

Clean Energy & its Impact: Template for Primary and Secondary Data Collection and Collation for Studying the Changes to the Developmental Paradigms in Sagar Island with Grid Electricity



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Integrated Coastal Zone Management Project which is being implemented in West Bengal has a primary mandate of amelioration of environment through reduction of pollution in its areas of intervention i.e. primarily Sagar Block along with coastal stretches of East Midnapore district. In this context creation of a major infrastructure facility, namely extension of grid electricity to Sagar Island upto household level has been taken up. It is to be noted that Sagar Block comprises of two islands i.e. Sagar Island and Ghoramara respectively. The said investment has been piloted by West Bengal State Electricity Distribution Company Ltd in coordination with the State Project Management Unit- West Bengal of ICZM Project. The total financial outlay of this project component is Rs 34.24 crores.

The above work component was entrusted to the turnkey contractor named M/S Starling & Wilson Ltd with an initial contract value of Rs.25.88 crores but later it was revised to Rs 32.27 crores due to additional works.

The execution of the work component is nearing completion and some documentation may be necessitated. In this regard in order to have quantitative and qualitative assessment in terms of the physical execution of the work component along with the socio-economic dimensions a three part template has been authored.

- ◆ Part A of the template pivots around secondary data collection and collation that needs to be sourced from WBSEDCL.
- ◆ Part B will be based on some random sample survey covering all the Gram Panchayats in Sagar Island at the household level.
- ◆ Part C hinges on stratified sample survey, semi-structured interviews, focus group discussions and observations – in some selected places of Sagar Island.

The collated data may be processed and interpreted to see to what extent the targeted project beneficiaries have been benefitted either directly or indirectly and what more needs to be done for the successful fructification of the project component.

Part – A

Major Outcomes of the Collection & Collation of Secondary data from WBSEDCL

- ∇ In situ situation at the time of commencement of the project (baseline data).
- ∇ Extent of physical work done.
- ∇ Financial analysis of the project with a reference to sustainability and addressing of issues pertaining to pollution management.
- ∇ Extent of household connection along with public offices and utilities.
- ∇ Type of new entrepreneurships that are being developed and nurtured with the introduction of grid electricity -24X7.

Demographic profile of Sagar Island as on.....

Gram Panchayat	Populati on	General	SC	ST	OBC	Minority	Literacy rate	Female literacy rate	Total no. of Househ olds	Working population	Average land per landowning families
Rudranagar											
Muriganga I											
Muriganga II											
Gangasagar											
Dhablat											
Dhasparasumatinagar I											
Dhasparasumatinagar II											
Ramkarchar											
Total											

Power Infrastructure in Sagar Island before the onset of the project		
1.	No. of DG sets Installed	
2.	Capacity of DG sets	
3.	Length of HT 11KV O/H Line	
4.	Length of LT O/H line	
5.	No. of 11/0.4 KV Distribution Sub-Station	
6.	Supply (KWH)	

Number of Consumers Connected to DG power in Sagar Island before the onset of the project		
1	Number of Gram Panchayats covered under Diesel power	
2.	Number of Revenue villages getting Diesel power	
3.	Number of domestic Households	
4.	Number of Commercial Consumers	
5.	Number of Industrial Consumers	
6.	Average Demand per Month(kWh or unit)	

Financial analysis of existing Power Infrastructure of Sagar Island before the onset of the project	
Average consumption per month	
Average consumption per year considering 24 hour power supply	
Cost of Supply per year	
Revenue earning	
Profit/Loss each year	

Key Components of the Sagar Island's Electrification Work

Sagar Island's electrification major work components	Cost Incurred/ Estimated
Drawl of 33kv line from the existing 33/11 kV Kakdwip substation at Kakdwip up to Lot 8 river bank. Drawl of 33 KV line was undertaken by WBSEDCL.	
Crossing of river Muriganga through river crossing towers and stringing to Kachuberia on Sagar Island was done by West Bengal State Electricity Transmission Company Limited.	
Construction of Rudranagar substation and drawl of 33 kV line from Kachuberia to Rudranagar substation was again undertaken by WBSEDCL.	
The present project component under ICZM Project covers drawl of 11 kV line from Rudranagar substation, drawl of HT/LT line and the installation of distribution transformers at various location of Sagar Island to supply grid power 24X7 to all its potential consumers.	
If any other (mention it)	

Timeline for Preparation of DPR, Procurement and Implementation of the work component

