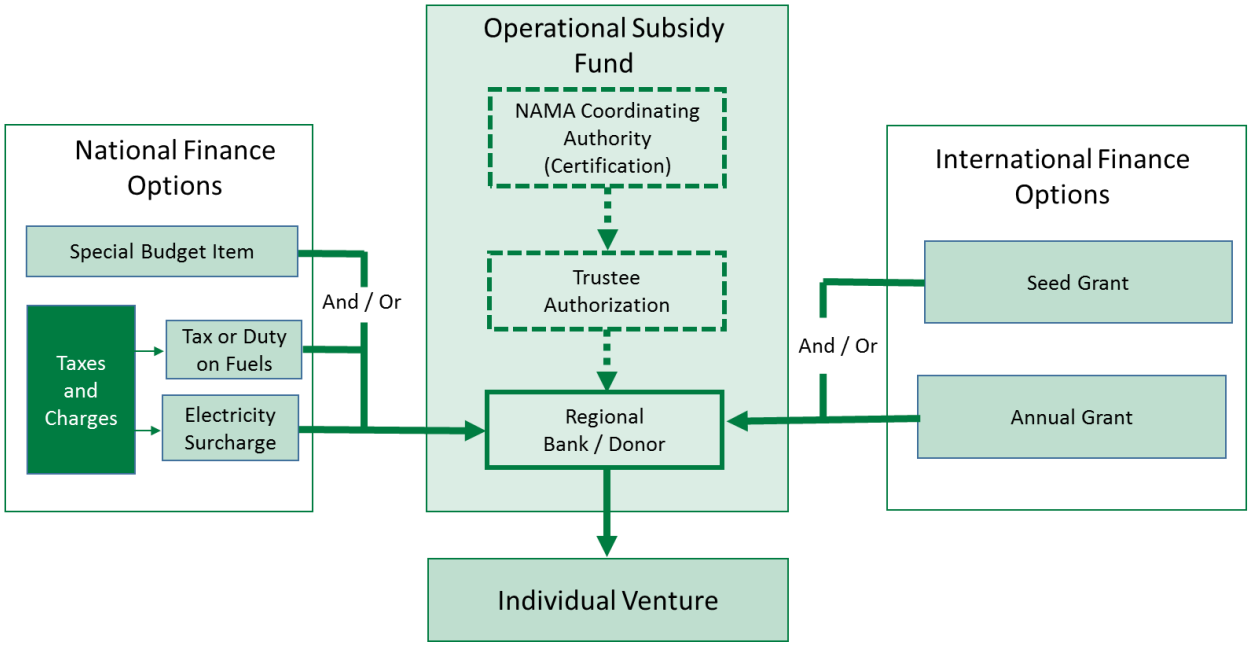

Figure 4: *Cash Flows and decisions for Operations Subsidy Fund*

The governance of the *Operations Subsidy Fund* should be included within the NAMA management structure. Capital can be placed in a trusted regional bank under escrow, in the Trustee account or in the financiers account. .. Whereas the NAMA Coordinating Authority will certify the need and value of payments to be made to individual ventures, the Trustee will authorize payments. Under this model the capital of the *Operations Subsidy Fund* gains interest under escrow deposit in a bank which can contribute to covering fund management

costs. The *Operations Subsidy Fund* will distribute the subsidy directly to the ESPs on a monthly or quarterly basis. It should be noted that in basing the subsidy distribution on performance, this allows for output expansion of the ventures and incentivizes the venture developers to achieve greater performance over time. A minimum standard of monitoring and reporting at the venture level will be developed and must be met by all ventures, in order to receiving financing. The subsidies will be long term, reliable subsidies which serve to reduce perceived risk as perceived risk can heavily impact the PPP and FPS business models. It is noted that at the point of exit of International Finance, when National Finance can cover all *Operations Subsidy Fund* long term expenditures, the NAMA Coordinating Authority absorbs full management and control of the fund.

2.3.2 Process for Venture Approval, Implementation, Operation, and Finance

It is critical at the inception and development phase of a NAMA to include the budgeting for the processes of venture approval, implementation, operation, and finance. In doing so, it is important to address and define the processes needed to ensure quality and proper management of the NAMA and its ventures. In this context the following set up is recommended as a pathway to ensure sustainable venture implementation and operation (also see Annex 2 for more detail). Note that the setup is divided into two phases:

- PHASE 1: In the first years of the NAMA, focus is placed on implementing the four main building blocks, and piloting a decent number (5 to 10) of ventures under the COO or, if viable, PPP business models;

- PHASE 2: In the remaining years of the NAMA, focus is placed on operation of the pilot ventures, inclusion of new ventures, and in allowing greater access to the private sector through the FPS business model.

In general, the processes of venture approval and implementation will be managed by the NAMA Coordinating Authority and an appointed NAMA Venture Approval Expert Group, via a well-defined mandate (STEP 0). This is then followed by a concrete effort of screening and developing a feasibility study to identify potential pilot ventures under a COO or PPP business model, the venture costs, and the sectoral capacity development needs that the NAMA finance will target (STEP 1). Next, letters of agreement are gained from the communities selected for the first round of ventures; this is followed by final approval by the Trustee (STEP 2). Then the first round of ventures are tendered out for implementation via a competitive bidding Engineering and Procurement Contracts (EPC) in batches or in whole via a direct contract with the Trustee (STEP 3a). Should the PPP business model be chosen, shortly after STEP 3a, the PPP contract is tendered out (STEP 3b). These first steps have ensured that the NAMA Coordinating Authority has the know-how needed to then begin to include individual ventures (STEP 4). Further, the NAMA Coordinating Authority provides oversight of the individual ventures, ensuring continual finance and MRV (STEP 5a). Venture outputs are verified & certified and the ESP receives the subsidy funds (STEP 5b). The stepwise flow is shown in the following figure.

