CHAPTER - 6

EMPIRICAL ANALYSIS OF THE IMPACT OF POWER SECTOR REFORMS ON ECONOMIC EFFICIENCY AND CONSUMER SATISFACTION

After Orissa, Haryana is the second State in India to introduce power sector reforms. In view to achieve the goals of the reform, Haryana State Assembly adopted: “The Haryana Electricity Reform Act, 1997”. Under this law there is a provision for the formation of an electricity regulatory commission, the restructuring of the electricity sector and seeking participation of consumers. There are provisions in the Act to create conducive environment, to facilitate the development and management of power sector in an efficient, economical and competitive manner.

To tackle the problem of power shortage, the board was restructured. The responsibilities for generation of electricity was given to Haryana Power Generation Corporation Limited (HPGCL), while the transmission and distribution of power were assigned to the Haryana Vidyat Prasaran Nigam Limited (HVPNL). Later responsibility for distribution was divided between the Uttar Haryana Bijli Nigam Limited (UHBVNL) and Dakshar Bijli Vitram Nigam Limited (DHBVNL) with areas earmarked for each, while transmission remained under the control of HVPNL.

The objective of the reforms in power sector in Haryana is to make the power industry financially viable and to conducive and congenial environment to attract demand investment necessary to meet the growing need for power. Promotion of competition, efficiency and economy in the supply of power is also the driving force for the introduction of reforms.

Reforms having been put in place for more than a decade, it is the right time to gauge the impact of power sector reforms on efficiency and social accountability. This issue was explored and it was found that the process of power sector has improved efficiency and consumer satisfaction in Haryana. This found that the process of power sector reforms improved efficiency and consumer satisfaction in Haryana.
Whether the power cut situation has improved, whether consumers are satisfied with power voltage and whether the consumers find changes in tariff reasonable are the questions which are under discussion and investigation. The study reveals that some of the indicators have improved over the last few years, which made these reforms relevant and significant.

The present study is divided into two sections. Section I is related to chi-square test. Section –II is related to consumer satisfaction.

SECTION – I

6.1 Participation of Consumers in the Power Sector Reforms in Haryana

Reasons for Consumer Participation

Management of Electricity sector is stupendous task, containing a number of technical issues. It the stakeholders participate in the regulatory process, it helps fix accountability of regulatory authorities, regulatory decisions become broad based and well informed and are perceived as fair and reasonable. A sort of checks and balances’ system comes into operation and regulation have to take care of the rights of consumers in a reasonable way.

It is very essential that consumers are well aware of their rights and responsibilities. They should be wide awake about the role of the regulatory bodies and the platforms where they can interact with the authorities and what the state of electricity sector is and how much gap between demand and supply exist. Only then can consumers have meaningful engagement. If consumers are ignorant about how regulatory decisions, including pricing, contribute to improving the quality and reliability of services provided, regulatory decisions are generally criticised opposed. Such awareness/ understanding would also enable consumers to make valuable suggestions concerning the welfare of consumers.

Consumer Participation - Current Status and Consumer Satisfaction Survey

The Electricity Act, 2003 requires Electricity Regulatory Commission (ERC) to invite consumers to participate in decision-making. Various provisions of the Haryana Electricity Reform Act, 1997 require the HERC to safeguard consumer
interests with the promotion of competition in the industry. Since its inception HERC has taken a number of steps to ensure greater transparency and consumer participation in the decision-making process. The Conduct Business Regulation (CBR) of HERC stipulates that there are other provisions that require proper involvement. This Act has severed provisions which help make regulatory process transparent fair, reasonable, accountable and participatory. It was a common opinion the participation of consumers in the decision-making process will go a long way in protecting their rights with the authorities.

Since the participation of consumers is needed in the regulatory process. All necessary steps must be taken to ensure the active involvement of consumers in the decision-making process. A consumer survey was carried out to investigate the progress in ensuring an effective consumer participation in the regulatory reform process in Haryana. The aim of the survey was to have feedback about the status of consumers satisfaction and the quality and standard of the services being rendered to the consumers as also to know what obstacles prevent the effective participation of consumers in the regulatory process in Haryana.

Based on the analysis of the survey results, suitable indicators for assessing consumer satisfaction were devised and a roadmap for promoting social responsibilities, efficiency and participation of consumers was drawn.

