

# BSES Yamuna Power Limited

CII National Award for Excellence in Energy Management, 2021

Presenter :

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# BYPL Profile



Key Parameters	As of Mar'20
Area	200 sq KM
Consumers	17.7 Lakhs
Customer Density	8850 /Sq.KM
Peak Load	1439 MW
AT&C Losses	7.46 %
Reliability Index	99.96%
Annual Energy Sales	5866 MU
Average Consumption	3314 kWh/year/consumer
Circles	3
Division	14

- ❖ Joint venture of Reliance Infra and GoNCTD (51 : 49)
- ❖ Licensed in 2002 for distribution and retail supply of power in Central and East Delhi
- ❖ Supply to historic and high density old city areas of central and east Delhi

**Successfully serving power requirements of people of Delhi for over a decade & half**

# Infrastructure details

## Network Infrastructure Details

Particulars	Mar'21
66/33 kV Substations (Nos)	5
33/11 kV Substations (Nos)	34
Power Transformers (Nos)	168
Distribution Transformers (Nos)	3953
33 kV OH feeders (Nos)	9
33 kV UG feeders (Nos)	161
11 kV OH feeders (Nos)	0
11 kV UG feeders (Nos)	948
Line Length (km)	543
33 kV OH Line (km)	99
33 kV UG Cable (km)	1062
11 kV OH Line (km)	25
11 kV UG Cable (km)	2134
LT Line (OH, AB & UG) (km)	6160

Consumer category	Sanctioned Load (MW) as of Mar'21
Domestic	2971
Non-Domestic	1595
Industrial	213
Agriculture	0.3
Others	196

Particulars	Mar'21
Circles	3
Divisions/Districts	14
Zones	46

# Overview – Sales & Demand

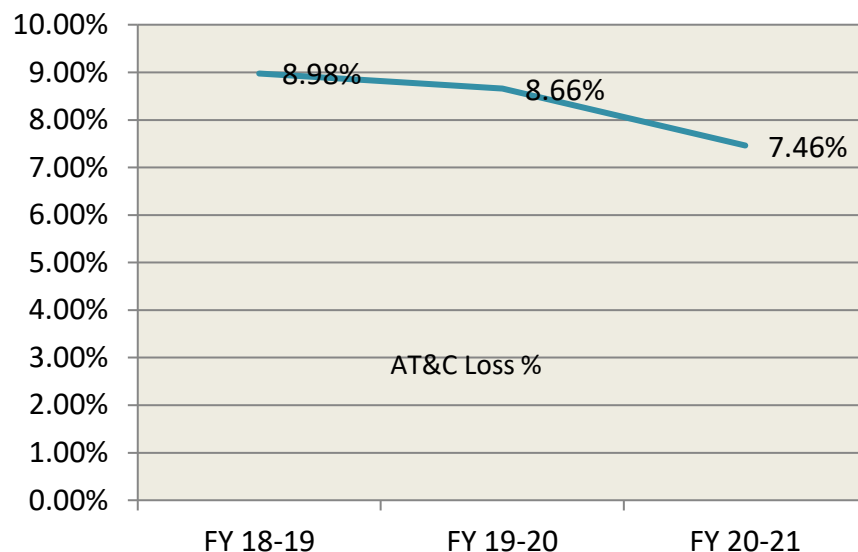
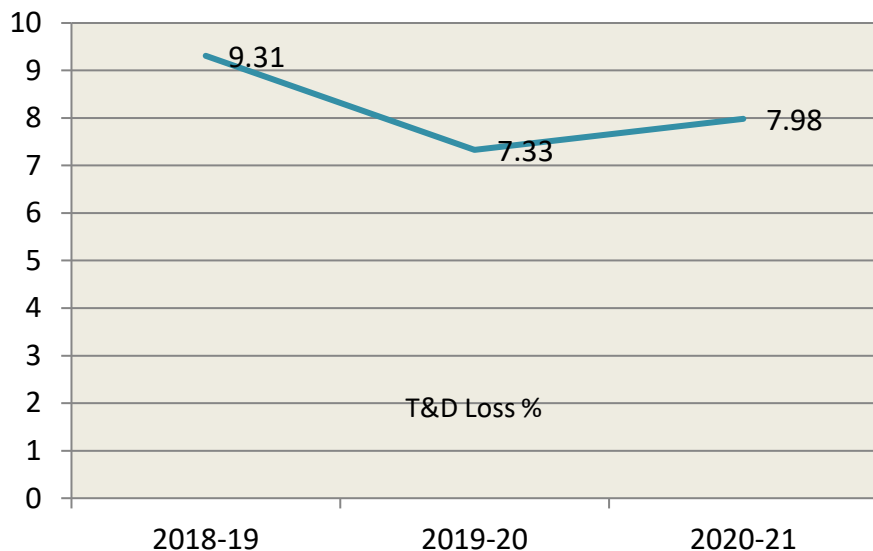
Parameter	Unit	FY 18-19	FY 19-20	FY 20-21
Energy purchased	MUs	7182	7183	6374
Annual Energy Sale	MUs	6514	6658	5866
Total Consumer	No.	1685734	1731136	1769976
Total Area	Sq.km	200	200	200
Consumer density	No./Sq. km	8429	8656	8850
Average Consumption	kWh/year/connection	3864	3846	3314

