To,
The Principal Advisor (Network, Spectrum & Licensing)
TRAI, New Delhi
Kind Attention: Shri UK Srivastava, Principal Advisor

Date: 29th March 2017

Ref: Consultation PaperonApproach towards Sustainable TelecommunicationsConsultation Paper No: 02/2017

Subject: Our comments on Consultation Paper on Approach towards Sustainable Telecommunications

Dear Sir,

In reference to the "Consultation Paper on Approach towards Sustainable Telecommunications", we hereby attaching our comments on following questions with appropriate justifications & details for your valued reference.

Question 7: Which of the formulas, (i) or (ii), in para 1.23 is to be used for the calculation of carbon footprints from the Diesel generator along with views on possible values of ? Please comment with justification
Response from Coslight India: Please refer Annexure 1

Question 9: What are the options available for renewable energy solutions which may be harnessed to their maximum potential to power the telecom sector? Please comment with justification.
Response from Coslight India: Please refer Annexure 2

Question 12: Please comment with justification on the approach suggested by the DoT committee.

Response from Coslight India: Please refer Annexure 3

Question 13: For effective implementation of RET/Energy efficient solutions in telecom sector, how can the industry be supported? Should incentives be provided to licensees (TSPs)? If yes, what should be the milestone? Please comment with justification.
Response from Coslight India: Please refer Annexure 4

Question 14: What methodology can be proposed for setting new Renewable energy targets in the telecom sector? What should be the timeframe for achieving these targets? Please comment with justification.
Response from Coslight India: Please refer Annexure 5

Key Driving factor for positioning "Telecom Energy storage solution (TESU)" in telecom network includes following highlights:

- Make In India Initiative
- Modularity & scalability + small footprint @ 1mx1m for 40kwh sol.
- TESU - 20KWH & 40KWH sol. can address more than 75% requirements of OPCOs/TOWERCOs LOAD/EB availability matrix

- TESU –provisioning is well suitable for intermittent EB availability /long outage to provide autonomy of 8hrs-16hrs/day
- TESU provisioning will make a telecom site DG free , wherein EB availability is more than 8hrs
- Results validated on multiple field Trial projects across different terrain /region
- CAPEX requirements is less than the Capex spend on DG+conventional Battery enabled solutions
- TESU provide Enhanced life provisioning of 4 years is definitely a game changer for telecom infra need fulfillment of having maintenance free power provisioning to manage telecom sites
- Faster adaptation of "Telecom Energy storage solution (TESU) " as Green Alternatives to remove DG usages at sites can support DoT objectives of enhancing rural coverage +Teledensity to support digital India mission
- The field data can easily be accessible with TESU's remote monitoring capability for analysis purpose and making policy framework to appropriately address carbon foot print reduction in the telecom ecosystem.
- TESU is being innovate , customized and developed in India for addressing local field challenges and environmental conditions
- TESU positioning is well planned for addressing distributed Telecom infra. Network unlike the challenges of other RET's alike solar/wind/hybrid/fuel cell etc. who have multiple issues for its execution and limited/negligible adaptation on ground

About Coslight India

- Coslight India is pioneer and leader in providing storage Energy solution for telecom industry.
- Coslight India , with its "make in India" Initiatives have done large investments in India on Localized R&D facility and manufacturing plants for producing Li-ion Batteries and advance VRLA batteries
- Due to Coslight India continuous focus on customized solutions, product engineering and system approach is well positioned to provide sustainable "Storage Energy Products/Solutions" for supporting Green Telecom Mission with success.

We hereby, further request for a suitable time to visit your office and present our approach and methodology to have sustainable Telecommunication network in our country.
Thanking you

Sincerely Yours
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Question 7: Which of the formulas, (i) or (ii), in Para 1.23 is to be used for the calculation of carbon footprints from the Diesel generator along with views on possible values of ? Please comment with justification (Annexure 1)

Response from Coslight India: Carbon emissions due to usage of diesel in powering the telecom equipment's fall under Scope 1 emissions. The carbon footprint due to DG sets can be calculated based on the *diesel consumption of the DG set among the two options given below:

i. Based on Diesel Consumption of DG set: This formula utilizes the carbon equivalents emitted per liter of diesel.
ii. Based on Capacity of Generator used: This formula is based on the Capacity of the DG set used to power the telecom tower. Each of these formulas has been defined and explained in the following section.

**Diesel consumption should be calculated on the basis of total procurement of diesel for Telecom sites*

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(Annexure 1)

Carbon footprint Analysis before & after provisioning*Telecom Energy Storage Unit* (TESU) in KWh*

	Before TESU	After TESU
Average DG Run Hours	4.5	0
DG CPH	2.1	0
Carbon Emission in Kg #C_{DGSET_A}	0.002629*4.5*365 = 4.318tons of CO2e per year (0.002629*N tons of CO_2e per year)	0

*For Grid availability greater than 8hrs

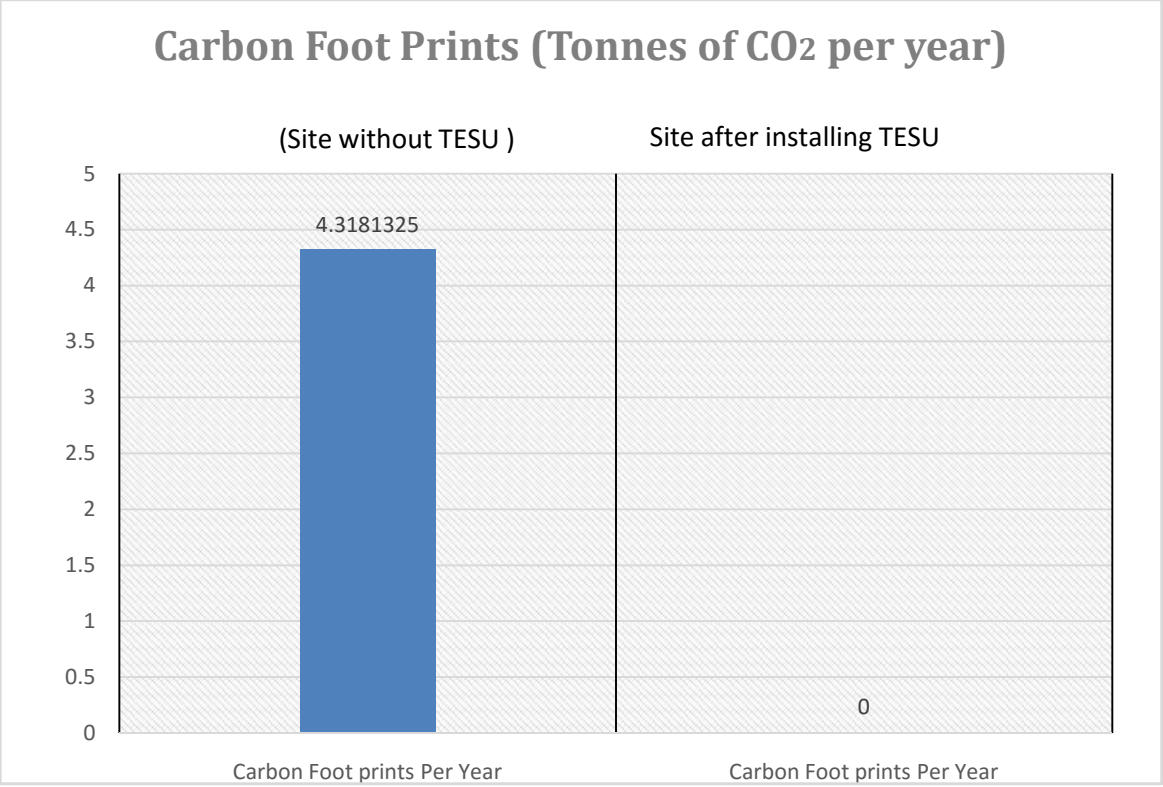
Formula as per Consultation paper 02/2017

Carbon emission doesn't include CPH value

Reduction in Carbon Foot Print per Site		
	VRLA	TESU
Site Load in KW	3	3
EB	14	14
Back Up Required in Hrs	10	10
Total Power required in KW	30	30
Total Usable Energy in Kw	17.28	32
No. Of cycles used in a Day	1	1
DG Run Hours	4.5	0
DG CPH	2.1	2.7
Carbon Foot Print per day in KG	24.84405	0
Cabon Foot Print per month	755.6566248	0
Carbon Foot Print per year	9067.879498	0
Carbon Foot print in Four years in KG	36271.51799	0
Total Diesel Consumption in four years	13608	0
Total Cost Consumed in Four years for Diesel In Rs	925344	0

Indicative Figures

- 1 ltr Diesel Consumption = 2.629 KG CO2
- 1 ltr Diesel Cost = 68 Rs/- including refilling & maintenance
- Carbon footprint includes CPH value



CapEx Budgeting

The proposed CapEx requirements for Telecom Energy Storage Unit (TESU) is almost equal or less than CapEx spent as on date for provisioning DG + Battery Solution at telecom sites depending upon on the load & EB availability matrix .

