

Haryana Comments on the Report

1. Sampling criteria

- 1.1 In Haryana there are 3.59 lac electricity driven tubewells, which include 2.85 lac un-metered tubewells and 73,000 metered connections. The study has been based on the 584 pumps spread over 25 nos. 11 kV feeders and around 140 distribution transformers. Around 10% meters were electronic tri-vector meters. Even during the period of study, over 10% meters were reported defective. Thus the sampling is based on the following percentage of pumps:

Number of pumps selected	584 out of 3.59 lac i.e. 0.16%
Number of feeders	25 out of 2250 i.e. 1.1%
Number of transformers	140 out of 1.1 lac i.e. 0.13%

This sampling is too inadequate for the study of the entire pump-set behaviour.

- 1.2 Even the samples chosen are not the true representative of the field conditions. The pump-set behaviour would depend on various factors like: land holding (small, marginal or large), type of soil (fertile, barren, gypsum affected or water logged), type of crop (rice, wheat, oilseeds, gram, bajra or jowar), irrigation criteria (canal/well/tubewell/diesel engine), sharing of pumps, quality of power, etc. Therefore, the process of sampling has to take all these factors into consideration. It has been seen that the criterion used for study does not address all these concerns adequately.
- 1.3 Even the selection of feeders has not been done corresponding to the overall number of feeders in each area. It makes lot of difference because lesser representation may totally distort the results. For example, the number of rural feeders in each circle and the sample chosen are as follows:

Region	Number of 11 kV rural feeders	Proportionate samples required	Actual samples taken
I	127	2	4
II	481	9	7
III	190	3	4
IV	255	5	5
V	344	6	5
Total	1395	25	25

Thus the samples have not been taken in proportion to the mix of feeders in the overall study area.

- 1.4 Even the number of sample tubewells taken is not commensurate with the relative total number of pumps in that region.

Region	Number of un-metered pumps as on 31.3.1999	Proportionate samples required	Actual samples taken for metering study
I	30,127	56	70
II	1,30,033	245	206
III	30,462	57	99
Region	Number of un-metered pumps as on 31.3.1999	Proportionate samples required	Actual samples taken for metering study
IV	52,807	99	107
V	39,384	74	50
Total	2,82,813	532	532

Thus the representation of pumps in regions II & V remained quite low compared to the over-representation of other regions like region I, III & V.

- 1.5 The sampling used for Recall Survey is also not in proportion to the overall number of tubewells in the State. The selection of samples taken and the relative share in the overall population of tubewells in the region works out as follows:

Region	Number of pumps as on 31.3.1999	Proportionate samples required	Samples taken for recall survey
I	37,713	82	83
II	142,046	309	307
III	41,196	90	126
IV	88,581	193	191
V	47,975	104	70
Total	357,511	777	777

While the samples in region III are much more in number, the number in region V has been much less.

- 1.6 The corresponding data, which is available with the Power Utility, is for 73,000 pumps that are metered and regularly being read. It represents over 20% of the total tubewells. If the meter readings are to be relied, then the reading already being collected by the Utilities should have been taken for analysis. The sample chosen is too small for replicating the results over the State for any serious conclusion. An analysis of the data based on the Utility meters is enclosed.

- 1.7 The State has different terrain over its length and breadth. While there are extensive cultivated areas of Karnal and Kurukshetra that is the rice bowl of Haryana, then there are arid zones of Bhiwani and Narnaul, saline water area of Rohtak and Hansi (in Hisar District), semi-hills of Panchkula and Gurgaon, cotton belt of Sirsa and Hisar, sugar cane belt of Yamunanagar and Panipat. The diversity varies over canal irrigated areas, purely tubewell irrigated areas, barren areas dependant on rains only, mixed irrigated areas with tubewell and canal irrigation. The sampling has to be consistent with all these factors which are likely to influence the outcome of the study. For example, the feeder chosen for study in Rohtak Circle has saline water and could not be a representative sample for the State. This is bound to distort the quality of results.
- 1.8 Thus the sampling used for the study is totally inadequate and hence can not be relied upon.