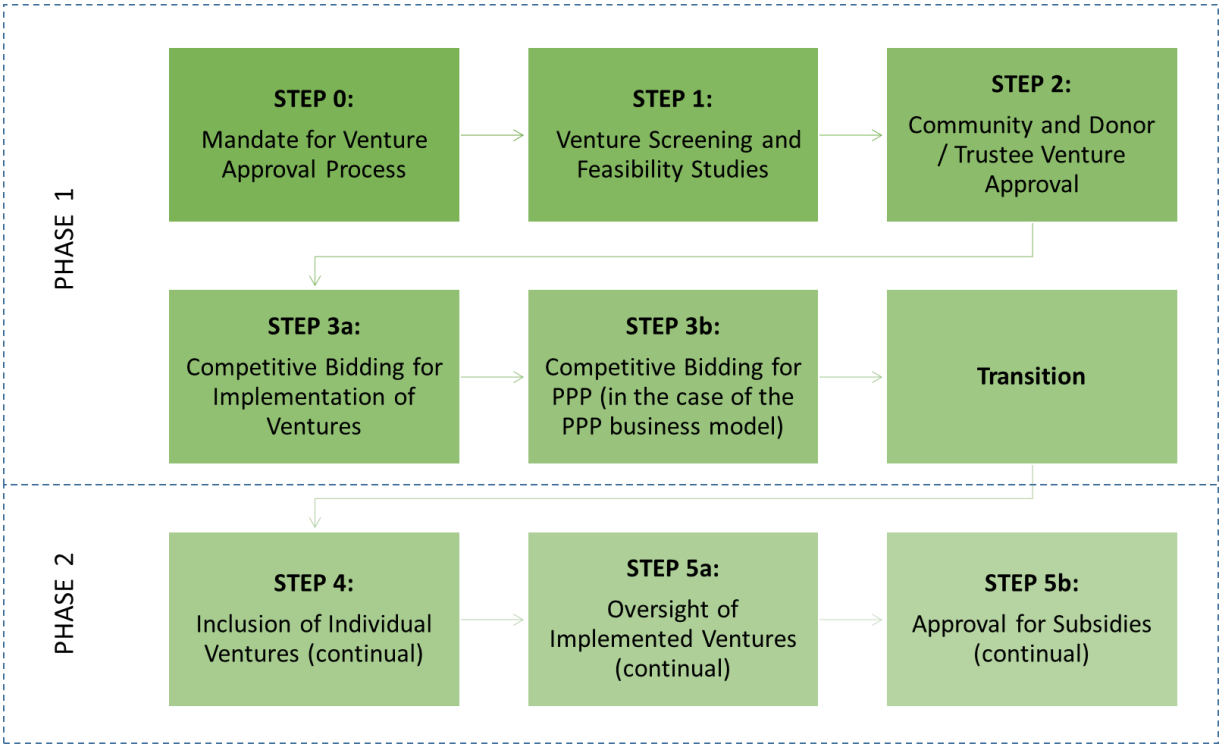

***Figure 5**: Step by Step process for Venture Approval, Implementation, Operation, and Finance*

2.3.3 *Incentivizing Venture Approval, Implementation, Operation, and Finance*

Since the NAMA is based on the principle of OBA at all levels, it is very important that the expectations of the NAMA stakeholders and their outputs are clearly and realistically defined at the start of the different NAMA phases. The need for some flexibility in budgeting and completion of outputs is expected and should take into account overall performance as well as minimum performance. The following text outlines suggestions on how to structure and incentivize the actions of stakeholders in venture approval, implementation, operation, and finance.

NAMA Coordinating Authority

The NAMA Coordinating Authority should have a budget category within the NAMA finance budget and, under that budget, include budget lines for at least the following:

- Perform planning and management for NAMA activities;
- Coordinate with the Trustee and other NAMA development partners;
- Support the activities of the NAMA Approval Committee, both technically and financially;
- Support inter-governmental actions on capacity building;
- Support inter-governmental actions on MRV;
- Institutionalize and support the NAMA Venture Approval Expert Group Panel;

- Administer tenders and contracts of contractors, partners, and consultants (if not done by the Trustee);
- Act as the Certifying Agent for the continual national and international finance / subsidies;
- Act as the conduit for venture based results reporting (e.g. bottom level MRV data flows);
- Support internal capacity building;
- Host NAMA related meetings;
- Manage external financial and evaluation audits;
- Fund institutional expert consultancy needs.

The NAMA Coordinating Authority will receive an annual grant from the Trustee to fund its annual responsibilities. However, given the heavy inter-linkage of activities and that delay or non-performance of one activity could lead to wider failures, performance of the NAMA Coordinating Authority is crucial. Therefore, the NAMA Approval Committee will have the mandate to recommend to the Trustee the suspension of funds per budget line in the case of non-performance of any activity of the NAMA Coordinating Authority. The NAMA Coordinating Authority should be given notice of non-performance at least six months before suspension of funds.

NAMA Venture Approval Expert Group

The NAMA Venture Approval Expert Group will have a budget category within the NAMA finance budget under the NAMA Coordinating Authority, and include budget lines for at least the following:

PHASE 1

- Inception meeting;
- Meetings for Screening and of Feasibility Study;
    - Completed terms of reference (TOR) / Request for proposal (RFP) as required for the NAMA activities.
    - Agreed approved shortlist of target priority ventures and sectoral capacity development needs,
    - Agreed approved final list of priority ventures and sectoral capacity development needs;
- Meetings for Competitive Bidding for Implementation of Ventures;
    - Completed TOR / RFP,
    - Completed approved evaluation and selection of contractors (if required);
- Meetings for Competitive Bidding for PPP;
    - Completed TOR / RFP,
    - Completed approved evaluation and selection of partners (if required);

PHASE 2

- Meetings for Inclusion of Individual Ventures;
    - Completed approved inclusion processed for new individual ventures,
    - Completed approved evaluation and selection of new ventures (biannually).

NAMA Venture Approval Expert Group shall be composed of public employees, embedded international advisors, and, if required, external experts. Funds for the group meetings should be disbursed per the conclusion/output of each group meeting, not for meeting attendance. The NAMA Coordinating Authority will decide if the objectives of each meeting are met and distribute funds accordingly or discipline those not receiving direct fees. This means that the conclusion/output of each panel meeting and related capacity requirements of each panel member should be well planned in advance by the NAMA Coordinating Authority and best as an annual agenda and budget.

Each external expert member of the NAMA Venture Approval Expert Group will receive a professional services fee per allocated working-day set for each meeting. In the case where government or institutional employees are involved, the professional services fee cost coverage can go to the employer or can be waived by the employer.

Implementation via Contractors and Consultants

Contractors and consultants will play a critical role in implementation and operation of the NAMA and ventures. They should be selected through an international standard and transparent quality & cost basis tender and evaluation, and be contracted directly with the Trustee or NAMA Coordinating Authority. This offers a means to incentivize participation of the private sector, in terms of fair competition and secured payments. Contracts with contractors and consultants should at a minimum be based on the payment-on-deliverables principle. If so decided by the Trustee or NAMA Coordinating Authority, awards for early delivery or penalties for late delivery can be applied (typically +/- 10% of contract value).

Individual Ventures (operation)

All individual ventures should receive national cost savings and international finance on a performance basis. Here it is noted that sectoral changes in developing countries often face bottlenecks. Therefore, adequate warning of non-performance and remedy periods should be given to individual ventures in relation to OBA, which is to be tracked via the MRV system put in place. Performance based payment of operation cost subsidies can consist of the following and should be tracked via the MRV system:

- Payment per consumed kilowatt-hr (kWh);
- Payment per tCO_2e mitigated;
- Payment for new consumer connections;
- Payment for positive sustainable development impacts.

In order to incentivize growth in the COO, PPP, and FPS business models, performance based payment can be based on a minimum threshold to meet minimum financial needs (e.g. revenues and returns are equal to cost coverage or a set IRR)). Technically, this minimum threshold is set by assuming a minimal community demand level. The incentive should allow for positive incentives for growth when exceeding the minimum thresholds. This means an excess from the minimum thresholds should be achievable and this level of positive incentives will need to be accounted for and capped in the NAMA budget.

