

GSM Association: Green Power for Mobile

Working Group – Cairo, March 2010

Green Power for Mobile

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Agenda

- Feasibility Study
- Green Power Software
- Energy Efficiency Operator Survey

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A Feasibility Study service is available to operators

- **Objective:**
  - The primary objective is to maximise an operator's Return on Investment (ROI)
  - For a Feasibility Study in East Africa our recommendations raised average ROI of the sites **from 30.3% to 42.9%**
  - Provide **vendor neutral**, non-biased advisory services from GSMA
  - To **educate operators** on the use of green power solutions (renewable energy & energy efficiency)

- **Approach:**
  - Complete a **10-12 week feasibility study** of real life operator network

- **Next Steps:**
  - **Operator requests** for feasibility studies are welcome

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Feasibility Study Deliverables

- Feasibility Study Report:
  - Ranking of Priority Target Sites
  - Site Dimensioning Proposal for Target Sites inc CAPEX & ROI
  - Suggested Implementation Plan
- Centre of Excellence Training Curriculum
- Monitoring and Evaluation Framework
- Draft RFP Document

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Methodology – Site selection

- GPM site selection methodology comprises several steps



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Identify Geographic Locations of the Base Stations and Prioritise Regions



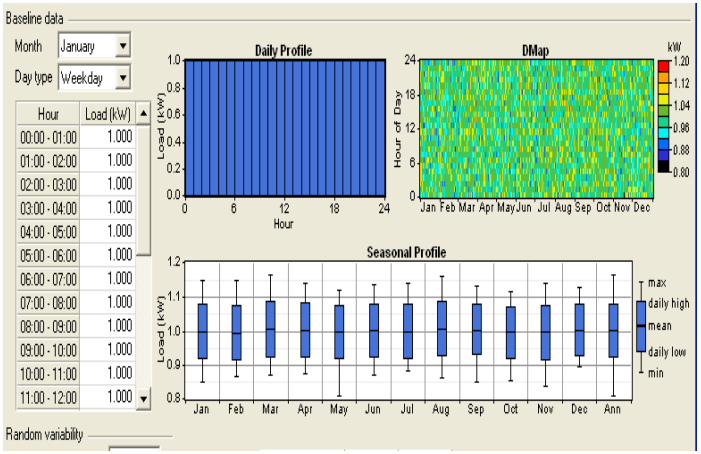
Selection criteria include:

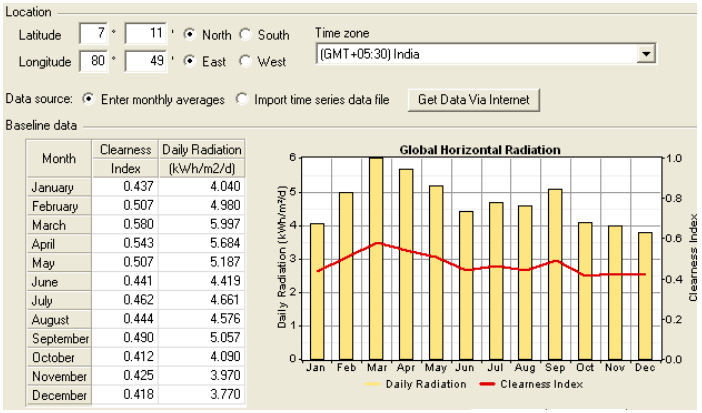
- Geographic region
- Meteorological regions
- Base Station Models and Configurations
- Infrastructure/Logistics