2. Consumption of pumps

- 2.1 The analysis of metered and un-metered pumps data indicates the following trend of consumption in the five regions constituted for the study:

Average Hours of Pump Operation per day

Region	1997-98		1998-99		1999-00		2000-01	
	M	UM	M	UM	M	UM	M	UM
I	3.05	7.04	3.36	6.74	4.06	7.36	5.49	8.27
II	2.88	5.11	3.61	4.95	3.67	5.75	5.25	7.46
III	3.25	6.57	4.07	7.03	4.00	7.61	5.20	9.00
IV	3.62	5.98	3.88	6.37	4.05	7.65	4.69	9.15
V	3.73	5.46	3.73	6.37	3.75	7.31	4.59	8.71
Total	3.40	5.69	3.78	5.87	3.93	6.73	4.39	8.21
Ratio		1.67		1.55		1.71		1.87

Note: 'M' stands for metered and 'UM' for un-metered connections.

- 2.2 Against the above analysis, the average pump operation time for the year 1999-00 when compared with the study results shows the following difference:

Average Hours of Pump Operation per day

Region	As per energy booked by the Utilities		ORG Study
	Un-Metered pumps	Metered pumps	Metered pumps
I	7.4	4.1	4.0
II	5.8	3.7	3.9
III	7.6	4.0	3.0
IV	7.7	4.1	4.3
V	7.3	3.8	4.7
Total	6.7	3.9	4.1

- 2.3 The above comparative data shows that the consumption brought out by the consultants is relatively higher than that recorded for metered tubewells by the Utilities and substantially lower than the un-metered ones. Considering the number of un-metered tubewells being 4 times the metered tubewells, the consumption is much lower than the actual. Even the difference over the regions varies widely.
- 2.4 The consultants have concluded from the survey that the connected load of the pumps is 1.74 times than that reported in the books. This would apparently be more in the un-metered cases where the farmers have to pay on the basis of declared capacity of the pump. Therefore, the method of estimating consumption as mentioned in paragraph 2.7 (read with Annex 2) taking kwh/kw or kwh/pump would yield distorted results.
- 2.5 The Haryana Distribution Companies had recently notified a Voluntary Disclosure Scheme under which the consumers were given an opportunity to disclose their actual connected load without attracting any penalty for un-authorized extended load and get it regularized. The results of the scheme have been quite encouraging. The analysis of the declared load shows that the average extended load is 2.35 kW per tubewell in South Discom and 3.12 kW per tubewell in North Discom. The number of metered and un-metered tubewell consumers who disclosed their extended load in different circles are tabulated below:

Circle	Metered tubewells			Un-metered tubewells		
	Number of consumers who declared extended load	Extended Load declared in kW	Load/pump in kW	Number of consumers who declared extended load	Extended Load declared in kW	Load/pump in kW
Ambala	30	165	5.50	391	1827	4.67
Y/Nagar	142	406	2.86	284	700	2.46
Kurukshetra	1321	4457	3.37	4554	14739	3.24
Karnal	80	232	2.90	1322	3298	2.50
Sonepat	91	209	2.30	372	868	2.33
Rohtak	11	23	2.09	-	-	-
Jind	6	10	1.67	268	705	2.63
UHBVN	1681	5501	3.27	7191	22137	3.08
Faridabad	34	156	4.59	-	-	-
Gurgaon	472	518	1.10	246	813	3.28
Narnaul	153	314	2.06	2782	7125	2.56
Hisar	266	633	2.38	1561	4199	2.69
Sirsa	144	922	6.40	839	3446	4.11
Bhiwani	208	583	2.80	132	450	3.41
DHBVN	1277	3163	2.48	5560	16033	2.88
State as a whole	2958	8664	2.93	12751	38170	2.99

Comparing with the average connected load of the State per tubewell as 5.47 kW, the extended load declared is 2.98 kW i.e. 55% or the actual load of the agriculture sector is around 155% of the declared load. Thus any calculation based on per kW load is bound to give wrong results.