2.4 Renewable Energy Policies and Actions

One of the building blocks for the CMF and NAMAs in general is the enactment of changes in government policies and actions which facilitate the implementation and finance of NAMAs. Typically, governments will have one or more of the overreaching policies for change under the paradigms of climate change, green growth, sustainable development, and/or energy security. Such policies often mandate regulatory authority, define strategic goals, set definitive targets, and outline a course of action. New actions under a NAMA are often reformative or original in nature, which needs to lead to a revision of policies and actions or the introduction of new policies and actions. It is these policies and actions that facilitate the change processes which the NAMA aims to encourage. A key element in this process is to establish realistic and concrete targets in the change processes and the implementable measures and actions (ultimately the success of the NAMA) will be measured against these targets. Table 2 presents the various types of policies and actions which can be enacted under a renewable energy rural electrification NAMA; Table 2 also offers an explanation of specific applicability of the policies and actions to such a NAMA and ventures.

Type of policy or action [4]	*Description*	*Applicability in Context of Renewable Energy Rural Electrification*
Regulations and Standards	Regulations or standards that specify mitigation technologies (technology standard) or minimum requirements for energy consumption, pollution output, or other activities (performance standard). They typically include penalties for noncompliance.	Technology and performance standards can help in the application of renewable energy in rural electrification as a means to ensure high quality and durable equipment. At a narrow extent this can for example be minimum efficiency requirements and/or minimum warranty periods for solar power equipment.
Taxes and Charges	A levy imposed on each unit of activity by source, such as a tax or surcharge on fuel, electricity, or carbon, traffic congestion charge, or certain imports or exports imposed by the government.	Taxes and charges are difficult to directly apply to renewable energy rural electrification. However, they can be used to generate revenues from GHG emission sources (e.g. a surcharge on each liter of diesel imported into the country or each kWh of electricity generated), which are then redistributed to renewable energy projects via a subsidy or loan program.
Subsidies and Incentives	Direct payments, tax reductions, price supports or the equivalent thereof from a government to an entity for implementing a practice or performing a specified venture.	Subsidies and incentives are the most common kind of measure to support renewable energy and are usually directed at the implementation phase (one-time payment of X US$ per kW installed) or operation phase (continual payment of X US$ per kWh generated) of a renewable energy project. Note that the subsidies and incentives are often financed through national budgets (taxes and charges) or via an outside grant. This Guidance Paper suggests the financing coming an Operational Subsidy Fund.
Information Instruments	Requirements for public disclosure of information. These include labeling programs, rating and certification systems, and information or education campaigns aimed at changing behavior by increasing awareness.	Information instruments are important measures in the finance, implementation, and operational of renewable energy rural electrification projects. Such measures are used to encourage private sector investments, increase quality in project implementation and to ensure higher quality operations through know-how transfer.

[4] Selected Policies and Actions Derived from: Table 5.1 (WRI 2014)

Financing and Investment	Public or private sector grants or loans (for example, those supporting development strategies or policies).	Financing and investment policies and actions are major drivers for renewable energy rural electrification and are often interlinked to one or more of the other types of policies and actions listed in this table. In particular, the establishment of loan and/or grant programs allows for greater access to capital which the private sector is not willing or able to provide. Direct grants can also pay for substantial portions of investment costs.

Table 3: General types of Policies and Actions applied to a rural electrification project

Part of NAMA development and later implementation and operationalization is to identify existing key policies and actions (and linked measures) already in place in a country, and define the gaps between what exists and what the most optimum changes to introduce under the NAMA are. Note that experience shows that often policies and actions are already enacted or decreed, but not enforced or implemented due to lack of supporting budgets, lack of political will, or conflicting regulations. The NAMA (and finance) should work to solve this problem. This approach takes into account key guidance on NAMAs that the NAMAs should "take into account national circumstances and national priorities, build on existing domestic systems and capacities, recognize existing domestic measurement, reporting and verification systems and promote a cost-effective approach". [5] The below graphic indicates the possible NAMA financing interlinkages of policies and incentives, international ODA, and ventures which can apply to financing renewable energy rural electrification ventures.

[5] UNFCCC / CP / 2013 / 10 / Add.2 - Decision 21/CP.19 "General guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by developing country Parties"

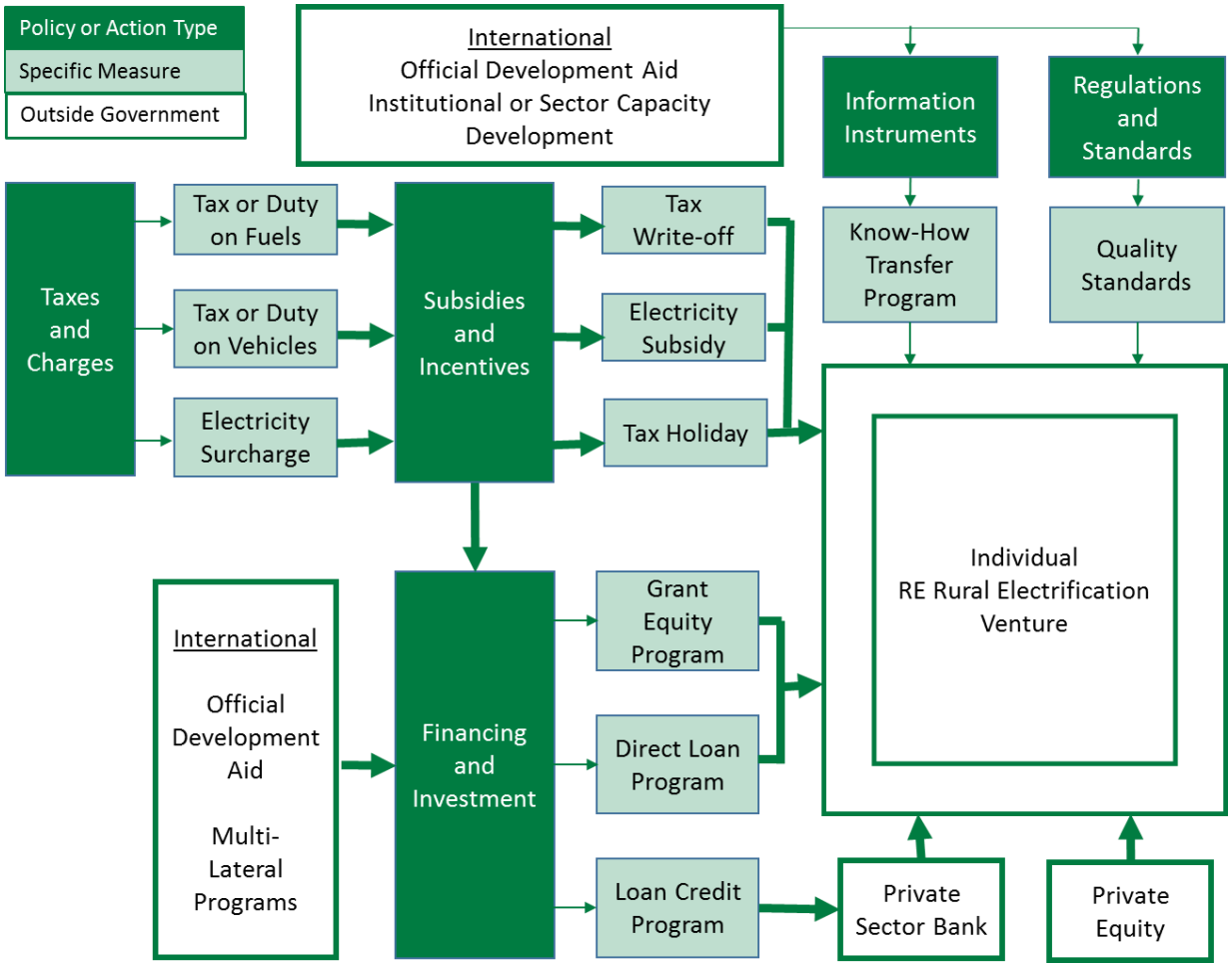

Figure 6: *Flow Chart of Example Policies and Actions for Financing Renewable Energy Rural Electrification*