Parameter	Unit	FY 18-19	FY 19-20	FY 20-21
Maximum Peak Load	MW	1561	1653	1439
Minimum Load	MW	255	232	252
Average Load	MW	819	825	739

Category Wise Sales	Unit	FY 18-19	FY 19-20	FY 20-21
Domestic	MUs	3838	4057	3963
Commercial	MUs	1791	1737	1221
Agricultural	MUs	0.23	0.22	0.3
Industrial	MUs	374	373	318
Others	MUs	509	491	362

# T&D, AT&C Losses in last 3 years ( FY 2018-21)

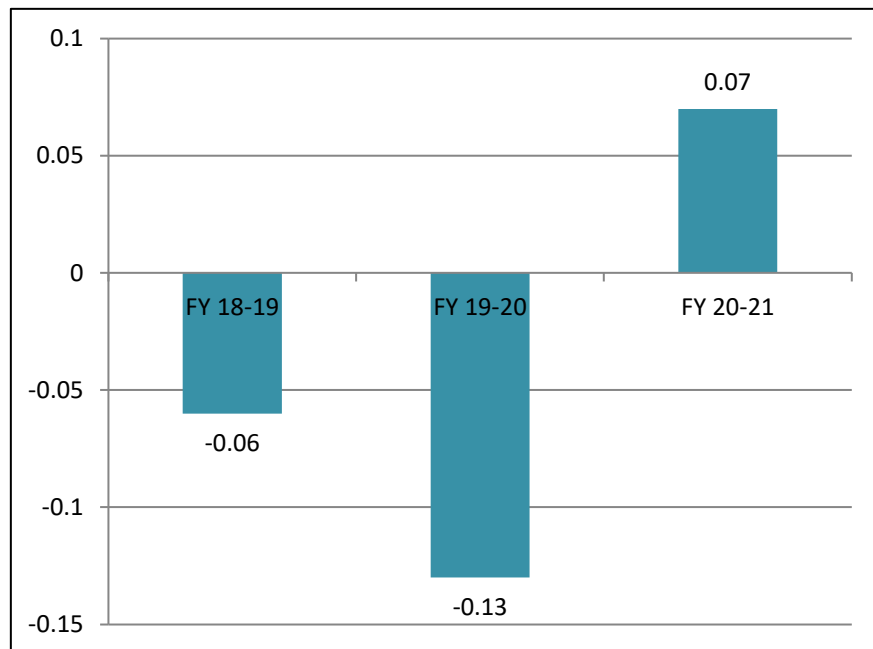
- BYPL started with losses almost double the National Average in 2002; Highest amongst the Delhi discoms
- Currently operating at loss level of <8% ; nearly 12% below national average & comparable with other Delhi discoms



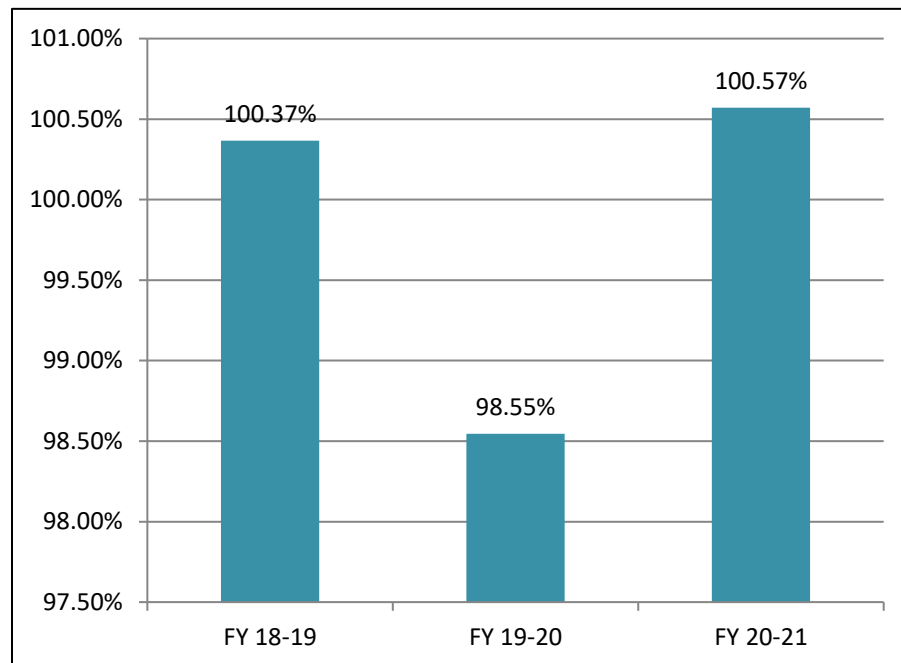
**~58% reduction in losses post takeover against 20% rise in a decade up-to privatization**

# ACS – ARR Gap & Collection Efficiency in last 3 years ( FY 2018-21)

## ACS – ARR Gap : Rs/unit



## Collection Efficiency



- *BYPL is endeavoring towards reducing the ACS-ARR gap.*
- *Regulatory Assets for nullifying gaps in ACS-ARR Gap*
- *Projected by DERC while approving tariff for FY 2020-21 vide tariff order dated 28.08.2020*

*Collection Efficiency dropped in 20-21 from 100% due to Covid-19 Lockdown scenario*