**Objectives of the Survey**

The survey was conducted with the following main objectives:

- To analyze the consumer perception about power cut information in Haryana.
- To assess the level of power voltage.
- To review the structure of tariff rate charged.
- To address the billing payment problem of power sector.
- To check the awareness about energy efficiency.
- To measure the diversification of distribution service of power sector in Haryana.
Empirical Results

Table 6.1
Estimated Results of Power Cut Information with Chi-square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>.820&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1</td>
<td>.365</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.580</td>
<td>1</td>
<td>.446</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>.820</td>
<td>1</td>
<td>.365</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td></td>
<td>.390</td>
<td>.223</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.816</td>
<td>1</td>
<td>.366</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases&lt;sup&gt;b&lt;/sup&gt;</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.
Note - a. 0 cells (.0 per cent) have expected count less than 5. The minimum expected count is 37.14.
b. Computed only for a 2x2 table

Table 6.1(a)
Symmetric Measures

<table>
<thead>
<tr>
<th>Nominal by Nominal</th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phi</td>
<td>.062</td>
<td>.365</td>
</tr>
<tr>
<td>Cramer's V</td>
<td>.062</td>
<td>.365</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>210</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from Table 6.1

The above table measures the efficiency of power sector reforms in terms of power cut information. Table 6.1 and 6.1(a) shows that Reforms have not played any significant role in providing the power cut information to the consumers. Power failure is a common phenomenon in Haryana and it has not improved even after the reforms in the power sector. It is revealed that calculated value of the Chi-square (0.820) is insignificant at the 0.05 per cent on the degree of freedom 1. It has accepted the null hypothesis and concluded that the two variables are independent, i.e., variable $X_1$ (power cut information) does not the behaviour of $Y$ variable (efficiency of power sector reforms). However, Phi value (0.06) indicates that there is low correlation between two variables. Power cut information does not affect and has no perceptible
role in the efficiency of power sector reforms. The people of Haryana don’t get advance information about power cut.

Table 6.2
Estimated Results of Power Voltage with Chi-square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>13.091</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>12.107</td>
<td>1</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>13.240</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear</td>
<td>13.028</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.

Note:  

a. 0 cells (.0 per cent) have expected count less than 5. The minimum expected count is 47.05.

b. Computed only for a 2x2 table

Table 6.2 (a)
Symmetric Measures

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phi</td>
<td>.250</td>
<td>.000</td>
</tr>
<tr>
<td>Cramer’s V</td>
<td>.250</td>
<td>.000</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>210</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from Table 6.2

The above given table calculates the efficiency of power sector reforms in terms of power voltage. It highlights that the calculated value of the Chi-square (13.091) is significant at 0.05 per cent on the degree of freedom 1. It has rejected the null hypothesis and concluded that the two variables are dependent, i.e., variable $X_2$ (power voltage) affects the behaviour of $Y$ variable (efficiency of power sector reforms). Power Voltage affects the Efficiency in power sector reforms. Furthermore,
Phi –value (0.250) shows moderate correlation between the two variables. There is an improvement in the power voltage. It is a positive sign of development of power sector in Haryana.

Table 6.3

<table>
<thead>
<tr>
<th>Estimated Results of Tariff Rate Charge with Chi-square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value</strong></td>
</tr>
<tr>
<td>Pearson Chi-square</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
</tr>
<tr>
<td>N of Valid Cases</td>
</tr>
</tbody>
</table>

Source: Compiled from primary data.

Note: a. 0 cells (.0 per cent) have expected count less than 5. The minimum expected count is 13.87.

