Renewable energy for the rural sector - How partnerships can make a difference

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1.1 Abstract

Energy demand is rising across the globe, as developed nations recover from the economic meltdown and developing countries like India embark on a double digit economic growth. In the wake of the recent oil spill, renewable energy lobbyists have gained support from public policy makers, in formulating the energy expenditure of developed nations. However, in developing countries, where energy sources are scarce, the dependence on traditional fossil fuels will continue for some decades. Resources have to be made available to the rural population to meet their energy needs. The concept of making renewable energy affordable by financial instruments is not novel, but business models are still unexplored in this area. Microfinance institutions (MFIs) can partner with private technology specialists to provide off-grid electricity in rural far-flung areas. A similar model can be used to provide waste water treatment facilities in slum areas of major cities. Public-private partnerships between government bodies, MFIs and private technology companies can ensure that renewable technology is adopted by rural communities using the benefit of micro-loans. This paper analyses the ways in which project management can streamline the operations of these complex partnerships. Each rural empowerment project will have definite stakeholders each working with a different equation of investment, risk and returns. These differences can be managed effectively with clear defined roles given to each participant. As these projects work in major cost constraints, project management tools can help reach out to the poor in reduced cost, enabling operational efficiency and knowledge sharing.

1.2 Keywords

Renewable Energy, Strategic Partnerships, Rural Empowerment

1.3 Introduction

According to the World Bank estimate of 2005, 42 percent of Indian population was below the International Poverty Line, which amounts to $1.25 for a day. This is Rs. 21.6 a day for urban areas and Rs.14.3 for rural areas. Although there has been a substantial decrease from 1981 when this percent was 60 compared to the 42 percent of 2005, the number of people below the poverty line is still a huge 456 million. [1]

Developing countries like India have always faced the problem of eliminating the barrier of financial inequality and providing basic living amenities to its people. The task of reducing poverty and empowering the rural population depends on the actual availability of resources among the masses and the role of government in bridging this resource gap.Various steps have been taken by the government and non-government organizations to improve the living standard of the poor. But the progress has been slow and can be attributed to the political rigidity and bureaucratic corruption in our system.

Agriculture, energy, education and sanitation are some basic facets that need to be improved for any below poverty household in India. This paper focuses only on the energy needs of a rural household and provides business models that can help to meet these needs.Providing energy sources to the poor can help create business opportunities for various small-scale industries. Renewable energy solutions, when provided to a rural communityensure that energy sources are available in demographic regions, which are not connected to the electricity grid.

Government and state bodies need to provide a stable regulatory and public policy system that can help in the dissemination of renewable technologies across the rural population. The cost involved can be spread over a period of time and borne by the rural community through a system of micro-loans. This system of providing micro-credit is carried out by various rural banks and Microfinance Institutions (MFIs) across the country. The necessary technological equipments and expertise needs to be provided by private parties that currently do not provide major solutions for the rural community. Ensuring that such technical parties are actively involved in this model requires stable monetary returns during its operational stage.

Various public and private parties need to form strategic alliances that can alleviate poverty and resource issues and create models that can be adopted on a large scale. Defining roles and responsibilities for each stakeholder can ensure that maximum returns are availed in reduced cost and with increased efficiency. The various partners can decide how investments are distributed and associated risks are managed. Starting from a small project level, the aim should be to have a flexible model that be applied across the country with a centralized control system. The partnership model discussed in this paper may face varied pressures based on the internal and external environment factors.These have been analyzed in detail with suggested mitigation routes.

1.4 Business Model

The basic feature of the business model described here is to ensure that a rural community is provided a renewable source of energy to at least meet its daily demands of lightning and cooking. At the initial stage the model may provide basic renewable energy equipments like solar lanterns to the inhabitants. This model can then be extended to solar cookers, biogas installations, rain water harvesting and waste water treatments based on the maturity and cost feasibility of the project.