Key points for the success of national policies and actions presented in *Figure 6*are:

- Taxes and Charges are utilized to fund Subsidies and Incentives, creating domestic sources for capital or cost reductions which are government controlled but leading to direct financial benefit of the individual mitigation projects;
- International climate finance is used to create grant and loan programs which are directly accessible to individual mitigation projects;
- Cooperation between international agencies and the national government for institutional and sector capacity development for Information Instruments and Regulations and Standards leads to higher quality and sustainability of the rural electrification sub-sector.

2.5 Institutional and Sectoral Capacity Building

The implementation of institutional and sectoral capacity building forms a cornerstone of the CMF of a NAMA, as well as that of MRV and NAMA management in general. In the cases of many emerging NAMAs, especially those involving renewable energy rural electrification, there is the need for institutional and sectoral change in order to overcome the existing market failures which have

historically prevented renewable energy rural electrification. It is noted that capacity building commonly occurs through one of three means:

1) **Internal Advisor**: A manager or staff of the existing ministry or agency whose responsibilities include developing, implementing, and operationalizing the processes which are targeted by the NAMA;
2) **Embedded Advisor**: An expert who has defined experience in the sector and in operationalizing institutional processes which are targeted by the NAMA. This Embedded Advisor can be an international consultant who is hired on a long term (multi-year) basis to work with one or more ministries / agencies or the NAMA Coordinating Authority. This person works on a day-to-day basis to assist the institutions in developing, implementing, and operationalizing the processes which are targeted by the NAMA;
3) **Short-Term Experts**: Consultants or consulting companies hired on a contract basis to address specific pieces of capacity building at the institutional level.

Institutional Capacity Building: At the institutional level, the change processes derived from NAMA designs commonly take the form of developing, enacting, and implementing changes to existing policies or creation of new policies. These policies then directly or indirectly give a mandate to institutions to implement various actions (measures, incentives and interventions) which will encourage and direct the change desired in the NAMA design. In developing countries which are most heavily impacted by the lack of electricity access, there is commonly a large gap in know-how and budget required to develop and implement the required changes, even in cases where policies already exist. The below table lists common types of institutional capacity building.

Type	Description
New policies and directives	If required development of new policies and directive (or amendment of old) linked to the NAMA actions.
NAMA Coordinating Authority	The design, implementation, and operation of a NAMA require dedicated capacity to deal with the many actions to be taken (change, coordination, implementation, MRV, finance, etc.).
New approval processes	Institutional NAMA setup for approvals for the inclusion of ventures into NAMAs.
New revenue generation scheme	Processes for adopting and enacting taxes or surcharges on energy, should these be part of the NAMA.
New subsidies schemes	Processes for adopting and enacting dedicated subsidies linked to the NAMA actions and ventures.
Opening access to renewable resources	In many countries, (renewable) energy resources are not mapped as to location and intensity, and in some cases are under the control of the government. Opening access to these resources may be critical to the success of a related NAMA.

Table 4: *Common types of institutional capacity building*

These regulatory changes commonly require new revenues streams (energy surcharges) and new methods of financial distribution (setting tariff / subsidies based on technology type and capacity). In some cases the changes may simply be the implementation of optimum methods (processes and procedures) for gaining approvals to build and operate renewable energy mini-grids in rural

communities. In other cases, such as the application of renewable electricity subsidies, stakeholder engagement and regulation changes will need to be made.

The cost of these regulatory changes should be included in the financial cost of the NAMA implementation and operation. The NAMA design must determine the institutional based measures / incentives / interventions required to achieve the end targets, typically through a bottom-up review (from project finance up to national regulations). Then, top-down review (from national policies down to project based regulations) should be used to identify the key changes needed and the cost and timeframe to develop and implement the changes. Note that it is likely that a NAMA involving the energy sector may require a phased-in approach to implementing change. This type of institutional capacity development is frequently funded by traditional ODA and it is recommended that, once the required changes and their costs are identified, the first source of finance should be the national budget allocation. Following the flow of national funds, funding development partners can further institutional capacity development.

Sectoral Capacity Building: In the case of renewable energy rural electrification, the "sector" targeted in terms of capacity building should be split into two parts. The first part is Rural Electrification as a sub-sector of the energy sector and the second part is Rural Businesses as a sub-sector of the business sector. The Rural Electrification sub-sector is uniquely different within the energy sector as the technical solutions, know-how, and finance structures required to achieve sustainable results are different from those required for large-scale power generation. Since rural electrification requires the establishment of mini-grids (likely by communities or micro-utilities) and requires service provision in rural areas, the Rural Businesses sub-sector is included as is it requires unique solutions for establishing new businesses which are significantly different from existing business models in the country. The cost of NAMA related capacity building activities in these two sub-sectors should be included in the financial cost of the NAMA implementation and operation. The table below demonstrates common types of sectoral capacity building.

Type	Description
Technical design know-how	The investigation of site-specific technical solution, engineering design, procurement services, supervision of installation and works.
Technical operation know-how	Processes for the transfer of technical, operational, and management knowledge for micro-utilities and operation of RE technologies.
Efficient energy use by consumers	Training the community to efficiently use electricity at the consumer level.
Energy services businesses	Development of new small business models for servicing the power generation and distribution to consumers. The businesses should receive training in business management.
Small-Business model development and support	Helping the community to access micro-loans and acquire skills needed for productive rural business development.

Table 5: *Common types of sectoral capacity building*

Since renewable energy rural electrification will most likely introduce new technologies into remote communities, there is a need for know-how and technology transfer in the Rural Electrification sub-sector. The capacity development activities related to know-how should target project feasibility, site-specific engineering design, installation, and operation generation and grids. Alternatively,

technical design know-how can be integrated in the procurement process such as through EPC contracts valid during NAMA implementation. Operational level capacity building can also be done in connection with commissioning and life cycle operation. Thus, technical design and operational know-how capacity building can be done in parallel to NAMA implementation.

It is envisioned that in the case of community level mini-grids applying COO and PPP business models, the Rural Businesses sub-sector will require capacity building in the establishment of small business models for the micro-utilities. Communities applying the COO model may also require assistance in terms of professional services (legal, accounting, etc.). Depending on the country-specific situation, unique solutions for revenue generation may be required and a level of payment per unit of consumption would ideally be instituted. More information on such business models can be found in Section 2.2, and in the referenced report "Hybrid mini-grids for rural electrification: lessons learned" (ARE 2011b). In addition to the primary generation side, small business models and training can be provided for small service companies which address the operation of the power generation and the distribution to consumers.

