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ENHANCED DISTRIBUTION MODEL AND RECOMMENDATIONS FOR IMPROVEMENT ENERGY CONSUPTION IN RURAL AREA

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ABSTRACT

The study reports and the literature review, features of study area, assessment of resources and the demand of energy, development of models, optimization and selection of appropriate model suitable for the area. A methodology was also developed by to design RES using a linear programming (LP) approach, which minimizes an objective function of total annual cost, subject to a set of energy and power constraints. A mathematical approach has been used in a simple and useful form and is directly applicable for the design of stand-alone IRES (INTEGRATED RENEWABLE ENERGY SOURCES) for rural area of developing countries. Focused on the design of stand-alone IRES with the technical and economic aspects and utilized loss of power supply probability (LPSP) as the key system variable.

There are three choices to improve power supply in country ranges:

Keywords - Energy Conservation, Energy Scenario, Energy Parameters in India, Energy in Maharashtra

I. INTRODUCTION

The Decentralized distribution of Electrical Energy can effectively improve Availability and affordability of energy to Rural Area

There are three choices to improve power supply in country ranges:

1) **FIT (Feed in Tariff) model**: Distributed era plants offer energy to the lattice at FIT dictated by the controller, and this power is added to the utility's brought together pool.

2) **Rural appropriation franchisee (RDF):** An info based dispersion franchisee is designated by the utility for metering, charging, and accumulation exercises, yet is not allowed to source control past its agreement with the utility.

3.) **Disseminated Generation and supply (DG&S):** Combined era and circulation, i.e., notwithstanding conveying force and gathering incomes, the franchisee likewise creates control locally and supplies to the diversified region. Figure speaks to the stream of power as indicated by each of these choices.

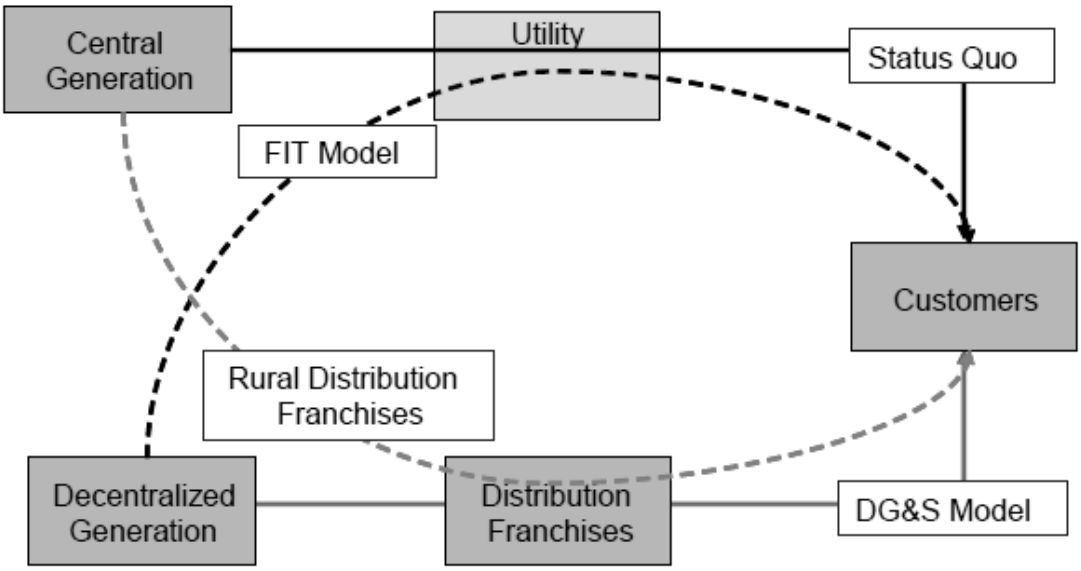

Figure. Possible options for enhancing rural power supply

Table summarizes the pros and cons of the existing options vis-à-vis the mutual DG&S model described above.

s. The surplus power, assuming any, is encouraged once again into the framework and is paid for by the utility at the proper FIT (if there should arise an occurrence of renewable energy according to power buy assention [PPA]).

Operational appropriations or extra wage is given to motivator DG&S administrator to initially take care of nearby demand before steering energy to the framework. The utility fundamentally lessens its total specialized and business (AT&C) misfortunes for serving the zone. Likewise, if the neighborhood plant is renewable-based, the limit is credited against its renewable portfolio commitment (RPC) amount as dictated by the State Electricity Regulatory Commission (SERC). This model has the upsides of appropriation establishments (lessened AT&C misfortunes and enhanced client benefit) and the accompanying extra advantages to the partners:

A. Customers

• Increasing unwavering quality and administration levels.

