

# Tata Power Demand Response Program

Agility

Care

Ethics

Safety

Diligence

Respect



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Mumbai Distribution

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# Demand Response

## An Innovative DSM program & Smart Grid solution

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- Demand Response (DR) is voluntary load curtailments by large Commercial and industrial consumers during peak hours when requested by Utility in order to create a curtail able capacity during high demand months.
- It is a primary demand side resource for *smart grid solution*
- Creates opportunity to use demand side assets.
- Financial incentives are offered to consumers participating in load curtailment when demanded.
- We have implemented both aggregator based and Auto DR projects

# Emergency Load management with DR



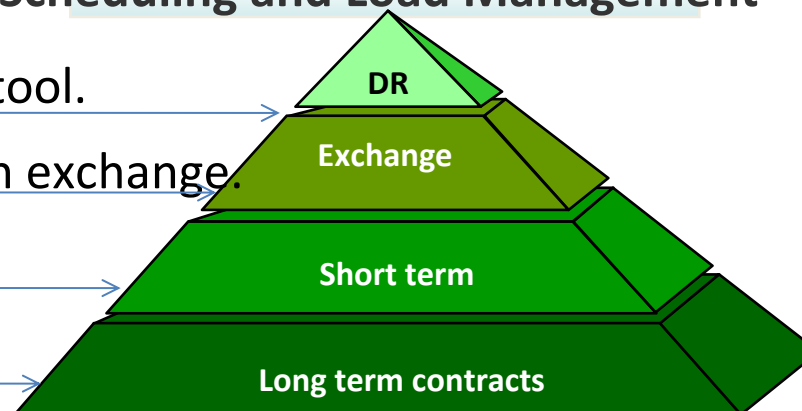
## Scheduling and Load Management

DR is additional emergency tool.

Daily deficits are met through exchange.