Activities	Sub activities	Period of activities
Preparation and submission of DPR		
Preparation of Bidding document	Preparation and finalization of bid document	
Sale of bid document		
Submission of questionnaire for pre bid meeting		
Bid evaluation	Pre bid meeting Submission of bid opening of bid Evaluation of technical bid. Intimation to bidder Price bid opening final evaluation Drafting of LOA Vetting of LOA Placement of LOA	
Survey	By successful contractor	
Procurement	Signing of contract	
	Approval of Drawing etc.	
	Inspection	
	Dispatch of materials	
Physical execution	Erection of pole Erection of fittings, stringing work and installation of DTR etc.	
Inauguration of the work component		

Scope of work and estimated cost

Sl No.	Description of work	Quantity	Cost of material (m INR)	Cost of labor(m INR)	Cost of Supervision(m INR)	Cess @ 1% on labor charge	Additional transport cost	Total (in INR)

Main Indicators of the work component estimated and achieved

Physical description of the main indicators	Estimated	Achieved
Length of transmission lines in Circuit Kms(LT+HT)		
No of 33 KV lines		
No of 11 KV lines		
No. of Poles		
No. of DTRs		
No. of 33 KV Substations		
Capacity of MVA		

Status of household electrification and its coverage in Sagar Island as on.....

Gram Panchayat	No. of revenue villages	No. of Electrified revenue villages	No. of Households	No. of BPL Households	No. of Electrified Households	No. of Electrified BPL Households	Beneficiaries	Per capita electricity consumption
Rudranagar								
Muriganga I								
Muriganga II								
Gangasagar								
Dhablat								
Dhasparasumatinar I								
Dhasparasumatinar II								
Ramkarchar								

Households surveyed, Households with meter installed & Households with grid connection as on.....

Gram Panchayat	Total No. of Household surveyed in electrified Villages	No. of Households with meter installed	No. of Households with grid connection
Rudranagar			
Muriganga I			
Muriganga II			
Gangasagar			
Dhablat			
Dhasparasumatinar I			
Dhasparasumatinar II			
Ramkarchar			

Public places and Public utilities	Proposed to be Electrified under the scheme	Achieved
Schools/Colleges		
Panchayat Samiti Office		
Hospital/Health Centre		
Police Station/Outpost		
Water works		
Sagar Block Office		
GBDA Office		
Gram Panchayat Offices		
Offices of other line Departments		
Street lighting		
Total:		

Statement on Grid Power Generation, Distribution and Transmission with respect to Sagar Island

Year	Generation cost per KWH	Transmission Infrastructure cost per KM for a load ofKw	Other maintenance costs/distribution on infrastructure etc.(per KWH)	Total cost per KWH per KM
2010				
2011				
2012				
2013				
2014				
2015				

Financial metrics of Grid electricity in Sagar Island

Production(KWH/Year)	% share to Sagar Block	CAPEX	OPEX	Total Cost	BEP	NPV	ROI	No. of persons employed	No. of Mandays generated

Projected Financial Analysis after the completion of the project						
Indicators	2015	2016	2017	2018	2019	2020
Estimated consumption per month after completion						
Consumption/year(12xG)						
Revenue earning from newly connected consumers/year Considering ..% Distribution loss & ..% transmission loss						
Cost of power purchased with ...% Distribution loss & ..% transmission loss						
Net earnings						
Reduction of recurring loss due to DG set operation/year						
Total benefit when power supply is given through WBSEDCL's grid						

Projected Internal Rate of Return

Year	Initial investment(cash inflow)	O & M cost @3% of project cost(cash out flow)	Earning in Corers(cash inflow)	Net cash flow	Discount factor @ 9.5%	Net present Value taking r= 9.5%	Calculated Discount factor @ 10%	Net present value	Calculated Discount factor @ 10.18%	Net present value

Provide a note on actual rate of return

Distribution as on ..

Parameters pertaining to distribution of grid electricity	units
Total No. of consumers	
Total connected load	
Weighted average distribution losses	
Line Losses	
Voltage drop	
Per capita annual power consumption	
T&D losses	
ATC Losses	

Connected load per consumer as on.....

Name of the Gram Panchayat	No. Upto 0.5 kw	No. 0.5 to 1 kw	No. 1 to 2 kw	No. 2 to 5 kw	No. 5 kw to above nos.
Rudranagar					
Muriganga I					
Muriganga II					
Gangasagar					
Rudranagar					
Dhablat					
Dhasparasumatinagar I					
Dhasparasumatinagar II					
Ramkarchar					

Electrical Network in Village as on..