Various stakeholders involved in this model need to have a defined role that can be elaborated under assumed operating scenarios. Each stakeholder works with a different equation of investment, risk and return and these should be effectively managed to ensure that the model is successfully adopted.

1.4.1 Stakeholders and their Roles

1.4.1.1 Village Community

The social structure of a village community in India is very close-knit. Every community establishment has a leader and its own body of elder individuals acting as decision makers in important matters. The influence of a leader is tremendous and he/she as an individual bears the responsibility of ensuring the welfare of the community.

The first step towards rural empowerment is to establish a faith and repo with the community leader, who can then direct the faith of the entire community population. It is essential to communicate the benefits of adopting a new technology like renewable energy so that the communities are assertive towards its adoption. Only when the community members are open to changes, can the implementation and operation of the project be made successful.

After the renewable energy project has been implemented it is essential to identify business opportunities that may provide new income options to the community. These new opportunities will help repay the cost of installation and operation associated with

the renewable energy technology. It will enable self-sustainability in the village community and develop their knowledge of the modern world.

1.4.1.2 NGOs and Community Workers

The business model should have an inherent capability to establish a good reputation with the village community members.This task is easily carried out by NGO members and community workers already working in such areas. These community workers generally belong to a nearby community and are well versed with the culture and dialect spoken. Cultural barriers are easily overcome by partnering with NGO workers. Risks of social boycott and upheaval against the modern technology is ensured a little control.

Such workers can help in the spread of knowledge concerned with the advantages of renewable energy. They can help in educating families on the benefits that can be derived once such schemes are implemented. Village community members can be made aware about the new sources of income that will be emerge by adopting these new technologies.

Women empowerment programs, which are being introduced in various villages across India, are a good example of such NGOs that already have established relations in rural areas. A major advantage of women oriented schemes ensure that programs are implemented with dedication and spread across the family structure in the village community.

1.4.1.3 Microfinance Institutions (MFIs)

A microfinance institution provides small loans that may range from Rs.1,000 to Rs. 20,000 with weekly or monthly payback periods. These loans are given to an individual for starting a small business or investing in agriculture equipments. Due to the small size of these loan amounts they are called micro-loans. These loans can also be given to a group of people who divide the loan amount, wherein the payment of installments is done by each member of the group. Suppose the village community comprises of 100 families, then each family can be the liable loan holder of Rs. 1,000, which will lead to the total loan amount to Rs. 1,00,000.

The basic requirement for establishing a renewable energy source is the huge initial investment cost that poses a hindrance in the adoption of renewable technologies. Implementing renewable energy sources in rural sector can be made possible by spreading this initial cost among the rural community members. The community members will apply for a micro-loan that can fetch them the initial cost involved in a renewable energy project. A MFI can be flexible in the loan repayment process if the livelihood of the community is bound by seasonal demands or weather impacts on agriculture productivity.

Repayment of the loan amount needs to be facilitated by increasing the business opportunities after the renewable energy project has been made operational. A MFI is a stakeholder in this project,which makes a significant investment and faces the risk of accumulating default accounts in its portfolio.

1.4.1.4 Original Equipment Manufacturer (OEM)

As we focus only on the delivery of renewable energy technology in the rural sector, another important stakeholder is a private OEM that will provide the needed equipments and technological expertise for renewable energy technologies like solar, biogas and wind (in some coastal areas of Tamil Nadu). The OEM is funded by the microfinance credit scheme run by the MFI. Apart from providing the equipments, the OEM ensures full installation and covers the maintenance procedures for a stipulated period of time as decided during the time of install.

The major risk for the OEM is the additional maintenance cost that has to be borne due to inefficient operational methods used by the poorly educated rural people. Moreover, the financing complexities depend on the mechanism being followed by the MFI which has made the technology affordable by providing micro-loans.