Please see below indicative comparative analysis or reference

	Unit	Gen (Kva)	VRLA(Ah)	TESU(KWh)
Solution Capacity		20	600	225 Li + 600 VRLA
Depth of Discharge	Percent		50	80
Run hours	Hours	12.00	4.00	16.00
CAPEX of System	Rs.	400,000	200,000	750,000
Maintenance Cost per Year	Rs.	87600	-	-
TCO for 1st year	**Rs.**	187,600	100,000	187,500
TCO for 2nd Year	**Rs.**	187,600	100,000	187,500
TCO for 3rd Year	**Rs.**	187,600	100,000	187,500
TCO for 4th Year	**Rs.**	187,600	100,000	187,500
TCO for 4 Years total	**Rs.**	**750,400**	**400,000**	**750,000**
Total Savings	**Rs.**			**400,400**
Average percentage Savings	**Percent**			**35%**

(Annexure 2)

Question 9: What are the options available for renewable energy solutions which may be harnessed to their maximum potential to power the telecom sector? Please comment with justification. (Annexure 2)

Response from Coslight India:

Coslight is proposing Telecom Energy Storage Unit (TESU with LVCS™ Technology) with energy storage option of 20 KWh & 40 KWh, which is suitable to meet the backup requirement under unpredictable grid power conditions for either intermittent or long grid outage. The system is designed with autonomy of 12 to 16 hrs. depending upon the load& EB . As per the given EB availability data, the proposed Telecom Energy Storage Unit (TESU) can be positioned to address more than 75% telecom sites wherein EB is available for more than 8hrs .

Contents

(Annexure 2)

Telecom Energy Storage Unit (TESU with LVCS™ Technology)

Coslight is proposing Telecom Energy Storage Unit (TESU with LVCS™ Technology) with energy storage of 20 KWh & 40 KWh, which is suitable to meet the backup requirement under unpredictable grid power conditions for either intermittent or long grid outage. The system is designed with autonomy of 12 to 16hrs. depending upon the load& EB.

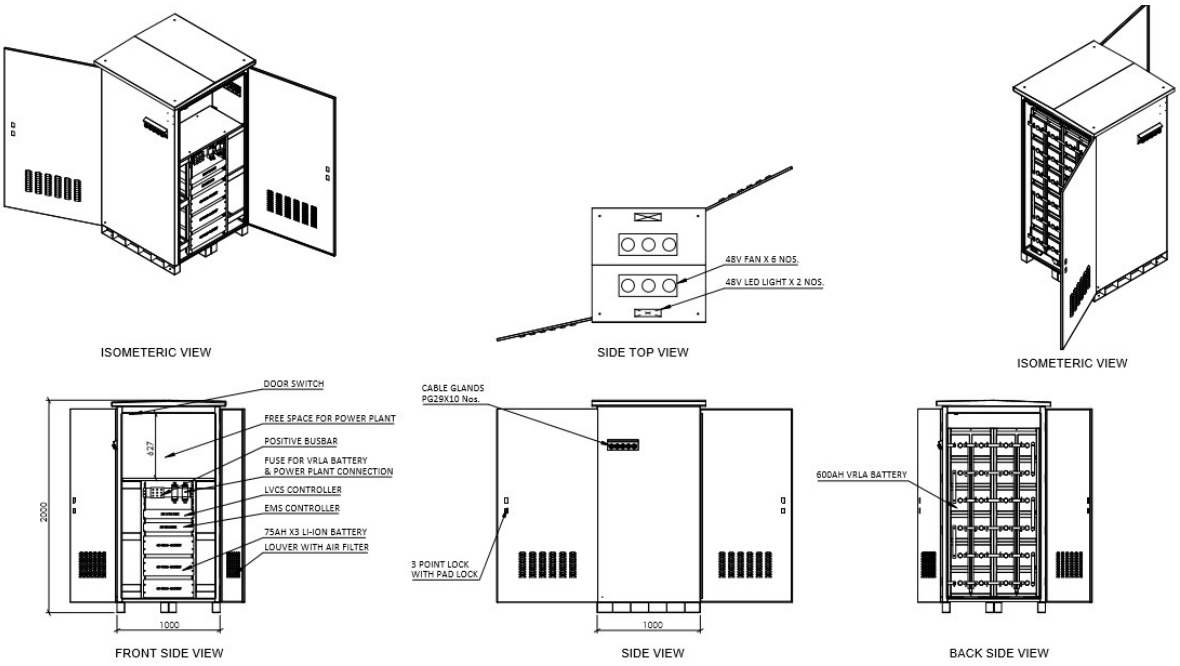
Configuration

Solution A: 20KWh TESU consists of:

- Lithium Ion Battery System
- Advance VRLA Battery
- Lithium VRLA Combo Switch (Coslight LVCS™ Controller)
- Outdoor Cabinet IP 55

Solution B: 40 KWh TESU consists of:

- Lithium Ion Battery System
- Advance VRLA Battery
- Lithium VRLA Combo Switch (Coslight LVCS™ Controller)
- Outdoor Cabinet IP 55



Telecom Energy Storage Unit (LVCS™) Site Photograph

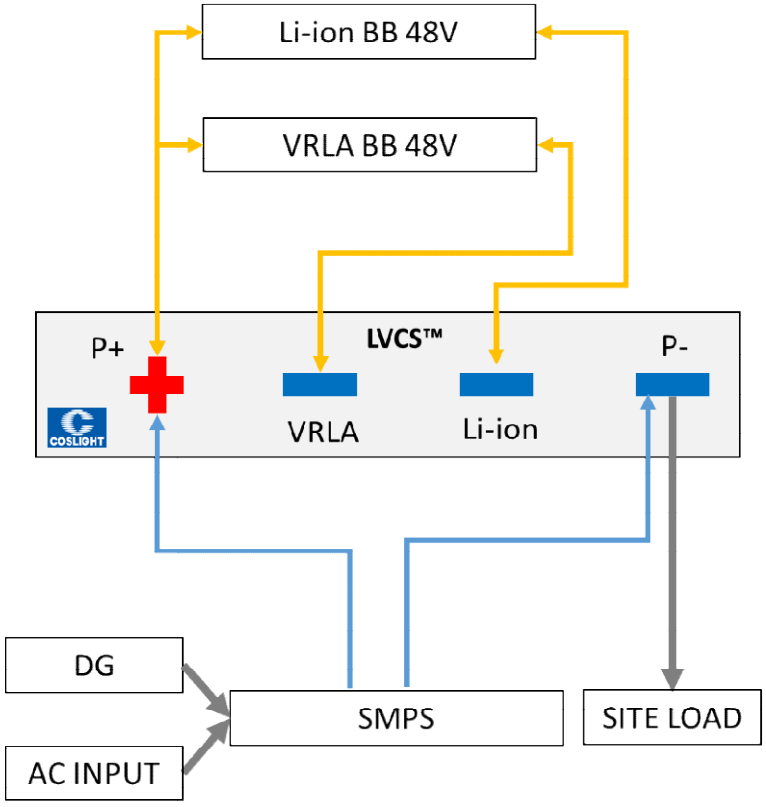
(Annexure 2)

Advantages of LVCS™ Technology

LVCS™ offer some unique advantages, which aims to transform a telecom site into energy efficient as well as DG FREE/DG STANDBY. Few key benefits are listed as below:

- High Autonomy
- Fast Charging
- Long Backup up to 16 hours
- Low OpEx Cost
- Remote Monitoring
- Reduction in Carbon Footprints

LVCS™ Design Overview



Lithium VRLA Combo Switch Schematic

(Annexure 2)

LVCS™ Technical Details for 40KWh

Lithium Ion Battery Technical Parameters

Type	**Lithium Ion Battery**		
Rated Voltage	-48V		
Power	11.25 KWh		
48V/75Ah Module Dimensions			
Width	Depth	Height	Weight
482 mm	400 mm	178 mm	45 Kg
Voltage Range	-42V to -54V		
Charging Voltage	-54V		
Charging Mode	Constant Current/Constant Voltage		
Maximum Charging Current	135 A		
Maximum Discharging Current	135 A		
Design Life at +25°C used at I or II Class Power Area	>20 years		
Cycle Life 80%DOD,+35°C,0.6C	>4000 cycles		
Operating Temperature	Charge ： +3°C to +50°C Discharge ： -20°C to +55°C		
Storage Temperature and Time	1 year @ 20°C, 6 months @ 30°C, 3 months @ 40°C		
Safety Certification	CE certification, UL certification		
Protection Class	IP20		

(Annexure 2)

Advance VRLA Battery Technical Parameters

Type	Advance VRLA Battery
Rated Voltage	-48V
Electric Characteristics	
Float Charge Voltage at Design Temperature	2.23 ± 0.01 at 27°C
Boost Charging Voltage	2.30 ± 0.01 at 27°C
Recommended Charging Rate	0.2C
Maximum Charging Rate	0.3C
Product Characteristics	
AH Efficiency	More than 95%
WH Efficiency	More than 85%
Self-Discharge/Month @ 27°C	Less than 2%
Operating Conditions	
Operating Temperature	-20°C ~ 55°C
Recommended Max Period of Storage	6 month storage at normal room temperature
Applicable Standards	ISO 9001:2008 ISO 14001:2004 OHSAS 18001:2007 IEC 61427 & IEC 60896

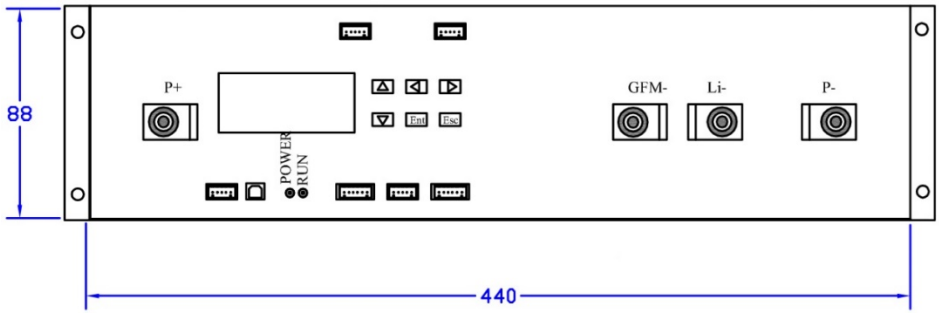
Coslight LVCS™ Logic Controller Technical Parameters:

The Lithium VRLA Combo Switch enable two storage technologies i.e. lithium battery and Advance VRLA battery as combined/hybrid storage solution as an application.