• Increasing power accessibility (as neighborhood era is hostage, the provincial regions are ensured supply).

• Accelerating people group improvement. (While not adequate without anyone else's input, the accessibility of ensured, long haul, solid power from a nearby source can goad financial development through energy escalated esteem included administration ventures.)

B. Utility

• Contributing to the RPO of the utility if the nearby plant utilizes a renewable energy asset.

• Avoiding transmission accuses and misfortunes related of unified influence sources by utilizing nearby era utilities.

• Meeting its administration commitments

IV. CONCLUSION AND RECOOMENDATIONS

Following areas need urgent attention and recommendations.

4.1 Availability of energy shall be made easy and consistent

Goal: Transmission and Distribution losses to be reduced)

Mahararashtra is one of the highest power losses in Technical losses, Theft and other losses if we go by 2015 ,Data 38000 MW capacity

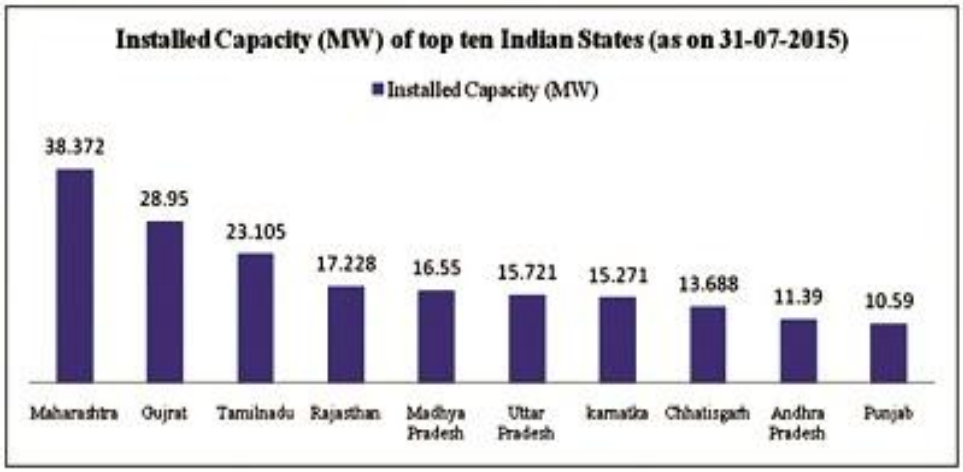

Figure 7.1 :Installed Power capacity Maharashtra

Source :CEA,2016

We can assume @10000 MW potential losses can be reduced to 5000 MW thereby saving 5000 MW additionally

Present situation: 25-35 % losses

Target Situation : 10-15%

Recommendations:

A. Investment in Transmission and Distribution appropriation, Monitoring and control Mechanism,

B. Feeder wise optimization strategy and SCADA

Goals: saving in Electricity by Energy Efficiency across Industry ,appliances and Households

State has Potential Energy saving .The inefficient systems ,Motors ,pumps ,Thermal equipment ,control has a lot to save

Table 4.1 :Potential energy Saving

Sr. No.	Sector	Conservation potential (%)
1	Industrial Sector	Up to 25
2	Agriculture Sector	Up to 30
3	Domestic Sector	Up to 20
4	Commercial Sector	Up to 30

(Source MEDA ,Govt of Maharashtra)

This indicates @ 8000 MW available for saving

Present situation: Average 25% Potential is available

Target Situation : Tap 10-15%

Recommendations

A. Appointment of Energy Auditor for Major consumers

B. Municipal wise Energy Audit

C.Insetive schems

D.Energy Audit compulsory with Financial Audit

4.2. The utilization of Energy shall be targeted increased in efficient and economical manner

Goals: To Promote SMALL SCALE INDUSTRY /House hold business with attractive Energy Teriffs

The survey has outcome in the comment section that if Energy is available for complete time and Rates are attractive people/industrialist may start business in Rural Area .

Present situation: Availability and Affordability is the issue

Target Situation : Promote Attractive schemes

Recommendations:

A. Make Electricity Free for certain period for small scale industry based on Limits .Silvassa Model is Efficient

B. Promoting Gas Piping IN Rural area

C. Distribute Renewable Energy Equipments

4. 3. Maximization of women's labor by ensuring Cooking means and heating lighting means available

Goals: To Promote LPG ,solar Heating ,small Biogas Plants ,solar PV ,solar cooker

The Outcome of survey shows Majority women's engaged in Biomass collection .This can be turned efficiently by availability and affordability

Present situation: Availability and Affordability is the issue

Target Situation : efficient Implementation of REE

Recommendations:

A. Govt To provide Solar cooker Free /Subsidized.

B. LPG subsidized Rates for Lower income group

C. Promoting Biogas .Subsided Cow/Buffalo Farming

4.4 Other Key Outcome and Suggestions

- Captive power generation by different private and cooperative industries is one of the best
- Alternatives to resolve electricity shortage.
- Innovative pump sets programs of central government must be once again initiated for economic use of electricity of farming sector.
- Exploitation of different sources like televisions, internet is to educate /inform customers. The awareness camps among consumers to use electric equipment having more stars.
- Feeder-wise energy conservation must be analyzed for load inspection. Losses and thefts must be reduced to its minimum level by installing new advanced appliances at substation level.

