

# Handbook for Financial and Development Professionals

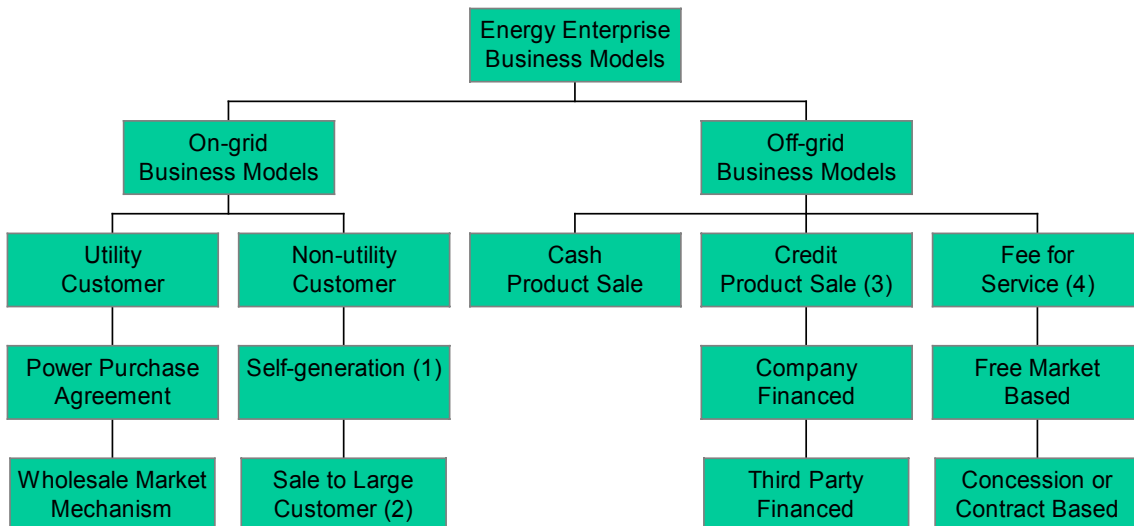
## Chapter 3

### Energy Enterprise Business Models

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This chapter consists of three parts. In the first part the various types of business models for on-grid and off-grid energy projects are introduced, based essentially on the types of customers served. In the second part this typology is expanded to include other factors that serve to distinguish different ways of doing business. The third part of this chapter reviews some of the lessons learned in developing country energy enterprises and describes three paths that these companies tend to take. This third part also elaborates on why this is a growth sector and the assistance needed for this sector to grow -- a theme that is also found in Chapter 8.

#### Part 1 – The Basic Business Model Distinctions: Grid Characteristic and Customer Relationship



- (1) usually includes purchase of back-up power from and sale of excess electricity to the utility.
- (2) usually involves "wheeling" electricity over the utility's electricity grid.
- (3) Includes installment sales and hire-purchase arrangements.
- (4) Includes leasing

The first distinction to be made concerning types of energy projects is between on-grid and off-grid projects: those connected to and selling capacity and energy to a national electricity system versus those off the national grid, which may be individual energy installations (households, businesses, public facilities) or local area grids.

#### *On-grid Projects*

Grid connected projects fall into two categories: those connected to public or private sector utility companies (generators or distributors, usually the latter) and those connected to non-utility companies (usually large industries).

#### *\*Utility Projects*

Projects involving utilities receive payments in two ways. The first way is a contract called a Power Purchase Agreement, which specifies the amounts to be paid for capacity and energy and the terms and conditions governing the contract.. The second way is called the Wholesale Market, in which case the price to be paid for energy is determined by a market mechanism that determines the price, usually per hour, on the basis of energy offered for sale by projects.

#### *Non-utility Projects*

In these projects energy is either consumed by a company producing the energy (these are called “inside the fence” projects but these also tend to be connected to the national grid for either the purchase of power or the sale of power not used within the companies operations. Common examples of these projects include sugar mills that use bagasse to produce steam and electricity for use, with the sale of excess electricity to the power grid. Another type of project involves the production of energy for sale to an industrial user, which usually involves the “wheeling” of electricity through the wires of the national grid.

#### *Off-grid Projects*

Off the grid projects involve the sale of products or energy services to customers directly or the production of energy at one location for sale to a group of customers (often through what is called a local “mini-grid”). Products tend to be sold for cash or a combination of cash and credit or hire-purchase, which is a form of installment purchase. Services are usually paid for on a regular basis, in cash (the fee for service model), which is also the way mini-grids tend to operate.