The integrated RPZ, discussed in "Integrated Sustainable Rural Development: Renewable Energy Electrification and Rural Productivity Zones" (UNDP MDG Carbon, 2014) calls for the need of a holistic approach to tackling rural electrification with an objective of ensuring that renewable energy is used by rural communities for income generating activities, which in turn enables the users to pay for the energy use. This revenue can go towards operational finance.

Apart from energy system capacity building, dedicated capacity building efforts will need to be provided to rural communities and stakeholders in developing small-business models and capacity to undertake economic activity. This will need to be done at two levels. At the first level, a management level, financial institutions (e.g. those providing micro-finance) and businesses (e.g. local companies who can benefit by outsourcing some aspects of their value chain to the RPZ) will need to be provided with a clear idea of the financial and operational model. This will enable micro-financial institutions to provide loans and allow companies to provide an appropriate price for the products/services.

At the second level, the RPZ implementation level, local communities who are employing the RPZ will need to be provided with special training and skill development to enable them to operate specialized equipment if any (e.g. gem cutting tools, leather tanning etc.) and understand the small-business models so that they are aware of the importance of paying for the energy use and integrating energy costs, and other resource costs, into the cost of produced goods

3 EXAMPLE MODEL VENTURE INVESTMENT AND OPERATIONAL COSTS

The main long-term goals of a renewable energy rural electrification NAMA are twofold:

1) To encourage the rural community's sustainable development through access to electricity and, in this Guidance Paper, to encourage rural income generation through RPZs; and
2) To mitigate GHG emissions through the implementation and sustainable operation of renewable energy projects (mini-grids…etc.). This means that the establishment of individual ventures needs to be financed and operational costs need to be covered through direct revenues and other income sources, as previously described in this Guidance Paper.

To achieve sustainability, a venture's investment costs must be covered through different forms of equity (grant, in-kind….etc.) and debt (through loan credits or revolving loans) if required. Just as important to venture sustainability is the ability to cover operational costs on a long term basis, through sustainable operational finance. *Sustainable Operational Finance* refers to the capital flows and costs needed to sustainably operate a business. This includes revenue streams (electricity sales and subsidies), cost savings (elimination of duties, tax write-offs and holidays), costs of continual operation, as well as servicing any debt. Several literature sources have highlighted risk factors affecting operational finance identified in renewable energy rural electrification projects; these risk factors, as seen in UNDP MDG Carbon (2014) and ARE (2011b), include:

- Improper design which does not take into account demand, changes in demand, and energy efficiency.
- Lack of reputable equipment suppliers/vendors, which causes excessive maintenance costs.
- Poor continual maintenance practices.
- Lack of proven operation in similar physical environments of selected electrical equipment.
- Lack of a long term financial model, from inception stage onwards, which takes into account projected investment / capital expenditures (CAPEX) and operating expenditures (OPEX).
- Lack of a clear strategy and long term cost projection of OPEX.
- Lack of consideration of consumer affordability for electricity.
- Lack of a comprehensive community stakeholder consultation process.
- Lack of integrating existing community leadership and governance into the management and operational structure.
- Improper method for the collection of consumer payments.

3.1 Model Venture Concept Design and Costs

For the purpose of illustrating and quantifying the theoretical design and costs of a single mini-grid venture based on solar power generation, a theoretical "Model Venture" will now be presented. As seen in the figure below, the "Model Venture" is designed to meet the basic electricity needs of a single rural village and the RPZ and consists of the following design basis:

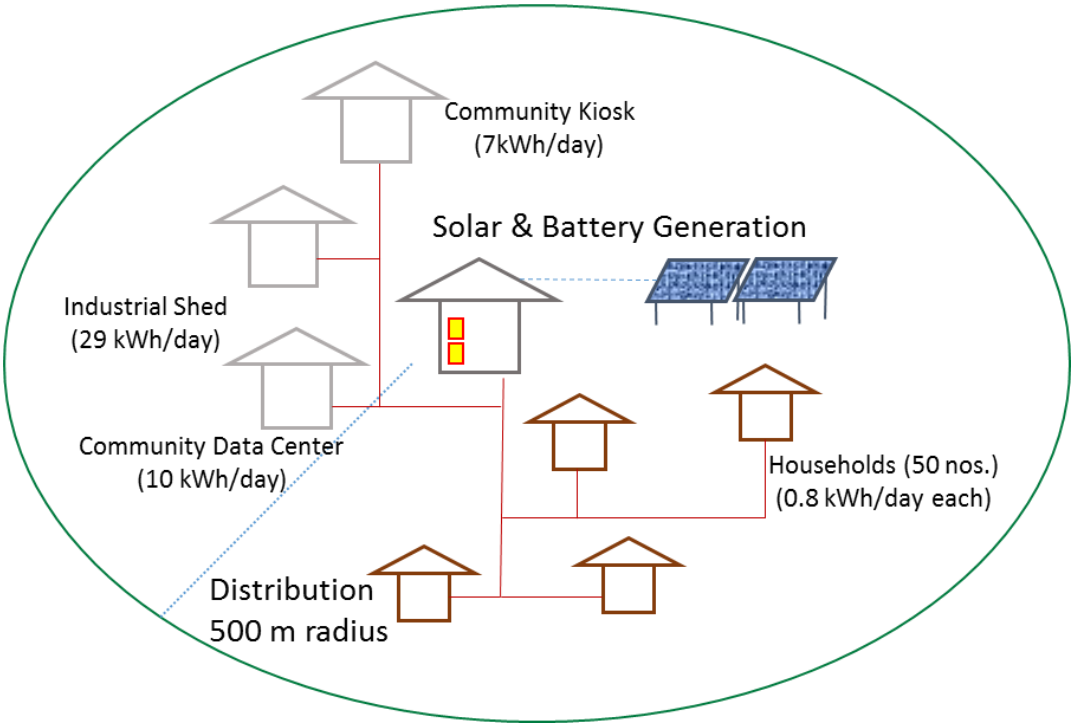

Figure 7: *Diagram of Model Venture Concept Design including the RPZ*

Design Basis

- Rural community of 50 households (~20 persons), with low daily electricity demand of 0.8 – 0.9 kWh (equal to daily operation of 2x compact fluorescent lights [CFLs] or light emitting diode [LED] lights, 1x radio, and 1x mobile phone charger).
- One community level kiosk, with daily electricity demand of 6.7 – 7.0 kWh (equal to daily operation of 4x CFL/LED lights, 2x fans, and 3x refrigerator/freezer).
- One community level data center, with daily electricity demand of 8.5 – 9.0 kWh (equal to daily operation of 4x CFL/LED lights, 2x computer/printer, 2x mobile charger and 1x LED TV & receiver).
- One community level industrial shed, with daily electricity demand of 26 - 29 kWh (equal to daily operation of 8x CFL/LED lights, 10x textile sewing machines, 4x 1 hp machine motors, and 2x 1 hp food processing mills).
- Small distribution grid extending no more than 500m in radius.