# Benchmarking

2020-21					
Discom	AT&C (%)	ACS-ARR Gap (Rs / Unit)	T&D (%)	SAIDI (Mins)	SAIFI (Nos)
Your Value- BYPL ACoS - ARR figures are indicating Revenue (surplus) - Gap	9.46%	0.07	9.00%	3.48	4.88
Other DISCOMS (near by ) - 2 BRPL ACoS - ARR figures are indicating Revenue (surplus) - Gap	8.56%	0.10	8.10%	2.40	4.82
Other DISCOMS (near by ) - 3 TPDDL	8.36%	0.18	7.90%	1.05	1.84

*\*Figures of AT&C (%) and ACES-ARR Gap (Rs/Unit) as approved by DERC vide tariff order dated 28.08.2020*



# Operational Performance

Parameter	Unit	FY 18-19	FY 19-20	FY 20-21
Total no of interruptions	Nos	3060	2730	2522
Interruption Duration	Hrs	2552	1948	1765
Total Consumer	No.	1685737	1731136	1769963
SAIFI*	%	0.69	0.54	4.88
SAIDI*	Hrs	0.6	0.39	3.48
Reliability Index	%	99.89	99.96	99.96

Parameters	UoM	2018-19	2019-20	2020-21
T&D Losses		9.31	7.33	7.98
PAT-II Baseline	%			-
Pat-II Target	%		15.33	-
PAT-II Achievement	%		9.31	-

- **Constant improvement in reliability Indices**
- **Under PAT-II Cycle BYPL achieved massive reduction of 200%**
- **SAIFI & SAIDI as per DERC norms**

# DSM Projects : 18-19

S.No	Title of Project	Year	Annual Electrical Saving (MWh)	Annual Electrical Cost Saving (Rs in million)	Investment Made (Rs in million)	Payback (Months)
1	Renewable Energy	2018-2019	23220	175	0.7	0.1
2	Demand Response Program	2018-2019	32.5	0.3	0.1	4.9
3	UJALA	2018-2019	4194	32	0.3	0.1
4	Consumer engagement programs on energy efficiency & conservation	2018-2019	300	2.3	5	28
5	Loss Reduction Activities	2018-2019	114100	860	919	12.8
<b>Total</b>			<b>141847</b>	<b>1069</b>	<b>925</b>	

# DSM Projects : 19-20

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S. No.	Title of Project	Year	Annual Electrical Saving (MWh)	Annual Electrical Cost Saving (Rs in million)	Investment Made (Rs in million)	Payback (Months)
1	Renewable Energy	2019-20	18262	134	0.2	0.02
2	UJALA	2019-20	4211	31	0.1	0.04
3	AC Replacement Scheme	2019-20	207	2	20	154.5
4	Consumer engagement programs on energy efficiency & conservation	2019-20	100000	734	0.2	0.004
5	Loss Reduction Activities	2019-20	144110	1058	911	10.3
<b>Total</b>			<b>266790</b>	<b>1958</b>	<b>931</b>	

# DSM Projects : 20-21

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S. No.	Title of Project	Year	Annual Electrical Saving (MWh)	Annual Electrical Cost Saving (in million)	Investment Made (in million)	Payback (Months)
1	Renewable Energy	2020-21	23420	158	0.3	0.02
2	UJALA	2020-21	49591	334	0.1	0.004
3	AC Replacement Scheme	2020-21	4018.4	27	1	0.5
4	Consumer engagement programs on energy efficiency & conservation	2020-21	300	2	0.1	0.593
5	Loss Reduction Activities	2020-21	16000	108	580	64.5