It has outstanding advantages in fulfillment of intermittent/prolonged power backup at telecom sites.

(Annexure 2)

The high Intelligence controller is equipped to the system for the automatic charging and discharging functions, controlling the usage priority for lithium battery or lead acid battery, with make before break combination.



TYPE	**LITHIUM VRLA COMBO SWITCH (LVCS™)**
DIMENSIONS(MM)	**440*410*88**
WEIGHT KG	**10**
NOMINAL VOLTAGE (V)	**-48V**
VOLTAGE RANGE (V)	**-42V~-54V**
NOMINAL CURRENT (A)	**≤150**
AMBIENT TEMPERATURE :	**-20℃ ~ +55°C**
STORAGE TEMPERATURE	**-20 ~ +65°C**
RELATIVE HUMIDITY	**5% ~ 95% RH**
ALTITUDE	**LESS THAN 3000 METERS**

Lithium VRLA Combo Switch Technical Specification

SitePRO™ e-monitoring

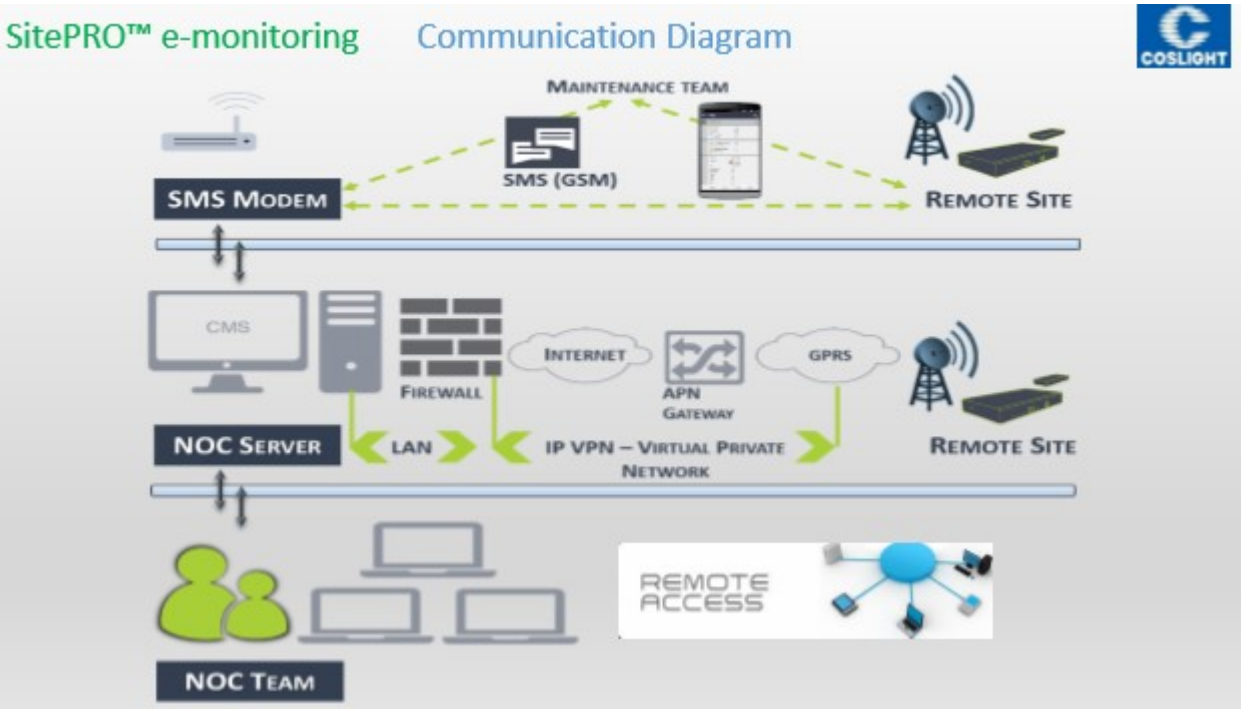
SitePro™ is a new generation data acquisition hardware controller that facilitates 24/7 seamless operations with reduced operating costs. SitePro™ is the perfect solution for the growing issues that tower companies face today. It monitors all energy related tower elements with 100% accuracy.

- Central Control: Multiple sites and towers can be monitored from a single platform.
- Reduced operating costs: : SitePRO™ provides real time updates of all passive equipment

- Predictive Maintenance: The device acts as an advance risk alert system for severe environmental conditions and external threats.
- Reduced Energy Costs & Carbon Footprint: SitePRO™ can monitor fuel consumption and battery charge levels, optimizing energy utilization that helps reduce the carbon footprint.
- Efficient Security Management: SitePRO™ monitors electronic surveillance systems at site thus eliminating the need of physical keys and security personnel.

Device I/O

- GSM/GPRS based Data transfer
- Four Opto-Isolated digital inputs
- Eight Relay Outputs
- One Serial Port (RS-485)
- Real Time Clock with battery back-up
- 230V AC Power Supply or 20V to 60V DC Power Supply



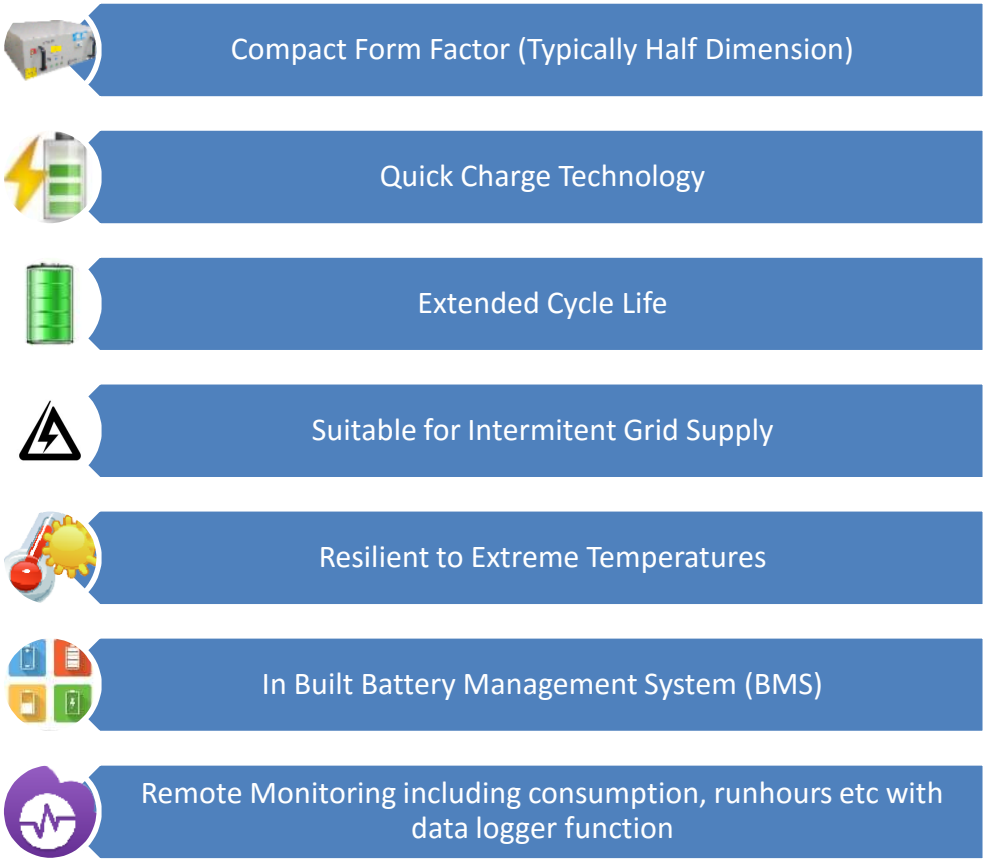
Device Monitoring Parameters

- Diesel accounting system for Diesel optimization
- Battery health management system
- Utility, DG and conditioner energy metering system
- Battery, BTS load, transmission load metering system with multi-tenantSupport(individual tenant level metering)

(Annexure 2)

- PFC Alarm sensing or sniffing system to sense existing alarms at site without affectingexisting alarm stream to NOC
- Multiple point temperature monitoring
- Humidity monitoring
- Alternate batteries, fuel cell energy metering for renewable energy resources
- AC DC Energy Metering