Short term through trader

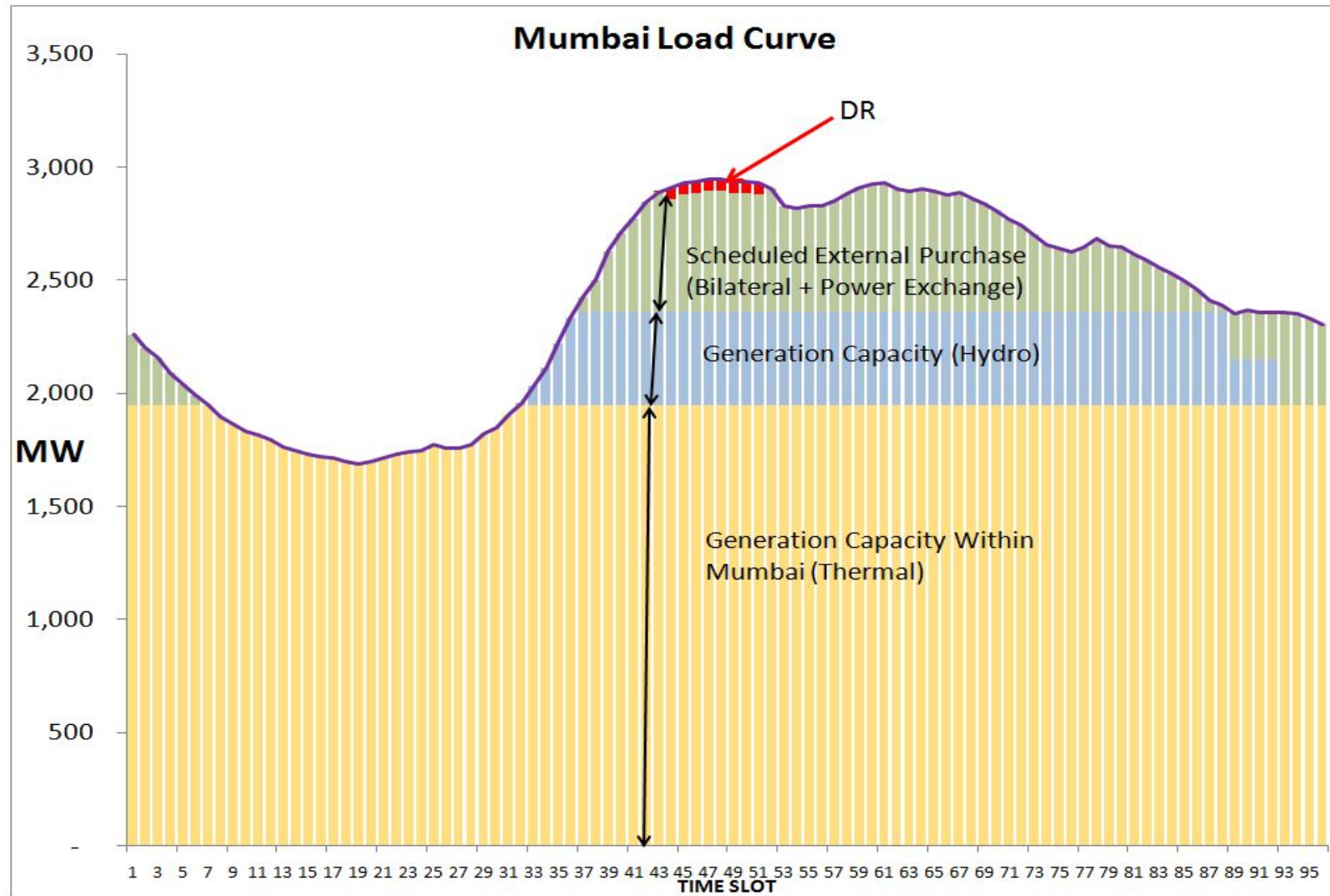
Normal power requirement



## Demand Response in Action at the Facility Level



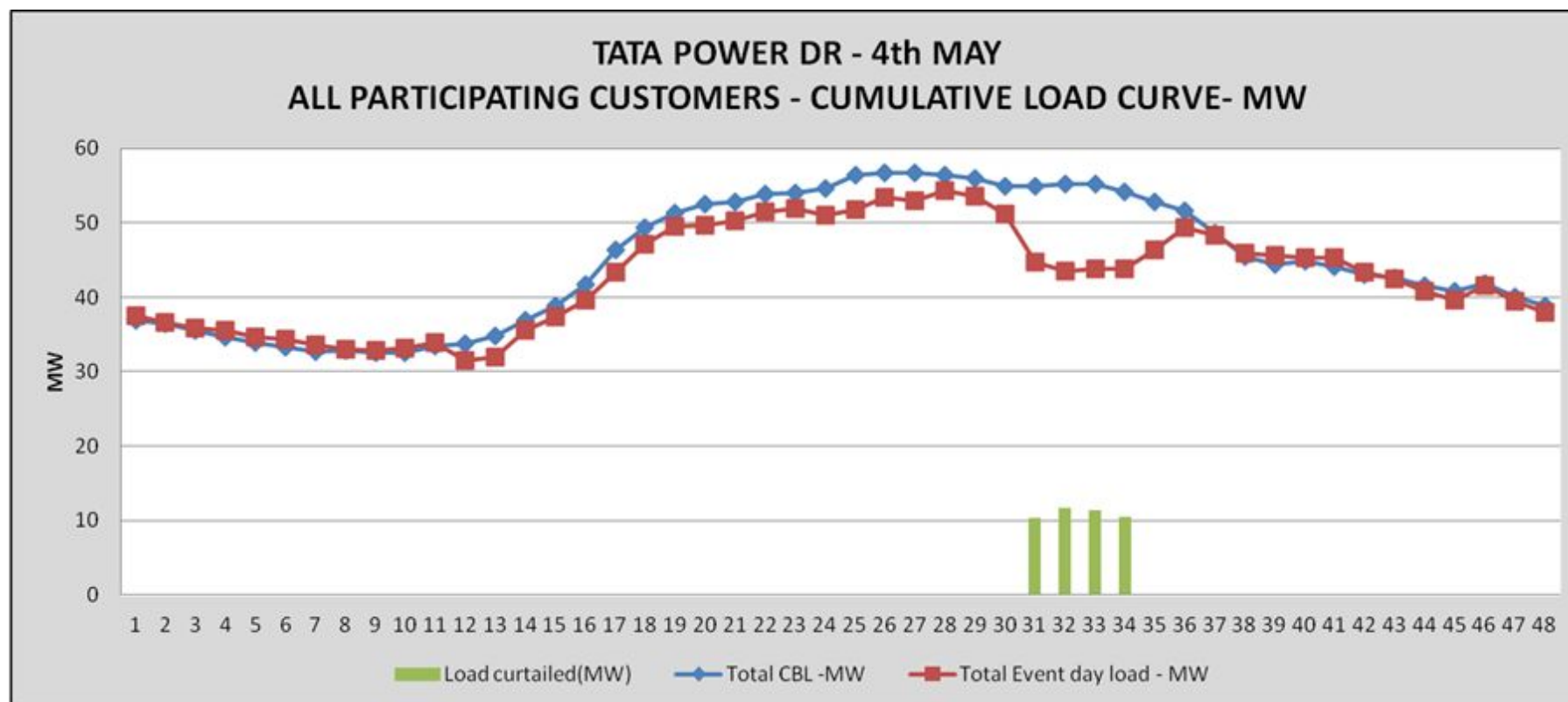