3.2 Comparative Cost of Model Venture Concept Design

To encourage a sustainable supply of electricity, in this Guidance Note, several mini-grid design options are: Solar PV & Storage Battery, Solar PV & Biodiesel Hybrid, and Diesel Only (for comparison). The physical characteristics and cost of these designs are described in Annex 1. It is highlighted that this description addresses only the energy system and not costs such as the investment costs of community or industry buildings or industrial equipment needed for the RPZ (these will vary widely depending on community resources).

The Model Venture options have comparatively high cost of investment when compared to a diesel only system, excluding the cost of diesel. The key investment costs in the Solar & Battery option are related to the batteries and additional solar panels (capacity) needed to charge the batteries during daylight hours. The Solar & Biodiesel Hybrid option has only enough solar capacity to cover peak demand points during the day and does not offer energy storage, so biodiesel generation takeover at night.

Table 6 presents the envisioned costs of the Model Venture options under a COO business model, in terms of investment and O&M. The table also presents the 15 year lifecycle cost and unit costs components of electricity consumed and mitigated GHG emissions. In order to bring these costs into perspective in terms of NAMA financing, *Table 6* shows the envisioned initial per unit source of finance over the 15 year lifecycle cost for a Solar & Battery Venture Concept Design. Taking the assumption that affordability is a major concern for rural communities, the unit cost of electricity is set at a fixed affordable rate covering a fixed portion of operational costs (in the Model Venture this is assumed to be 0.20 US$ / kWh). Applying this rate, it can be seen in *Table 6* that the vast majority of life-cycle per unit cost will need to be covered by *International Finance* and the *Operational Subsidy Fund*. However, should the income generation and electricity consumption increase in the venture community, as described in Section 3.4, then per unit cost will slowly drop but total net cost of generation and distribution will increase. It is assumed that consumer payment per unit will be consistent over time, and that net value of the *Operational Subsidy Fund* contribution will need to be capped in order to stay within the budgeted limits of the continual finance. This means that at the venture level, the *International Finance* portion should be adjusted on a consumption based scale or simply capped to ensure that there is no risk of surpassing the amount of *International Finance* budgeted for a venture. However, incentives should be put in place to encourage growth and expansion, by means of an allocated increase (buffer / contingency) in the net subsidy which will become effective in the case of over performance of a venture (see Section 2.3.3 regarding incentives). This approach would ensure basis revenue streams for individual ventures and allow for the opportunity of additional revenues to encourage further growth. It is noted that with stable basis revenue streams and the opportunity for additional revenues, private sector finance or a specially established Revolving Loan Fund could in principle be accessed for growth of ventures under the NAMA.

Model Venture Concept Design Options[6]	*27 kWp Solar & Battery*	*15 kWp Solar & Biodiesel Hybrid*	*Diesel Only* *(for comparison)*
Total Investment Cost	**US$ 325,000**	**US$ 245,000**	**US$ 222,000**
Energy System	210,000	130,000	107,000
Distribution System	115,000	115,000	115,000
Annual O&M (excl. fuel)	**US$ 30,000**	**US$ 21,000**	**US$ 19,000**
15yr Lifecycle Cost			
Net Cost	**US$ 773,000**	**US$ 675,000**	**US$ 620,000**
Unit Cost	**1.40 US$/kWh**	**1.22 US$/kWh**	**1.43 US$/kWh**
Investment Cost (One-Time International Finance)	0.59 US$/kWh	0.45 US$/kWh	0.40 US$/kWh
Operation Cost (Operation Subsidy Fund)	0.61 US$/kWh	0.57 US$/kWh	0.83 US$/kWh
Operation Cost (Consumer Payment Scheme)	0.20 US$/kWh	0.20 US$/kWh	0.20 US$/kWh
Fuel Component of Operation Cost	0 US$/kWh	0.21 US$/kWh	0.50 US$/kWh
15yr GHG Emissions Mitigation Potential	**771 tCO_2**	**318 tCO_2**	**0 tCO_2**
Net Mitigation Cost	**1002 US$/$tCO_2$**	**2122 US$/$tCO_2$**	**x**

Table 6: Model Venture Concept Design – Summary of Costs

[6] Investment costs are indicative, and based on nominal costs of end suppliers and general developing country labor costs estimated in 2014. The cost does not include financing cost, vendor/EPC markups, taxes & duties, and variation due to specific country conditions. O&M costs are annualized, taking into account periodic replacement of required equipment. The cost of diesel and biodiesel includes a 3% annual increase. The cost of investment for the community/data center, cooperative, and industrial sheds are not included.

3.3 Comparative Cost of Business Model Options

As previously indicated in this Guidance Paper, the unit cost (US$ / kWh) of generation significantly changes based on the type of business model employed at the venture level, COO, PPP, or FPS. *Table 7* and *Table 8* presents the envisioned costs, in terms of investment and O&M, of the Model Venture option under all three business models with a 27 kWp Solar & Battery Design Model. The non-levelized 15 year lifecycle cost and unit costs components of electricity consumed and abated GHG emissions costs are also included in the table. What is demonstrated through this cost option analysis is that a FPS model has a comparatively high unit cost which is almost double of the COO model. This is due to the level of equity returns required by private investors in risky markets (equity IRR of 18%) and the servicing of debt (at 5% interest), and these additional costs drive up the unit price. Under an FPS model, grants are not needed to cover investment costs, but the increase in cost is transferred into operation costs and thus there is a need for much higher subsidies. The PPP business model represents only a slightly higher unit cost from the COO model. This is due to the fact that without investment requirements, the private party only needs to worry about operational costs and derives a reasonable profit (15%) from the sale of electricity. Therefore, the least cost option is the COO business model, which requires a 100% grant to cover total investment costs and to finance of the Operation Subsidy Fund.

Business Model Options *(27 kWp Solar & Battery Design Model)*[7]	***COO***	***PPP*** [8]	***FPS*** [9]
Total Investment Cost	**US$ 325,000**	**US$ 325,000**	**US$ 325,000**
Energy System	210,000	210,000	210,000
Distribution System	115,000	115,000	115,000
Annual O&M (excl. fuel)	**US$ 30,000**	**US$ 35,000**	**US$ 73,000**

Table 7: *Business Model Options for the 27 kWp Solar & Battery Design Model – Summary of Costs*

[7] Based on the model venture concept design of Solar & Battery system described in Section 3.2, note that investment is covered by a 100% grant.
[8] PPP business assumes a 15% profit margin for the private partner on the operational costs for the model venture, note that investment is covered by a 100% grant.
[9] FPS business model assumes an 18% equity IRR on the investment, with a 70% / 30% debt to equity ratio, and a 10 yr loan at 5% interest, with no investment grants.