Advantages of TESU

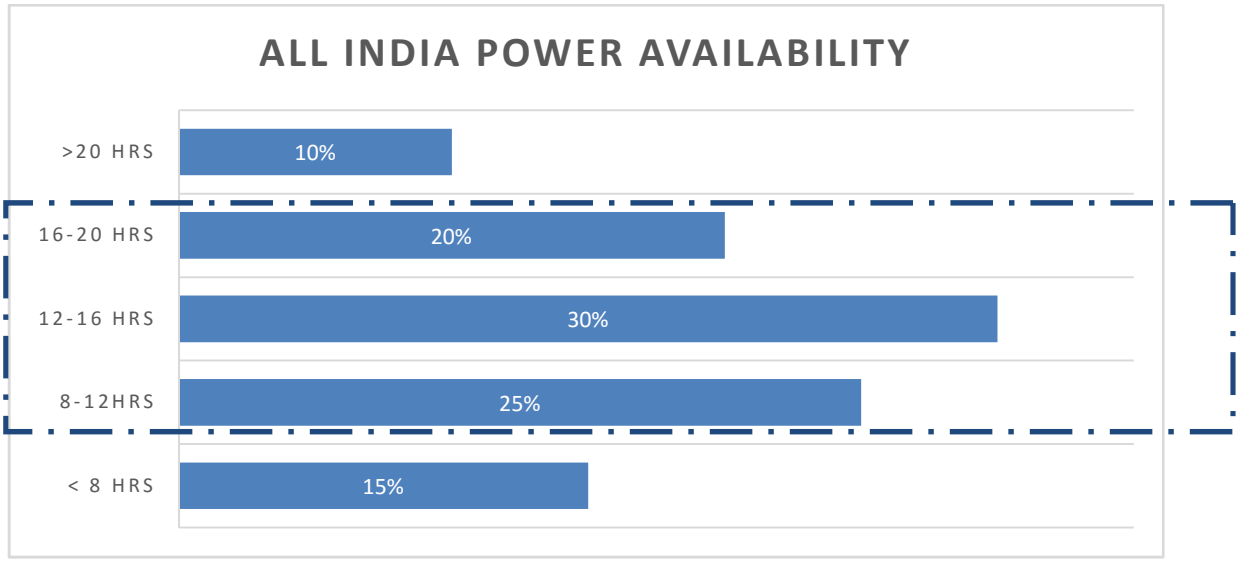


(Annexure 3)

Question 12: Please comment with justification on the approach suggested by the DoT committee. (Annexure 3)

Response from Coslight India: As per the DOT approach and recommendation the overall objective of a green telecom policy should aim towards reducing the diesel consumption of the telecom networks and achieving the overall carbon reduction targets for the mobile network.

Coslight is proposing Telecom Energy Storage Unit (TESU with LVCS™ Technology) with energy storage option of 20 KWh & 40 KWh, which is suitable to meet the backup requirement under unpredictable grid power conditions for either intermittent or long grid outage. The system is designed with autonomy of 12 to 16 hrs. depending upon the load &EB. By adopting Telecom Energy Storage Unit (TESU) wherein EB availability is >8hrs, more than 75% telecom sites can be made DG free.



* Source TRAI Report

Refer above figure ~40% of the telecom towers face load shedding for more than 12 hours per day due to which they are dependent on source like DG. There are almost 5, 00,000 Telecom Towers which means almost 2, 00,000 towers are on working on DG.

The recommended energy resource if Grid is less than 8 hours: In case of grid less than 8 hours, TESU need to be charge with alternative active source, such as solar or wind turbine. This system can charge the TESU for required cycle and will ensure site will become green.

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(Annexure 3)

DOT/RET committee Recommendations

Compliance matrix	
Description	**Remarks**
DOT/RET committee Recommendations	
The overall objective of a green telecom policy should aim towards reducing the diesel consumption of the telecom networks and achieving the overall carbon reduction targets for the mobile network at 8% by the year 2014-15 and 17% by the year 2018-19 from base year 2011-12	Fully complied by using TESU (Telecom Energy Storage Unit)
In new mobile tower installations, the backup power to grid shall be based on Energy Efficient solutions/ RET power to the extent feasible such as to make the site diesel free.	Fully complied by using TESU (Telecom Energy Storage Unit)
In urban areas, the outdoor BTS installations should be made diesel free to the extent feasible with required capacity of efficient storage battery backup/RET systems.	Fully complied by using TESU (Telecom Energy Storage Unit)
In the first phase, the Non-EB (Non- Electricity Board) sites & the sites having grid power availability up to 8 hours and DG set more than 5 years old may be converted to RET by 2015-16.	TESU has charging limitation of minimum 8 hr.
The diesel free sites that contribute to the overall objective of reducing diesel consumption in telecom networks may be recognized as contributing towards the overall objective of the policy.	Fully complied by using TESU (Telecom Energy Storage Unit)
Telecom operators and vendors to spend less on energy and extract more efficiency out of their systems	Fully complied by using TESU (Telecom Energy Storage Unit)
Monitoring of Telecom Sites	
Tower Remote Monitoring Solution can achieve remote monitoring & control of onsite equipment's and energy on a 24x7 basis.	Complied by using TESU (Telecom Energy Storage Unit in KWh) with feature of Site Pro e-Monitoring System
The industry may compile the location of all tower sites with Latitude/ Longitude. Other details, such as electrification status of the site, broad data of the cluster i.e. diesel consumption, RET power generated, if any etc. may be collected and this information may be provided to DoT TERM for creating a database within six months	Complied by using TESU (Telecom Energy Storage Unit in KWh) with feature of Site Pro e-Monitoring System
The industry shall develop a monitoring & management system for efficient monitoring, controlling and optimizing the use of power consumption in to the network	Complied by using TESU (Telecom Energy Storage Unit in KWh) with feature of Site Pro e-Monitoring System
A web based Centralized Energy monitoring system needs to be developed in DoT for monitoring of various parameters and generation of reports.	Complied by using TESU (Telecom Energy Storage Unit in KWh) with feature of Site Pro e-Monitoring

	System
TERM cells need to monitor compliance of RET objectives of DOT	Complied by using TESU (Telecom Energy Storage Unit in KWh) with feature of Site Pro e-Monitoring System
Support	
All projects being implemented with funding from USOF should be powered by Grid/RET only.	The same support can be extended to "Telecom Energy Storage Unit" (TESU) for mass deployment as an NEW alternate energy source
The Ministry of New and Renewable Energy (MNRE) is supporting off-grid solar photovoltaic telecom applications by providing a capital subsidy of 30%.	The same support can be extended to "Telecom Energy Storage Unit" (TESU) for mass deployment as an NEW alternate energy source
Directions of DoT on 4.01.2012 based on the recommendations of TRAI	
At least 50% of all rural towers and 20% of the urban towers are to be powered by hybrid power (Renewable Energy Technologies (RET) + Grid power) by 2015, while 75% of rural towers and 33% of urban towers are to be hybrid powered by 2020	Achievable through the use of TESU (Telecom Energy Storage Unit in KWh)
The eventual goal under this phased programme is to ensure that around 50% of all towers in the rural areas are powered by hybrid renewable sources by the year 2015	Achievable through the use of TESU (Telecom Energy Storage Unit in KWh)
Service providers should evolve a 'Carbon Credit Policy' in line with carbon credits norms with the ultimate objective of achieving a maximum of 50% over the carbon footprint levels of the base year in rural areas and achieving a maximum of 66% over the carbon footprint levels of the base year by the year 2020	Achievable through the use of TESU (Telecom Energy Storage Unit in KWh)
Based on the details of footprints declared by all service providers, service providers should aim at Carbon emission reduction targets for the mobile network at 5% by the year 2012-2013, 8% by the year 2014-2015, 12% by the year 2016-2017 and 17% by the year 2018-2019	Achievable through the use of TESU (Telecom Energy Storage Unit in KWh)
Pilot Project	
In order to examine the technical feasibility and financial viability of RET in Telecom sector, DoT undertook 20 RET pilot projects in USOF Phase-I sites through BSNL with subsidy support from Universal Service Obligation Fund (USOF) and MNRE	Similar 1000 Pilot projects can be carried out with TESU (Telecom Energy Storage Unit)
According to the RET Committee report, 400 RET projects were taken up by various TSPs with support from MNRE. The Telecom Industry has also executed around 3400 RET projects on RESCO (Renewable Energy Service Company) model. Based on the pilot projects, it was found that solar power system for mobile BTS is technically feasible and the payback period in an off-grid site based on savings in diesel consumption alone is about 4 to 5 years	Similar 4000 Pilot projects can be carried out with TESU (Telecom Energy Storage Unit)

(Annexure 3)

Challenges faced by Industry

Telecom Energy Storage Unit (TESU) can address below given Telecom infrastructure provisioning challenges	
1	Due to the precarious power scenario ~40% of the telecom towers face load shedding for more than 12 hours per day.
2	Because of limited availability of power and an uncertain grid power situation, telecom tower companies are increasingly relying on diesel generators, batteries and a variety of power management equipment to back up the grid and ensure network availability. Average DG run-hours for such sites hovers up to 16 hours/day
3	Presently ~40% power requirements are met by grid power and 60% by diesel generators. It is seen that energy costs account for ~30%-34% of total operational expenditure for a telecom tower company.
4	It has been observed that teledensity is lower in rural areas than that in urban areas. Areas with low teledensity could offer potential for future growth but have limitations in terms of power and other infrastructure availability