Name of the Gram Panchayat	33/11 Kv/s feeding village	Capacity MVA	Length of Network in GPs in cKms	Capacity of DTRs/Capacity available to DTRs /No. of DTRs	No. of Electric poles/ distribution points in GP	No. and size of DG sets in GPs	Average connected load watt/HH	Total Demand of village in KW
Rudranagar								
Muriganga I								
Muriganga II								
Gangasagar								
Rudranagar								
Dhablat								
Dhasparasumatinagar I								
Dhasparasumatinagar II								
Ramkarchar								

Projected Electricity Demand & Supply

Year	Projected population	Projected domestic load	Projected commercial load	Projected industrial load	Projected agricultural load	Projected street lighting load	Projected energy demand/load	Peak Demand	Capacity Reqd.

Retail Power Tariffs as on....

Retail Power Tariffs	Actual	Provisional	Revised	Annual Plan
Domestic				
Commercial				
Agriculture				
Industry				
Public Services, School, Hospital				

Revenue Generation from Sagar Island

Name of the Gram Panchayat	2010	2011	2012	2013	2014	2015
Rudranagar						
Muriganga I						
Muriganga II						
Gangasagar						
Rudranagar						
Dhablat						
Dhasparasumatinagar I						
Dhasparasumatinagar II						
Ramkarchar						

Supply, Subsidy, Revenue and Tariff

Cost of Supply, Subsidy and Tariff	2010	2011	2012	2013	2014	2015
Cost of Supply(Paise/KWH)						
Cost of electricity KWH cost						
Average Tariff(paise/KWH)						
Sales revenue/ KWH sale						
Total KWh less sales revenue KWH sale						
Average Agricultural Tariff(Paise/KWH)						
Average Domestic Tariff(Paise/KWH)						
Average commercial Tariff(Paise/KWH)						
Average industrial Tariff(Paise/KWH)						
% of recovery						
Commercial Losses(with subsidy)						
Commercial Loses(Without Subsidy)						
Subsidy for domestic consumer						
Subsidy for agricultural consumer						
Gross Subsidy						
Subvention Received						
Unrecovered subsidy						
Gross Subsidy/Unit						

Tariff Collection Process Details & frequency of Non-Payment

Collector internal or external to the community	Basis of payment to the Collector	Penalties enforced	Frequency of non-payment

Method of Bill Collection

Collections by Franchisee	(Y/N)
Home to Home	(Y/N)
Few locations/drop box	(Y/N)
In Franchisee office	(Y/N)
Panchayat	(Y/N)
Electricity office of utility	(Y/N)

Funding Sources of Maintenance

Year	Government/WBSEDCL'S Own Reserve Fund	Internal(tariff based)
2012		
2013		
2014		

Pattern of Power consumption in Sagar Island from the year 2012-2015

Item	Rudranagar	Muriganga I	Muriganga II	Gangasagar	Dhablat	Dhasparasumatinar I	Dhasparasumatinar II	Ramkarchar
Domestic consumption								
Commercial consumption								
Industrial consumption								
Public Light System								
Ferry Ghats								
Agricultural consumption								
Public services, school, hospital								
Public Water Supply consumption along with other public utilities and offices								

Status of renewable energy in Sagar Island as on.....

Gram Panchayat	Bio-gas Plants(no.) with capacity and households catered	Bio Mass Gasifiers(MW) (no.) with capacity and households catered	Solar Home Lighting System(no.) with capacity and households catered	Solar lanterns (no.) with capacity and households catered	No. of Solar photovoltaic plants with capacity and households catered	Wind Energy with capacity and households catered
Rudranagar						
Muriganga I						
Muriganga II						
Gangasagar						
Dhablat						
Dhasparasumatinar I						
Dhasparasumatinar II						
Ramkarchar						

Statement on Duration of Power Supply & Disruption

Year	Duration of power supply (total hours in a year)	Units of power supplied	Disruption (total hours in a year)	Disruption Cause
2010				
2011				
2012				
2013				
2014				
2015				

Power Disruption

Causes of disruption	No. of cases in 2012	No. of cases in 2013	No. of cases in 2014
Transformer Burned Out			
Theft of Wire			
Theft of Transformer			
Wire Fell Down			
Theft of Transformer Coil			
Tidal Flood			
Storm Surge			

Note on Community Involvement

- ◆ Initiation/Planning strategy help
- ◆ Collection of tariff
- ◆ Construction labor
- ◆ Contribution of Land
- ◆ Community ownership
- ◆ Deploying CBOs for
 - ▽ Mobilization of consumers
 - ▽ Meter Reading
 - ▽ Delivery of Energy Bills to the consumers

Note on Demand Side Management Measures that had been or may be deployed in Sagar Block

- Efficient Appliances
- Limiting Business hours
- Home-wiring restrictions
- Over-use penalties
- Load Limits

Note on WBSEDCL's contribution as an energy utility service provider with reference to Gangasagar Mela before and after grid electricity. Briefly mention the qualitative improvement of services, enhanced scope of work along with the environmental parameters that were taken care of due to the introduction of grid electricity.