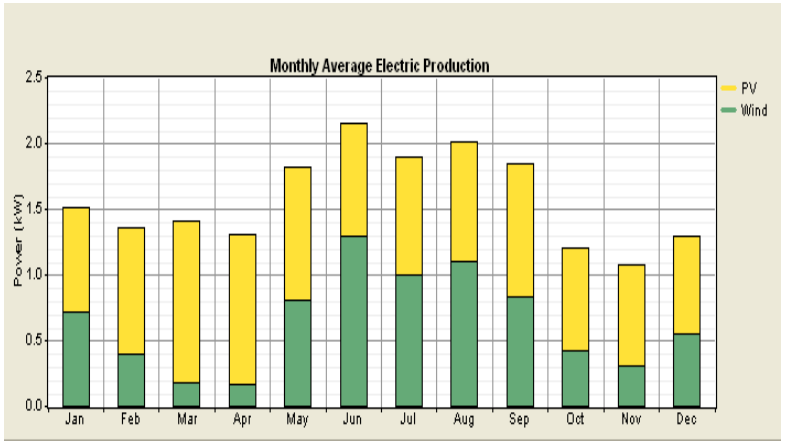
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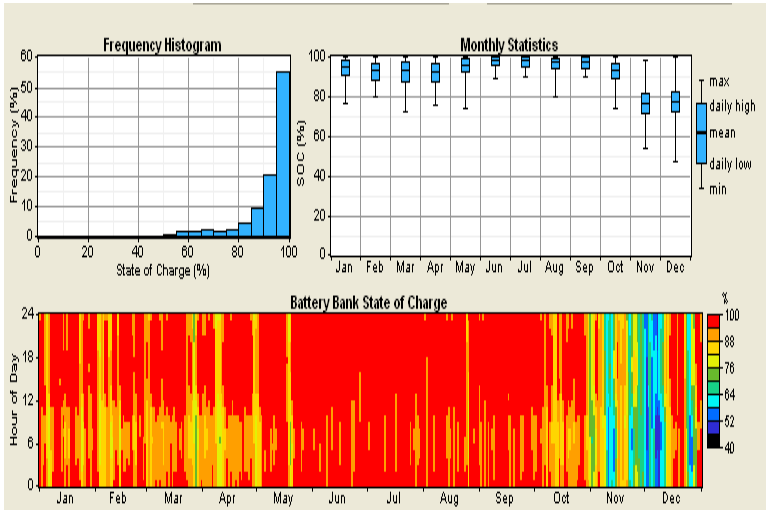
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Use HOMER (NREL) Software to Dimension the Renewable Energy Equipment









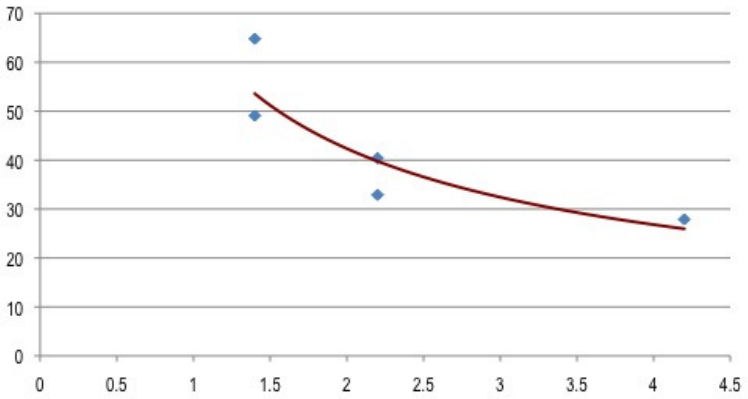
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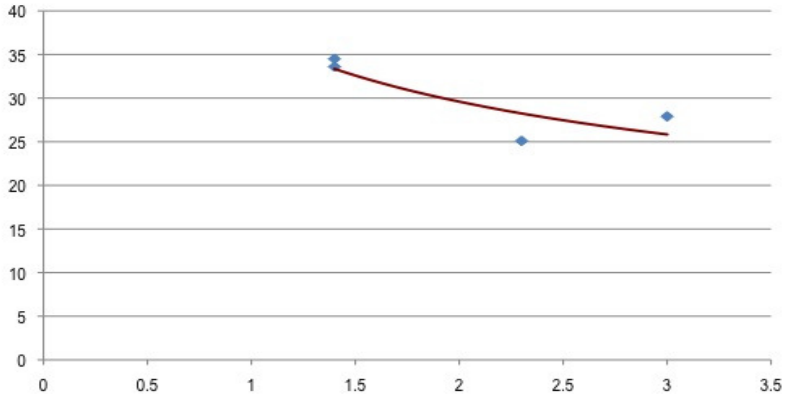
Prioritise Sites by Financial Viability

