



## Power Quality Issues Related to Domestic Consumers in Delhi State (India)-A Survey

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**ABSTRACT:** Since the industrial revolution, power has become the most basic element required for any function in an economy. Each segment of modern society is dependent heavily on power without which the world, regardless of a specific sector, would come to a standstill and India is no exception to the rule. With a growing population, especially that in urban areas, this new industrializing country (NIC) has increasing demands of electricity and power production. India currently ranks at fifth in the global scale in terms of the power sector. India is falling short to meet the demands of a rapidly growing economy and population. This excessive demand has put a strain on the power production facilities; especially as India's power production is derived primarily from conventional sources such as thermal generation or hydroelectric. In this paper, in order to assess the level of consumer satisfaction with the services offered by the Distribution Companies a survey related to the Consumer Satisfaction cum Consumer Awareness has been carried out among domestic consumers in Delhi.

**Key Words:** Power quality, Consumer Satisfaction, Consumer Awareness, Electricity act, EPQ

### I. INTRODUCTION

Electricity is a unique product which cannot be stored on your premises, electricity is produced and delivered the instant you use it. It typically has to travel a considerable distance over the transmission and distribution system. Because of the complexity of the system, and the fact that thousands of other customers are taking electricity from it at the same time, there are a great many factors which can influence the reliability and quality of the electricity supply you receive [1-4].

Quality of supply issues became important some years ago because of the poor performance or failure of a wide range of electrical equipment in domestic, commercial and industrial applications. Technological advances – especially the widespread use of electronics and microprocessors – had introduced a myriad of new features and benefits but the equipment was sensitive to variations and disturbances in

the electricity supply that had previously gone largely unnoticed [5-8].

Realizing that power shortages in India, especially the recent grid failure, has an immense impact on the industry of the Indian economy, the Federation of Indian Chambers of Commerce and Industry (FICCI) has proposed a study to understand the demand for power, the cost of use and production and the impact on industrial output due to power shortages in specified sectors within the industry, across India [9-10].

### II. CONSUMER SATISFACTION AND AWARENESS SURVEY

In this survey, 150 domestic consumers avail the services offered by the Distribution Companies across 3 categories having sanctioned load upto 4KW, between 4-10KW and above 10KW including domestic consumers being serviced under Single Point Delivery (SPD) system, were covered.

Category	No of Participants
1-4KW	115
4-10KW	25
>10KW	10
TOTAL	150

The objective envisaged to be achieved from the survey were to ascertain the performance of the electricity distribution companies in Delhi on the following parameters:-

- Specific problems pertaining to supply of power including voltage fluctuations, load shedding, metering, billing, time taken to give new connection/disconnect/load enhancement/reduction etc
- Awareness of Consumer on Complaint Redressal Mechanism and consumer Grievance forums.
- Effectiveness of Complaint Redressal Mechanism and Consumer Forums for Grievance Redressal.
- Perception of consumer on the quality of the existing Grievance Redressal Mechanism.
- Overall satisfaction among consumers on the whole range of services provided by the DISCOM in the process of power distribution
- Opinion of the consumers about tariff in New Delhi.
- Awareness in consumers about Electricity Act 2003 and Standards of DERC.

Stratified random sampling was used to select consumers from the entire geographical area of the Distribution Companies covering every Division of each Discom, irrespective of socio-economic categorization.

Delhi Vidut Board had responsibility from generation to distribution of electricity. To encourage participation of private companies and also to decentralize the power, in 2003 Delhi Vidut Board was unbundled into six successors. NDMC and MES are also distribution companies in Delhi but they existed before the unbundling of DESU.

Delhi Electricity Board Regulatory Commission (DERC) was constituted in May 1999 whose responsibility was to look into the entire gamut of existing activity and search for various ways of power sector reforms.

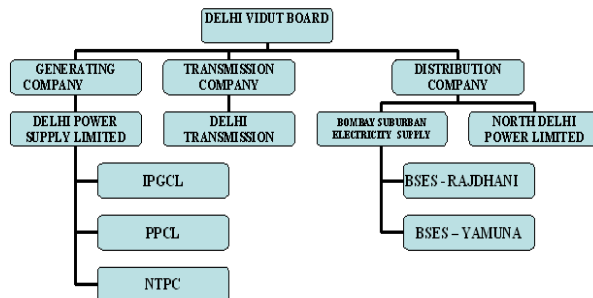


Fig. 1. Divisions of Delhi Vidut Board.

