

GE Energy Storage

GENERAL ELECTRIC COMPANY

Voice of Customer session – OPEX reduction initiatives
& Batteries
GPM working group @ Doha, Qatar
18th April 2012



imagination at work

Goals of this session

Off grid
Telecom cell
phone
towers

High
operating
costs

- Discuss issues around OPEX & solutions
- Understand role of batteries in these initiatives
- Explore alternate business models
- Summarize & document the discussion
- Publish to the working group members

Discussion topics

1. Description of current telecom network (5 minutes)
2. Understanding issues around OPEX solutions on cell sites (10 minutes)
3. Understand role of batteries in current applications with focus on OPEX reducing solutions (DG + Battery, renewables) (25 minutes)
4. Business models for OPEX reduction solutions (10 mins)
5. Market Adoption of new technology (5 mins)

Break out groups

	Group 1		Group 2		Group 3		Group 4	
1	General Electric	Ganesh B	General Electric	Mike Frausing	GSMA	Areef Kassam	GSMA	David Sanders
2	GSMA	Abi Birrell	GSMA	Satish Kumar	GSMA	Charlotte Ward		
3	QTEL Group	Farizul Ahsan	Asia Cell - Iraq	Soran Ghafoor	Millicom	Garry Bridgwater	Vodafone Qatar	Ovidiu Bogdan
4	Telecel Central African Republic	Theophile Nziamgombet	Vimplecom	Ashraf El Nagger	Nawras - Oman	Zahir Al Abri	Millicom	Mahmoud Sada Dia
5	Tunisia - Tunisia	Faouzi Hidouri	Wataniya Maldives	Shabeen Ali	QTEL Group	Brian Theaker	Wataniya Kuwait	Khaled Al-Suraiei
6	Vodafone Group	Mohammed Belfqih	Wataniya Kuwait	Biju Sobhana	Telesom	Rachid Mousa Iman	Wataniya Maldives	Hussain Haleen
7	Zain	Khalid Pervez	QTEL Qatar	Shihab Suliman	Wataniya Palestine	Amer Abi Ali	Nawras - Oman	Nasser Al Rayami
8	Nedjma-Algeria	Ali Ait Mohammad					Tigo	Mohammed Adamu
9	Eltek Valere	William Pretorius	Ericsson Qatar	Wasim Eid	Amersco Solar	Chris Pinelli	Amersco Solar	Rob Rallo
10	NSN Qatar	Samer Bounasreddine	AEG	Lionel Alzina	Huawei Qatar	Manar Al Asma	Catapillar	Vincent Lentsch
11	Zephyr	Mats Vilander	Flexenclosure	Ann Louise Johansson	Power Oasis	Peter Bishop	Idatech	Scott Egbert
12	Clean Power Systems	Christopher Luckhurst	Eight19	Seena Rejal	Astrium	Mattius Simnacker	Power Oasis	William Wallace
13	AEG	Simon Naylor	Off Grid:Electric	Joshua Pierce	HIP Consult	Judah Levine	Zephyr	Jonas Mattesson
14			Cascadient	Josh Steinmann	Eltek Valere	Miloud Abdeliah	Tenesol	Thomas Thillou
15	IFC	Arata Onoguchi	ICT Qatar	Chi Kwan Lam	IFC	Yucui Sun	Net Hope	Rui Lopes

Description of current telecom network (5 minutes)

- How do you typically segment your network by Power outages/availability (Off grid, V poor grid, Medium grid, Good grid etc..) How many hours of commercial power each day makes up each of these categories
- Of the existing install base what is the percentage of Indoor Sites Vs Outdoor sites
- Of the new sites that you are rolling out what is percentage of Indoor Vs Outdoor sites
- What is the typical power consumption per sites (kw) – both BTS load & passive loads
- Do you see a trend of tower sharing across operators
- Do you own/operate the towers or outsource some/all of this scope and if this is changing
- **Do you buy components and put the sites together, do you buy complete solutions, or do something between these 2 extremes - and how does this answer change depending on the type of site (i.e. Off-grid v. good grid)**
- Who is involved in the purchasing decision and how this impacts the criteria used of making purchasing decisions

Issues around OPEX solutions on cell sites (10 minutes)

- **What are the top drivers of OPEX**
- Anything apart from topics like DG fuel costs, landed fuel costs, DG maintenance, batteries, Aircon, general maintenance etc...
- What initiatives have you already undertaken to reduce OPEX drivers
- Why have you chosen the initiatives that you have(Discuss topics like fuel cells, hybrid DG + battery, renewables etc...)
- Who owns these initiatives within their organizations
- What has worked well and what has not ... why didn't the "poor" initiatives work and why did the "good" initiatives produce results
- **Please describe the experience with the overall systems that you bought to reduce the OPEX ... did they deliver the results that you were hoping for ... if not why, was it something in the way that the solution was installed, commissioned, operated, maintained, etc.**
- **Understand the larger problems you may/may not have getting value from some of the different solutions that customers are buying today to reduce fuel consumption or other OPEX-drivers**
- Have you tried battery-based solutions

Understand role of batteries in current applications with focus on OPEX reducing solutions (25 minutes)

- What are the most common issues with batteries in your applications?
- **What are the perceived weaknesses of traditional battery technology (Lead Acid) (Discuss life, temperature, reliability, availability, maintenance, installation, commissioning)**
- On average, how many hours do you size your battery backup system for
- Describe the procedure used to size your battery systems applications?
- **What application, technology or business problems or limitations affect how you size battery systems?**
- **After giving the team a brief of DG + Battery operation and experiences and understand tradeoffs between**
 - Backup time & battery backup size in the event the DG doesn't start
 - The number of start/stops per day and battery backup size
- How fast do battery systems need to recharge? Why is it important to you?
- What data are logged related to a battery system operation?
- What market opportunities, infrastructure trends or potential disruptive technologies do you see coming that will change the way you use energy storage systems?
- **What potential complaints, problems or weaknesses do you see with the new battery technologies ?**
- **Please describe your ideal battery**



Business models for OPEX reduction solutions (10 mins)

- Please describe the typical warranty & level of satisfaction with the warranty that you get on your current OPEX reduction solutions (including batteries)
- Please provide some inputs on the type of warranty that you would like from a new battery technology
- **In a DG + Battery application – where the key value driver is Kwhr/day, would a warranty based on kwhr/day be a good metric that will be accepted by the industry**
- What is the typical payback period you look for before making a purchasing decision on a new technology
- What is the total cost of ownership advantage that you look for and what period of time do you consider for this TCO analysis
- **What is the CAPEX that you will spend on a new battery technology (relative to what you spend today on traditional lead acid batteries) 1x, 2x, 3x,4x,5x etc..**
- **Discuss High CAPEX with warranty Vs payback ?**
- Would financing make any change on your decision making process
- How easy is it to get access to financing in your region
- **Please describe other business models that you are evaluating in case procuring on CAPEX is not possible (Discuss OPEX model, financing, leasing, pay for performance, power by the hour)**



Market Adoption (5 mins)

- What factors do you consider important in the value proposition for a battery system? Why are these factors important to you? What value do you attach to these factors?
- **What would you need to see before considering and potentially procuring a new battery system in your network**
- **What can be done to accelerate market adoption?**