Table 6.3 (a)

<table>
<thead>
<tr>
<th>Symmetric Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value</strong></td>
</tr>
<tr>
<td>Nominal by Nominal</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
</tr>
</tbody>
</table>

Source: Compiled from table 6.3

Table 6.3 estimates the efficiency of power sector reforms in terms of tariff rate charge. This table shows that calculated value of the Chi-square (0.619) is insignificant at the 0.05 per cent on the degree of freedom 1. It has accepted the null hypothesis and concluded that the two variables are independent, i.e., variable $X_3$ (tariff rate charge) does not affect behaviour of $Y$ variable (efficiency of power sector reforms). Tariff rate charge does not affect the level of efficiency in power sector reforms. The change in tariff rate has not satisfied the consumers. Most of the consumers think that tariff rates are high and unreasonable. About 70 per cent of residents of Haryana are engaged in agriculture, low only 14.1 percent of State GDP is being contributed by Agriculture sector. High tariff is being charge from agriculturist, which is not at all reasonable.
Table 6.4
Estimated Results of Billing Efficiency with Chi-square Tests

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>2.575a</td>
<td>2</td>
<td>.276</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>2.602</td>
<td>2</td>
<td>.272</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>2.113</td>
<td>1</td>
<td>.146</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>210</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from primary data.

Note: a. 0 cells (.0 per cent) have expected count less than 5. The minimum expected count is 12.38.

Table 6.4(a)
Symmetric Measures

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phi</td>
<td>.111</td>
<td>.276</td>
</tr>
<tr>
<td>Cramer's V</td>
<td>.111</td>
<td>.276</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>210</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from table 6.4

The above given table measures the efficiency of power sector reforms in terms of billing efficiency. It shows that calculated value of the Chi-square (2.575) is significant at 0.10 per cent on the degree of freedom 1. It has rejected the null hypothesis and concluded that the two variables are dependent, i.e., variable $X_4$ (billing efficiency) affects behaviour of $Y$ variable (efficiency of power sector reforms). There is efficiency in the payment of bills. Respondents don't have bill related complaints. They get correct and frequent Bills. Starting E-payment option by power companies is a positive step after reforms in power sector in Haryana.
Table 6.5
Estimated Results of Energy Efficiency with Chi-square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>4.292</td>
<td>1</td>
<td>.038</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction b</td>
<td>3.739</td>
<td>1</td>
<td>.053</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>4.307</td>
<td>1</td>
<td>.038</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td></td>
<td>.040</td>
<td>.026</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>4.271</td>
<td>1</td>
<td>.039</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from primary data.

Note: a. 0 cells (.0 per cent) have expected count less than 5. The minimum expected count is 51.50.
b. Computed only for a 2x2 table

Table 6.5(a)
Symmetric Measures

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
<td>Phi</td>
<td>.143</td>
</tr>
<tr>
<td></td>
<td>Cramer’s V</td>
<td>.143</td>
</tr>
<tr>
<td>N of Valid Cases b</td>
<td>210</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from table 6.5

The above table estimates the efficiency in terms of the use of energy efficiency equipment and knowledge about them. This table reveals that it is crystal clear that calculated value of the Chi-square (4.292) is significant at the 0.05 per cent on the degree of freedom 1. It has rejected the null hypothesis and concluded that the two variables are dependent, i.e., variable X (energy efficiency) affects behaviour of Y variable (efficiency of power sector reforms). Consumers have knowledge about energy efficient equipment and they use them also. Recently, Haryana joins Uday Scheme under which LED will be provided to all at affordable rates. Energy efficient street lights have been installed. State Government's emphasizing on the use of solar energy, renewable, wind and bio energy.
Table 6.6

Estimated Result of Distribution Service Efficiency with Chi-square Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>25.061</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>23.683</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>25.621</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td></td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>24.942</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from primary data.

Note: a. 0 cells (.0 per cent) have expected count less than 5. The minimum expected count is 44.08.
   b. Computed only for a 2x2 table

Table 6.6(a)

Symmetric Measures

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phi</td>
<td>.345</td>
<td>.000</td>
</tr>
<tr>
<td>Cramer's V</td>
<td>.345</td>
<td>.000</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>210</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from table 6.6