- 2.6 The consultants solely depended on the meter readings given by the Utility staff without cross checking at site especially at the pumps where there was inconsistency or wide variation in the consumption figures. This should have been done to give authenticity to the study data.
- 2.7 The responses from attitude surveys conducted by the consultants, as projected on Table 2.14 state that the farmers have been getting power supply from 6-11 hours a day in different regions with average of 7-8 hours a day over the state. Similar results have been obtained from recall survey, which has concluded that the farmers are getting 6.2 to 11.6 hours of power supply in different regions with the state average of 6.3-9.7 hours. Thus the study result that the farmers are using electricity only for 4.1 hours is totally negated and conservative.
- 2.8 The feeder study results brought out in Table 2.15 shows that the average 3-phase supply has been given from 8-9 hours. Even the reliability of power supply has been reported as varying between 77 to 94 %. This further indicates the fallacy of the study results.
- 2.9 The average pump set capacity based on recall survey is reported as 10.9 BHP in region I. This region has the low water table except the hilly areas of Panchkula, where there is hardly any tubewell irrigation. Even the area under crop shown in Table 2.6 for summer season gives a very wrong picture of the crops in regions I, II & III, which shows Bajra & Jowar as the majority crops. This is factually wrong. These inconsistencies show that while making the study mechanical computation has been done rather than to use analytical approach.
- 2.10 The study results brought out in Tables 2.3, 2.4 & 2.5 show that during Kharif season the consumption per pump of region V is 2.5 times that of the high agriculture intensity region II. Similarly, the consumption per kW is highest in region V, both in Kharif as well as the whole of the year. Same is the trend for number of hours of operation of pump sets per day. This is totally absurd. There is nothing more reliable than the actual power flows from the substations. The actual power supplied figures give a totally different picture. The power demand is always higher in region II which has the maximum round the year agriculture operations.
- 2.11 The Table 1.6 indicates that 46.9% farmers have jointly owned pumps. In paragraph 1.26 it has further been mentioned that on an average pumps were co-owned with 3 other farmers. This goes to prove that the farmers would have a tendency to sell the water and install higher size motors with preferably un-metered connection. Any survey done on the basis of numbers would give wrong result.
- 2.12 The study indicates that 56% farmers preferred to have metered connections. The fact remains that even today 80% farmers have un-metered connections and they are even opposing the installation of meters for study purpose also. This comments on the reliability of the study results.
- 2.13 Thus the results of the study are not at all reliable and could not be used for future reference or base for computation/restatement of agriculture consumption for the State.

3. Consumption of metered pumps compared to the un-metered pumps

3.1 The units being booked for un-metered pumps are 1.55 to 1.72 times than that of the metered pumps. There are apparent reasons for the un-metered pumps to operate for longer hours than the metered ones. The Utilities have consciously directed the field offices to limit the energy booking to the un-metered pumps at the most 1.25 times the metered consumption. Although, there are sample meters installed in the field on the un-metered pumps i.e. one for every 50 pumps. The Superintending Engineers/ Operation announces the energy to be booked for each subdivision every month based on these meter readings. The apparent reasons for the un-metered pumps using higher consumption are enlisted hereunder:

- i) The un-metered pumps are billed on the basis of the BHP declared by the farmers. Thus the farmers are benefited by declaring lesser BHP and use higher size of motors. Even the ORG study concludes that the actual load of the motors is 174% of the declared BHP. Therefore, the un-metered pumps are consuming much more energy than recorded by the metered pumps. If the metered consumption is 3.78 then the un-metered pumps should be consuming 1.74 times the metered consumption, all other factor remaining the same.
- ii) The tariff for un-metered pumps is much higher than the metered ones. While the tariff for metered pumps is 50 Ps and amounts to on an average operation of 4 hours per day. On the contrary, the un-metered pumps are charged @ Rs. 65/BHP or equivalent to 5.8 hours a day. Thus, the un-metered pumps are charged at least 1.45 times the metered pumps. Therefore, the farmer taking un-metered connection is aware that he is paying 1.45 times the metered pump rate and would like to take full advantage of the extra payment he makes.