# Load management by DISCOM



# Demand Response : Aggregator model

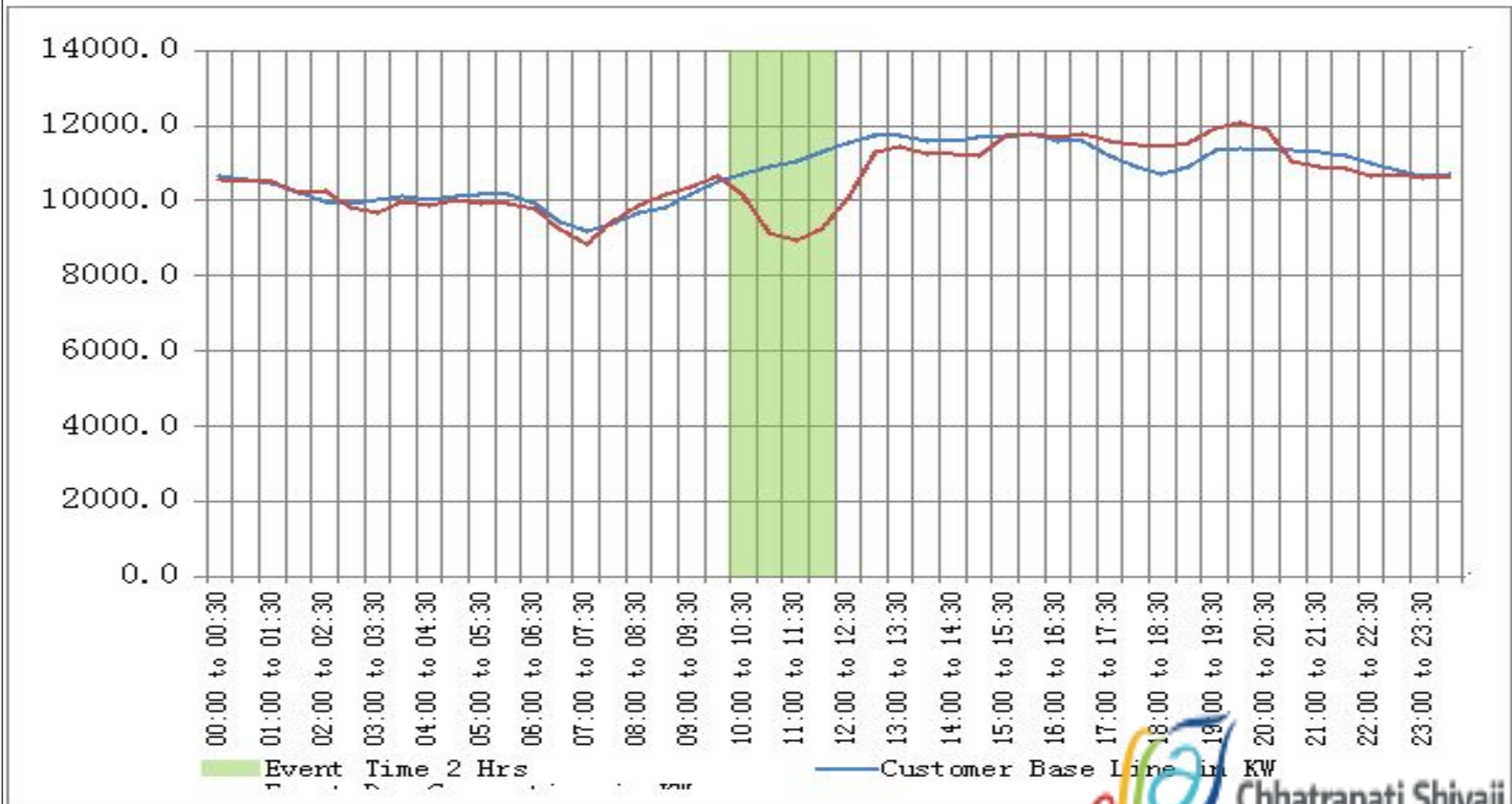


- Achieved Capacity of 15 MW with Tata Power Direct consumers
- 21 Events of 2 Hours each are called.