Table 6.6, it depicts that calculated value of the Chi-square (25.061) is significant at the 0.05 per cent on the degree of freedom 1. It has rejected the null hypothesis and concluded that the two variables are dependent, i.e., variable X6 (distribution service efficiency) highly affects the behaviour of Y variable (efficiency of power sector reforms). Moreover, Phi –value (0.345) reveals that there is high correlation between DSE and EPSR. The distribution service is the most efficient variable in the power sector reforms. The distribution lines coverage has improved. The distribution losses have come down. The Discoms have played a good role in improving the efficiency of power distribution.
Table 6.7
Estimated Results of Chi-square Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>Chi-Value</th>
<th>P – Value</th>
<th>Phi -Value</th>
<th>P -Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>X₁</td>
<td>0.820</td>
<td>0.365</td>
<td>0.062</td>
<td>0.365</td>
</tr>
<tr>
<td>X₂</td>
<td>13.091*</td>
<td>0.000</td>
<td>0.250</td>
<td>0.000</td>
</tr>
<tr>
<td>X₃</td>
<td>0.619</td>
<td>0.734</td>
<td>0.054</td>
<td>0.734</td>
</tr>
<tr>
<td>X₄</td>
<td>2.575**</td>
<td>0.276</td>
<td>0.111</td>
<td>0.276</td>
</tr>
<tr>
<td>X₅</td>
<td>4.292*</td>
<td>0.038</td>
<td>1.430</td>
<td>0.038</td>
</tr>
<tr>
<td>X₆</td>
<td>25.061*</td>
<td>0.000</td>
<td>0.345</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Source: Compiled from table 6.7

Note: * The Coefficient are significant at α=0.05.
** The Coefficient are significant at α=0.10

X₁- Power Cut Information
X₂- Power Voltage
X₃- Tariff Rate Charge
X₄- Billing Efficiency
X₅- Energy Efficiency
X₆- Distribution Service Efficiency
Y- Efficiency in Power Sector Reforms

Table 6.7 highlights the estimated results of the Chi-square Test for the various variables with the (efficiency of power sector reforms) Y. The model reveals that the variables X₂ (power voltage), X₄ (billing efficiency), X₅ (energy efficiency) and X₆ (distribution service efficiency) have affected the behaviour of Y significantly. However, the variables X₁ (power cut information) and X₃ (tariff rate charge) are insignificant. The coefficient of X₂, X₅ and X₆ are statistically significant at α=0.05 per cent level of significance. Moreover, Phi-value of these variables have shown high correlation between them. The variable X₆ (distribution service efficiency) has tremendously affected the variable Y with Phi-value (0.345). Distribution service has improved considerably in the post reform period. More emphasis needs to be laid to improve this service by the Discoms. As far as the variable, Power cut information and tariff rate are concerned, not much improvement is noticeable on this front and consumer satisfaction in the wake of power reforms is not perceptible.
SECTION –II

6.2 Consumer Satisfaction

(A) Quality of Electricity Supply

Quality of electricity supply is one of the most important features in regard to consumer satisfaction. As part of the conditions and regulations of HERC license, distribution licensees are required to provide not only reliable but also good quality power supply (in terms of voltage, frequency, etc.) to consumers. Lack of good quality and reliable supply causes dissatisfaction among consumers and they have to bear a significant burden due to damage electric appliance.

The main feedback regarding quality of electricity supply is:

- Most consumers report that they do not get prior information about power cuts. Most of the respondents said that it would be helpful if they are transmitted information about power cuts through television, SMS, village Sarpanch (head), advertisements in local newspapers as given in Figure 6.2.

- About 62 per cent of consumers are satisfied from the power voltage. The quality of power has improved as given in Figure 6.1.

- The above given observations imply that steps should be undertaken to respond proactively to consumer concerns proactively, promptly and sincerely. In addition, information about all these initiatives and efforts should be shared with consumers to make the process participatory and acceptable to consumers, leading to desired results.

Consumers should also be provided with advance information on power cuts so that they may be able to make alternative arrangements. It is all the more necessary because about 79 per cent of consumers reported that they are never given prior information about power cut. Only 21 per cent of consumers reports that get power cut information.
Several agents have suggested that information about the power cut be given through newspapers, SMS radio, communication with school centers, etc. (Figure 6.2). About 52 per cent of consumers have opined that messages in this context be published in newspapers. The next best provision for power cut information according
to the consumers are from the electricity department. Some of the other provisions for providing information according to the power voltage consumers are announcement in village, TV, SMS, others, etc. Some consumers hold the view that this information could be supplied in rural areas through the Sarpanch (Leitersdorf).

Most consumers are concerned about power voltage (fig. 6.3 provides an overview of consumers concern category wise).

**Figure 6.3**

**Perceptions about Power Voltage (by percentages of consumers)**

![Bar chart showing power voltage perceptions](chart.png)

Source: Compiled from Primary Data.