Existing Solution & Initiative taken by Industry

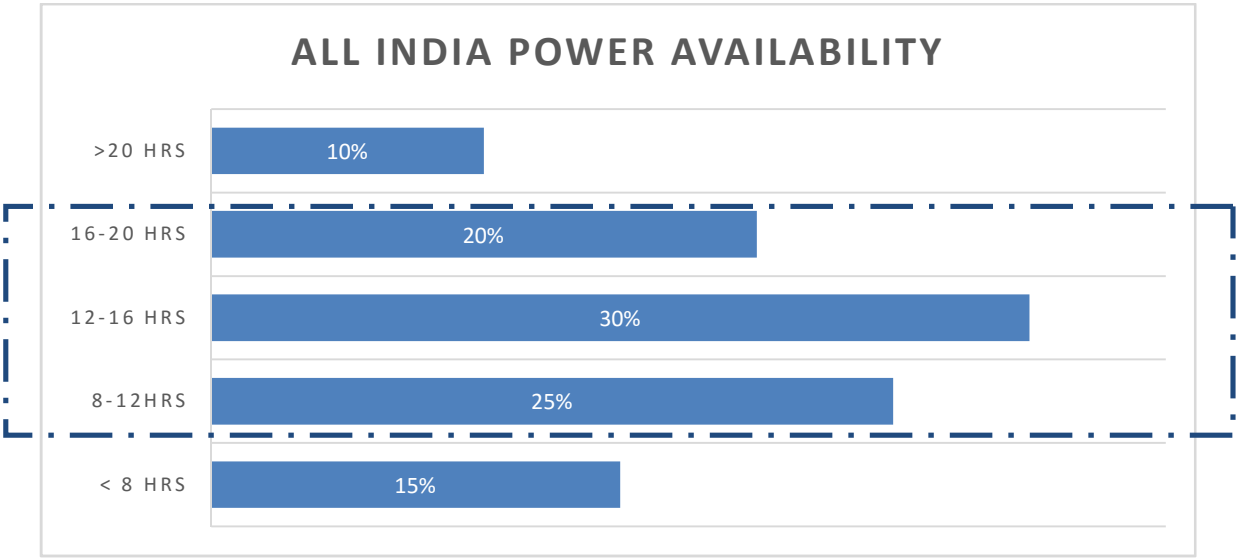
Prevailing Technology	Challenges	Present Condition	Remarks
Solar power	High Capex Involvement	Less than 10% deployed	TESU (Telecom Energy Storage Unit in KWh) can address prevailing challenges
	Large Space requirement		
	Solar in India limited to 4-6hr/day		
Wind Power	Dependent on Wind speed and quality which varies throughout the year	Very Limited Deployment	TESU (Telecom Energy Storage Unit in KWh) can address prevailing challenges
	Advantage is limited to certain locations only		
Fuel cell	Logistics and transportation issue	Negligible deployment	TESU (Telecom Energy Storage Unit in KWh) can address prevailing challenges
	High Capex involvement		
	Maintenance & upkeep very hazardous & costly		
Batteries	When battery life is longer, the need for towers to depend on costly diesel-fuelled generators (DG) during grid supply failures, becomes lesser		TESU (Telecom Energy Storage Unit in KWh) can address prevailing challenges
Hybrid systems	System require availability of diesel generator		TESU (Telecom Energy Storage Unit in KWh) can address prevailing challenges
	High initial capital investment required		

(Annexure 3)

Proposed Concept note with justification

Background & Overview

Mobile Network Operators & Tower Companies are looking forward to minimize/remove their DG from the telecom site. As understood with major part of their sites operating with multiple tenancies, the sites are operating at very high loads. This load coupled with low/unpredictable grid availability is pushing their OpEx to a greater level. Energy Optimization and managing the pilferage challenges has become their top priority to remain competitive.



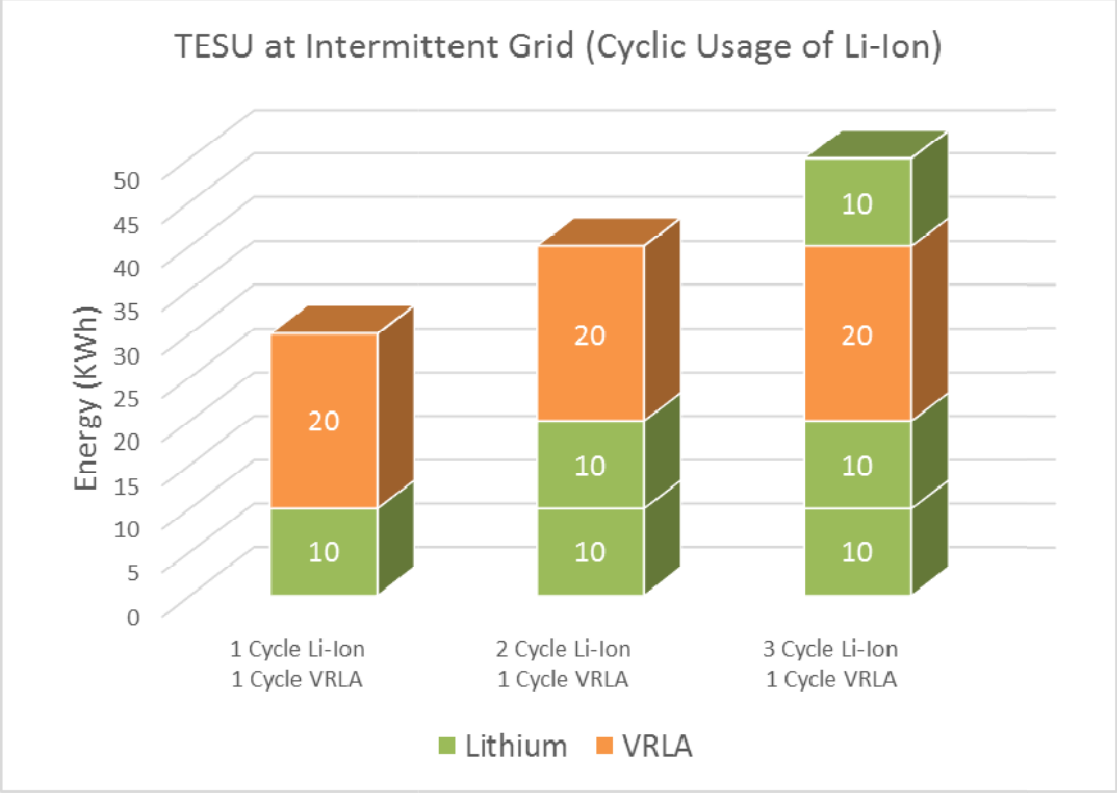
* Source TRAI Report

Refer figure ~40% of the telecom towers face load shedding for more than 12 hours per day due to which they are dependent on source like DG. There are almost 5, 00,000 Telecom Towers which means almost 2, 00,000 towers are on working on DG.

Coslight Telecom Energy Storage Unit (TESU) offers a wide load band, which can be further extended by adding additional lithium Ion module. TESU having 20KWh energy to offer a continuous backup of over 6 hours for a load less than 2 KW and TESU with 40KWh energy to offer a continuous backup of over 15 hours for a load above 2KW . Proposed solutions will put DG on standby mode due to high autonomy and fast charging.

The system is designed to meet maximum load up to 6.0 KWh and there is no need of site infra up gradation due to increase in tenancy/load up gradation. Also proposed solution is suitable for intermittent grid outage as well as long outage scenarios.

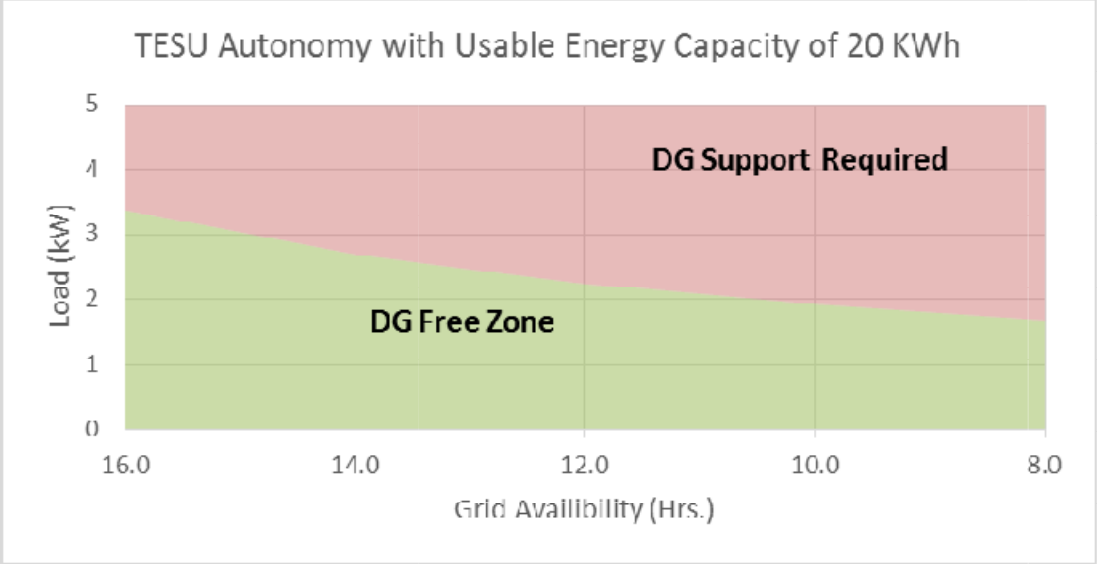
TESU at Intermittent Grid with Multiple Li-Ion Cycle Usage per Day