Part – B

Major Outcomes of the Proposed Random Sample Survey

- ∇ Socioeconomic profile of actual and potential beneficiaries/customers
- ∇ Fuel and energy use before and after grid electricity including energy from all sources, such as candles, kerosene, batteries, diesel sets and etc.
- ∇ Monthly expenditures on fuels and energy, by source
- ∇ Potential and actual willingness to pay for energy services
- ∇ Reasons for not connecting to the grid
- ∇ Appliances in rural households, including those with and those without electricity
- ∇ Benefits accrued due to grid electricity
- ∇ Degree of satisfaction level

Questionnaire for Random Sample Survey

1. **Name of the Gram Panchayat**.....
2. **Name of the Revenue Village**.....
3. **Household Serial No:**
4. **GPS reading:**
5. **Name of the respondent**
6. **Is the respondent or his/ her family conversant about works of ICZMP Y/N. If yes then state the source:-**

Source	Y/N	Rank (in increasing order)
Village/ Ward Notice Board		
Public Announcement (Megaphone)/ Public Meeting		
Pamphlet/ Hoarding/ Banner		
Govt. Officials/GP Members		
NGOs / Community Organizations/ CBOs/ SHGs		
Local business associations/ clubs		

7. **Caste cum Religion:** _____
[Code: SC-1, ST-2, OBC-3, General-4, Minority- 5]
8. **Voter Card ID/ Aadhar Card ID of the respondent**
9. **Type of ration card: 1= Antodaya; 2=BPL; 3=APL**
10. **Number of Family members:**

Number of family members	Total
Male	
Female	
Total	

11. **Education:**

Code	Education	Total members		Total
		Male	Female	
1	Illiterate			
2	Upto class V			
3	Beyond class V but upto class IX			
4	10 th standard			
5	12 th standard			
6	Graduation and above			

12. Type of Dwelling:

Code	Parameters pertaining to dwelling	Write the appropriate code or Y/N as the case may be
1	Type of house: [Code: Kutchha - 1A, Pucca - 1B - semi Pucca - 1C]	
2	Do you have a separate kitchen	
3	Do you have a bathroom in the house	
4	Do you have a latrine in the house	
5	Do you have a household water source	

13. What type of Toilet facilities does the household use

Description	Y/ N
Flush toilet to piped sewer system	
Flush toilet to septic tank	
Flush toilet to pit latrine	
Ventilated improved pit latrine	
Pit latrine with slab	
Pit latrine without slab/open pit	
Composting toilet	
Bucket	
Hanging toilet/hanging latrine	
No facilities or bush or field	
Do you share this facility with other households? (Y/ N)	
Can any member of the public use this toilet?	

14. What is the main source of water used by your household for drinking and other purposes, such as cooking and hand washing?

Description of source	Drinking purpose Y/ N	Other purposes Y/ N	Nearest Water Source
Piped Water into Dwelling			
Public Tap/Standpipe			
Hand Pump/ Bore Well			
Dug Well			
Rainwater Collection			
Water Vendor			
Tank/ Pond			
Canal, Irrigation Channels			

15.

What is the common method of solid waste disposal mechanism at your household?

Description of solid waste disposal mechanism	Y/ N
Skip Bin	
Pit	
Heap	
Garden	

16.

Land Ownership - (Y/N) , if yes then narrate the following:

Sl. No	Land type	Cultivation land		Non-cultivation land/non-farm land	Orchard/ plantation land	Homestead land
		Irrigated	Unirrigated			
1	Land owned (including jointly owned)					
2	Land possessed but not owned but leased from private/ public					

17.

Which type of facility did your family visit, or which type of health provider did your family consult?

Healthcare facility	Y/ N	Rank on the basis of accessibility
Govt. hospital		
Public health center/ sub center		
ICDS center		
Private clinics/dispensaries having MBBS/ MD/ BHMS physicians		
Traditional healer		

18. **Social Integration Mapping**

Whether the member(s) of the household are associated with any of the following	Y/N
SHG/ Federated bodies	
NGO	
Religious Group	
Village Development Committee	
Local-self-government/ Panchayat/Panchayat Samity	
Business association	
Cooperatives	

Whether the member(s) of the household are associated with any of the following	Y/N
Water user associations/ watershed committees	
Beneficiary committees as part of EPA implementation under ICZMP	

19.

In the past one year, did your household receive any income from the following sources?