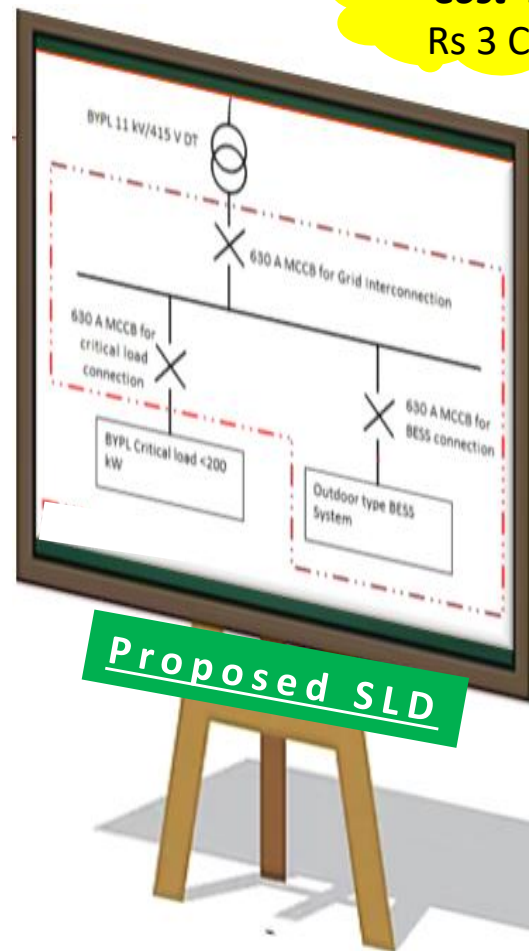
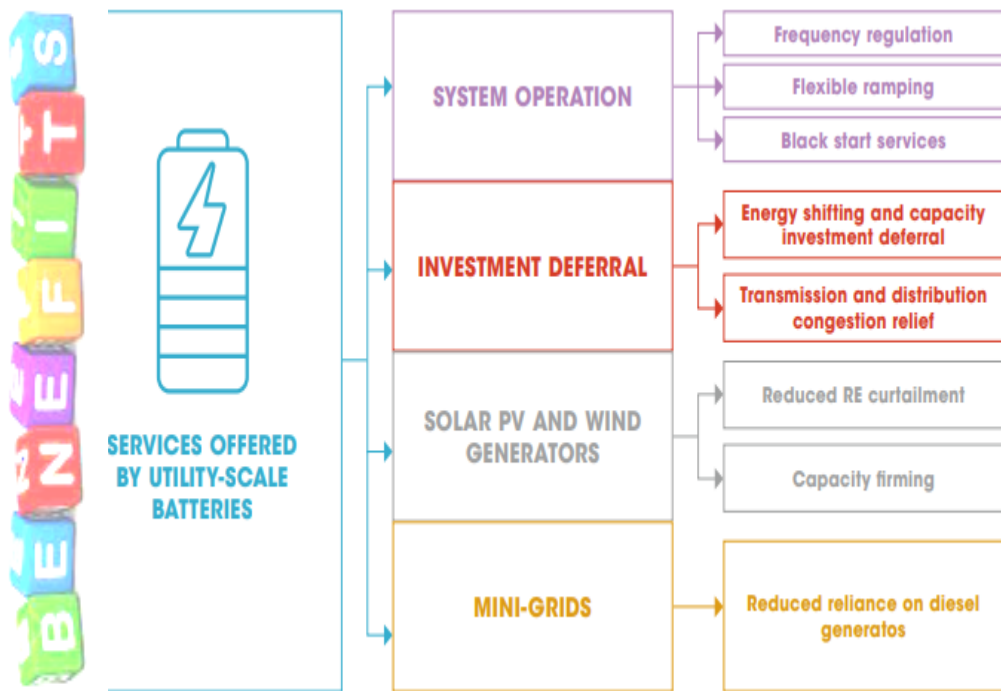
# IT Initiatives taken

S.No	Initiatives	Amount Spent (In cr)	Impact on Discom	Impact on Consumer
1	DMS : Motorised RMU installation and FRTU integration with SCADA	4.7	Increased efficiency in the system. Reduction in downtime	Uninterrupted & reliable power
2	DMS : Integration of PFI with GIS and SCADA for fault location in distribution network	1.0	Increased efficiency in the system	Uninterrupted & reliable power
3	IT activities : Implementation of Enterprise Management Network , Implementation of Supplier Relationship Management , Implementation of Group Net metering & Virutal Net metering	0.6	Infusion of new technologies ,Increased efficiency in the system	Enhanced Customer experience & advanced applications

# Battery Energy Storage System [BESS]

Attractive proposition to restore real-time Supply Demand balance through Quick Response & Emission-Free Operation

**Proposed Cost : Rs 3 Cr**



**1 MW Pilot underway (5 nos X 200 KW/ 200 KwHr) at the Distribution Transformer Level**

# Sustainable 'Green' Prospects

## Smart Energy Innovation Hub With SIN, Norway

- A **guiding tool** for setting up an 'Smart Energy Innovation Hub' wherein live test beds could be created for **testing** new technologies on simulated environment

## Energy Management Platform with Columbus

- A pilot platform to monitor energy parameters from various Energy Vectors (EV, Solar, Storage) which could be used for market price driven scheduling