Around 62 per cent of the consumers feel that they get low power voltage for less than 5 hours a day, which is a very significant improvement in the wake of power sector reforms. However, 25 per cent of the consumers experience low voltage for 5-10 hours a day and 13 per cent of the consumers feel that they get low voltage for more than 10 hours a day. This signifies that the voltage problem has mitigated but it still persists, which is a matter of concern. More efforts should be made utilities to case the power voltage problem further.
The reforms in the power sector played a major role in the improving the distribution of power. Distribution service agency efficiency has improved after the reforms. About 72 per cent of the consumers feel that its efficiency has improved. More lines have been laid. The rate of material damage has also come down. Installation of technically advanced transformers has increased, since the reforms in the power sector started.

Table 6.8 brings out that equipment damage was higher in agriculture sector than in commercial and private sectors. Moreover in DHBVN area, the percentage of damage was 14 percentage higher than in the UHBVN area.

Moreover, there are wide variations among districts concerning material damage. For instance, the percentage reported in Karnal district is two times that of Hisar. This serious situation calls for immediate and adequate interest to address the issue so that losses caused by damage may be minimized.
### Table 6.8
Percentage of Consumers Experiencing Damage (including burning) to Electrical Equipments

<table>
<thead>
<tr>
<th>Factor</th>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Category</td>
<td>Commercial</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Domestic</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>42</td>
</tr>
<tr>
<td>Locality (rural/urban)</td>
<td>Urban</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>40</td>
</tr>
<tr>
<td>Company</td>
<td>DHBVN</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>UHBVN</td>
<td>48</td>
</tr>
<tr>
<td>District</td>
<td>Hisar</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Panchkula</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Fatehabad</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Gurgaon</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Ambala</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Kurukshetra</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Kaithal</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Yamuna Nagar</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Panipat</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Rohtak</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Sirsa</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Jind</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Mewat</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Bhiwani</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Jhajjar</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Mahendergarh</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>Sonipat</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Rewari</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Karnal</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Faridabad</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Palwal</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>All Consumers</td>
<td>37</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.
(B) Tariff and Other Related Issues

Tariff rates are also an important factor with regard to consumer satisfaction. While high rates no doubt cause dissatisfaction among consumers, leading to significant drop in energy consumption the misuse of subsidies. Tariff should be high enough to make the cost of supply adequately, necessary for viability and sustainability of the supply system. If required, government should provide subsidies only to deserving poor consumers but in a transparent and accountable manner, to avoid the misuse of subsidies.

Summary of the Main Results of Tariff Rate Charge and Related Issues.

The main findings on tariffs and other related matters are

- Most consumers (81.9 per cent) believe that they have to pay unreasonable tariffs for electricity. Only 10 per cent feel tariff changes are reasonable. 8 per cent consumers are not sure whether.

- About 54 percent consumers who the changes are fair and reasonable applied for new connection during the last four years (2010-11 to 2014-15) are not satisfied with the procedures required to be followed to get new connections. Non-transparent process and high charges being taken from consumers for new connections are the major irritants articulated by them.

Many consumers are aware of the increasing tariff slabs for their energy consumption. Consumers need to be told about the tariff structures and tariff issues, which indirectly provides them several advantages, including better and more efficient of electricity.

Consumers have also raised concerns about the complex better and more efficiency procedures for new connections. Many consumers were not satisfied with the procedures required to be complied with while applying for a new connection.
As shown in Table 6.9, most of the consumers are either not satisfied or partially satisfied with the procedure adopted by distribution companies to approve new connections. However, agricultural consumers raised more concerns about domestic and commercial sectors. Consumers were also asked to cite reasons for low satisfaction in regard to connectivity issues.
Overall, non-transparency in releasing new connections was a major concern expressed by consumers. However, responses received from consumers of different categories varied considerably. For example, for consumers from commercial category, high connection charges were the biggest concern while for domestic consumers ‘non transparency’ was a major issue. At the same time “unfriendly behavior” of the utility staff was not an issue for commercial categories at all, while it was an important issue for domestic and agricultural consumers.