Site	Region	ROI (%)	Payback Period (yr)	NPV (USD)	CAPEX (USD)	Renewable vs DG power contribution	Autonomy (hr)	Group	Suggested trial
Site #1	XXX	49.1	2.04	26,842	47,874	solar 41%/DG 59%	13.4	Outdoor/DG only	Y
Site #2	XXX	64.8	1.54	44.230	45,379	solar 35%/DG 65%	13.4	Outdoor/DG only	Y
Site #3	XXX	Site not dimensioned						Outdoor/DG only	N
Site #4	XXX	33.6	2.83	4,124	34,177	solar 41%/DG 59%	13.4	Outdoor/DG+batteries	Y
Site #5	XXX	34.5	2.90	5,378	40,167	solar 52%/DG 48%	13.4	Outdoor/DG+batteries	Y
Site #6	XXX	32.9	3.04	8,791	64,315	solar 32%/DG 68%	17.6	Indoor/DG only	Y
Site #7	XXX	27.9	3.59	2,360	56,830	solar 17%/DG 83%	9.6	Indoor/DG only	N
Site #8	XXX	40.4	2.48	19,561	56,830	solar 25%/DG 75%	18.4	Indoor/DG only	N
Site #9	XXX	27.9	3.59	-1,284	45,830	solar 37%/DG 63%	13.2	Indoor/DG+batteries	N
Site #10	XXX	25.1	3.99	-3,632	40,840	solar 36%/DG 64%	17.2	Indoor/DG+batteries	N

Site numbers and ROI(%) vs Power Consumption (kW) – DG only sites



Site numbers and ROI(%) vs Power Consumption (kW) – DG+batteries sites



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Generate Accurate Financial Forecasts of Solution Options

		1	2	3	4	5	6	7	8	9	10
	Diesel Solution Net Cashflow	0	19,486	19,486	24,698	37,055	19,486	24,698	37,055	24,698	19,486
	Renewable Solution Net Cashflow	34,177	10,693	10,693	10,693	10,693	10,693	21,117	10,693	28,262	10,693
	Net Difference	-34,177	8,793	8,793	14,005	26,362	8,793	3,581	26,362	-3,564	8,793
	Total Diesel Solution OPEX	0	19,486	19,486	24,698	37,055	19,486	24,698	37,055	24,698	19,486
	Total Renewable Solution OPEX	0	10,693	10,693	10,693	10,693	10,693	21,117	10,693	28,262	10,693
	Average Diesel Solution OPEX	24,972									
	Average Renewable Solution OPEX	13,481									
PayBack	2.97										
ROI	33.6%										
IRR	34.5%										
NPV	$4,124										
Discount Rate	30%										