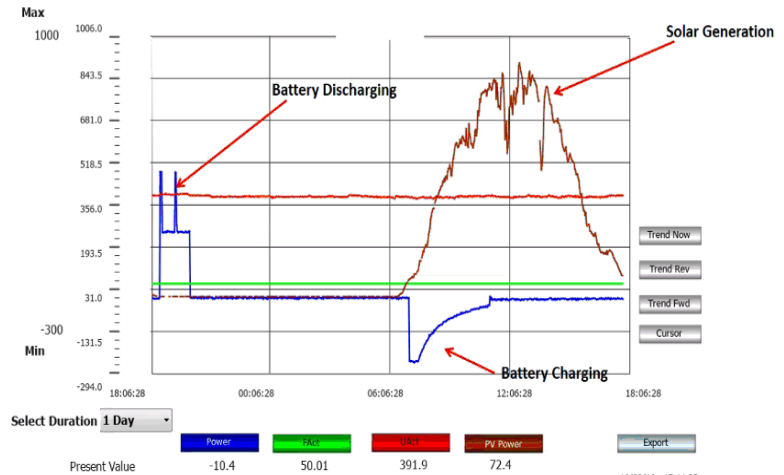
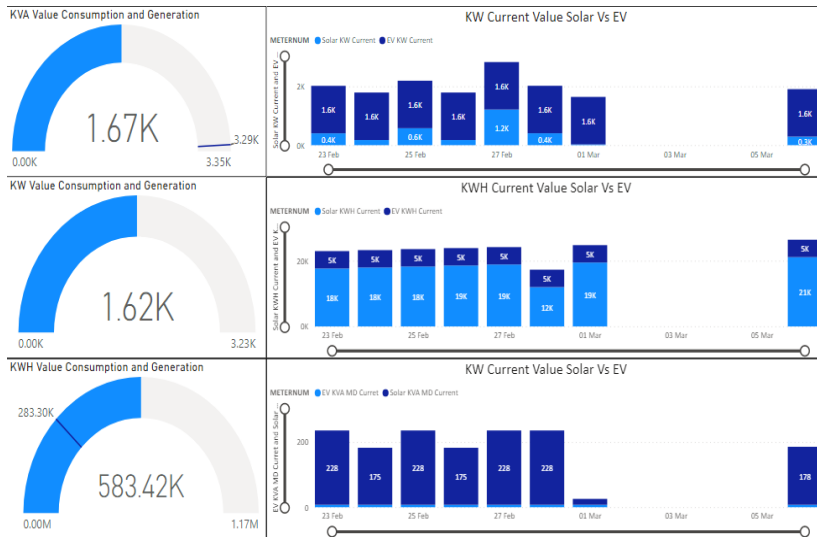
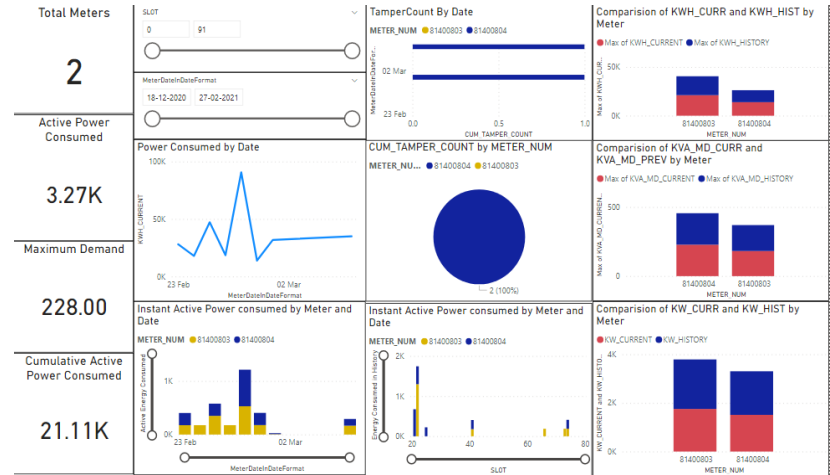
## Smart EV Charging Solution with Fortum

- Building EV chargers of 1 no. each of 50 kW DC, 30 kW DC (2x15 KW) and 22 kW AC and integrating them to Fortum Charge and Drive CDMC (Cloud based charger management system) to enable dynamic demand management of EV charging

## Evolution of Net-Load Variation from Emerging Technologies

- In Collaboration with National Renewable Energy Laboratory, US
- Contribution of RE plants to BYPL's Power Portfolio - "Top-down" approach
- Evolution of Net-Load Variation from Emerging Technologies – "Bottom-up Approach"

# Energy Management Dashboard





# Energy Management Dashboard

https://bypw1.bsesehi.com:7076/api/ESSData

POST https://bypw1.bsesehi.com:7076/api/ESSData

Params Authorization Headers (8) Body Pre-request Script Tests Settings Cookies

none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1 {
2   "uid": "hub_1",
3   "timestamp": "2021-02-15 15:58:00",
4   "offset": "0",
5   "city": "M",
6   "data": {
7     "a",
8     "b",
9     "c",
10    "d"
11  }
12 }
```

Body Cookies Headers Test Results Status: 201 Created Time: 809 ms Size: 329 B Save Response

Pretty Raw Preview Visualize JSON

```
1
2 {"statusMsg": "Data Successfully Posted for uid = hub_1."}
3
```

https://bypw1.bsesehi.com:7076/api/ESSData/hub\_1/command/1/commandStatus-success

POST https://bypw1.bsesehi.com:7076/api/ESSData/hub\_1/command/1/commandStatus-success

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies

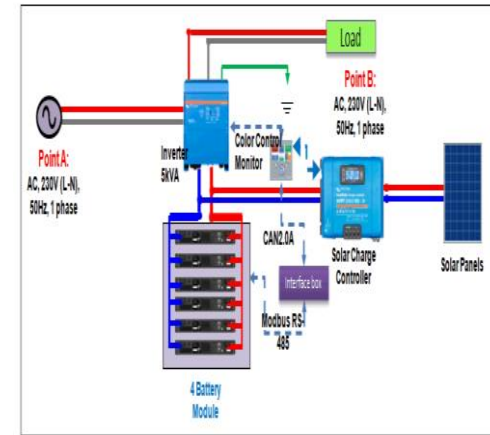
Query Params

KEY	VALUE	DESCRIPTION
uid	hub_1	
commandId	1	
commandStatus	success	

Body Cookies Headers (10) Test Results Status: 200 OK Time: 691 ms Size: 434 B Save Response

Pretty Raw Preview Visualize JSON