4.5. Awareness about Non renewable sources .Policy Correction and Effective implementation

Goal :Clean Energy Drive

Survey has Outcome of RES unawareness. Peoples are unawreness about hazardous effect of Biomass Burning ,coal usage etc

Present situation: high Degree Unawareness

Target Situation : Choice to cleaner fuel

Recommendations:

A. Awareness Drives

B. Inclusion in the Education system

C.Gram Sabha Agenda

4.6 MUNCIPLAE WASTE TO ENERGY DRIVES

As per MNRE indan states has following capacity

Table: Potential for Municipal waste to energy Project

state/Union Territory	From Liquid Wastes* (MW)	From Solid Wastes (MW)	Total (MW)
Andhra Pradesh	16.0	107.0	123.0
Assam	2.0	6.0	8.0
Bihar	6.0	67.0	73.0
Chandigarh	1.0	5.0	6.0
Chhattisgarh	2.0	22.0	24.0
Delhi	20.0	111.0	131.0
Gujarat	14.0	98.0	112.0
Haryana	6.0	18.0	24.0
Jharkhand	2.0	8.0	10.0
Karnataka	26.0	125.0	151.0
Kerala	4.0	32.0	36.0
Madhya Pradesh	10.0	68.0	78.0
Maharashtra	37.0	250.0	287.0
Manipur	0.5	1.5	2.0
Orissa	3.0	19.0	22.0
Pondicherry	0.5	2.0	2.5
Punjab	6.0	39.0	45.0
Rajasthan	9.0	53.0	62.0
Tamil Nadu	14.0	137.0	151.0
Uttar Pradesh	22.0	154.0	176.0

Uttaranchal	1.0	4.0	5.0
West Bengal	22.0	126.0	148.0
Total	**226.0**	**1457.0**	**1683.0**

From the Table one can find that there have an estimated potential of about 220 MW from all types (estimate from MNRE) and about 1460 MW of power from the MSW generated in India, thus a total of close to 1700 MW of power.

Of this, only about 24 MW have been exploited, according to MNRE. Thus, less than 1.5% of the total potential has been achieved

Table : Current Waste-to-Energy Installed Capacity

GRID-INTERACTIVE POWER		**(CAPACITIES IN MW)**	**Contribution (%)**
Waste to Power			
	Urban	20.20	27.4
	Industrial	53.46	72.6
	Total	**73.66**	

V.CONCLUSION

From the discussion ,The way forward

- For faster, reliable and effective rural electrification a unified model for implementation is necessary. An integrated policy framework would help in this regards.
- We also need regulatory framework to support min-grid based rural electrification which can be sustainable in long term. Mini grids depend on small local consumers which are mostly dependent on agriculture income. These groups are vulnerable to loss of income from disturbances in agricultural activities resulting in loss of revenue for micro-grids. Such practical difficulties need to be addressed on priority basis.
- Solar street lights/ lighting community places Introduced in early 1980s for village electrification and providing light at community places.
- Solar lanterns / home lighting systems
- Introduced in mid 1980s for providing basic light ing solutions to households, new versions with LED lights and additional facilities like cell phone charging or powering fans, TV
- Solar charging stations
- Lantern charging stations which work on tee tor service principle, managed by local entrepreneur
- Mini grids
- Mini grids with variety of sizes based on solar, wind, small hydro or biomass power. These are promising candidates for sustainable business model for rural electrification
- Grid interactive grids
- MW level RE powered grid with smart controllers and suitable energy storage technologies. These grids can fulfill the need for reliable 24 x 7 power in rural areas

- Technology development in hybrid systems tor mini grids and energy storage systems for balancing supply and demand in mini grids or distributed generation in remote areas is essential.
- Awareness, capacity building and creating quality consciousness among the players is also an essential part of the process. Rural electrification is complex and challenging however, an integrated approach of combining renewable with conventional grid extension approach and proactive policies to resolve the integration and tariff issues is one of the preferred ways to move ahead.

Energy losses restriction down to 10 %

Energy conservation drive in industry and appliances

Renewable energy propagation in efficient with regulation and incentives

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