1.4.1.5 Government and State Bodies

It is mandatory to have a government support that establishes a policy system targeting the spread of renewable energy in the rural sector. The government has the penetration power into rural areas with already established projects of local governing bodies and state boards. Currently Indian state governments provide an amount of Rs. 6 lakhs to each Gram Panchayat for improving the living conditions of its rural population. In the year 2009, Orissa spent 19.39 crores on its local rural bodies for building infrastructure across the state.

Government's role is essential in developing a transparent mechanism where grants are also provided to the MFIs and OEMs operating projects in such rural areas. It is essential to keep the bureaucratic red tape in the minimum and ensure that proper funds are disbursed through the right channels.

1.4.2 Environmental Factor Analysis

Various factors that arise from internal and external business environment have been analyzed in a SWOT framework to assess the various forces that will shape the business model under consideration.

1.4.2.1 Strength

Factor	Probability of Occurrence	Impact	Ranking
Ensuring availability of energy sources in rural and off-grid areas.	High	Medium	1
Alleviating poverty by creating new business opportunities and reducing unemployment.	Medium	Low	2
Risk disbursement among various stakeholders currently operating in rural areas through similar projects.	Medium	High	3
Reduction in pollution due to adoption of renewable energy.	High	Medium	4

Less dependence on fossil fuel that will be beneficial to reduce dependence on coal and wood.	High	Low	5
Government savings by reduced use of subsidized kerosene, which is a major fuel in rural areas.	Low	Medium	6

(**Table 1:** Strength Factors of the Business Model)

1.4.2.2 Weakness

Factor	Probability of Occurrence	Impact	Ranking
High initial cost of investments required which are not affordable by village communities.	High	High	1
Huge risk of default and non-performing accounts may develop under the MFI that provides micro-loans for such projects.	Medium	High	2
Risk due to lack of knowledge about the benefits of adopting renewable energy. The cost to benefit ratio might be high.	Medium	Medium	3
Lack of support from village community in adopting such new technologies. Means of generating income may remain unused.	Low	Medium	4
Misappropriation of government grants provided in the scheme.	High	Medium	5

(**Table 2:** Weakness Factors of the Business Model)

1.4.2.3 Opportunity

Factor	Probability of Occurrence	Impact	Ranking
Development of new sources of income that will lead to the modernizationof a rural area.	Medium	High	1
Paving way to implement similar programs for different services like health, education, IT and retail services.	Medium	High	2
Improving private sector involvement in the rural sector. This is possible once sufficient returns on investments are	High	Medium	3

ensured to the private parties.			
Better penetration of energy sources in the rural areas,which will reduce the responsibilities of the local and state governing bodies.	Medium	Low	4
The business model provides OEMs an opportunity to develop technology services for the rural sector with the support of other stakeholders in the model.	Medium	Medium	5

(**Table 3:** Opportunity Factors of the Business Model)

1.4.2.4 Threat

Factor	Probability of Occurrence	Impact	Ranking
Unclear roles among stakeholders may lead to conflicts in case the project suffers.	High	Medium	1
Lack of knowledge of the renewable energy may lead to unwillingness in adoption. There may be an inherent fear in the village community about using the new technology.	Low	Medium	2
Extremist individuals and groups (like money lenders) in the village community may create conflicts in case their dominance gets reduced due to self-sufficiency of the masses.	Medium	Medium	3
Government may not provide support to some projects that have already been started by some state bodies.	Low	Medium	4

(**Table 4:** Threat Factors of the Business Model)

1.4.3 Case Studies

A few projects have been initiated in this field all across the globe. Bangladesh has been the pioneer of such rural development programs and a few projects have been initiated in the region with the support of local government, NGOs and development organizations like the World Bank. This section deals with some specific projects that can be regarded as distinguished case studies in this area. They have been selected

purely for the academic study of the topic, irrespective of their current status, success and challenges.