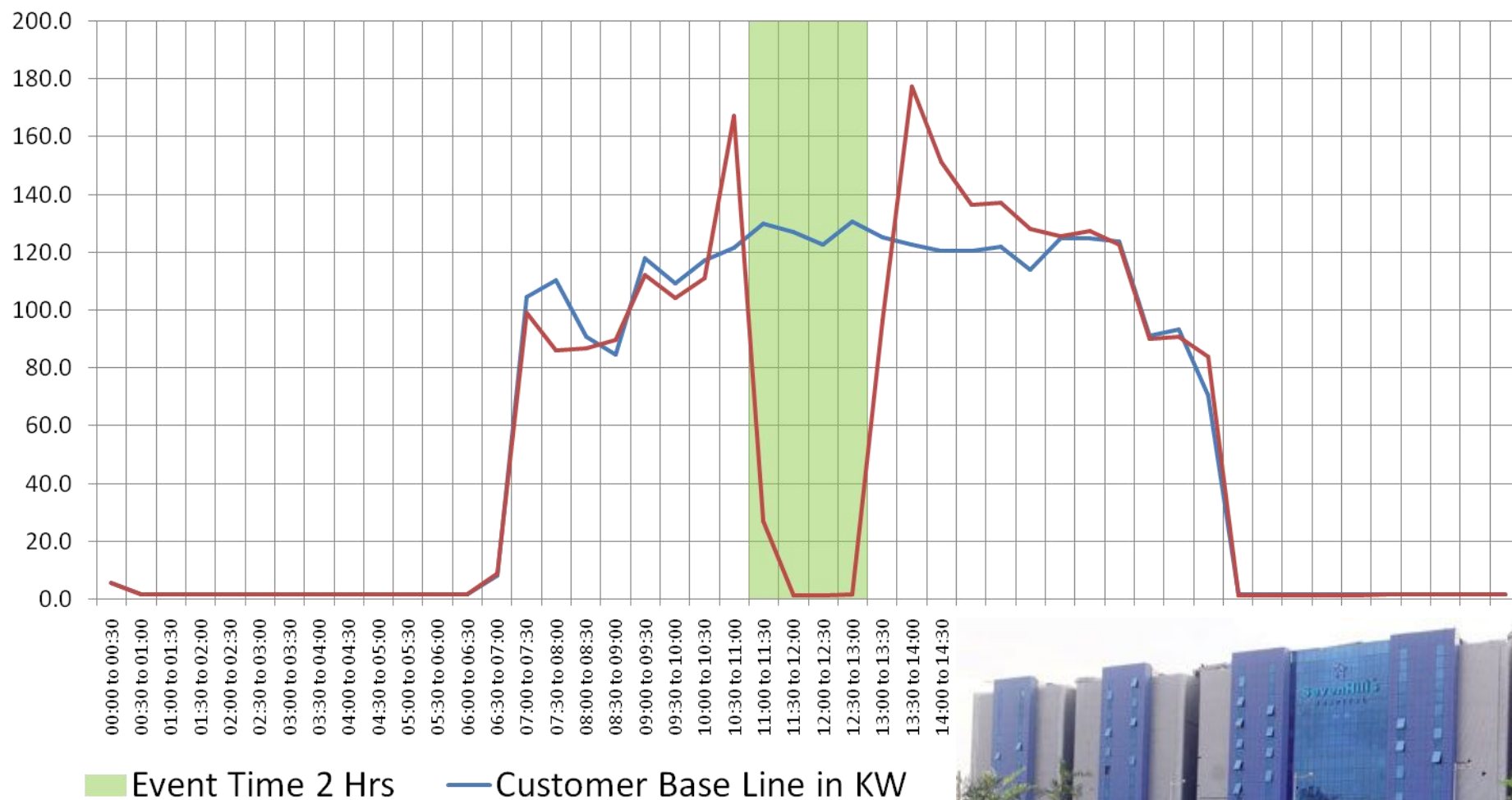




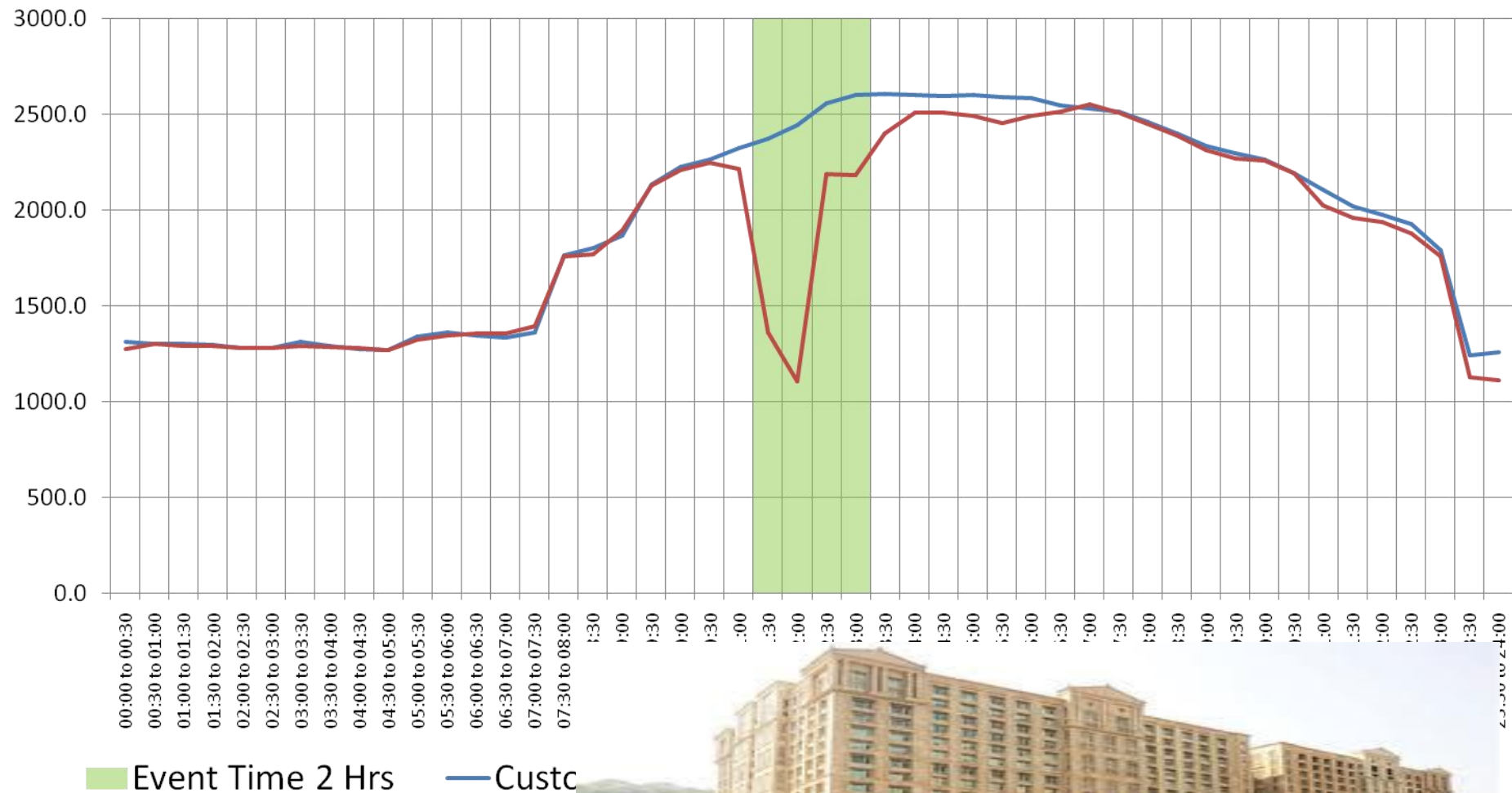
# Mumbai Air Port – Raising AC Temp



# Commercial Private Office – Switch Off Chillers by pre-cooling

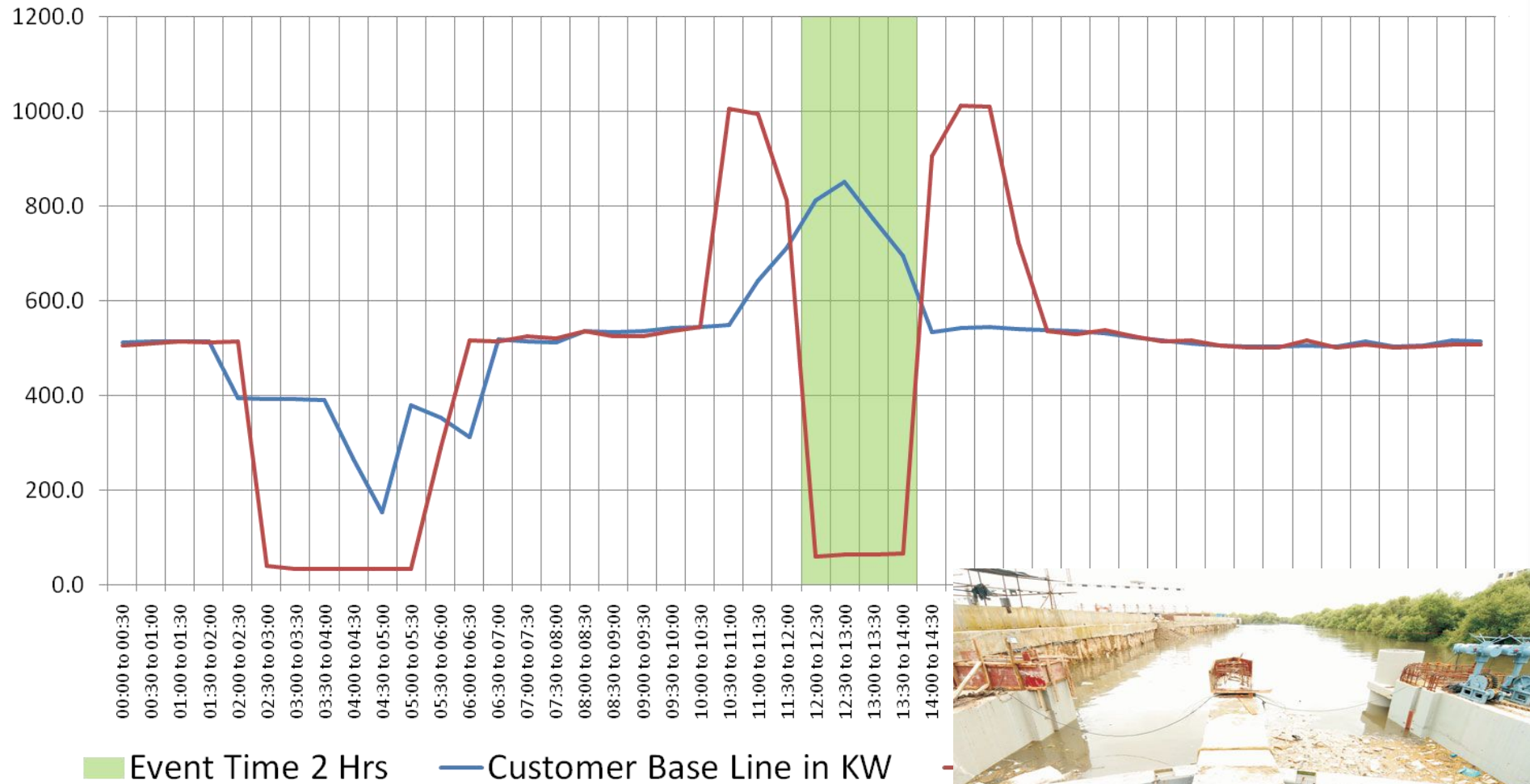


# IT Park – Trial runs of DG set / alternate generation during event call

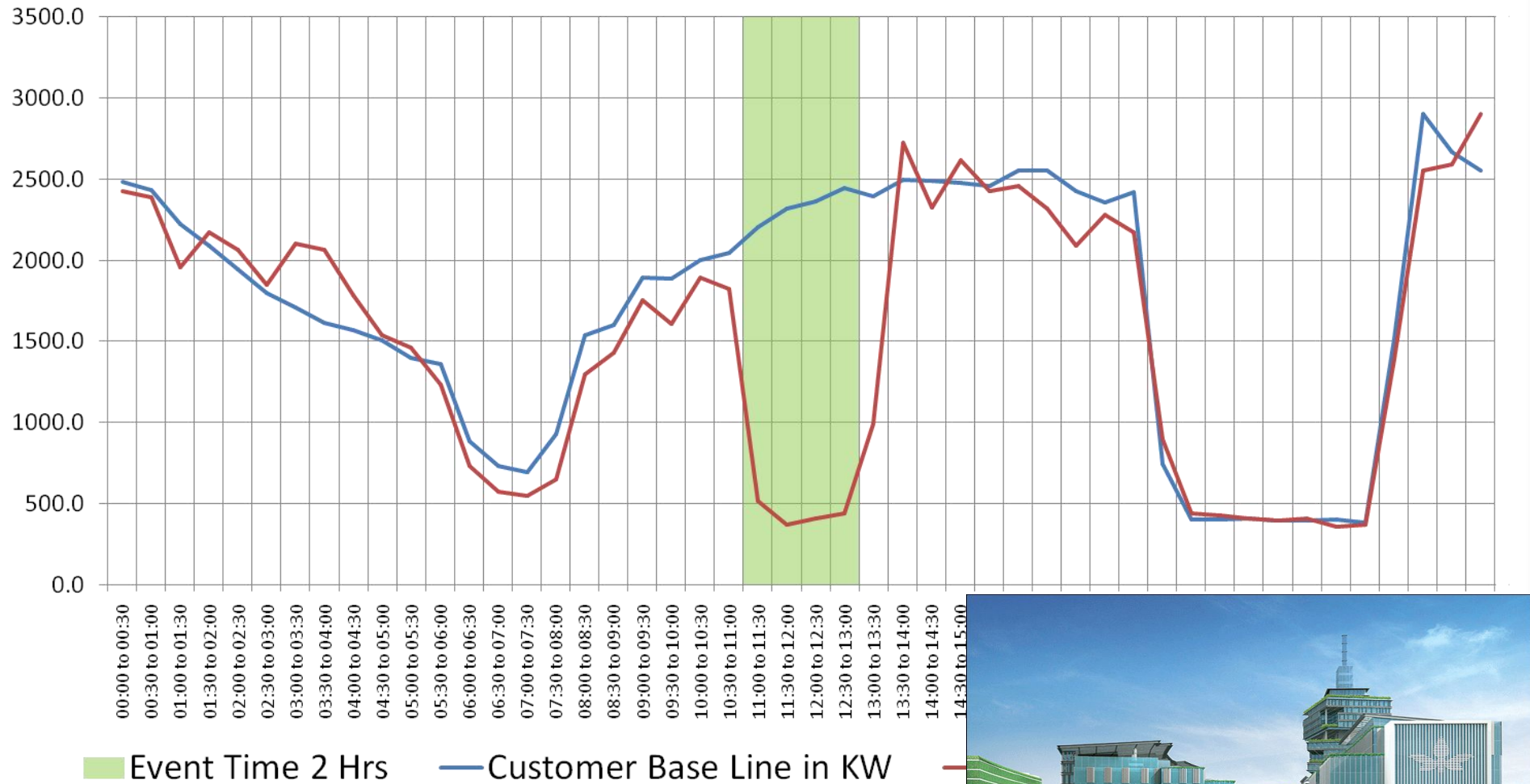




# Municipal Sewage Pump Staggering



# Use of Thermal Energy