15yr Lifecycle Cost			
Net Cost	**US$ 773,000**	**US$ 850,000**	**US$ 1,415,000**
Unit Cost	**1.40 US$/kWh**	**1.51 US$/kWh**	**2.57 US$/kWh**
Investment Cost (One-Time International Finance)	0.59 US$/kWh	0.59 US$/kWh	0.59 US$/kWh
Operation Cost (Operation Subsidy Fund)	0.61 US$/kWh	0.72 US$/kWh	1.78 US$/kWh
Operation Cost (Consumer Payment Scheme)	0.20 US$/kWh	0.20 US$/kWh	0.20 US$/kWh
Fuel Component of Operation Cost	0 US$/kWh	0 US$/kWh	0 US$/kWh
15yr GHG Emissions Mitigation Potential	**771 tCO_2**	**771 tCO_2**	**771 tCO_2**
Net Mitigation Cost	**1002 US$/$tCO_2$**	**1102 US$/$tCO_2$**	**1835 US$/$tCO_2$**

Table 8: *Business Model Options for the 27 kWp Solar & Battery Design Model – Summary of Lifecycle Costs*

3.4 Cost Benefits of Increased Community Income and Growth

What is very noteworthy about rural electrification cost is the possibility for encouraging rural income generation, while reducing unit costs, through the introduction of a RPZ. The RPZ in effect utilizes the backbone of the mini-grid to provide additional electricity to the community for the running of new rural micro-businesses (e.g. a machine shop, woodcrafts shop, and garment manufacturing). In turn, access to electricity creates new jobs and revenue streams in the community. The added benefit to the rural community is that these businesses pay for their own electricity consumption, but at a very low additional cost of investment and operation. This effectively dilutes / lowers the unit cost of power for the community as a whole. Another means to lower the community's unit cost of power is to increase the number of consumer connections within the mini-grid; this increase should be encouraged within the planned business model and venture financing. Note that in both cases of a RPZ and an increased number of consumer connections, there is an increase in investment costs due to the need for increased capacity and connections; means to access additional investment should be included within NAMA finance. Figure 8 depicts the change in unit price when the number of community connections doubles and the RPZ demand doubles. The price decrease is significant, even despite the increased investment cost, and thus the presence of a RPZ and / or an increased number of connections is highly encouraged.

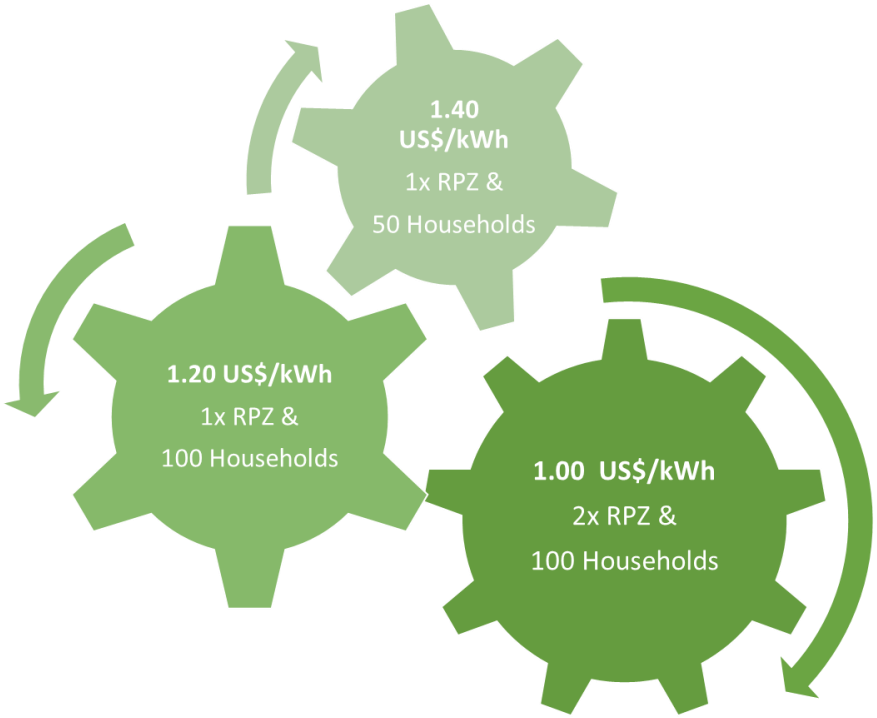

Figure 8: *Unit cost of power based on mini-grid growth (Solar& battery design model under COO business model)* [10]

[10] The Model Venture for a Solar & Battery Design System serving 50 households and 1x RPZ requires a solar capacity of at least 27 kWp, 100 households and 1x RPZ requires a solar capacity of at least 38 kWp , 100 households and 2x RPZ requires a solar capacity of at least 44 kWp .

ANNEX 1: MODEL VENTURE DESIGN – INVESTMENT AND OPERATIONAL COSTS UNDER A COO BUSINESS MODEL

Venture Concept Design Option (In US$) [11]	*Solar & Battery*	*Solar & Biodiesel Hybrid*	*Diesel Only (for comparison purpose)*
Energy System Investment Cost	210,000 Total 27,000 PV Panels (27 kWp) 9,000 Mounting/Frame System 3,000 DC/AC Wiring 28,000 Inverters/transformers 36,000 Battery Pack 6,000 Monitoring / Control 8,000 Backup-Genset (8kW) 50,000 Installation & Engineering 15,000 Housing 28,000 Other	130,000 Total 15,000 PV Panels (15 kWp) 5,000 Mounting/Frame System 2,000 DC/AC Wiring 9,000 Inverters/transformers 3,000 Monitoring / Control 8,000 Backup-Genset (8kW) 50,000 Installation & Engineering 15,000 Housing 23,000 Other	107,000 Total 8,000 Genset (8 kW) 2,000 AC Wiring 14,000 Monitoring / Control 40,000 Installation & Engineering 15,000 Housing 28,000 Other
Distribution Investment Cost	115,000 Total 53,000 Distribution Lines etc. 9,000 Household ready-boards 40,000 Installation & Engineering 13,000 Other	115,000 Total 53,000 Distribution Lines etc. 9,000 Household ready-boards 40,000 Installation & Engineering 13,000 Other	115,000 Total 53,000 Distribution Lines etc. 9,000 Household ready-boards 40,000 Installation & Engineering 13,000 Other
Total Investment	325,000	245,000	222,000
O&M (annual) excluding fuel	30,000 Total 12,000 Local Staff 13,000 Energy Maintenance 5,000 Distribution Maintenance	21,000 Total 12,000 Local Staff 4,000 Energy Maintenance 5,000 Distribution Maintenance	19,000 Total 12,000 Local Staff 2,000 Energy Maintenance 5,000 Distribution Maintenance

[11] Investment costs are indicative and based on nominal costs of end suppliers and general developing country labor costs estimated in 2014. Costs do not include financing, vendor/EPC mark-ups, taxes & duties, and variation due to specific country conditions. O&M costs are annualized, taking into account periodic replacement of required equipment. The cost of investment for the community/data center, cooperative, and industrial sheds are not included.