Income Source	Y/N	Rank in increasing order
Cultivation(own)/Farm income		
Fishing/ Fisheries related activities		
Forest gatherer/natural produce collection		
Livestock/other agro-enterprise		
Casual wage employment (agricultural)		
Casual wage employment (non-agricultural)		
Salaried employment		
Own non-agricultural enterprises/businesses/services		
Rental income		
Income from savings in financial institutions and equity		
Pension		
Remittances/transfers from friends or family (cash or kind)		
Begging/charity		

20. **Household consumption pattern**

Consumption pattern	Last 30 days (in quantity/ price)	Last 365 days (in quantity/ price)
Cereals & cereal products (includes muri, chira, maida, suji, noodles, bread (bakery), barely, cereal substitutes, etc.		
Pulses & pulse products (includes soyabean, gram products, besan, sattu, etc.)		
Milk and milk products (includes milk condensed/ powder, baby food, ghee, butter, ice-cream, etc.)		
Edible oil and vanaspati		

Consumption pattern	Last 30 days (in quantity/ price)	Last 365 days (in quantity/ price)
Vegetables, fruits & nuts (includes groundnut, bengal gram mango, banana, coconut, dates, kishmish, monacca, other dry fruits, etc.)		
Egg, fish, & meat		
Sugar (includes gur, candy (misri), honey, etc.)		
Salt, spices and other food items (includes beverages such as tea, coffee, fruit juice and processed food such as biscuits, cake, pickles, sauce, fast foods, dry chilies, curry powder, etc.)		
Pan, tobacco & intoxicants		
Fuel & lights		
Entertainment (includes cinema, picnic, sports, club fees, video cassettes, cable charges, etc.)		
Personal care and effects, toilet articles, and other sundry articles (includes spectacles, torch, umbrella, lighter, toothpastes, hair oil, shaving blades, electric bulb, tubelights, glassware, bucket, washing soap, agarbati, insecticide, etc.)		
Consumer services and conveyance (includes domestic servant, tailoring, grinding charges, telephone, legal expenses)		
Rent/house rent, taxes (includes water charges, etc.)		
Medical expenses		
Education expenses: Tuition fees & other fees, school books and other educational articles (includes private tutor, school/college fees, newspaper, library charges, stationery, internet charges, etc.)		
Clothing, bedding and footwear.		
Durable goods		
Furniture		

Consumption pattern	Last 30 days (in quantity/ price)	Last 365 days (in quantity/ price)
Utensils		
Ornaments		
Kitchen equipment's		
Vehicles		
Clocks & watches		
Cassettes & CDs		
TV, radio, etc.		
Other household appliances		
Repair and maintenance of household		

21. Type of household asset

Type of Asset	Y/N	No. of Assets
Utensils		
Two-wheeled motorized vehicle		
Three-wheeled motorized vehicle		
Four or more wheeled motorized vehicle		
Tractor		
Thrasher		
Harvester		
Mechanized tiller/Harrow/Seed drill		
Tube well		
Bore well		
Sprinkler/Drip irrigation set		

Bullock cart/other cart		
Fish pond		
Fishing net		
Motorized fishing boat		
Non-motorized fishing boat		
Processing plant for agricultural commodities		
Factory		
Brick kiln		
Sewing machine		
Generator/inverter		
Steel almirah		
Watch/Clock		
Ceiling/Table fan		
Cycle rickshaw		
Bicycle		
Cable TV connection or DTH		
Radio		
Television (colour or B&W)		
Air conditioner (A/C)		
Refrigerator		
Mobile/cell phone		
Landline telephone		
Computer/laptop		
Water cooler/purifier/filter		
Geyser/Room heater		
Electric mixer/grinder/ food processor		
Tape recorder/ cd player		
LPG/Biogas		

22.

Financial Assets

Financial Inclusion - Description	Y/N
Saving AC (either in Bank/ Post Office)	
National Savings Certificate/ Kisan vikas patra	
Provident fund	
Fixed Deposits	
Account in MFI	

23.

Household Indebtedness

Nature of loan(hereditary loan-1/ loan contracted in cash-2, loan contracted in kind-3, loan contracted partly in cash and partly in kind -4	Source: govt-1, cooperative society-2, bank-3, employer-4, landlord-5, professional money lender-5, shop keeper/ trader-6, relatives-7, SHG/ Cluster -8	Purpose: house hold consumption-1, medical expenses-2, educational expenses-3, legal-4, marriage and ceremonial expenses-5, purchase of land/ construction of building-6, productive purpose-7, repayment of old-debt-8

24.

What kind of livestock does the household possess?