(C) Metering and Billing

Accurate Metering and billing are important determinants of consumer satisfaction. Given that in a number of industries, energy cost constitutes a major chunk of the total cost of production, metering and billing issues are indeed very important. Moreover, unlike agricultural consumers, industrial consumption is believed to be fully metered.

Industrial consumers have been provided recent technology based electronic or smart meters. A majority of consumers (57 per cent) use smart meters with 43 per cent using electronic meters. Mechanical meters are by less than 1 per cent of industrial consumers.

Figure 6.6
Types of meters installed

Source: Compiled from Primary Data.
The perception of consumers about the erroneous billing frequency is shown in Table 6.10 below.

### Table 6.10
**Consumer Perceptions on Billing Payment: Percentage Support for Listed Options**

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect Bills</td>
<td>80</td>
</tr>
<tr>
<td>Infrequent Bills</td>
<td>11</td>
</tr>
<tr>
<td>More Time and Effort required in paying bills</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.

While 11 per cent of respondents have infrequent bill complaints, 80 per cent have incorrect bill complaints. 9 per cent feel that more time is required to make the payment of bills. Among other things, discontent among consumers stems from the fact that it takes a very long time to redresses their complaints. (Table 6.11)

### Table 6.11
**Time Taken in Resolving Billing Related Complaints: Percentage Incidence among Consumers of Provided options**

<table>
<thead>
<tr>
<th>Consumer response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than a month</td>
<td>26</td>
</tr>
<tr>
<td>Between One week and one month</td>
<td>14</td>
</tr>
<tr>
<td>Between One day and One week</td>
<td>29</td>
</tr>
<tr>
<td>Within One day</td>
<td>29</td>
</tr>
<tr>
<td>No Action taken</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.

The above table 6.11 shows that on 2 per cent of complaints no action is taken, which points to the fact the effective control is missing.

In the context of billing, consumers did not express any serious concerns over its regularity and accuracy. About 98 per cent of the respondents report that they have
have been receiving bills regularly and about 76 per cent reveals that they have never received a faulty or inflated bill. The corresponding percentage for agricultural consumers is 81 per cent. The relatively favorable perception in agriculture can be attributed to a low level of awareness and education of consumers, on account of which they sometimes are not able to detect errors in the utility bills.

**Figure 6.7**

**Frequency of Faulty Bills (by percentages of consumers)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Never</th>
<th>Occasionally</th>
<th>Mostly</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>68%</td>
<td>33%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Agricultural</td>
<td>81%</td>
<td>11%</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Commercial</td>
<td>77%</td>
<td>15%</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>76%</td>
<td>16%</td>
<td>6%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.

An analysis of time taken in resolving bill related complaints by different consumer categories is given in Figure 6.8

In this context, it is observed that majority of the consumers don’t have any problem regarding the payment of bills. The commercial users are the least affected ones and they don’t have any problems in clearing their bills. It is the agriculturist who face problems in cleaning the bills.
Figure 6.8
Problem in Paying Bills (by percentages of consumers)

Source: Compiled from Primary Data.

A breakup of the respondents according to the level of education is shown in Figure 6.9

Figure 6.9
Education Level of Respondents (per cent)

Source: Compiled from Primary Data.
As shown in Figure 6.9, the sample is made up of a good mix of respondents with different educational levels. Around 30 per cent of respondents are educated above high school.

An important reason among others for disputes regarding bills is the complex form of electricity bills, in which details in vernacular language is provided. Thus, most consumers are not able to understand the bill fully and correctly. Only about 7 per cent of respondents confirmed that they fully understand the utility bills.

**Figure 6.10**

**Consumers who can Understand the Bill Details Reasonably Well**

Source: Compiled from Primary Data.

Among the uneducated respondents, only 11 per cent are able to understand the bill correctly. As the educational level increases the percentage of those who understand the bill, also increases, reaching 53 per cent in the case of those with education upto high school or higher secondary a significantly higher level of 72 per cent is observed among highly educated respondents. There is a positive correlation between education and bill problems.

Overall, a majority of consumers have not found any significant improvement in metering and billing procedures over the last three years. Considering increasing consumer concerns, there is an urgent need to put in place a more effective grievance redressal system.
The urban-rural gap is an important factor in determining the quality of services to the consumer. This factor has been given due attention in designing the sample. As the rural population represents about 65 per cent of the state's population, about 80 per cent (mainly household and agricultural categories) of the sample are drawn from the rural areas in each district. It is observed that in rural areas, the number of un-metered consumers, especially in the agricultural sector, is very high, as indicated below in table 6.12.