```
1
2 {"statusMsg": "Command Status Successfully updated."}
3
```



# RE Purchase & RPO Purchase

	Annual Energy purchased MU (2018-19)	% Share	Annual Energy purchased MU (2019-20)	% Share	Annual Energy purchased MU (2020-21)	% Share
Wind	0	0	0	0	53.05	0.83
Solar Photovoltaic (PV)	56.33	0.78%	59.4	0.83%	142.19	2.23
Others	41.24	0.57%	41.74	0.58%	93.24	0.46

RPO Targets	2018-19		2019-20		2020-21	
	Target given (%)	Achieved (%)	Target given (%)	Achieved (%)	Target given (%)	Achieved (%)
Solar	4.75%	0.86%	6.75%	0.89%	7.25%	2.5%
Non Solar	9.50%	0.63%	10.25%	0.63%	10.25%	2.57%

- BYPL has already tied up close to 500 MW of renewable power
- Fulfillment through RPO obligation through purchase of RECs
- BYPL is accelerating internal solar project and running many campaigns for increased solar rooftop adoption by consumers
- BYPL has facilitated in installing Net Metering Connection in it's area of capacity of 5 MW during FY 20-21

# Monitoring

## Frequency of Review of Performance & Consumption

- **Monthly review of Performance and Consumption** is being carried out by the energy Audit Cell on a monthly basis. A monthly report is prepared and presented to the management and divisions for review at various levels.
- **Energy Efficiency Projects:** For monitoring progress against energy efficiency projects , a mechanism as part of Annual Operating plan exists. Under AOP review meetings, progress against each project is discussed on a monthly basis.

## Roles & Responsibilities of Energy Manager /DSM Cell

- Devising of new schemes for energy efficiency projects and monitoring progress
- Capacity building for personnel and recommendations
- Organization's Mandatory Energy Audit in accordance to stipulated norms from BEE
- Compliances and submissions for statutory and regulatory bodies as per requirements

## Review Matrix:

S. No	Forum Name	Review Level	Scope	Participation
1	AOP Formulation Meeting	CEO, CFO	Operational Target setting along with identification of Strategic themes for every business, operation & support function	HoDs, Biz & Operational Support teams
2	AOP Review Meeting	CEO, CFO	Performance review : Target Vs actual performance (catch-up plan if reqd); need based project addition / scope modification	Divisional Level Participation (O&M, Biz & Support functions)
3	Project Based reviews ✓ Cost review ✓ Improvement / gains ✓ Statutory compliances	Head Biz / Head O&M along with respective department heads	Functional Performance	Departmental teams

# Monitoring Contd.

CEO Cell along with Operational Excellence Team (OET) & Business Excellence Teams (BET) work in tandem for supporting the overall review framework

Sample reporting formats

SDO	Division Name	Sub-Cluster Code	Sub-Cluster Name	DT Functional Code	No Of DTs in Substation	DT Capacity	DT Meter No	Monthl y DT Input (MU)	Monthl y DT Sale (MU)	Monthl y FL Input (MU)	Monthl y FL Sale (MU)	No Of DTs in Sub-Cluster	Monthl y Sub-Cluster Input (MU)	Monthl y Sub-Cluster Sale (MU)	Difference (MU)	Sub-Cluster Loss (%)
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Sr	Key Driver / Parameters	AOP Theme	UoM	FY20 AOP	Achieved till Aug'19	Remarks, if Any
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# Monitoring Contd.

## Sample Monitoring Dashboards

BYPL						