Type of livestock	Y/N	No livestock
Goat		
Sheep		
Pig		
Cow		
Buffalo		
Hen		
Duck		
Mule/Donkey		
Fish (estimated- for those who own or leased ponds)		
Bee stocks		

25. **Government support and subsidy to the household**

Description of the assistances that are being received	Y/ N
Housing	
Education	
Insurance	
Agriculture	
MGNREGA	
Pension/ Handicapped pension	
Aanganwadi/ ICDS	
Financial assistance e.g. Kanyashree/ Yubashree etc.	
Any other (specify)	

26.

Main critical issues in the area in accordance with the respondent's perception. (rank in increasing order)

Main critical issues in your area	Rank
Sanitation	
Drinking water	
Communication with the main land	
Education	
Health	
Environmental disasters	
Road network within the hamlets	

27.

Whether any member(s) of the household has migrated outside or relocated within Sagar Block? (Y/ N). If yes then state the no. of migrants and also tick the appropriate undernoted reasons

Reasons for migration	Within Block	Sagar	Outside Block	Sagar
In search of better employment				
Transfer of service/ contract				
Proximity to place of work				
Studies				
Natural disaster				
Social/political problems				
Displacement by development project				
Housing problems				
Healthcare				
Post retirement				
Marriage				
Migration of parent/earning member of family				

28. Is the household is connected to the grid electricity? (Y/N).

29. If the household is not connected with the grid the respondent is required to state the same has applied or not. Respondent is also supposed to mention whether the electric connection is shared or not. If the respondent doesn't want to be connected with the grid then the reason needs to be specified

30. Means of Irrigation

Code	Water source (prioritize according to usage)	
1	River	
2	Canal	
3	Ground water	Electric
		Diesel
4	Water/Irrigation tank/pond	
5	Spring	
6	Any other (specify)	

31. Do the household work with pump set(s)? If yes then

Cost of running a pump set	Owned	Hired
Diesel		
Energized		

32. How much the household did have to pay for getting the grid connection?

Code	Cost incurred to get the grid connection (tick the appropriate)
1	Less than Rs 250.
2	Rs. 250-750/-
3	Rs. 750 - 1250/-
4	Rs. 1250 - 1750/-
5	More than Rs. 1750/-

33. How much time did it take to get grid connection (tick the appropriate)?

Code	Time taken to get the grid connection	Code	Time taken to get the grid connection
1	Less than 3 months	4	1 to 1.5 year
2	3 to 6 months	5	1.5 to 2 year
3	6 months to a year	6	More than 2 years

34. How many hours in a day do the household gets electricity (tick the appropriate selection)?

Code	Hours of electricity	Summer	Monsoon	Winter
1	Less than 4 hrs.			
2	4 to 8 hrs.			
3	8 to 12 hrs.			
4	12 to 16 hrs.			
5	16 to 20 hrs.			
6	20 to 24 hrs.			

35. What is the quantum of monthly bill that the household is willing to pay?

Code	Cost incurred to get the grid connection (tick the appropriate)
1	Less than Rs.100
2	Rs. 100-200/-
3	Rs. 200 – 300/-
4	Rs. 300 – 400/-
5	Rs. 400 – 500/-
6	More than Rs 500

36. What is your monthly consumption of (tick the appropriate)?

Code	Type	Consumption before and after being connected to the grid			Households without electrification
1	Kerosene	1	Less than 2 liter		
		2	2 to 4 liter		
		3	4 to 6 liter		
		4	6 to 8 liter		
		5	8 to 10 liter		
		6	More than 10 liter		
2	Candles	1	Less than a dozen		
		2	12 -24		
		3	24 – 36		
		4	More than 36		
3	Batteries for lighting	1	Less than 2		
		2	2 – 4 batteries		
		3	4 – 6 batteries		
		4	More than 6		
4	Diesel	1	Less than 5 liter		
		2	Less than 10 liter		

Code	Type	Consumption before and after being connected to the grid				Households without electrification
		3	Less than 15 liter			
		4	More than 15 liter			
5	Any other source used (specify)					

37. List all the appliances that the household owns that work on electricity

Code	Appliances owned	Quantity (units owned)	No. of units procured before grid electricity connection	No. of units procured after grid electricity connection	Cost incurred on purchase
1	TV				
2	Fan				
3	Electrical Stove/ cookingwares				
4	Radio/tape recorder				
5	Mobile				
6	Refrigerator				
7	Bulb/tube light				
8	Iron				
9	Cooler/ AC				
11	Washing machine				
12	Pump set				
13	Chaff cutter				
14	Heater				
15	Mixer/grinder				
16	Grain Processor				
17	Computer				
18	Any other (specify)				

38. What is the source of lighting for the household (prioritize according to usage)?

Code	Source of lighting	Rank	Code	Source of lighting	Rank
1	Grid Electricity		5	Firewood	
2	Kerosene Lamps		6	Any other (specify)	
3	Candle Wax		7	LPG/petromax lamp	
4	Solar lighting system				

39.