It mainly provides for the constitution of an Electricity Regulatory Commission, unbundling of DVB into separate generation, transmission and distribution companies and increasing avenues for participation of the private sector.

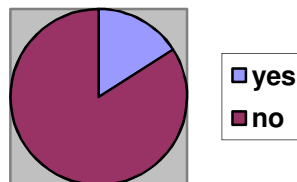
### III. SURVEY RESULTS OF CONSUMER SATISFACTION AND AWARENESS

#### A. Agreement between Consumer and Discom

(a) Are you aware of getting new connection?

In this survey participants were questioned about the form prescribed for new connection by the commission and the survey revealed that 98% of the participants were not aware of the same. If the applicant wishes to provide the meter himself, he shall explicitly inform the same in writing to the licensee at the time of making the application.

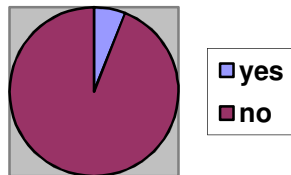
Category	No	Yes
1-4KW	87%	13%
4-10KW	80%	20%
>10KW	55%	45%



Around 97% were unaware of the fact that after the completion of 1year either of consumer or Power Supply Utility can terminate the agreement in prior notice of 15days.

(b) Do you know that the agreement can be terminated by either party in 15 day notice after completion of 1 year?

Category	No	Yes
1-4KW	87%	13%
4-10KW	92%	8%
>10KW	94%	6%

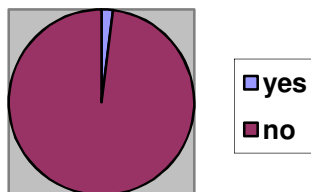


In this survey we also came to know that 99.1% of the participants were unaware of the security deposit taken by the distribution company. DERC has fixed standard security deposit to be taken by Distribution Company per KW of the total load sanctioned. The security charges depend upon the type of load

S.No.	Category of Load	Amount(Rs/KW)
1	Domestic	600
2	Non-Domestic	1500
3	Industrial	1500
4	Agriculture	300
5	Street light	1500
6	Railways, DMRC	1500
7	Temporary Connection :	
i)	Upto 3days	300
ii)	Upto 7days	500
iii)	For regular use/ construction works	1.5 times the relevant category

(c) Do you know the security deposit taken by the distribution company per KW?

Category	No	Yes
1-4KW	100%	0%
4-10KW	96%	4%
>10KW	94%	6%

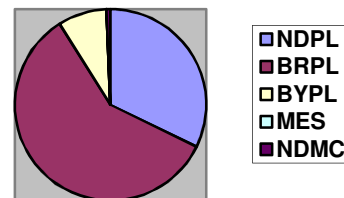


*B. Technical & Quality Aspects of Power Supply*

Through this survey we also tried to measure the quality of power supplied by the distribution companies in Delhi. India is yet to develop its power sector to meet international standards. None of the distribution companies in Delhi provide advance information about power cuts or shut down. Participants were not much satisfied with the performance of their Power Supplying Utility. The 150 participants were classified as follows

S. No.	Load Category	NDP L	BRP L	BYPL	ME S	NDMC
1	1-4KW	30	72	12	0	1
2	4-10KW	13	10	2	0	0
3	>10KW	4	4	2	0	0
<b>TOTAL</b>		<b>47</b>	<b>86</b>	<b>16</b>	<b>0</b>	<b>1</b>

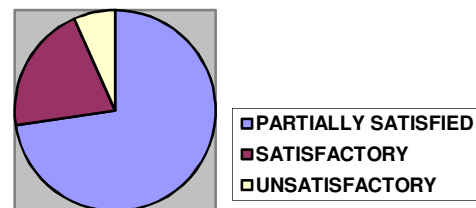
**Distribution of participants as per Discom**



(a) Are you satisfied with the performance of your power supply company?

Category	Partially Satisfied	Satisfied	Unsatisfied
1-4KW	79%	16%	5%
4-10KW	68%	29%	3%
>10KW	78%	12%	10%

**PERFORMANCE OF DISCOM**



In our survey 69% of the people were partially satisfied with the performance of their power supplying utility. 21% of the people fully satisfied while 10% of the people were not satisfied with the performance of their power.

DESU was unbundled to encourage involvement of private companies in power sector. This statement was also supported by our participants in the survey. All 150 participants believed that privatization of electrical supply have improved quality of supply.