<table>
<thead>
<tr>
<th>Category</th>
<th>Total respondents</th>
<th>Unmetered</th>
<th>Percentage share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>110</td>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>Agricultural</td>
<td>80</td>
<td>6</td>
<td>8.00</td>
</tr>
<tr>
<td>Commercial</td>
<td>20</td>
<td>4</td>
<td>2.00</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>16</td>
<td>4.00</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.

From a total of 210 respondents, 4 per cent are unmetered consumers. Most of the consumers are from agriculture sector. This is roughly half the number of unmetered respondents and is representative of the actual position of the wide variety of consumers.

(D) Reforms Awareness and Regulation

Under the new regulatory framework, consumers are invited to participate in the regulatory decision making process. Effective consumer representation, is essential to achieve the objectives of the reform process. It depends on sensitizing consumers about and sharing information with them.

The main findings on awareness of the reforms and regulations are:

- The positive side of reforms is that it is reported that most consumers (approximately 90 per cent) have knowledge about energy efficiency equipment. Interestingly, 95 per cent of them have started using efficient equipment in terms of energy, such as compact fluorescent lamps, fans, refrigerators, etc., to save power.
• Awareness about energy efficient equipment is being created by employing various measures such as holding seminars, providing cheap loans, literatures advertisements putting out through TV, Radio, Capacity Building Programmes.

<table>
<thead>
<tr>
<th>Stated reason</th>
<th>All</th>
<th>Consumers</th>
<th>Domestic</th>
<th>Agricultural</th>
</tr>
</thead>
<tbody>
<tr>
<td>One time cost of equipment</td>
<td>71</td>
<td>77</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Quality of product is not good</td>
<td>20</td>
<td>13</td>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>No financial support available</td>
<td>6</td>
<td>2</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Not aware of efficient Equipm.</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.

The most quoted reason is the high energy costs of equipment (71 per cent of consumers) followed by those who consider the quality of the product being not sufficiently good (20 per cent) for removed from the first. While 4 per cent have no knowledge about energy efficient equipment. Consumers are not satisfied with the little information they have on energy efficiency issues and the proposed resources for the transmission of such information include seminars use of the media, distribution of handouts, etc. HERC should consider taking some concrete steps in this regard to create more awareness among consumers seriously.

Problems in Energy Efficiency and Demand Management

Energy efficiency has been an area of focus in power sector reforms all over the world. In the Indian context, it is all the more important because of two reasons: first, fossil fuel sources account for the generation of most of the energy available in India and this source causes environmental pollution substantially. Second, in the short run, it seems that scarcity of power can’t be done away with and only stress on energy efficiency can mitigate it to some extent.

About 56 per cent of consumers have admitted that there is ample scope for reduction of electricity consumption if energy efficiency techniques are adopted. A potential for energy savings of 28 per cent or above was perceived by 36 per cent of respondents from the HT segment and 20 per cent from the LT segment (Figure 6.11). number of consumers perceiving a scope for energy of 10 per cent of above was much higher 58 per cent from HT and 46 per cent from segments.
However, realizing the importance of the issue, about 99 per cent consumers opine that there is an urgent need to exploit the energy saving potential in the industrial sector. For these purposes various types of efforts such as organising training seminars, publishing literature etc. need to be made. Consumer perceptions regarding the relative effectiveness/ desirability of these means are provided in table 6.14.

### Table 6.14

**Suggested Measures to Exploit the Energy Saving Potential in the Sector:**
Percentage Support from Consumers

<table>
<thead>
<tr>
<th>Barrier \ Rank</th>
<th>No of consumers suggesting actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organising training seminar</td>
<td>54 (26)</td>
</tr>
<tr>
<td>Providing cheap loans</td>
<td>42(20)</td>
</tr>
<tr>
<td>Publishing literature</td>
<td>12(6)</td>
</tr>
<tr>
<td>Focused capacity building initiatives</td>
<td>41(19)</td>
</tr>
<tr>
<td>Green energy certificate etc.</td>
<td>38(18)</td>
</tr>
<tr>
<td>Advertisement TV Radio</td>
<td>23(11)</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.
All percentage figures are worked out on the basis of 210 consumers. 26 per cent of the respondents maintained that seminars for imparting training be organized and they regarded it as the most effectiveness. 20 percent of the respondents held the view that extending cheap loans could prove to be very effective. 6 per cent respondents regarded publication and circulation of literature as every effective and rewarding measure. 'Publication literature 'also received significant support from the most preferred initiative (6 per cent)