Thus, the first distinction in energy project business models essentially relates to who is paying for the project’s output and how they are paying for it:

#### *Utility On-grid Project*

- Paid via Power Purchase Agreement
- Paid via Wholesale Market Mechanism

#### *Non-utility On-grid Project*

- Paid via Contract for Local Use
- Paid via Contract for Energy Wheeled to Different Location

#### *Off-grid Projects*

- Product is Sold for Cash
- Product is Sold for Cash-Credit Combination

Product is Rented (Hired) with Ultimate Purchase  
Service is Sold for a Fee.

## **Part 2 – Other Characteristics Distinguishing Business Models**

The second set of distinctions applies to how the project is owned and financed, how it is licensed, how revenues are collected and how tariffs are set.

### *Ownership Structure*

Private Sector Company – share company, partnership or sole ownership.  
Public Sector Company – government, village-town or co-operatively owned enterprise.  
Joint Venture or Mixed Ownership -- multiple private sector or public sector entities.

### *Capital Structure*

Grant based – where the required capital is donated by a specialized donor program or charitable institution.  
Net revenue (customer) based – where the revenues of the project support the borrowing of funds (regardless of the source of funds) and the investment by owners and others.  
Government financed – where capital is supplied as a matter of public policy, with no repayment expected.  
Mixed Structure, combining elements of customer-based, government financed and grant-based financing.

### *Revenue Collection Structure*

Sales are monitored (metered) and billed.  
Fixed payment is made for set hours of service or provision of capacity.  
Combination of both.

### *Customer Tariff Structure*

Tariff covers all costs and provides a return on investment.  
Tariff covers operating costs.  
Tariff covers capital costs.  
Tariff based on presumed ability to pay.

### *Authorization Structure*

Project operates in an open market situation.  
Project is authorized to service a particular territory based on an awarded concession.  
Project operates under a contract from a concessionaire or utility holding a franchise.

### *Construction and Operation & Maintenance*

Private sector managed engineering, procurement and construction (EPC).

Public sector managed EPC.

Mixed EPC.

Private sector operations, maintenance and revenue collection.

Public sector O&M and revenue collection.

Mixed O&M and revenue collection.

### **Part 3 – Lessons Learned and the Development Path of Energy Enterprises**

*This part is derived from portions of an October, 2000 essay "Meeting the Unmet Demand for Energy Services" ..*

#### *The Demand for Improved Energy*

Consensus forecasts (IEA, WEC, etc.) point to the conclusion that the demand for modern energy services by hundreds of millions of unserved households, businesses and communities will continue unabated for the foreseeable future.

The vast majority of these unserved customers are in the developing world. Their demand is for basic energy services -- for cooking and lighting -- and for energy to grind, pump, shell, bake, sew and to perform other productive or income generating activities.

Ten years ago it was still possible to ignore this demand. Entire rooms of experts would explain that the technology to deliver such energy services to the customer's location was immature, that the delivery mechanisms and infrastructure did not exist, that extensions of the electricity grid would solve the problem, that policy and price adjustments would solve the problem, and – most often cited – that people could not afford to pay for the services being demanded.

Although there are still small groups who proclaim parts of these positions, mercifully it is becoming generally accepted that all but the poorest of the poor can pay for energy services; that successful programs of service delivery exist; that electricity grid extensions are prohibitively expensive in most cases; and, that technologies to provide energy to remote areas are proven to be cost competitive and reliable. These technologies include wind, water, biomass, solar and fossil-fueled solutions, alone or in combination.

#### *There is a Demand. Energy Enterprises Represent the Supply*

In addition to learning that technologies work, grid extensions have their limit, delivery systems can be put in place and that the poor can and do pay for improved energy, something else has been learned in these ten years. If the driving force is the unmet demand for energy services by the rural people of developing countries then the next gear in this energy machine consists of energy entrepreneurs, those men and women who organize the delivery of energy services.

These entrepreneurs come in many forms. Some are local businesses. Others are larger businesses who work with local people to deliver equipment or

services for sale or for a fee. Others are employees of governments who organize programs, which invariably depend on other men and women to deliver. Some of these entrepreneurs are in community organizations and what are called NGO's or non-governmental organizations.

### *The Third Gear -- Seed Capital and Enterprise Development Services*

There is a third gear in this energy machine: the programs and organizations that support energy entrepreneurs. This support can take many forms – advice on policy and technical training being the ones that come most easily to mind and have had the largest focus. But there are two types of support that are proving to be far more important than policy advice and technical training, more important in that without such support the policy advice and technical training will be left floating like debris in orbit.