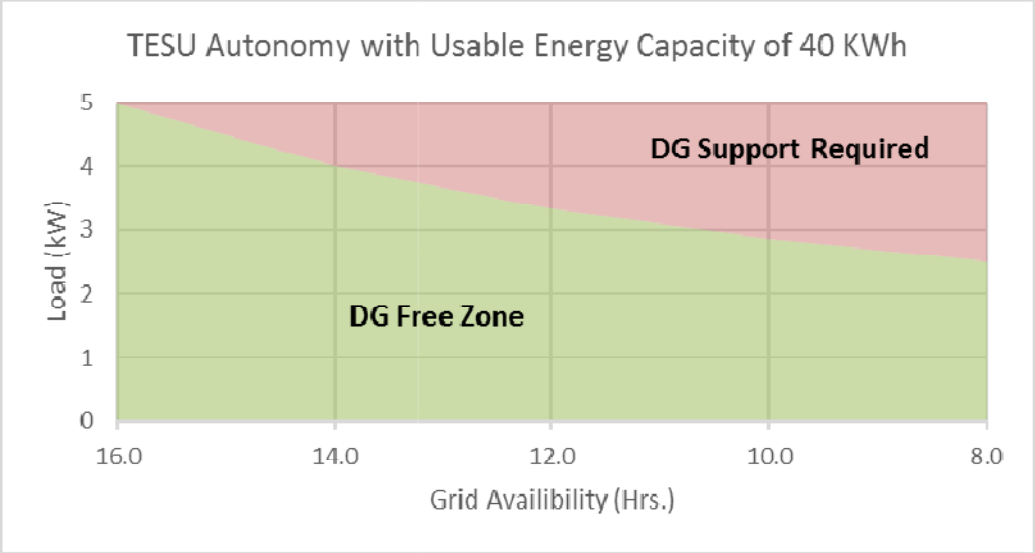
TESU is designed to utilize the cyclic capability of Li-Ion batteries. In an intermittent grid supply, this is achieved by using a maximum of one cycle from VRLA batteries and up to three cycles through Li-Ion batteries on an average per day. This provides an optimum and efficient usage of both VRLA and Li-Ion batteries fulfilling the energy requirements. Furthermore, the overall life expectancy of the system is also significantly increased.

TESU Autonomy with Usable Energy Capacity

- First Cycle Usable Energy Capacity: 20 KWh



- Intermittent 2 cycle usable capacity: 40 KWh



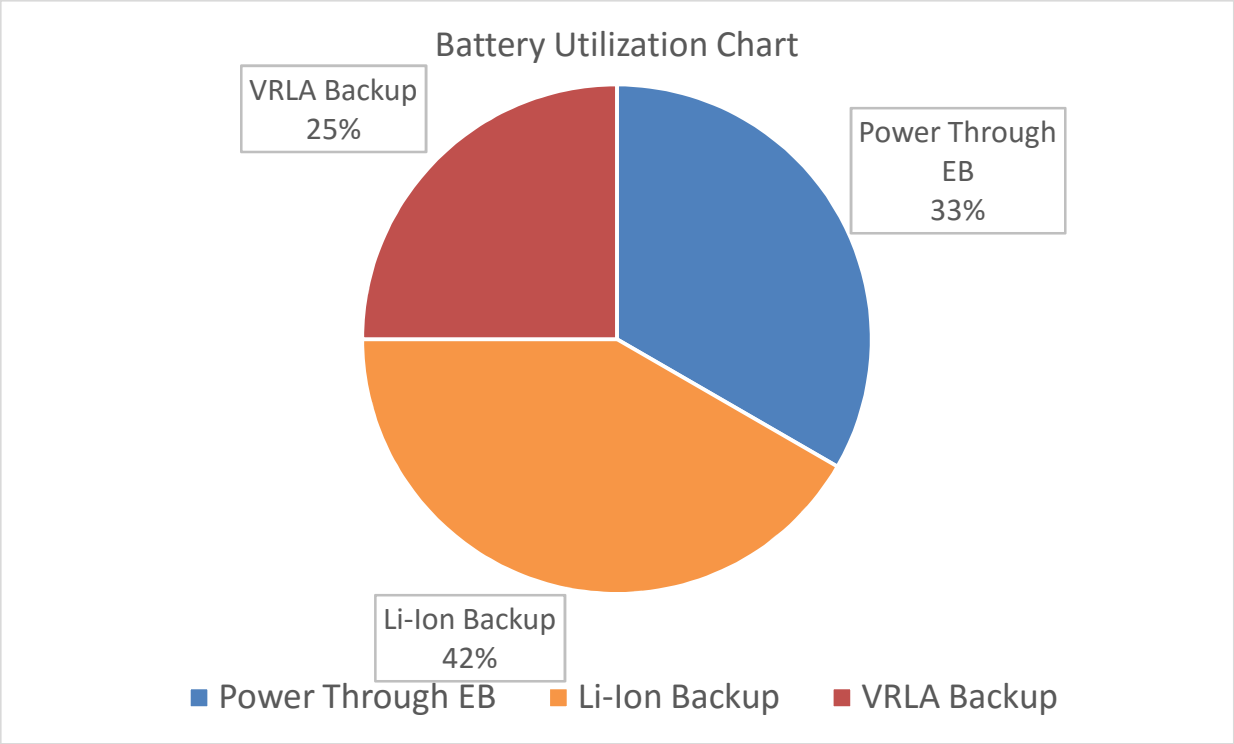
Lithium VRLA Combo Solution is answer for reliable backup solution for intermittent grid outage and long grid outage conditions. For intermittent grid outage, lithium-Ion battery will take multiple charge discharge and VRLA will act as a standby battery bank and in case of long outage VRLA, battery will give long backup. It means System is suitable for both types of grid scenarios.

TESU Energy Usage at Different Load and Grid Scenario

(Annexure 3)

Case 1: Load of 2 KW with Intermittent Grid Availability of 8 Hours

Required Autonomy 32 KWh (16 Hrs.) Per Day			
S No	**Battery System**	**Rated Storage**	**Average Battery Utilization Per Day**
1.	Li-Ion Battery	11.25 KWh	20 KWh (10 Hrs.) 2 Cycles of 10 KWh each
2.	VRLA Battery	28.80 KWh	12 KWh (6 Hrs.) Less than 1 Cycle of 12 KWh
Expected Life of System: 5 Years			

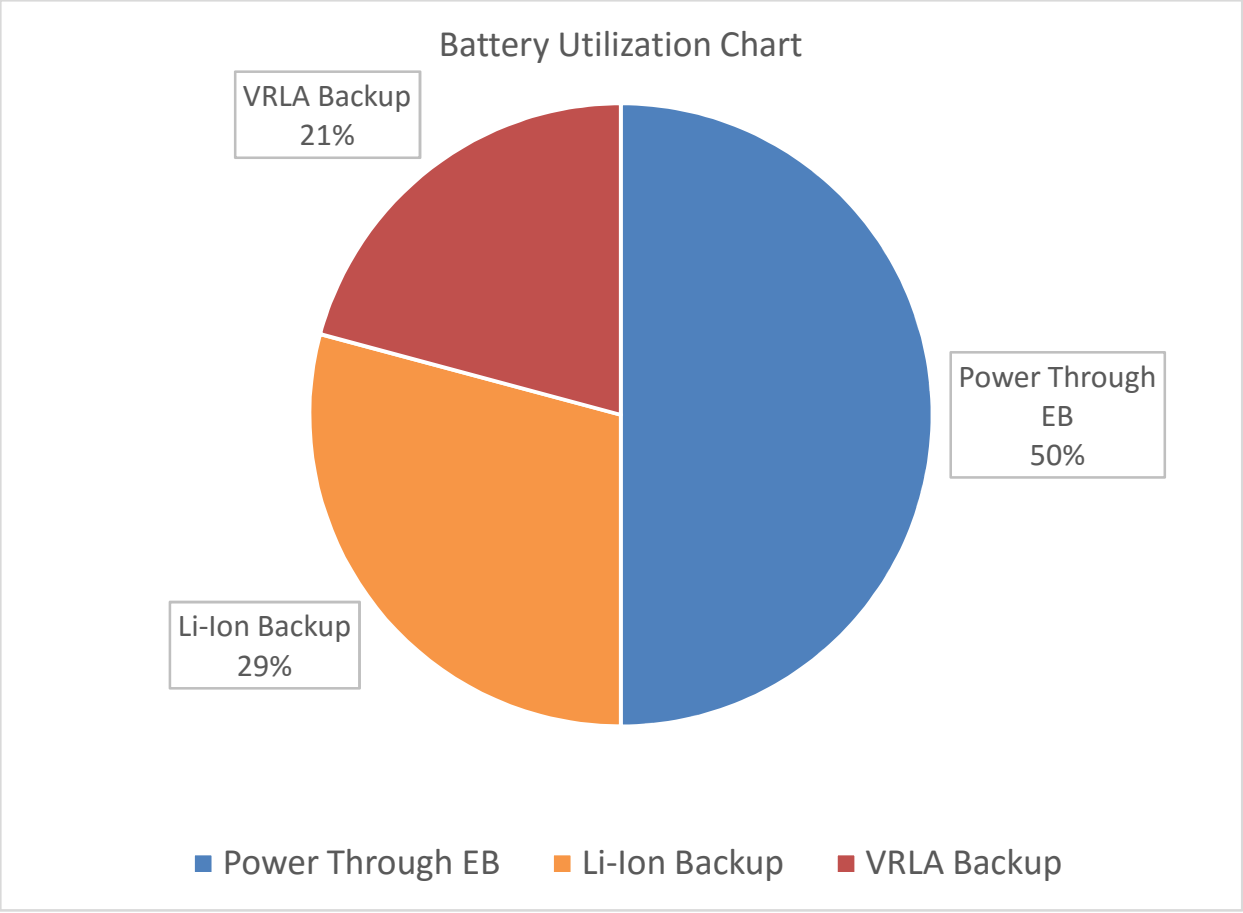


DG run of 8 Hr. per day Eliminated

(Annexure 3)

