

SUSTAIN **IMPACT**

...commitment to sustainability

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Transactive Grid Ecosystem

- Transition from conventional utility to modern digital energy company
- Dynamic management of grid assets → improved supply reliability
- Enables active control of grid and consumer energy assets → promotes integration of RE resources
- Elements of DERMS already developed and being offered by SI
 - Automated Demand Response
 - P2P Energy Trading
 - Smart Controllers



Demand Response @ BRPL

GridSync – Automated Demand Response



Automated Demand Response - Steps

1. DSO onboard consumers who can offer Demand side flexibility with energy assets
2. Smart controllers for automated control of consumer assets are installed on premise
3. DSO publishes DR event schedule containing expected relief, incentive offered
4. Consumer participates in DR events and commits to energy reduction
5. Appliances are triggered according to participation from consumer
6. Measurement and Validation is done in real time and Relief offered is calculated
7. Benefits / Incentives are transferred to consumer instantaneously



Awarded **Smart Startup of the year 2021** by ISGF Innovation Awards 2021

GridSync - Demand Response

SUSTAIN IMPACT Dashboard / Demand Response Events

List of Events

Upcoming Demand Response Events

20191026HYS

Exclude times with '0' quantity & price

DR EVENTS	TIME
<input type="checkbox"/>	2019102604HYS 0800 - 0815
<input type="checkbox"/>	2019102605HYS 0815 - 0830
<input checked="" type="checkbox"/>	2019102606HYS 0830 - 0845
<input type="checkbox"/>	2019102607HYS 0845 - 0900
<input type="checkbox"/>	2019102608HYS 0900 - 0915
<input type="checkbox"/>	2019102609HYS 0915 - 0930
<input type="checkbox"/>	2019102610HYS 0930 - 0945
<input type="checkbox"/>	2019102611HYS 0945 - 1000

2019102608HYS
South Hyderabad - 26 Oct, 2019

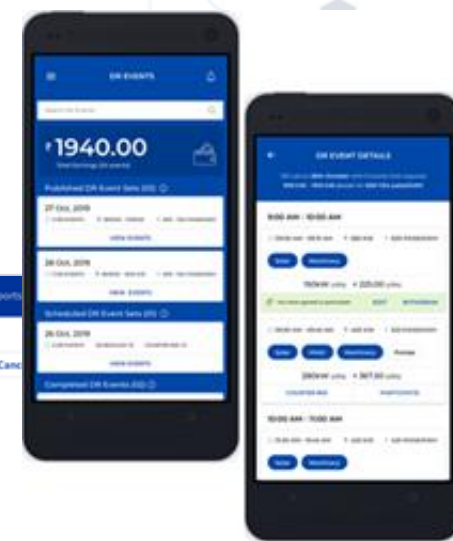
09:00 AM - 09:15 AM f 250 kWh @ 1025 paise

Customers

Invites	Participated	Counter bid	No Response	Actively Participating	Non-Compliant User (has penalty)	Live Ending in
25	18	00	07	03	01	00:10:23

Selected Customers - 06/25

CUSTOMERS	STATUS	PRICE (PAISE)	COMMITMENTS (KWH)	TRANSFERRED (KWH)
Aman Hospitality Private Ltd	PARTICIPATED	1025	50	0
DR_Inspector	PARTICIPATED	1025	20	07
Videocon	PARTICIPATED	1025	120	105
STC Developers	PARTICIPATED	1125 COUNTER BID - ACCEPTED	30	06
Ganga Ram Trust Society	PARTICIPATED	1025	--	--
SUPTD	PARTICIPATED	1025	--	--
Jyothi Trust	PARTICIPATED	1025	--	--
SUPTD Delhi	NO RESPONSE	1025	--	--
TOTALS	--	--	320	118



- Comprehensive
- Automated
- Trusted & Secure
- Customizable

GridSync Application - Features

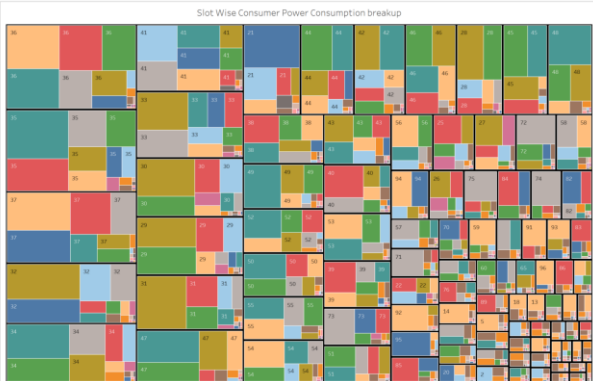
- **Application:** Web app for DSO and Mobile app for consumers
- **Comprehensive:** Pre-publish, Post-publish, Counter bidding, Performance tracking and Customer management modules
- **Automated:** Smart agent triggered control actions (*AC temp set, On/Off*)
- **Contracts:** Price and Capacity contracts, with customizable penalty terms for deviation
- **Notifications:** Targeted communication between consumers and DSO
- **Event Segregation:** Segregated DR event schedules & incentives for Residential & C&I customers. Also Feeder wise / Region wise event schedules
- **Customizable:** Modular product design for improved flexibility
 - DR parameters (gate closure time, bidding, order stacking, priorities etc.)
 - Commercial (pricing, penalty) according to regulatory regime