Storage during DR call (Load Shifting)



## Cumulative DR curtailment



Customer name	Location	Units (KWh)	MW Curtailed
		2 Hrs Basis	1 Hr Basis
Malls, Hospitals, IT parks, Municipal sewage treatment plants, Airports etc.	Hiranandani	1462	1.2
	Hiranandani	109	0.1
	Powai	804	0.55
	BKC	530	0.3
	Andheri	723	0.5
	Andheri	262	0.1
	BKC	327	0.2
	Vikhroli	3292	1.7
	Kandivali	0	0
	Bhandup	555	0.3
	Vikhroli	195	0.15
	Malad	181	0.15
	Various sites	1503	0.8
	Andheri	335	0.2
	Powai	105	0.1
	Andheri	2617	1.4
	Andheri	172	0.1
	BKC	188	0.1
	Goregaon	5841	3
	Powai	726	0.55
	Dadar	633	0.35
	Byculla	0	0
	Dadar	254	0.2
	Ghatkopar	1721	0.9
	Varsova	486	0.3
	Malad	486	0.3
	Kurla	1472	0.9
		<b>24979</b>	<b>14.45</b>

# Tata Power Auto DR Pilot



- Uses The Demand Response Automation Server (DRAS) with OpenADR compliant software
- Uses SaaS platform, Provides web based remote access to consumer and utility.
- Able to configure load curtailment strategies and schedules.
- Integrates with plant BMS

## ADR Pilot

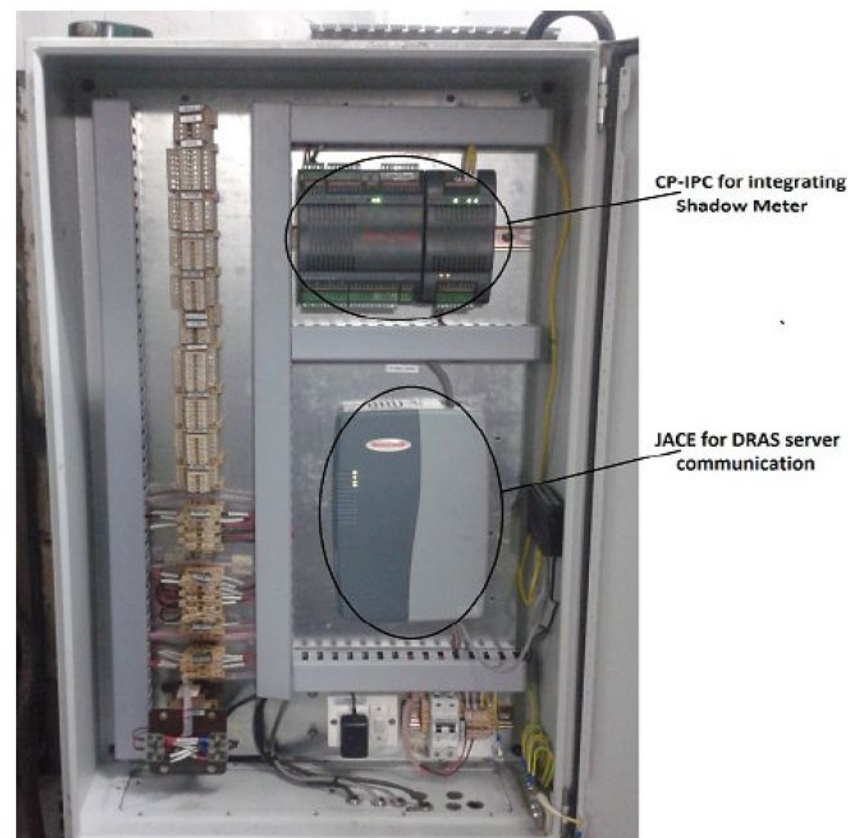
- It is a seven story 100000 Sq Ft. Hotel at Marve with load of 600 KVA
- Two chillers, AHUs, Heat pump, Laundry and kitchen equipments consumes the power.
- Existing BMS is used for ADR integration.