ANNEX 2: STEP-BY-STEP PROCESS FOR VENTURE APPROVAL, IMPLEMENTATION, OPERATION, AND FINANCE

- ***STEP 0: Mandate for Venture Approval Process***
    a. Assignment of the mandate for designing and administering the venture approval process to the NAMA Coordinating Authority, which should ideally be an existing department or agency dealing with energy sector issues (e.g. Department of Energy, Rural Electrification Authority, etc.).
    b. The mandate should dictate the formation of a NAMA Venture Approval Expert Group, consisting of no more than six technically and economically qualified experts from the NAMA Coordinating Authority, other government institutions, national stakeholders, and international development partners and stakeholders.
    c. The mandate may also include a provision for consultants to provide technical assistance for one or more of the following steps.
- ***STEP 1: Venture Screening and Feasibility Studies***
    a. To kick start NAMA implementation at the venture level, the NAMA Venture Approval Expert Group should as a first task define and agree upon the scope and terms of reference (goals, activities, and outputs) for a "Screening and Feasibility Study" based on the NAMA designs eligibility criteria, with the goal to identify the first round of ventures and sectoral capacity development needs that NAMA finance will target. The output of the study should as a part one include a long-list of potential ventures and short-list of priority ventures. Part two includes feasibility studies of the priority ventures selected, including local stakeholder consultations and environmental impact assessments (if required) and Letters of Interest from the communities.
    b. The NAMA Coordinating Authority should then work with an international development partner or Trustee to tender and contract consultants to perform the 'Screening' studies.
    c. Mid-way through the study, the NAMA Venture Approval Expert Group should review the results of the screening and agree on a final shortlist of target priority ventures and targeted sectoral capacity development needs meeting the budget level allocated and targets in the NAMAs design for Phase 1. A feasibility study under the consultant's contract will then be developed for the priority ventures.
    d. Upon completion of the feasibility study, the NAMA Venture Approval Expert Group should approve of the shortlist of ventures and the expected total budgets of each venture including expected sector capacity development needs.
- ***STEP 2: Community and Development partner / Trustee Venture Approval***
    a. Upon finalizing STEP 1, the NAMA Coordinating Authority should secure a final Letter of Agreement with the communities of the priority ventures and business models, based on the outcome of the feasibility studies. This shall be done directly by the NAMA Coordinating Authority.
    b. Once final Letters of Agreement are secured, the NAMA Coordinating Authority should then gain approval of the budget for implementation of the priority ventures and needed sectoral capacity development needs by the NAMA Secretariat (please check throughout the doc if this is consistent) Approval Committee and Trustee.

- ***STEP 3a: Competitive Bidding for Implementation of Ventures***
    a. Upon completion of STEP 2, the NAMA Venture Approval Expert Group should define and approve the scope of delivery, terms of reference, and selection process for "Implementation of NAMA Ventures" to implement the civil, mechanical, and electrical works of the priority ventures selected, plus their commissioning and handover to the communities. Note that the contractors for the above tasks should be preferably selected through an international level tender for EPC which encourages local and regional contractors.
    b. The NAMA Coordinating Authority should then launch the tender.
    c. Upon receiving proposals from EPC contractors, the NAMA Venture Approval Expert Group and Trustee should evaluate the proposals and award the contract.
    d. Upon selection of the awardees the NAMA Coordinating Authority should work to negotiate and finalize EPC contracts, and final sign off by the Trustee.
- ***STEP 3c: Competitive Bidding for PPP (in the case of the PPP business model)***
    a. Upon completion of STEP 3a (award), the NAMA Venture Approval Expert Group should define and agree upon the scope of delivery, terms of reference, and selection process for "Long Term Operation, Maintenance and Management (OMM) of NAMA Ventures" to implement PPPs in the communities for OMM agreements of at least the first life-cycle (15 years). Note that these PPP should begin in batches defined by geographical area, and preferably be contracted out through an international level tender which encourages local and regional contractors. *[In theory STEP 3 and STEP 4b could be combined into a Build Operate Transfer (BOT) contract, but these prove to have less interest when they are small projects and are most viable in countries with well-developed energy markets and sectors]*
    b. The NAMA Coordinating Authority should then gain approval to launch the tender and process by the NAMA Approval Committee and the Trustee.
    c. Upon receiving proposals from PPP partners, a committee (e.g. NAMA Venture Approval Expert Group and Trustee) should evaluate the proposals and award the contract.
    d. Upon selection of the awardees the NAMA Coordinating Authority should work to negotiate and finalize PPP agreements, with a final sign off done by the Trustee and communities.
- ***STEP 4: Inclusion of Individual Ventures (continual)***
    a. After the completion of STEPs 1 through 3, the NAMA Venture Approval Expert Group should define country specific criteria, evaluation, award and inclusion processes for new individual ventures. Note that the NAMA design will likely have general criteria but detailed changes will need to be made based on experience of previous STEPs.
    b. The NAMA Coordinating Authority and NAMA Venture Approval Expert Group should utilize this consolidated process at least on a biannual basis for the inclusion of new individual ventures under COO, PPP, or FPS business models, and to improve the inclusion process as time goes on.
- ***STEP 5a: Oversight of Implemented Ventures (continual)***
    a. The NAMA Coordinating Authority has the authority of oversight of the ventures and sectoral capacity development efforts in both the implementation phase and the operational phase. As such, the NAMA Coordinating Authority should:

i. Develop a detailed MRV system as defined in the NAMA design for the implementation and operation phases of the NAMA ventures and sectoral capacity development efforts. This MRV system should at a minimum include monitoring and reporting of implementation progress, operational progress, NAMA finance requirements, Trustee oversight requirements, mitigation progress, and sustainable development progress.

ii. During implementation, continuously review the progress of implementation of each venture and deliverable of sectoral capacity development efforts, at least quarterly.

iii. During operation, review the progress of each venture and long term sectoral capacity development efforts, at least annually.

b. The NAMA Approval Committee has the responsibility of oversight of the NAMA Coordinating Authority's actions during implementation and operation phases, and has the authority to mandate management (persons and processes) changes in the NAMA Coordinating Authority, should there be signification lack of progress. Such changes may require process review and/or audits.

- ***STEP 5b: Approval for Subsidies (continual)***

a. Continual capacity building for verification and certification processes will be needed for the operationalization of STEP 5b. Based on the NAMA design and MRV design in particular, the NAMA Coordinating Authority could act as the verifying entity at the venture level. However, for optimal private sector involvement this can be done by private sector verification or auditing companies, through a simple process. This requires the NAMA Coordinating Authority to oversee the development of a verification methodology and manual, its training, and approval of private sector verification or auditing companies or its own staff (as the case may be).

b. Based on STEP 5a, the NAMA Coordinating Authority should act as the Certifying Agent for the continual national and international finance / subsidies, insofar that the finance / subsidies for ventures are performance driven. Note that the Certifying Agent must receive verified statements from the ventures / ESPs. In this manner, the MRV and management processes of the NAMA Coordinating Authority shall reflect the needs of the finance structured and ventures operation. For example:

i. The NAMA Coordinating Authority should at least annually certify the proper operation of a venture and such certification be used in claiming eligibility for national cost savings (e.g. tax write-off or holidays).

ii. The NAMA Coordinating Authority should certify electricity delivered to consumers, GHG mitigation, sustainable development outputs and new connections. This certification is then used by the NAMA Approval Panel to authorize Trustee payments to the ESPs, via the Operational Subsidy Fund.

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http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?display=graph

SUGGESTED RESOURCES

Climate Change Policy and NAMAs

"Nationally Appropriate Mitigation Actions – A Technical Assistance Sourcebook for Practitioners", Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ), August 2012
http://www.adelphi.de/files/uploads/andere/pdf/application/pdf/nama_source_book.pdf

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"Greenhouse Gas Protocol: Policy and Action Accounting and Reporting Standard", World Resource Institute, June 2014
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