- iii) The farmers who have larger irrigation demand due to having larger land holdings, extensive tubewell irrigation, multiple cropping, or have facility for selling water to the adjoining land would opt for the un-metered pumps. This is supported by the data of the relative population of metered and un-metered tubewells in different circles. The comparative figures for the year 1998-99 are:

Number of Agriculture Pump Connections as on 31.03.1999

Circle/ Region	Metered	Un-metered	Ratio
Ambala	2,545	8,084	3.18
Yamunanagar	5,041	22,043	4.37
Region - I	7,586	30,127	3.97
Kurukshetra	8,452	56,039	6.63
Karnal	3,561	73,994	20.78
Region – II	12,013	130,033	10.82
Sonepat	4,991	11,794	2.36
Jind	1,450	15,344	10.58
Rohtak	4,293	3,324	0.77
Region – III	10,734	30,462	2.84
Faridabad	9,054	5,059	0.56
Gurgaon	15,350	13,556	0.88
Narnaul	11,370	34,192	3.01
Region – IV	35,774	52,807	1.48
Bhiwani	1,932	12,503	6.47
Hisar	1,737	11,317	6.52
Sirsa	4,922	15,564	3.16
Region - V	8,591	39,384	4.58
State	74,698	282,813	3.79

Thus the popularity of metered or un-metered tubewell in different regions would support the statement that the un-metered tubewell owners have a tendency of using the pumps for longer hours than the metered ones.

- iv) There is bound to be extra exploitation of a source of energy, which is available without metering. The consumer who has a metered connection is fully conscious of the fact that the energy consumed by him is being metered and any wastage in energy would be billed to his account. On the other hand, an un-metered consumer can afford to waste energy as he is not directly affected by the over exploitation due to fixed charges paid for the electricity.
- v) An un-metered consumer is attracted for use of electricity for ancillary jobs as his intention is to use the facility to the maximum extent. He would use it for his other uses like; lighting, cooking, other agricultural activities, etc.
- vi) An un-metered consumer would also sell the water to his neighbour farmers who may not be having such connections. Although this fact would neither come in the survey by the consultants or on record. But it is a hard fact in the field.

3.2 These arguments would support the above statement about the consumption of un-metered pumps being more than the un-metered ones.

4. Variation in the energy consumption over the years

4.1 The table under paragraph 2.1 above shows that there is a large swing in the metered & un-metered pump consumption over the years. While the metered consumption has increased from 3.40 hrs/day in 1996-97 to 4.39 hrs/day in 2000-01, the un-metered booking has changed from 5.69 hrs/day to 7.55 hrs/day during the corresponding period.

4.2 These figures would be affected by various factors like; extent of rainfall, type of crop sown in a particular year, extent of multiple cropping followed by the farmers in a particular year, and the water in the canals. Even the addition in the cultivated area each year would have a direct bearing on the consumption. Thus the figures worked out for a sample period cannot be applied for next year. In fact even it changes very widely over the season also.

4.3 Therefore, the study results cannot be used for any other year or even for comparison purpose.

5. Comparison with the Running of Rural Feeders over the year

5.1 The energy consumption over the rural feeders varies widely due to the change in the agriculture demand. While the load on the rural feeders varies from 150 to 325 lac units a day over the year. In kharif season it remains on an average 300-325 lac units a day except for a heavy rainy day when this drops to 150 lac units only. Similarly, it varies from 225-250 lac units on a normal day in rabi season and it drops to 150 lac units on a rainy day.

5.2 The running of rural feeders show that on an average power is supplied at almost full load for 7-9 hours a day throughout the year. The load may vary from area to area depending on agriculture crop season. While, in kharif the pressures on rural feeders increases to even 12 hrs a day.

5.3 Therefore, the average running of pumps based on the load on the 11 kV feeders goes to support the operation of pumps for 7-8 hours in paddy belt and 4-5 hours in the non-paddy belt over the year.

6. Problems encountered in the installation of Meters on un-metered Tubewells

6.1 The study has concluded on the basis of surveys that:

“The farmers are willing to get metered supply and even pay higher tariff if the quality of power supply is improved”.

Moreover, the study has suggested that:

“100% metering is the only remedy. The cost of the installation of the meters would be recovered in the first 4 months only”.