### C. Metering

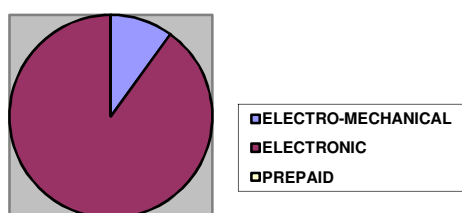
Now days in many countries the government is encouraging consumers to use Pre-paid meters. Studies have shown that consumers can be encouraged to use electricity judiciously and reduce wastage by prepaid metering. To charge the meter, consumer needs to buy electricity in advance according to his/her requirements.

In Delhi, distribution companies are offering prepaid meters to consumers at Rs2600. BSES is offering a 5% discount on electricity bill if the consumer is using prepaid meter.

But in this survey most of the people were still unaware of prepaid meters. Most of the participants were using Electronic meters. 90% of the participants were using Electronic meters while 10% were using conventional electromechanical meter. DERC is planning to make prepaid metering mandatory during peak load (day time).

(a) What kind of meter is installed at your locality?

Category	Electro-mechanical	Electronic	Prepaid
1-4KW	8%	92%	0%
4-10KW	6%	94%	0%
>10KW	13%	87%	0%

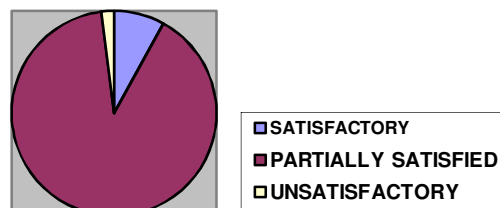


The electromechanical meter has had predominance in the metering of energy consumption using AC supply system. Electronic meters have gained popularity because of the possibility of remote reading and controllable non uniform rate of billing. The performance of electronic meter is better than electromechanical energy meter for light loads.

In this survey most of the people were partially satisfied with the meter installed at their locality. Around 90% people were partially satisfied with the meter they are using while 8% were fully satisfied and remaining 2% were unsatisfied.

(b) Are you satisfied with the performance of the meter installed in you locality?

Category	satisfied	Partially satisfied	Unsatisfied
1-4KW	2%	98%	0%
4-10KW	11%	87%	2%
>10KW	25%	50%	25%



In this survey participant's having higher sanctioned load seemed to be more unsatisfied with the performance of meter. Therefore it is advisable to get meter tested at regular intervals. DERC has also fixed standards for meter testing which includes specifications which the meter must satisfy along with cost of testing to be charged by the distribution company for meter testing. Any domestic consumer can get his/her meter tested on any day by paying Rs25.

It is the duty of the distribution company or the licensees to get meters tested by themselves at regular intervals and submit report of the performance of meters to the DERC. The licensee shall observe following time schedules for regular meter testing.

S.No	Category	Interval of testing
1	Domestic	5years
2	Railways , DMRC	6months
3	Bulk supply meter(HT)	1year
4	LT meters	Five years

Though DERC has made standards and regulations but in this survey most of the participant's complaint and were not satisfied with the performance of the meter and also complaint that the distribution company did not perform meter testing at regular interval as per norms laid down by DERC.

In case meter is found burnt at the consumer premises then as per DERC norms the distribution company shall restore connection within six hours of receiving the complaint and a new meter shall be restored within 3 days.

After inspecting the site if electrical inspector finds that the meter was burnt due to tampering of wires by consumer or due to falling water in the consumer premises etc, then the consumer shall bear the cost of the new meter. If the meter is burnt due to voltage fluctuations, transients etc then Distribution Company shall bear the cost of installing the new at the consumer premises.

**D. DERC Regulations**

As per DERC regulations, a bill should carry following details:

- K.No/BookNo./DTNo./Reading Repository/Binder details-
- Bill number/ Bill month/ Bill type
- Meter number
- Supply type/ Application tariff
- Security deposit with the licensee
- Sanctioned load
- Fixed charge
- Meter reading of previous billing cycle and date of reading
- Current meter reading and date of reading
- Billed units
- Slab calculation /Energy charge
- Arrear details/ Arrear amounts
- Amount payable
- Due date including last date before which the bill has to be paid.
- Late Payment Surcharge
- Amount payable
- Amount payable after due date.
- Government subsidy, if any
- Compensation to the consumer, if any
- Previous consumption pattern
- Meter remark- this indicates the meter status.