# Tata Power Auto DR programme Mumbai

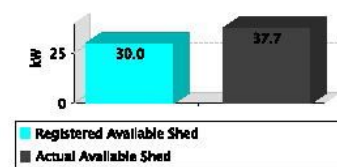
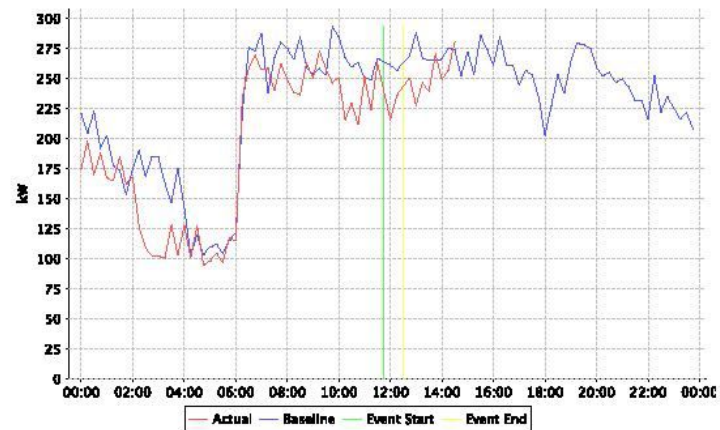
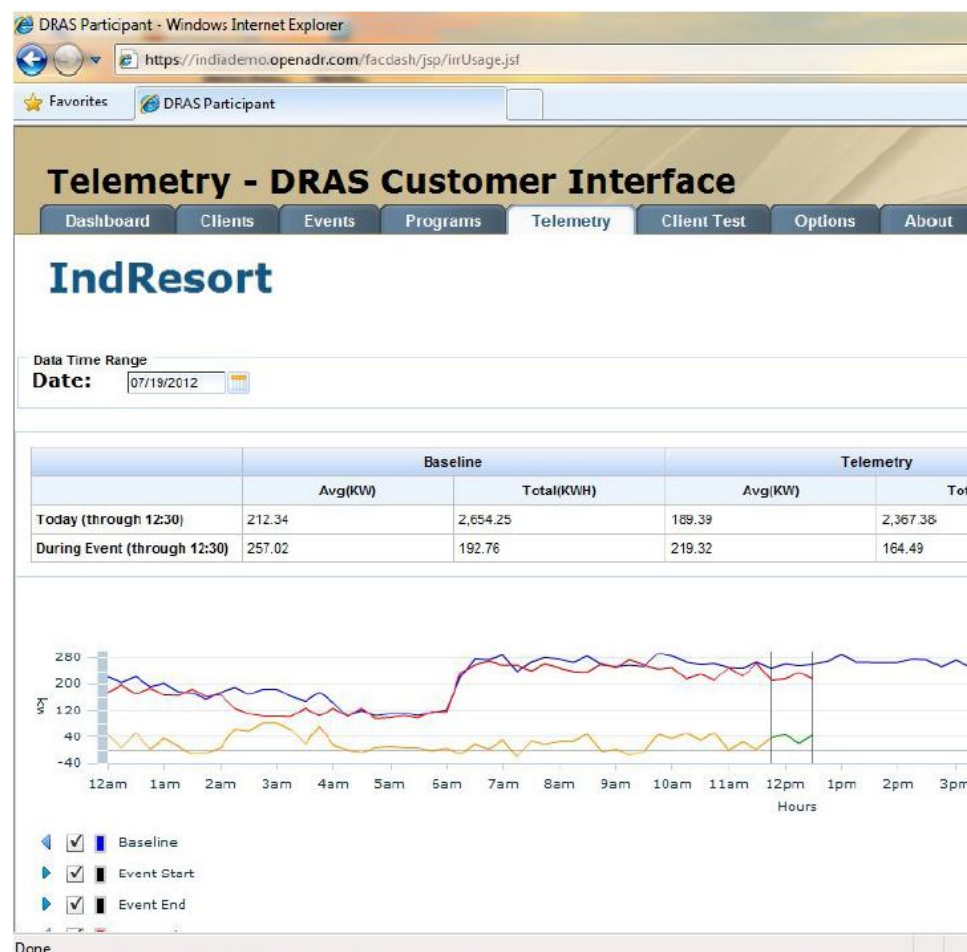


Sr. No.	Load Shed Strategy	Possible shed (Kw)
1	Maximize space temperature set point to 23-24 deg C	13
2	Switch off / Change over - Chiller & AHU's	50
3	Switch off 1 service elevator	5.5
4	Switch off Irrigation pump	6
5	Duty cycling of STP plant every half an hour	5.5
6	Switch off 2 washing machines and 1 dryer	10
7	Switch off 1 Kitchen exhaust fan between 10AM to 12PM and 3PM to 6PM	11
<b>Total Shed KW</b>		<b>101</b>





# DRAS: Base line and actual load



# Some learning's from Demand Response Pilot



- Significant DR capacity can be developed but it can be used for very short periods and only few times a year.
- DR is not a solution for daily peak power shortage. DR has to be used judiciously.
- In Auto DR, consumers think that utility is interfering in their operations and are reluctant to participate.
- Aggregator based DR is very cost effective and gets wide acceptance.
- Managing air conditioning is the most effective way of achieving DR curtailment. Hence controls on room ACs must be promoted.
- The consumers remain interested for long time only if attractive incentives are offered.

**“Journey Continues..  
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critique.”**

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