Case 2: Load of 3 KW with Intermittent Grid Availability of 12 Hours

Required Autonomy 36 KWh (12 Hrs.) Per Day			
S No	**Battery System**	**Rated Storage**	**Battery Utilization Per Day**
1.	Li-Ion Battery	11.25 KWh	21 KWh (7 Hrs.) 2 Cycles of 10.5 KWh each
2.	VRLA Battery	28.80 KWh	15 KWh (5 Hrs.) Less than 1 Cycle of 15 KWh
Expected Life of System: 5 Years			

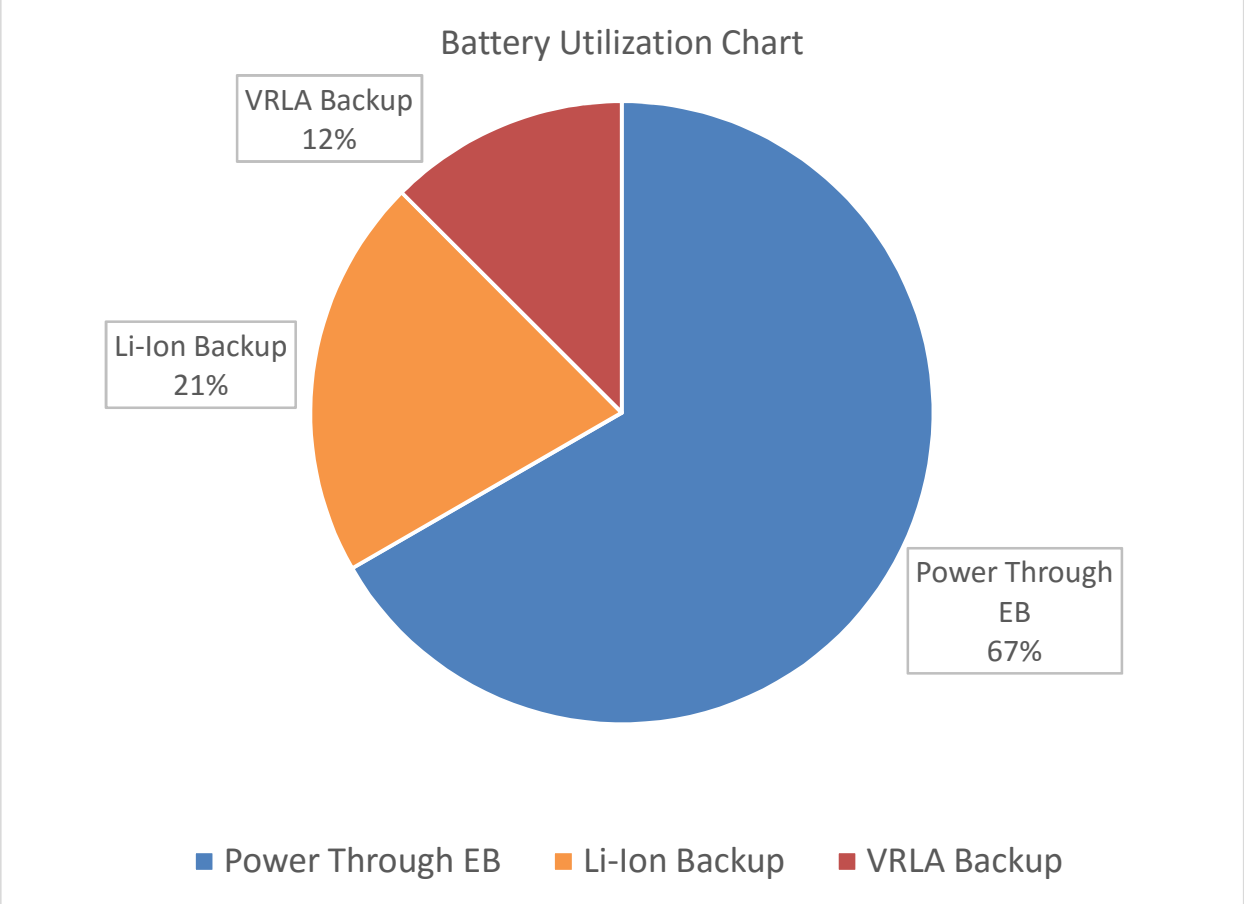


DG run of 7 Hr. per day Eliminated

(Annexure 3)

Case 3: Load of 5 KW with Intermittent Grid Availability of 16 Hours

Required Autonomy 40 KWh (8 Hrs.) Per Day			
S No	**Battery System**	**Rated Storage**	**Battery Utilization Per Day**
1.	Li-Ion Battery	11.25 KWh	25 KWh (5 Hrs.) 2 to 3 Cycles of 10 KWh each
2.	VRLA Battery	28.80 KWh	15 KWh (3 Hrs.) Less than 1 cycle of 15 KWh
Expected Life of System: 5 Years			



DG run of 5 Hr. per day Eliminated

(Annexure 3)

Proof of Concept:

Site Name: Mission Road		
Site ID: 861074026435241		
Circle: Assam		
Item Description	**Prior Solution**	**Post Solution**
EB Availability per day	8 ~10 Hours (As per survey report)	8 ~ 10 Hours (as per EMS Report)
DG capacity	15 KVA	15 KVA
Total DG run hours per day	More than 6 Hrs.	0
No of cycles DG run per day	> 1-2 Cycles	0
SMPS Power plant	Delta 2700/8 Slot	Delta 2700/8 Slot
Energy Solution	Amara raja VRLA 300Ah	Coslight TESU Solution 40KWh
Battery Run Hours/Day	6 Hours	14-16 Hours
BTS load (Max.)	25~ 30 A	25 ~ 30A

(Annexure 3)

Energy Usage

Description	With VRLA Battery (VRLA 48V/300Ah)	With TESU
	DC Load 1~1.5KW (25A)	DC Load 1 ~ 1.5KW (25A)
Grid Availability	8 - 10 Hrs.	8 - 10 Hrs.
Battery Run Hours Per Day	6 Hrs.	14 -16 Hrs.
DG Run Hour per Day	06 Hrs.	0 Hrs.
Diesel /Hour	2.3 Ltrs	0 Ltrs
Diesel/ Day	13.8 Ltrs	0 Ltrs
Total Diesel in 4 Years (Ltrs)	20148	0
Cost of the Diesel @ INR 60/- per liter	INR 12,08,880/-	-
Total Expenditure (Four Years)	INR 12,08,880/-	-

*Detailed usage summary can be shared if required

(Annexure 4)

Question 13: For effective implementation of RET/Energy efficient solutions in telecom sector, how can the industry be supported? Should incentives be provided to licensees (TSPs)? If yes, what should be the milestone? Please comment with justification. (Annexure 4)

Response from Coslight India: As per the DOT recommendation highlighted in the consultation paper for adoption of RET, if possible consider and include Telecom Energy Storage Unit (TESU) as an alternate NEW Energy means to eliminate DG usage on Telecom sites . This practice will benefit/support to overall telecom industry ecosystem &stakeholders.

- For DoT , there are strong possibility to achieve its rural coverage mission + higher teledensity objectives if All projects being implemented with funding from USOF should be powered by "Telecom Energy storage solution (TESU) " besides Grid/RET only.
- For operators , as per **DOT Committee that recommends a rebate of 1%, 2% and 3% in license fees** in the financial year subsequent to installation to licensees (TSPs) which deploy RET solutions in 20%, 35% & 50% of their total BTS's in India respectively can be achievable through adaptation of "Telecom Energy storage solution (TESU) " as Green Alternatives to remove DG usages at sites wherein EB is available more than 8hrs ; that means more than 75% of the telecom sites across India can be addressed.
- For TOWERCOs , to encourage deployment of "Telecom Energy storage solution (TESU) " as Green Alternatives to remove DG usages at sites wherein EB is available more than 8hrs **; MNRE needs to extend subsidy to Towercos in line with other RET objectives and technology** to promote fast adaptation of "Telecom Energy storage solution (TESU) " at Telecom sites across India and can possibly address 75% of the deployed network+ new sites rollout by making it DG free and in turn reducing carbon foot print.
- For Mfg. , who are supporting "Make in India" Initiatives , there needs to provide **"Custom duty " benefits** on the import components at par with Electric vehicle Industry to drive "Telecom Industry" focus on reducing carbon foot print by adopting "Telecom Energy storage solution (TESU) " as Green Alternatives to remove DG usages at sites wherein EB is available more than 8hrs ; this will in turn support mfg. to address price reductions and will encourage mass deployment including in the remote areas to enhance the teledensity across India.