- Solomon Islands saw a new project for renewable energy that used a unique microfinance concept. The rural community paid for the micro-loans not in cash but in kind using the crops as barter for electricity. The crops were then sold to traders who dealt with the microfinance institution. This method ensured that the rural population obtained sufficient returns on their crops and paid the scheduled monthly payment of the loan. [2]
- A government-sponsored program has been launched to promote the use of biogas in rural areas of China. Due to lack of financing, a local microfinance institution developed a microloan specially dedicated to renewable energy. The loans are used to install biogas pits and solar panels and provide energy, which increases agrarian productivity of the individual farmers. [3]

1.4.4 Project Management Strategies

Some project management strategies may prove advantageous to the model. They can help in resolving issues and streamlining the process. The ultimate objective of the business model is to be help in the adoption of renewable energy at a larger scale. Pilot projects have been implemented, but the success of such a rural empowerment scheme is possible only when strategic opportunities and challenges are targeted froma long term perspective.

1.4.4.1 Targetingchallenges

- It will be beneficial to first identify the opportunities that can be targeted in a specific region and have the potential of being introduced in the entire country at a mature level.
- The technology providers should be encouraged to better R&D techniques that provide sustainable technology solutions to rural masses at a cost effective level. It is essential to develop new technologies that can help achieve the aim of economic self-sustainability of Indian villages.
- Government should provide incentives to the technology companies and private partners venturing into this business model. One solution could be to provide rebate on export duties to these companies. It will be beneficial to provide incentives not in cash but ‘kind’ to avoid the misappropriation of grants and loan schemes.
- Microfinance institutions should focus on developing new income opportunities for the rural community being powered by renewable energy under such a model. Here the MFI can partner with local dealers of nearby towns and cities to source out the products or crops from such communities at a reasonable price level.
- Small cottage industries should be developed in such rural communities. Not only will this generate tremendous employment opportunities, but will also be a green industry powered by a renewable source. This solution will develop as a long term strategy as the initial cost and operating expenses will be very high.
- It is essential to develop a strong strategic partnership model that can support the overall working capacity of the project.Continuous improvements need to be performed that can update the model with new opportunities of income and employment. The business model should aim at creating a supply chain strategy where each stakeholder can cover a certain aspect of working. This model should

be robust enough to be replicated across the entire country, preferably under a centralized control.

1.4.4.2 Mitigating risks

- At the initial stage of development, the model faces the communication barrier,which exists in the village communities. NGOs and community development workers should ensure that these barriers are removed and the threat of non-adoption is removed.
- Educating the rural population about the benefits of renewable energy is as important as spreading awareness among the private users to invest in such a model. Only after a collaborative approach is established, will the associated risks be minimized. Having many parties under one stakeholder group will ensure that funds and expertise is maintained throughout. Default on the part of one party should not lead to an adverse impact on the survival of the project.
- Gaining support from private parties and investors across different sectors will make the model more robust towards adopting new challenges of a rural community empowerment. The same model has the potential of being scaled to provide different services to the rural community at a later stage.

1.5 Conclusion

Rural empowerment is possible by the public private partnership model where risks and roles are explicitly detailed. Beginning from a small initiate as a renewable energy installation, the model has the strength to develop into a small scale cottage industry. Renewable energy provides us a solution at an off-grid area without huge infrastructure cost of grid-connectivity. Although the cost of renewable energy installation is also high, the cost can be borne by the micro-loan scheme provided by microfinance institutions. The short term objective is to provide basic energy for cooking and lightning of a rural household.

Looking at a global scenario, the various developments in renewable energy have shown a huge potential that is still untapped in this segment. Renewable energy projects reduce the problem of carbon emissions and get financial incentives from a carbon trading exchange like Chicago Climate Exchange (CCX) established in Chicago. Various such projects from India and China are already listed under CCX. With the adoption of renewable energy worldwide these mechanisms will open new ways of getting finance for renewable energy.

Creating renewable energy projects for the empowerment of rural population has a tremendous potential untapped. Only when the business models are streamlined and the risks and mitigated by proper strategic planning, can these initiative be deemed successful. Project management techniques can help to reduce the various risks associated by planning out the business activities, implementing them with efficiency and recording the failures for future improvement of these models.

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