The types of support needed in this third gear are seed capital and what are bundled together under the heading enterprise development services.

Seed capital is the modest amount of capital needed to convert a good idea and a capable entrepreneur into a specific business transaction that brings customers and improved energy together. If someone is going to simply buy and sell individual energy systems – generators, stoves and fuel, rooftop solar systems, biogas units using waste from animals – this seed capital can be extremely small, as small as the price of a few units and the transport to get them to customers, literally hundreds of U.S. dollars or ten thousands of West African CFAs. To create a business that regularly buys, sells, installs, and services such units requires more seed capital, the proper amount being determined by the number of customers being served. Using US\$500 per customer as a metric, a company servicing 1000 households requires \$500,000 in capital (and probably 3-5 years to reach them all if the base is today zero). This would qualify, if somewhat arbitrarily, as a small rural energy delivery company, and would probably continue to be so classified until it was operating in the 2500-5000 household level, at which time it would have to be graduated to “mid-sized” as a classification. The distinction is more than number of customers. A mid-sized company has substantially more human and physical infrastructure than a small company. A small, dedicated team close to its customers can service one thousand customers. A mid-sized company needs local and regional offices and a network of employees or contractors. At 5000 customers a company requires capital totaling US\$2.5 million but it requires it over a multi-year period, not all at once.

The second type of support these entrepreneurs need are bundled together under the heading enterprise development services. Most of these entrepreneurs are new to business and new to energy technologies. Most approach the business from the perspective of the technology. They need a great deal of orientation to the demands and needs of customers, the

understanding of market and marketing, the gathering of information and preparation of feasibility analyses, proposals and business plans, the development of contracts and collection mechanisms, the identification of financial and non-financial resources and the negotiation with credit providers, lenders and investors. Enterprise development services involve the information, tools, consulting and direct assistance provided to entrepreneurs so that they can wisely use seed capital to build a sustainable business entity to supply invaluable energy services to customers.

### *Lessons Learned*

Experience to date teaches a few things regarding seed capital and enterprise development services.

The first is that seed capital will often launch a small enterprise but will not suffice to prepare it for next stage, more commercial type of capital.

The second is that rural energy delivery companies are slow to grow, which reinforces the difficulty of attracting next stage capital.

The third lesson regarding these services is that enterprise development services are absolutely key to creating sustainable businesses. While there is scope for standardization, there is a substantial need for customization and “hand-holding” within new markets. Once one or two companies succeed in these markets it is expected that later market entrants will copy the techniques of the first entrants.

The fourth lesson is that there are different paths that companies follow. Path A involves a company that uses seed capital and enterprise development services to bridge directly to commercial capital. This is the path taken by the Kanata Project, a 7.4 MW first-of-its-kind hydroelectric project in Bolivia and many other projects these last 10 years. Path B involves a company that uses seed capital and enterprise development services, reaches a certain level of activity and can be sustainable with no additional input. This is path taken by companies like Vacvina, a Vietnamese biogas equipment company. Path C, taken by companies such as NOORWEB, a Moroccan solar company, involves a need for additional capital and additional enterprise development services after initial infusions of seed capital and enterprise development services.

Most companies (i.e., a substantial portion of the rural energy delivery universe) are simply not yet ready to access commercial capital immediately. There are many variations on theme within these three paths but this typology captures the major classifications to be recognized<sup>1</sup>.

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<sup>1</sup> A companion typology has been developed by Eric Martinot. While focused on solar companies it provides a handy classification of all types of rural energy delivery companies that serve many customers. In his paper, “The GEF Solar PV Portfolio” Martinot presents a typology broken down between Sales Models (Model A – Cash, Models B, C and D for various credit schemes) and Service Models E, F, G and H, depending on whether the service is delivered through a

A fifth lesson is that enterprise development services tend to be described as third parties teaching and assisting entrepreneurs. This is often the case, especially as regards accessing capital and preparing business plans. However, there is another kind of enterprise development services to be provided. This involves providing sufficient latitude for the entrepreneur to continue to learn, grow and invent. While in mature industries the maxim is to keep the entrepreneur focused on the implementation of a well defined business plan, in immature industries – and rural energy delivery is clearly an immature industry – it is equally important for seed capital and enterprise development services to include support for entrepreneurs to continue to explore and invent.

### *Stages and Paths of Development*

Energy delivery companies go through various stages of development (see next page).

In Stage 1 the companies are new, involve high risk and pioneering entrepreneurs. Many, perhaps most, will fail. Seed capital and enterprise development services are needed to organize the company so that it can deliver products and services to customers.