Contents

(Annexure 4)

Support/Initiative to Industry

Support/Initiative to Industry	
In order to enable industry to access resources for deployment of RET power solutions, DoT should facilitate in processing the industry's proposals for financial assistance, if required under various government schemes such as MNRE cluster based scheme for providing micro-grids and mini-grids with telecom as anchor load and Ministry of Power capital subsidy scheme under Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY	The same support can be extended to "Telecom Energy Storage Unit" (TESU)
In the event of a proposal being received from industry, the Government may consider support through (National Clean Energy Fund) NCEF or bilateral financing agencies like World Bank or (Asian Development Bank) ADB to fund capital requirements for green telecom initiative	The same support can be extended to "Telecom Energy Storage Unit" (TESU)
For realizing the impact of inclusion of Telecom as an Infrastructure sub-sector in the harmonized master list, the benefits for accelerated depreciation and concessional loans with longer tenure may be extended to telecom companies, so that the Service Providers qualify for claiming depreciation on the capital cost of PV system with associated tax benefits. This would support in faster deployment of RET in telecom sector	The same support can be extended to "Telecom Energy Storage Unit" (TESU)
The Committee while taking into consideration the objectives of NTP2012 (National Telecom Policy) which inter-alia includes enhanced and continued adoption of green policy in telecom and incentivization of the use of renewable resources for sustainability, recommends that performance based incentives be provided to telecom licensee/ operators who deploy RET solutions in their networks.	The same support can be extended to "Telecom Energy Storage Unit" (TESU)
The Committee recommends a rebate of 1%, 2% and 3% in license fees in the financial year subsequent to installation to licensees (TSPs) which deploy RET solutions in 20%, 35% & 50% of their total BTS's in India respectively	The same support can be extended to "Telecom Energy Storage Unit" (TESU)

(Annexure 5)

Question 14: What methodology can be proposed for setting newRenewable energy targets in the telecom sector? What should be thetimeframe for achieving these targets? Please comment withjustification. (Annexure 5)

Response from Coslight India:

There could be following methodology for setting new Renewable Energy targets in the Telecom Sector.

Methodology 1

By Using Telecom Energy Storage Unit (TESU)

Methodology 2

By using RET Technologies like Solar + Energy Storage

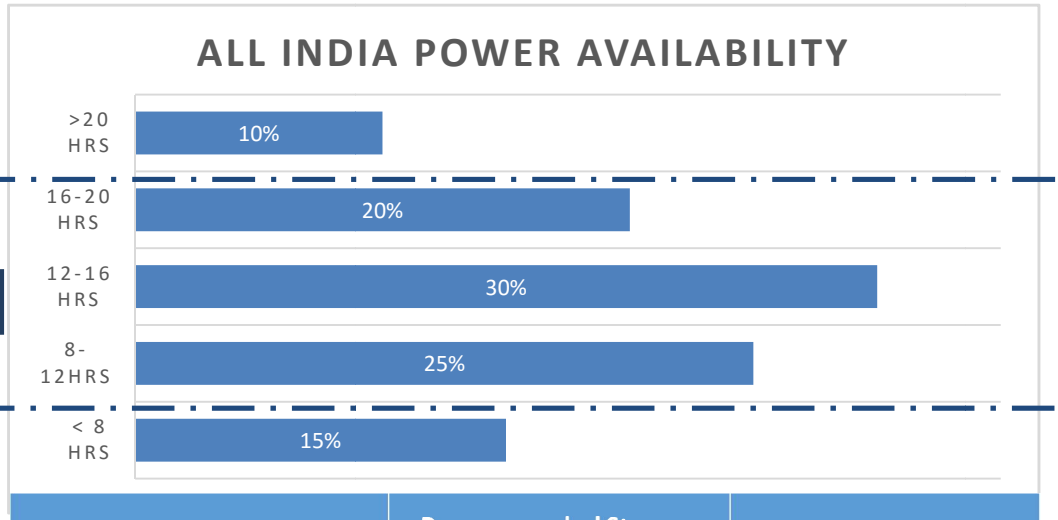
Methodology 3

By using Micro Grid & Mini Grid options

Contents

(Annexure 5)

Methodology 1: Target Selection & fulfillment Methodology using TESU

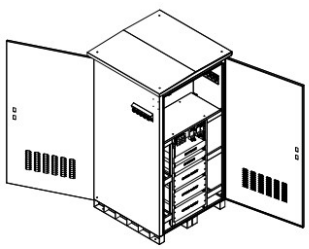


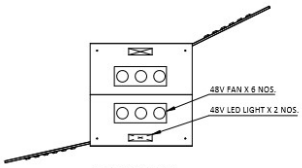
STEP 1

STEP 2

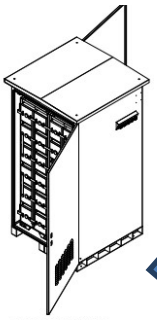
Grid Availability	Recommended Storage Solution	Ideal Load Band
Good Grid (More Than 16 hrs)	Advance VRLA	1.0kW to 2.0kW
		2.0kW to 5.0kW
		5.0kW to 7.0kW
Regular Grid (8 to 16 hrs)	Telecom Energy Storage Unit (TESU)	2.5kW to 4.0kW
		4.0kW to 5.0kW
		5.0kW to 7.0kW
Poor Grid (Up to 8 hrs)	Lithium Ion Battery	1.0kW to 2.0kW
		2.0kW to 3.0kW
		3.0kW to 4.0kW

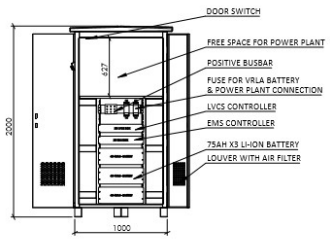
STEP 3


ISOMETERIC VIEW

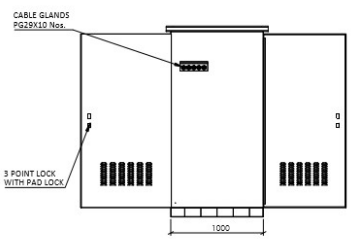


SIDE TOP VIEW

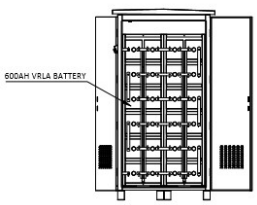

ISOMETERIC VIEW



FRONT SIDE VIEW

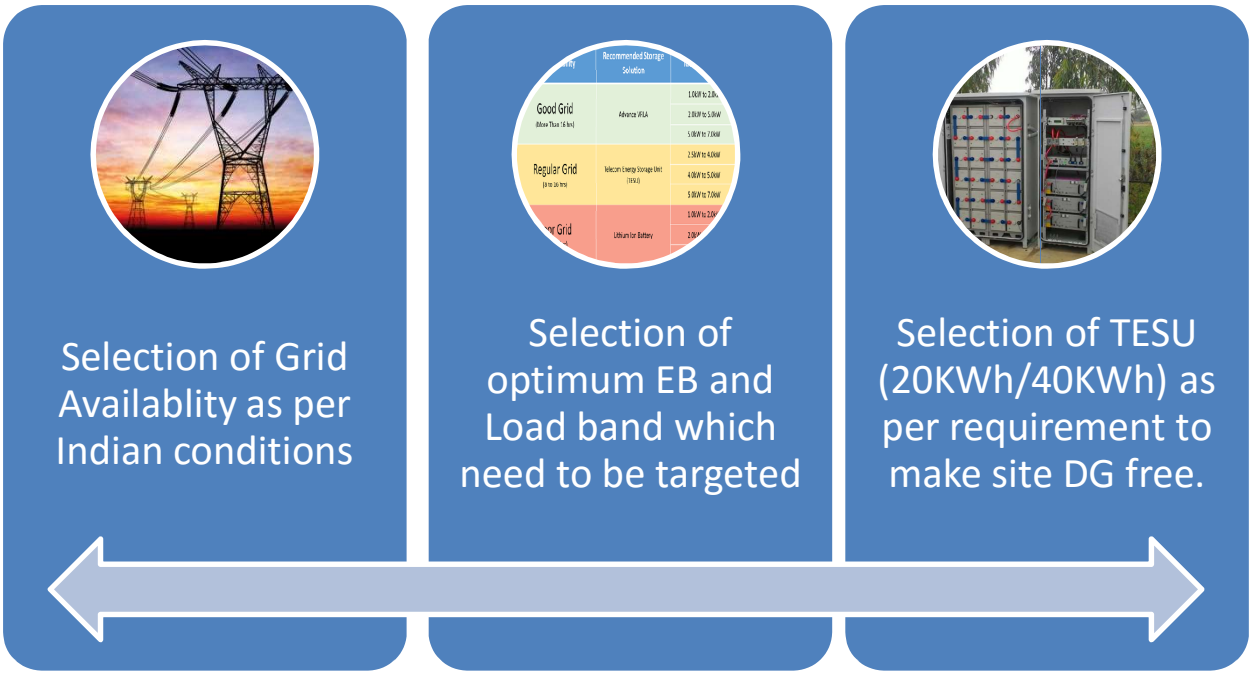


SIDE VIEW



BACK SIDE VIEW

The execution of Methodology 1 can be planned and achieved altogether in 1-2 year time frame & the same shall be fully supported by MAKE IN INDIA initiatives.



Methodology 2

The recommended energy resource if Grid is less than 8 hours: In case of grid less than 8 hours, TESU need to be charge with alternative active source, such as solar or wind turbine. This system can charge the TESU for required cycle and will ensure site will become green. The timeline for executing Methodology 2 needs to be discussed among respective stakeholders for appropriate planning and forecasting accordingly

Methodology 3

Apart from TESU, if the site conditions are in the rural area and there is no space constraint then Mini Grid and Micro Grid applications can be treated as other renewable resources. Using this application, both telecom towers as well as nearby communities can be supported. More details can be further discussed with respective organizations for supporting the initiative. Thereon the timeline for executing Methodology 3 needs to be discussed among respective stakeholders for appropriate planning and forecasting accordingly