What fuel does this household mainly use for cooking (prioritize according to usage)?

Code	Source of lighting	Rank
1	Grid Electricity	
2	Kerosene	
3	Solar systems	
4	Charcoal/cowdung/ firewood	
5	LPG	

40. What is the duration and time of study of the children before and after grid electricity?

41. Whether the members of the household feel safer at night (Y/ N) – If yes then elaborate with instances

42. Whether the ability to conduct household (non-income generating) responsibilities has increased or decreased or remained same. Elaborate with instances

43. Whether the ability to conduct income-generating activities along with productivity/efficiency has enhanced. Elaborate with instances.

44. Frequency at which meter reading and billing are being done.

45. What is average billing amount for the last three months?

46. **Where the bill is being paid and whether the bill is being paid by own self or through a collection agent.**
47. **How long it takes for restoration of connectivity in case of disruption of electricity services?**
48. **Whether the household has ever launched any complaints against the service provider. If yes, then whether the grievance has been redressed and also the time duration in resolving the grievance.**
49. **Are you satisfied with the services provided by WBSEDCL?**

Part – C

Major Outcomes of the Proposed Random Sample Survey, Focus Group Discussions, Semi – Structured Interviews & Observations

- Time spent on education along with quality of education before and after grid electricity
- Quality of health care, access to medicines, presence of doctor(s)/health worker(s), preservation of drugs, pathological establishments before and after grid electricity
- Changes that grid electricity brought to micro-enterprises expansion, growth and establishment in rural areas
- Ease of telecommunication facilities.
- Improvement in mass transit system and road safety with respect to transportation of goods from interior zones to market hubs.

Questionnaire for Random Sample Survey- Micro-enterprises

A. General Information of Micro-enterprise

1. Name of respondent Gender
2. Enterprise Location..... Revenue village of.....Gram Panchayat
3. Main enterprise activity(ies)
4. Nature of ownership (single, family, partnership, cooperate)
5. Year of establishment of the enterprise
5. Where does the respondent sell his/ her products? Local market or distance market and why?

B. Information about Enterprises which uses grid electricity.

1. Whether the respondent’s activity(ies) has been connected to the grid? (Y/N)
2. If the respondent’s activity(ies) is not connected with the grid then the latter is required to state whether the same has applied or not.
3. How much the respondent did pay for getting the grid connection?
4. How much time did it take to get grid connection (tick the appropriate)?

Code	Time taken to get the grid connection	Code	Time taken to get the grid connection
1	Less than 3 months	4	1 to 1.5 year
2	3 to 6 months	5	1.5 to 2 year
3	6 months to a year	6	More than 2 years

5. For how long the enterprise was connected with the grid till date.

6. How many hours in a day do the household gets electricity (tick the appropriate selection)?

Code	Hours of electricity	Summer	Monsoon	Winter
1	Less than 4 hrs.			
2	4 to 8 hrs.			
3	8 to 12 hrs.			
4	12 to 16 hrs.			
5	16 to 20 hrs.			
6	20 to 24 hrs.			

7. Type of grid connection -

Domestic	
Commercial	

Agriculture	
Industry	

8. How does the respondent rate the quantity/quality of the electricity services its enterprise(s) are using?

(Reliability, Availability and affordability).

9. What type of existing technology or machines/ equipment and production process in the enterprise (electricity using machines or appliances for enterprise activities) being currently used

10. Is availability of electricity a contributing factor for starting and operating the respondent's enterprise? If yes how, if no, what were the influencing factors?

11. Does the enterprise share the electricity bill with household? Why?

12. Does the enterprise share the electricity by way of sub-metering?

13. Does the enterprise use other source of energy? For which activity (ies) and Why?

14. What are the advantages and benefits obtain from connection to the grid electricity?

15. What are the problems/barriers in accessing and using electricity services? Mention and explain them.

16. Frequency at which meter reading and billing are being done.

17. What is average billing amount for the last three months?

18. Where the bill is being paid and whether the bill is being paid by own self or through a collection agent.

19. How long it takes for restoration of connectivity in case of disruption of electricity services?

20. Whether the microenterprise has ever launched any complaints against the service provider. If yes, then whether the grievance has been redressed and also the time duration in resolving the grievance.

21. Whether the respondent is satisfied with the services provided by WBSEDCL?
22. What is the quantum of user-charges for grid electricity that the micro-enterprise is willing to bear?