(E) Complaint Redressal Mechanism

One of the main objectives of the reforms in the power sector is that the Council should devise and put in place an effective redressal mechanism so that consumers may be able to have prompt and satisfactorily redressal of their grievances. Electricity Act, 2003 also lays emphasis on this important topic. In addition to the establishment of Complaints Redressal Forum (CRF), The act also provides for the appointment of the Ombudsman to deal with complaint redressal forums.

Summary of key findings regarding Complaint Redressal Mechanism in Haryana

The main findings on the complaint redressal mechanism are:

- On the whole, the status of the complaint redressal process is not satisfactory. Most consumers are ignorant of the complaint redressal process.
- Apart from the above, traditional method to get complaint registered is used.

The most powerful hurdle is the poor awareness among consumers regarding the provisions and functioning of Redressal Forums and the Ombudsman in Haryana.

Most consumers report that they have used traditional methods for registration of complaints. About 50 per cent made personal visits to the local offices of the distribution companies. Other common methods include making registers available in the village by utilities and the provision of phone calls to distribution centres.

On the other hand, only 20 per cent give phone call to register complaints and even less than 1 per cent send email.
Figure 6.12
Methods used to Register Complaints (per cent)

<table>
<thead>
<tr>
<th>Method</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal visit</td>
<td>50</td>
</tr>
<tr>
<td>Register available in village</td>
<td>13</td>
</tr>
<tr>
<td>Call to distribution circle</td>
<td>16</td>
</tr>
<tr>
<td>Toll Free No</td>
<td>20</td>
</tr>
<tr>
<td>Email</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data.

The HERC regulations require the distribution companies to provide complaint reference numbers to complainants. This regulation is observed more in breach than in observance. About 88 per cent of consumers report that they were given complaint reference numbers by distribution companies. Further, 38 per cent stated that most of the time the utility staff was not available to register complaints.

Consumers need to play a very significant role in making the complaint redressal system more transparent and accountable. Their views should be considered while taking regulatory decisions through the consultation process.

The overall level of consumer satisfaction with the complaint redressal process is low. The utilities as well as HERC need to be proactive in engaged consumers in the process of formulating and executing regulations in this regard.

6.3 Summary of the Chapter

The present study has examined comprehensively the efficiency level of and consumer satisfaction level with the power sector in Haryana. Process of technology and improvement in technical efficiency level are the two key sources for the long-term growth of the power sector. Therefore, more attention should be paid to promote them by investing in R&D. The present study has been divided into two sections. First
The study has comprehensively analysed the estimated results of the Chi-square test for various variables with the variable Y (efficiency in power sector reforms). It has been observed that $X_2$, $X_4$, $X_5$ and $X_6$ significantly affect the behavior of variable Y (efficiency in power sector reforms). However, the variable $X_1$ (power cut) and $X_3$ (tariff rate charge) are insignificant suggesting no significant improvement. Such empirical exercises in economic theory are very necessary to control the behavior of target variables through the efficient/optimal use of policy variables by the various governments/decision makers.

The section two deals with quality of electricity supply, tariff and other related issues, metering and billing, reform awareness and regulation and complaint redressal mechanism entitled in the study “Power Sector Reform and Economic Efficiency: A case study of Haryana State”. It has been found out that consumers are not satisfied from the quality of voltage during peak load. In addition, according to the survey the tariff rate charge is unreasonable. As far as metering and billing is concerned about two-third of the consumer face incorrect billing problem. Furthermore in reform awareness and regulation, consumers are less aware but are eager to get knowledge about the latest energy equipments. According to the consumers the best mode to generate awareness is by conducting training seminars time to time. However, due to lack of digital knowledge in India, about 50 per cent of the consumers are visiting power sections for their complaint registration.