Financials - Revex/ Profitability (Rs Cr)						
Item	Span	AOP	Actual	Variance with AoP	Last yr.	YoY Variance
Revenue (Total)*	Feb'19	337	301	-10%	273	10%
	YTM	4970	4729	-5%	4493	5%
Opex	Feb'19	278	252	-9%	244	3%
	YTM	3830	3746	-2%	3680	2%
O&M Cost	Feb'19	60	54	-10%	49	10%
	YTM	627	651	4%	613	6%
Capex	Feb'19	44	26	-40%	44	-40%
	YTM	357	232	-35%	270	-14%
EBIDTA*	Feb'19	59	50	-16%	30	66%
	YTM	1140	983	-14%	813	21%
PAT	Feb'19	7	25	272%	7	272%
	YTM	64	112	75%	22	410%

\*Excluding RA

Operational						
Item	Span	AOP	Actual	Variance from AoP	Last yr.	YoY Variance
Sales (MU)**	Feb'19	416	373	-10%	378	-1%
	YTM	6340	6147	-3%	6068	1%
BST (Rs/Unit)	YTM	4.55	4.56	0%	4.49	1.6%
T&D (%)**	Rolling	9.6%	9.1%	-0.5%	11.4%	-2.3%
AT&C (%) **	Rolling	9.8%	9.7%	-0.2%	11.9%	-2.2%
Overdue Debtors	YTM	199	264	33%	274	-4%
CWIP Reduction	YTM	104	126	21%	201	-37%

\*\*Excluding Open Access

Reliability						
Item	Span	AOP	Actual	Variance with AoP	Last yr.	YoY Variance
No supply complaints	YTM	513712	587562	14%	604367	-3%

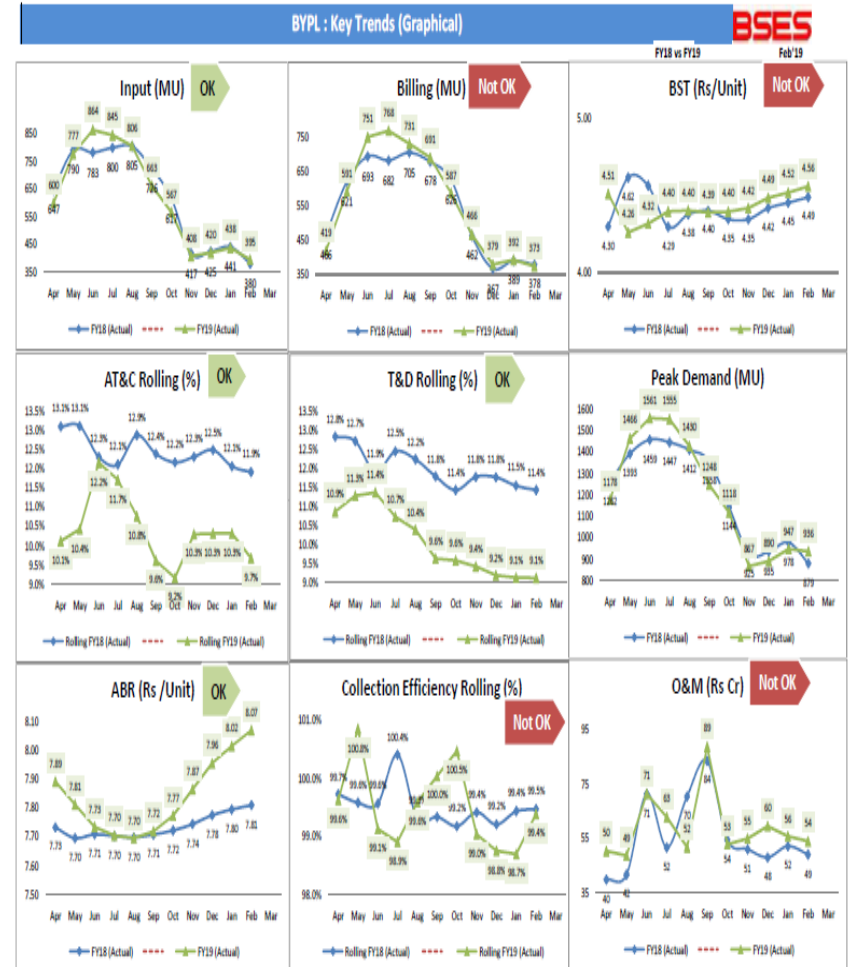
### Notes

Loss Decrease from last year : 2.2%

Loss increase from monthly AOP target : 0.2%

Delta from yearly AOP target : 0.2%

New Consumers Added		
New Consumers Added (Nos.)	Feb'19	3,048
	YTM	68,177



# Steps / efforts taken to create awareness in public for DSM

Initiatives	Impact on DISCOM	Impact on Consumer
Sanjha Prayas	<ul style="list-style-type: none"> <li>• Conducted for door step resolution of consumer grievances. Also,</li> <li>• consumers are provided information of DSM, energy conservation</li> </ul>	<ul style="list-style-type: none"> <li>• Increased awareness amongst consumers &amp; especially kids</li> </ul>
Pragati	<ul style="list-style-type: none"> <li>• Focus on imparting information for safety, energy conservation &amp; DSM through Flyers, quizzes etc. for increased awareness</li> </ul>	<ul style="list-style-type: none"> <li>• Increased awareness amongst consumers &amp; especially kids</li> </ul>
Information on bill - Energy saving tips	Information published at monthly electricity bills along with information for safety, energy conservation etc. The bill is an integral part of document kept for record by consumers	Increased awareness amongst consumers & consumers have now started enquiring about techniques & tools available for energy conservation & DSM
Comparative analysis available on website for increased awareness on energy efficiency / conservation	Apart from energy efficiency & DSM, we also share information pertaining to consumption of electricity data of consumers for encouraging energy efficiency. Each individual can see its own data & analyse consumption	The shared information will inculcate habit of energy conservation & energy efficiency. The information will also encourage consumers to go for energy efficient appliances

✓ More than 2528 nos of Consumer Engagement Program conducted since 2016 to 2021

# Steps / efforts taken to create awareness in public for DSM

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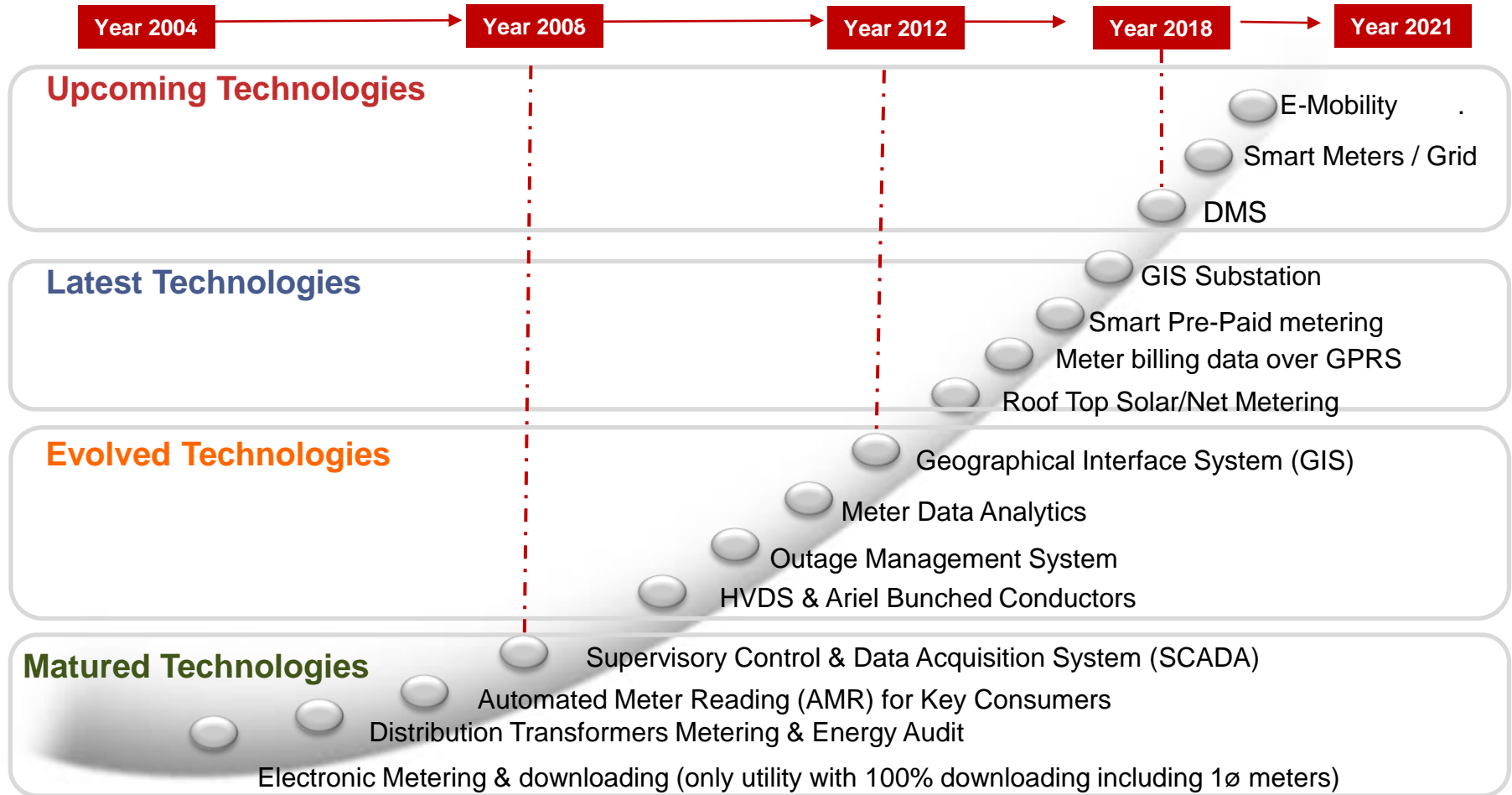
## BEE Capacity building program for EE & DSM



We have already conducted Training of Trainers program for imparting training to around 170 senior employees to inculcate Energy efficiency awareness & strong sense to implement DSM measures & new initiatives