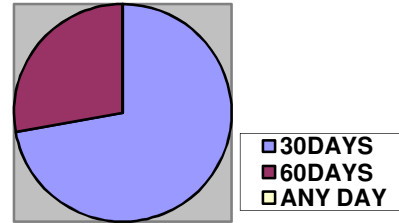
Electricity bill can be paid in installment also. The details of the same are as follows:

S. No.	Arrear for Period	Amount to be recovered in each installment
1	Upto 12months	50% in first installment and balance in two equal installments
2	More than 12 months and up to 24 months	In four equal installments

In this survey 71% of the people had 30day billing period and 29% had 60days billing period. No participant had any day billing period.

(a) Which billing period you prefer?

Category	30days	60days	Any day
1-4KW	80%	20%	0%
4-10KW	88%	12%	0%
>10KW	16%	84%	0%



**E. Complaint and Grievance Handling**

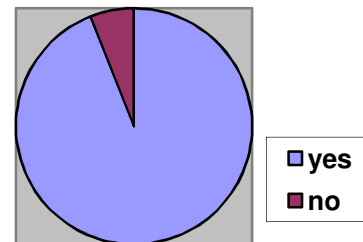
In this survey 60% of the participants were not aware of the complaint redressal forums of their distribution company. Distribution Company should conduct public awareness campaigns to make people aware of the grievance handling forums and should educated people about modes by which they can submit a complaint.

Participant’s also believed that personal visit to the office was most effective way of submitting a complaint as compared to the email, calling on toll free number etc.

94% of the participants had complaint to the utility office about their problems and poor performance of the utility.

(a) Have you ever registered a complaint with the utility?

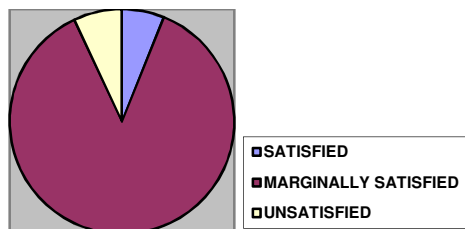
CATEGORY	yes	no
1-4KW	87%	13%
4-10KW	91%	9%
>10KW	94%	6%



After submitting the complaint 9% of the participants were satisfied with the time and measure taken by Power Utility officials to resolve the issue ,71% of the participants were partially satisfied while 20% of the participants were not satisfied with the response of the Power supplying Utility officials.

(b) Were you satisfied with the response of Distribution Company?

Category	Satisfied	Marginally satisfied	Unsatisfied
1-4KW	12%	70%	18%
4-10KW	15%	25%	60%
>10KW	2	2	6



DERC has specified time within which the Distribution Company will have to resolve the issues of consumer based on the nature of complaint.

S. No.	Nature of complaint	Time to be taken by licensee
1	Complaint on billing	Licensee shall acknowledge the complaint immediately, if received in person, or within three days from the date of receipt if received by post. If no additional information is required, Licensee shall resolve the complaint and intimate the result to the consumer within fifteen days of receipt of the complaint.
2	Final bill on vacation or change of premises	The consumer shall make a request to the Licensee for a special reading at least seven days in advance before the premises are to be vacated or change of occupancy and the Licensee shall arrange for a final bill to be delivered, including arrears if any, at least three days before the vacation of the premises or change of occupancy. It is the consumer's responsibility to make the payment before the vacation of the premises.
3	Nonpayment of dues by the consumer	Licensee to give fifteen days notice to pay the dues and if not paid, the Licensee may disconnect

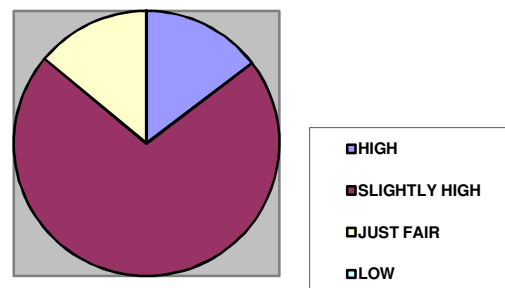
		the Consumer's installation on the expiry of the notice period.
4	Consumer for reconnection	Licensee shall reconnect the consumer's installation within two days of payment of past dues
5	Consumer wanting disconnection	Licensee to carry out special reading and prepare final bill, including all arrears upto the date of billing, within five days of receiving such request.