In Stage 2 these companies take a variety of paths.

Some, like Kanata (Path A) require no additional capital or services and access commercial capital.

Others, like Vacvina (Path B), may or may not need additional capital or services and then reach a level of self-sustaining business, never in need of nor in position to access commercial capital.

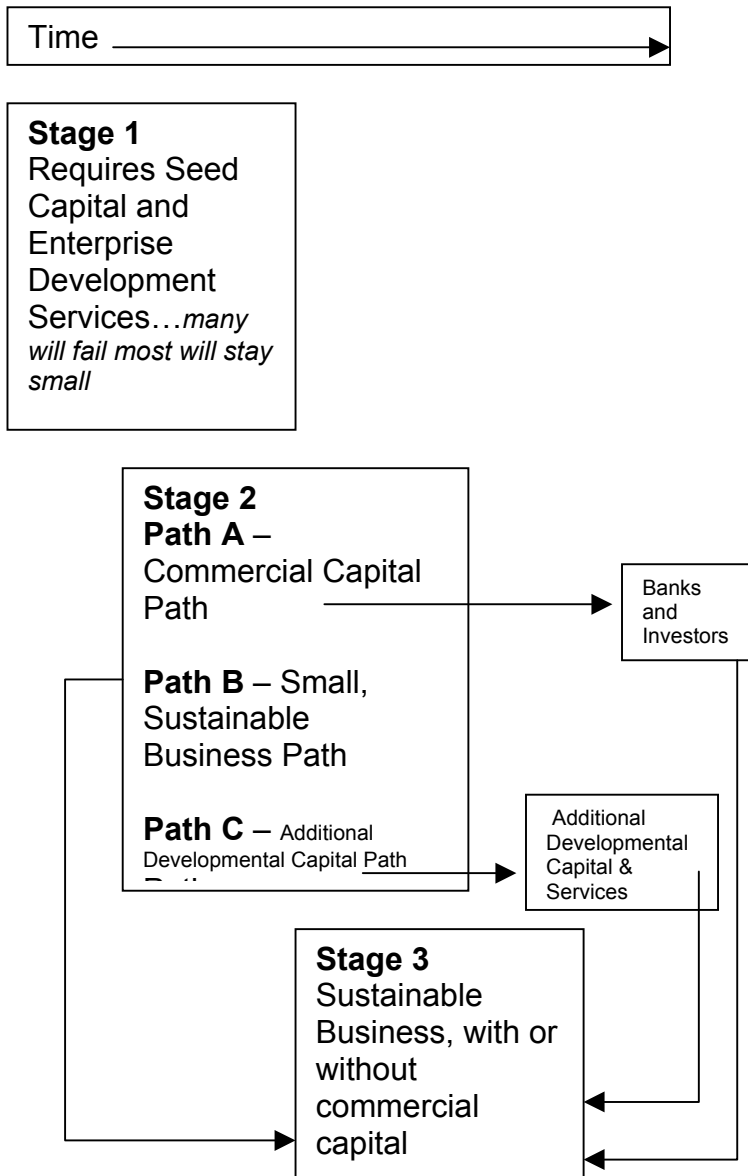
Finally, there is the case of the company like NOORweb (Path C), that is not ready to access commercial capital and is not yet large enough to be self-sustaining. This type of company needs additional capital and services.

Though a percentage distribution among these companies is not possible most rural energy companies delivering products and services to rural customers fall in the Vacvina or NOORweb category. Kanata-like companies tend to deliver bulk power to one or a few energy users, including local grids, rather than serving large numbers of customers directly.

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concession operated by a utility (E), by a private company (F) or through an unregulated market provider (G) or community provider (H).

## Rural Energy Delivery Businesses Developmental Stages



### *What Programs and Organization Need To Do At Each Stage*

The third gear of the energy machine – organizations and programs that support companies dedicated to providing energy to unserved households, businesses and communities – needs to provide seed capital and enterprise development services at Stage 1 to virtually all companies entering this market. In addition, these organizations and programs need to recognize that (1) certain entrepreneurs -- those along the NOORweb path, Path C -- require additional

capital and services to reach sustainability and, if needed, attract commercial investment capital; (2) other entrepreneurs – along the Kanata path, Path A – often require additional enterprise development services to successfully access commercial capital; (3) all entrepreneurs need to be provided sufficient “breathing room” to pay attention to market developments and required innovations.

### The Three Gear Energy “Machine”