# Technology Journey



Technological innovation has been a regular feature



# Other Sustainable Initiatives

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- Promotion of Energy Efficient Appliances – ACs, Fans, Tube Light & LED.
- Two pilots for manual Demand Response already conducted.
- Auto DR for Air-Conditioning load successfully conducted.
- Around 1000 EV charging connections & more than 8 Public & Captive charging stations
- First EV Charging Station with discom partnership in East Delhi implemented.
- Technical study conducted for Impact Assessment of EV charging on discom network
- Consumer Behavior Program for adopting Energy Efficiency (Susthome App. Launched)
- Green Division Scheme
- Peer to Peer Trading using blockchain
- Data related programs using AI / machine language & synchronization with consumer behavior study
- Awareness Programs for Renewables, DSM, Energy Efficiency in RWAs, Schools, Consumer Engagement Programs, through articles in Electricity Bills etc.

# Other Sustainable Initiatives..... Contd

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- Soon to start EV managed charging pilot under Nordic Innovation.
- Awareness programs and MNRE rooftop program Phase – II. Over 700 net metering connections with a combined capacity of 28.4 MW
- Urban Microgrids in Mayur Vihar area utilizing BESS and rooftop PV
- PV Port pilot in association with GIZ
- Non Intrusive consumption monitoring pilot
- E-Land Projects with support from EU partners
- Business models for promoting rooftop PV
- Project in association with NREL on RE Integration
- Roll out of E Vehicles for operational duties
- Large scale DR program for residential consumers being conceptualized and initiated
- Roadmap for smart energy innovation hub which will help in development of use cases for evolving and green technologies

# Rewards & Recognitions... *International & National Level*



**+75 Awards & further counting...**

## Recent Awards

## Details

CII – Excellent Energy Efficient Unit (2019 & 20)

Excellent Energy Efficient Unit Award

Smart City Awards

Best Smart Grid Project by Utility

India Smart Grid Forum

Best Smart Grid project (Jan-20)

ICC

Innovation with Impact Awards – Green Energy

Golden Peacock Award

Innovative Product Service (June-20)

# Way forward to improve Energy Performance

- Strategic tie-ups with leading industry players for bringing in advanced technologies and upgrades
- Establish Energy Management System (EnMS) as an integral part of our Integrated Management System (IMS).
- Minimize wastages by involving various stakeholders to incorporate best practices and promote Energy efficient products for efficient Energy storage & promotion of green technologies.
- Ensure involvement of employees, Customers & public at large through awareness programs about Energy conservation.
- Implementing Delhi EV Policy 2020 for enhanced proliferation of EVs & E Charging Station.

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*BYPL is proud to serve the National Capital & look forward to a collaborative spirit to achieve the common objective in the interest of consumers of Delhi...*

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**Thank You**

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