Demand Response @ BRPL

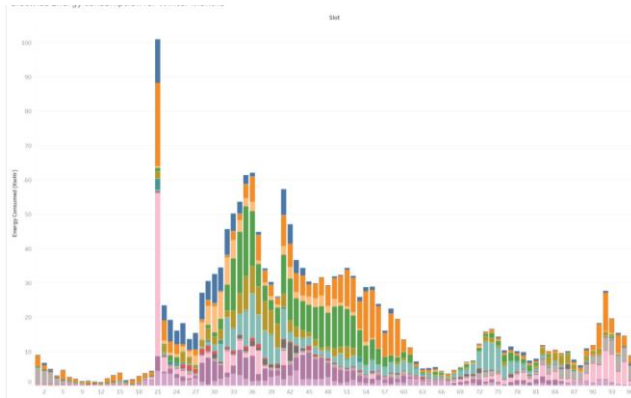
- **5000 DR** events published for “**Peak shaving**” of AC loads & “**Load shifting**” of Geyser loads
- Average relief of **0.86kW** for Peak Shaving and **2.08 kW** for Load Shifting for residential consumers
- **10%** timeslots contribute to **~70%** of entire days energy consumption
- Custom DR event schedules & incentives for Residential & C&I customers
 - **Feeder wise / Region wise event schedules**
- Time slots of 16:00 & 22:00 have higher DR participation from consumers
- Overall consumer participation of **40%** observed



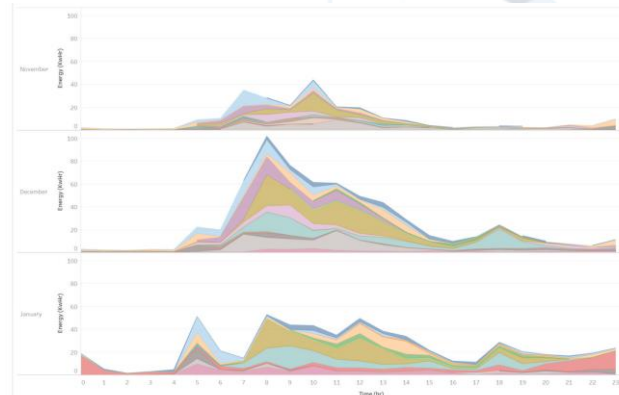
Data Analytics



Slot wise breakup of energy consumption



Anomalies on Baseline Energy usage



Monthly changes in energy usage

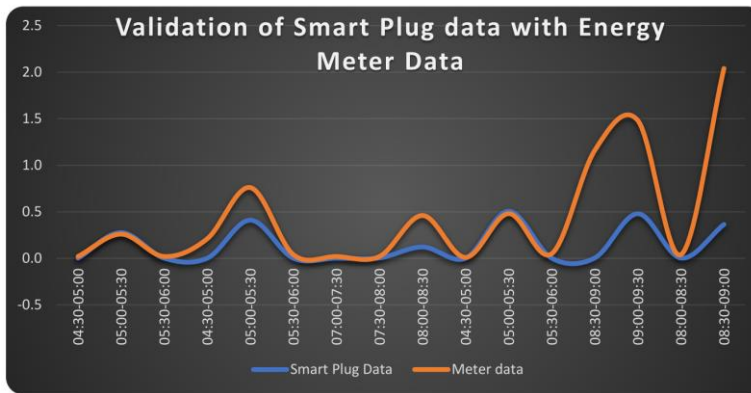
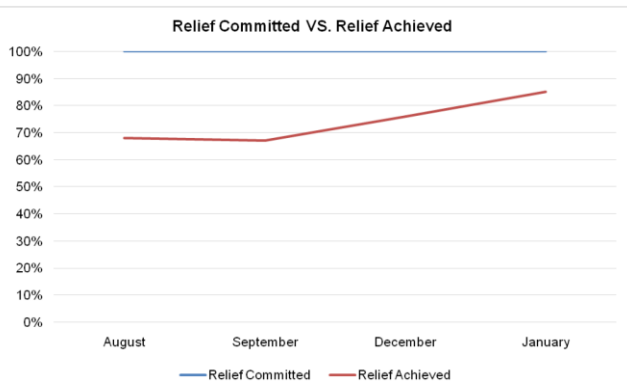