C. Information about Enterprises without grid electricity services

1. Why is your enterprises not connected to electricity grid?
2. Do you know that electricity services can be used for productive purposes? Explain.
3. Are you willing to be connected to the grid electricity services? Why?
4. Are you ready to pay per month so that you can get electricity services for your activities? Do you have this money?

D. Livelihood situation of Enterprise owner

Changes that takes place within an enterprise after taking up grid electricity services

● **Social assets:**

1. Does use of electricity improves social relations of the entrepreneur? How
2. How did reputation of enterprise owner and employees improve in a community?
3. What were the effects on the enterprise employees and community members after the same has been connected to electricity?

● **Human Assets**

1. What skills have been improved by being involved in ME activities? Whether newer workforce has been introduced in order to keep pace with enhanced scope of activities?
2. Is taking up electricity services change in working hours of enterprise? And this leads to improvement of deliverables? How
3. How do the members of the enterprise use their extra time?

● **Financial Assets**

1. Has the use of electricity services improved turnover and income of entrepreneur?
How

2. Does change in production process lead to increase price of products for other villages/ markets? Why
3. By how much the availability and reliability of electricity improved the production, service time to customers, reduce work load, reduction of use of biomass energy, fossil fuel etc. Explain

● **Physical Assets**

1. Does use of electricity increase innovation of ME? And lead to improve quality of products and / or services?
2. How many branches opened or new business established, within or outside the village?
3. Is Use of electricity services lead to change in production processes and type of products? How?
4. What were the average production/services per month before connecting to electricity and after connecting to electricity?
5. Which new product/service have you started to produce after connecting to electricity? Mention them

Questionnaire for Random Sample Survey - Academic Institutions

1. Name of the respondent
2. Designation of the respondent.....
- 3.

Name of the Gram Panchayat	Name of the Revenue village	Name of the Academic Institution	Type of Academic Institution	Teacher Strength	Student strength	Whether connected to the Grid(Y/N)	Whether applied for Grid electricity (Y/N)	If not connected to the Grid then what are the alternative sources of energy that are being used along with quantum of usage

4.

No. and type of electrical appliances used – academic institutions with grid electricity	No. and type of electrical appliances used – academic institutions without grid electricity	No. and type of electrical appliances bought by the academic institutions after connecting with grid electricity

5.

Capital cost incurred owing to grid electrification(including the rental to WBSEDCL)	Quantum of energy user charges before grid connection	Quantum of energy user charges after grid connection

6. What is the major impact due to grid electricity that contributes in the enhancement of quality of education (say in terms of duration and period of classes, retention of students for longer period of time, introduction of ICT enabled courses, additional sources of lighting, provision of water for drinking and other usages, preservation of ingredients in laboratory and any other means)
7. How long it takes for restoration of connectivity in case of disruption of electricity services?
8. Whether the respondent has ever launched any complaints against the service provider. If yes, then whether the grievance has been redressed and also the time duration in resolving the grievance.
9. Whether the respondent is satisfied with the services provided by WBSEDCL?

Questionnaire for Random Sample Survey- Healthcare sector

1. Name of the respondent
2. Designation/ occupational pattern of the respondent.....

3.

Name of the Gram Panchayat	Name of the Revenue village	Name of the organization/ firm	Type of organization/ firm	No. of Employees	No. of beneficiaries/ consumers catered	Whether connected to the Grid(Y/N)	Whether applied for Grid electricity (Y/N)	If not connected to the Grid then what are the alternative sources of energy that are being used along with quantum of usage

4.

No. and type of electrical appliances used – organization/ firm with grid electricity	No. and type of electrical appliances used – organization/ firm without grid electricity	No. and type of electrical appliances bought by the organization/ firm after connecting with grid electricity

5.

Capital cost incurred owing to grid electrification(including the rental to WBSEDCL)	Quantum of energy user charges before grid connection	Quantum of energy user charges after grid connection

4. What is the major impact due to grid electricity that contributes in the enhancement of facilities pertaining to health care (say in terms of preservation and administration of drugs, introduction of electric fed medical appliances and pathological testing, additional sources of lighting, provision of water for drinking and other usages, duration and period of services by medics along with health-workers)
5. How long it takes for restoration of connectivity in case of disruption of electricity services?
6. Whether the respondent has ever launched any complaints against the service provider. If yes, then whether the grievance has been redressed and also the time duration in resolving the grievance.
9. Whether the respondent is satisfied with the services provided by WBSEDCL?

Note: With respect to the enhanced spate of activities due to grid electricity in the domain of telecommunication and improvement in mass transit system, road safety, ease of transportation of goods from interior zones to market hubs may be documented primarily through focused group

discussions; semi- structured interviews followed by some case studies (provided relevant materials may be gathered).