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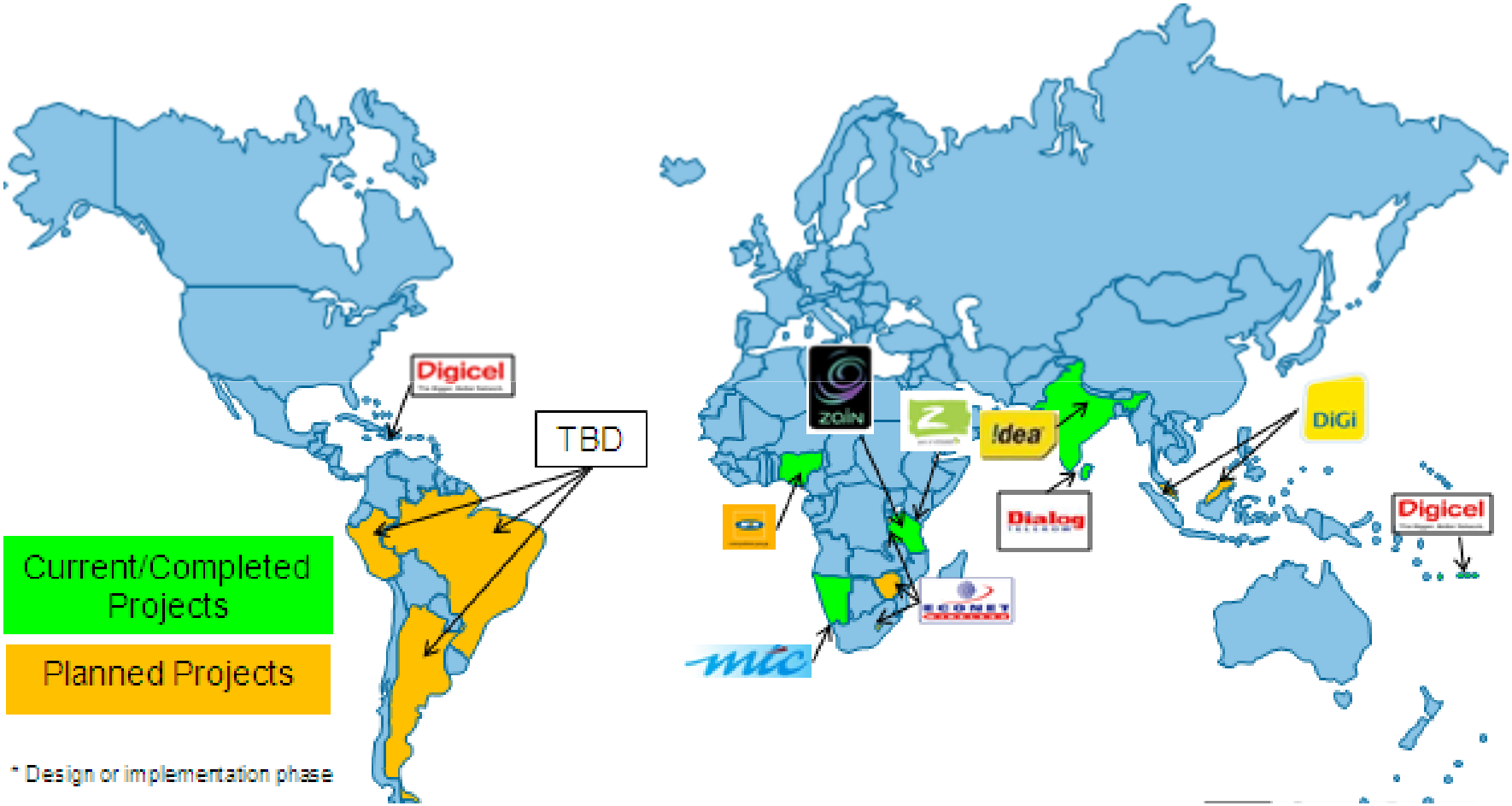
Provide Implementation Recommendations

- **Results:**
  - GSMA has identified 6 sites where solar solutions pay back within 3.5 years
  - Across 10 sites the spread of ROI is between 25.1% and 64.8%
  - The CAPEX range for these solutions is US$ 34,177 to US$ 64,315 per site
- **Recommendations:**
  - GSMA recommends implementing 5 trial sites for a forecast implementation CAPEX of US$ 231,912. The recommended sites are based on two conditions being satisfied:
    - Payback period less than 3.5 years
    - Renewable contribution greater than 25%
  - This rollout plan would save 61,774 litres of diesel per year and 162.6 tonnes carbon per year

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Map of GPM projects



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Green Power Software

- Free online tool available from the GSM World website
  - Can be used as a starting point for designing renewable energy sites
  - Requires site data to be input and produces a single site design and financial indicators for that design
  - Purely a renewable energy tool – all site designs will have high renewable energy percentage

- Available online in May 2010

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Energy Efficiency Operator Survey

- Collection of Energy Efficiency initiatives
  - Standardized aggregation of results
  - Benchmark savings and cost/benefit analysis
  - Determine the most effective solutions
  - Publish data to the operator community
  - Incorporate findings into new GPM initiatives

- GPM is requesting all operators to participate and share their experience

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