Figure 16: Summary of relief committed vs achieved during the POC

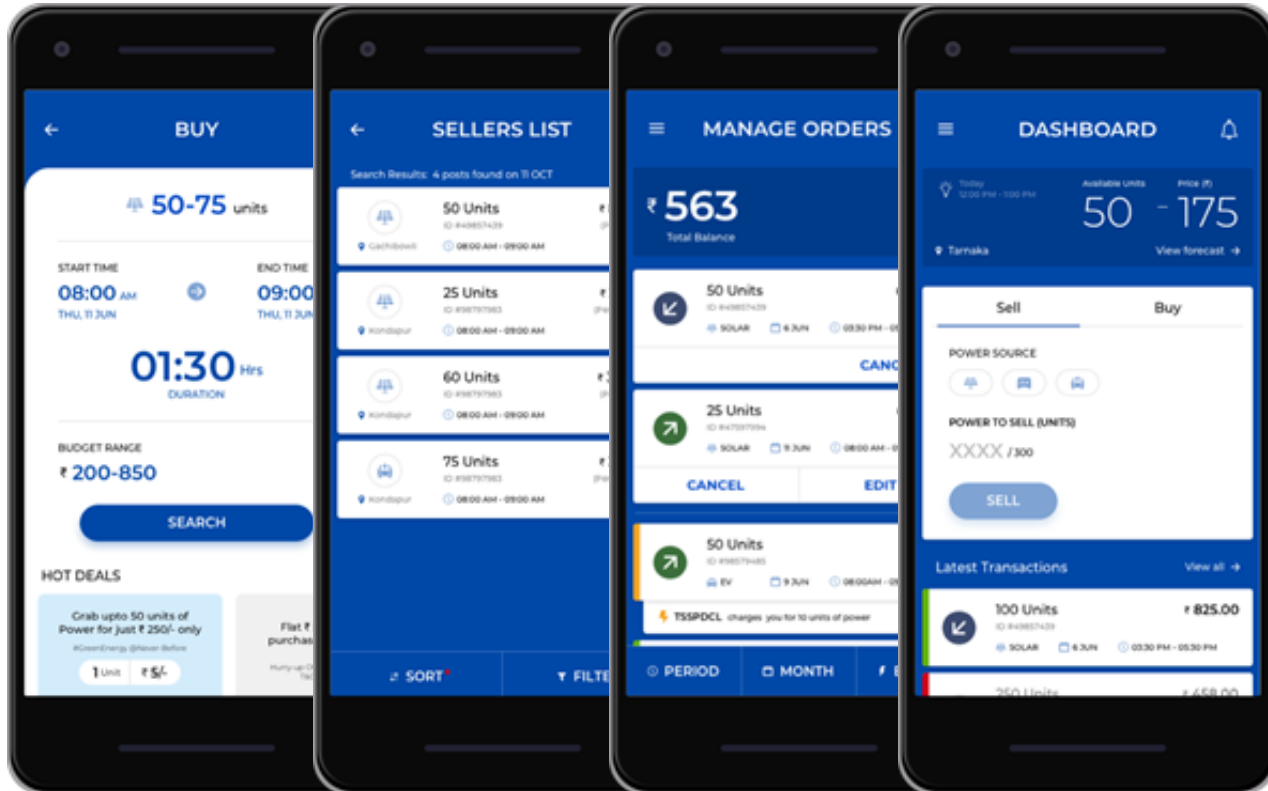


P2P Energy Trading @ CESC

PowerUp – P2P Energy Trading



PowerUp: Mobile Application



PowerUp Application - Features

- **Onboarding:** Seamless one step consumer onboarding process
- **Trade Management:** Trade tracking & Order management
- **Trade Moderation:** Network operator performs trade moderation
- **Contracts:** Price and Quantity contracts, with customizable penalty terms for deviation
- **History:** User can see historical demand and generation
- **Customizable:** Modular product design for improved flexibility
 - Trade related (gate closure time, bidding logic, order priority etc.)
 - Commercial (pricing, penalty) according to regulatory regime

P2P Energy Trading @ CESC

- Conducted P2P Energy Trading between multiple commercial locations (~ 20 consumers and 10 prosumers)
- Overall > 250 KW RE assets on boarded on to the platform and more than 2000 trades conducted during pilot
- Commercial and residential consumers have quite a varied power consumption behaviors and may in fact be natural partners in P2P Energy Trading.
- Residential consumers generally have surplus power during weekdays, while commercial (office) consumers have a deficit in weekdays and surplus during weekends.
- Significantly different energy consumption behavior for all types of consumers on Weekdays, Saturday and Sunday.



Relevance

- Energy Ecosystem quickly evolving & DSO need to
 - Understand consumer expectations and behavior (eg. EV, HVAC etc.)
 - Evaluate near term requirements and scale up challenges
 - Evaluate the business models and use cases for long term
- DSM provides new avenues for consumer engagement & retention
- Real time monitoring / control of distributed energy assets key
- Data driven approaches to augment power management
- Paves the way to behavioral energy efficiency & DERMS



THANK YOU!

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