These findings are not supported by the actual conditions on the ground.

- 6.2 Firstly, we can confirm this statement from the farmers' behaviour after the change in tariff w.e.f. 1.1.2001. As per the tariff approved by the HERC, the metered tariff is much cheaper than the un-metered. Comparative rates are:

Description	Pre-revised rates	Revised rates
Metered tariff Ps per kWh		
Upto 100' depth	50	62
101-150' depth	38	50
151- 200' depth	31	43
above 200' depth	23	35
Minimum Charges Rs./BHP/year		
Upto 100' depth	540	540
101-150' depth	410	410
151- 200' depth	335	335
above 200' depth	248	248
Un-Metered tariff Rs./BHP/year		
Upto 100' depth	780	1200
101-150' depth	600	900
151- 200' depth	480	720
above 200' depth	360	540

Thus, even with the rates of metered connections being lower than the un-metered connections, the farmers still prefer to take un-metered connections.

- 6.3 While it would be seen that the un-metered tariff has been increased by over 50% from the pre-revised level and made over two times than the metered tariff there is no swing in the un-metered connections converting to the metered connections. The growth of metered connections to un-metered connections over the past years has been as follows:

Year	Metered connections	Un-metered connections	Ratio between metered & un-metered connections
1995-96	107075	267274	2.50
1996-97	89163	275914	3.09
1997-98	83968	279673	3.33
1998-99	74698	282813	3.79
1999-00	69155	283720	4.10
2000-01	73948	285128	3.86

- 6.4 From the above data it is evident that the farmers prefer to take an un-metered connection rather than to go in for a metered connections. Therefore, the conclusions of the survey are not realistic.
- 6.5 The un-metered connections have been released on the pump itself without insisting for the construction of a metering room or shed. When these meters are to be installed, there is no safe weatherproof place to install these meters. Farmers are not ready to construct the room or shed for these meters.

- 6.6 The farmers apprehend that once the meter is installed they would be questioned for the extra consumption for other purposes than the pumping load. Moreover, their unauthorized load would come to the notice of the Utility by way of extra energy consumption.
- 6.7 The farmers also do not own the responsibility of safe custody of the meters, as these are not covered under their Power Supply Contract for un-metered connections.
- 6.8 The Utility is neither able to recover the cost of the meter nor charge any meter rental or maintenance charges. In addition, it has to replace the meter at its own cost even when it is damaged by the farmer deliberately. The cost of meter reading would also be borne by the Utility that would be extra financial burden to the Utility. Thus the conclusion of the study that the cost of meter installation would be recovered in 4 months is totally out of place. The fact remains that the cost would be an addition to the Utility expenses.
- 6.9 In general, most of the farmers oppose installation of meters. Till date, 10000 meters have been installed on the un-metered tubewells in UHBVN but no meter has been installed in the DHBVN so far. Even after the outsourcing of the meter installation work, the progress of this activity is very slow. Even a good number of the meters, which have been installed in UHBVN, there are reports of the meters having been removed by the farmers and even cases of damage to the meters.
- 6.10 Therefore, the findings of the study that 100% metering is the only solution is not based on correct premise. The campaign for meter installation on the un-metered tubewell connections is going to be a difficult and un-remunerative task as long as the un-metered tariff is in vogue. Only after the un-metered tariff is totally withdrawn and there is no option than to have a metered connection for the farmers, they would not let the metering programme be successful.
- 6.11 However, we could continue reading the meters installed under the agriculture study and use these readings for in-house analysis of energy consumption by the un-metered tubewells. Even if some additional sample meters are to be installed, this could be extended to have more reliable data for replicating over the State as a whole.
- 6.12 Meanwhile, the Haryana Power Utilities have already instructed that all new tubewell connection would be released on metered supply basis only. Even the farmers who apply for shifting of tubewell connections are allowed to do so with a clear understanding that the connection at the new site would be a metered connection. This would help in moving towards the goal of achieving 100% metering on tubewells. We are committed to install meters on all consumer premises by December 2001, in line with the national goal.