#### F. Reasonability of Tariff and other Services

Tariff or cost of electricity per KW paid by consumer to the Distribution Company influences his satisfaction to a large extent. In Delhi few years ago Government established DERC to regulated Tariff and withdrew subsidy from domestic consumer which increased tariff. In this survey, participants complaint that the tariff they were paying was slightly high.

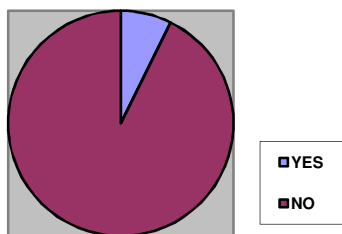
(a) What is your opinion about the tariff you are paying?

Category	High	Slightly High	Just Fair	Low
1-4KW	15%	78%	7%	0%
4-10KW	10%	69%	21%	0%
>10KW	12%	78%	10%	0%



(b) Are you happy with government's decision to withdraw subsidy for Domestic consumers?

Category	Yes	No
1-4KW	13%	87%
4-10KW	17%	83%
>10KW	11%	89%



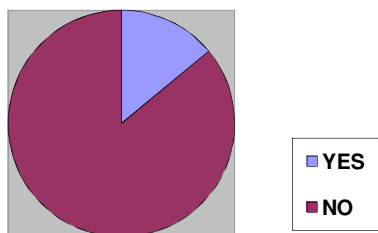
G. Consumer Awareness

From this survey, it can be concluded that almost participants were unaware electricity acts like

- Indian Electricity Act 2010
- Indian Supply Act 1948
- Electricity Regulation Commission Act 1998
- Electricity Act 2003 (replaces all the above acts)

Electricity Act 2003 is an act to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies constitution of central electricity authority, regulation commissions and establishment of appellate.

(a) Are you aware of the provisions made in Electricity Act of 2003?



(b) In your opinion does the quality and service of supply of electricity has improved in last five years?

Category	Yes	No
1-4KW	89%	11%
4-10KW	92%	8%
>10KW	40%	60%

IV. FINDINGS OF SURVEY

The salient findings of the Survey were as follows:-

- The consumers have expressed their concern about load shedding.
- Consumers have also complained about fast running electronic meters and other problems of billing wherein inflated bills were being received.
- The consumers were, generally, not satisfied with the complaint redressal mechanism in place.
- The Call Centers set up by the DISCOMs were not yet popular among consumers as they preferred to lodge their complaints at the nearest office of the DISCOM.
- The consumers were generally not aware about the existence of the institution like Delhi Electricity Regulatory Commission (DERC), the Consumer Grievances Redressal Forums (CGRFs) and the appellate institution of the Electricity Ombudsman.
- However, it was felt that the private distribution companies were a success and the Consumers preferred the services of private DISCOMs to that of the erstwhile DESU/DVB.
- The overall rating of the performance of DISCOMs as indicated by the consumers in the Survey on a scale of 1 to 10 ranged from 5.1 to about 5.7.

V. RECOMMENDATIONS

From this survey participants showed disappointment with the current performance of Distribution Companies. Participants were unaware of the complaint forums and were not happy with the overall functioning and decisions taken by complaint redressal forums.

Apart from disappointment with the performance of Distribution companies, participants were also unaware of DERC norms and provisions made in Electricity Acts by the Government of India. To make consumers more aware and satisfied with the performance of Distribution Companies, DERC should organize more and more consumer awareness programs. DERC shall also monitor the complaints submitted by consumers and should set up a body to cross examine the decisions made by these Consumer Complaint Redressal Forums. Participants showed concern about the tariff they are paying currently. Therefore measures should be taken to lower down tariff in Delhi. To reduce tariff, technology needs to be upgraded i.e. to reduce T&D losses, thefts and high cost of manufacturing. Providing higher subsidy than that currently given by the government on solar panels can help in reduce tariff and can also help in development of country by making power system of the country more stable. Consumers in Delhi were satisfied with the result of privatization of distribution companies.

## VI. CONCLUSION

From this survey, it can be concluded that consumers in Delhi need reduction in tariff. We personally feel that after this survey the norms or regulation formulated by DERC for distribution companies are more consumer friendly but consumers are not aware of their rights given by DERC and Government of India in various electricity acts passed by parliament. The results of the survey also revealed that much of the regulation laid down by DERC are not followed by Power Supplying Utilities at ground level, hence DERC must monitor that the Power Supplying Utilities in Delhi follow all rules and regulation of DERC.

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