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Under BEE standards and labeling programme, it is nice to have a large list of equipment, which contribute for major energy consumption. From the list given in the electricity saving potential priority table, it is evident that Agricultural pumps tops the list. So, I have taken this sector for review.

As already mentioned agricultural power consumption, the data may be very vague, because different studies shows the different picture. Because of subsidized nature of the sector, and also due to free supply of power to agri-pump sets in many states, in majority of the cases, there is no metering for this sector. So the different estimates have their own deficiencies.

Major issues and assumptions involved in estimation of energy consumption in Agri-pump sets are:

- Assessment of average connected load of the each pump set (5HP / 7.5HP / 10HP /12.5 HP)
- Assessment of number of operating hours
- Total number of agri-pump sets energized
- Addition of new Agri-pump sets each year
- Type of pumps (jet pumps / submersible pumps / mono block pumps)

Average connected load of Pump sets:

In the priority table, the avg. load of the pump set is taken as 5 KW. In the recent study conducted by NPC(1) in Andhra Pradesh the majority of the new submersible pumps, which are used for agriculture are above 10 HP. Farmers concern for opting for larger HP pumps is primarily triggered by the steep fall in water table levels all over. In some locales the water table has even fallen below 500 feet. Specific to Andhra Pradesh, the free agricultural power supply has given rise to installation of large HP pumps of more than 10HP. In earlier days, the agri-pump sets were connected to open wells and people were using either 3 HP or 5 HP pump sets. Since the water table as stated above has fallen, and all most all the open wells have dried up, and farmers are forced to use higher rated pumps. In the present situation, the average connected load per pump will be higher than 5 Kw. Also in many Indian states, for agricultural pumps, the tariff is collected based on the HP of the Pump. So people are tempted to change the name plate details and show lower HP rating. A sample survey indicates, that the average connected load of the new pumps will be 6.5 Kw per pump.

Number of Operating Hours:

In the present table the number of operating hours have been taken as 1500 Hours, average out to about 4-5 hrs per day. Due to free nature of power in many cases, people are tend use more number of hours as long as water is available in the well and also till the power is available. The ground reality is that farmers do not ever switch off their pump sets. If pump sets are found not working, the reasons are largely due to :

a) Non availability of power or
b) Non – availability of water

In many states, power availability to farmers is ensured for 9-10 hrs per day. The number of operating hours also very from state to state depending on the water table and monsoon conditions. Another NPC report on agri tariff revision[2] indicate, the average pumping hours are in the range of 1500-2400 hrs in different regions. The average can be taken as 1800 pumping hours annually.

Total Number of agri-pump sets in India:

The total number of irrigation pump sets in India 12.5 million[4] (year 2001) . Based on Annual power consumption of 118,059 GWh (2002-03) by Agri-pump sets, the number of pump sets works out to 15.7412 Million. Considering the addition of another 0.8 Million pump sets every year, the present total number of pumps installed seems to be OK.

Percentage power consumption by the Agri-sector:

Various estimates, indicate that the contribution of Agri-sector in total electricity consumption vary between 30% to 40%. USAID report[4] estimates 30+% consumption of total electricity use by agri –sector. In the states of Andhra Pradesh and Gujarat, the agricultural sector alone accounts for 37.45%[6] and 40%[5] respectively. Based on the present table, the Total electricity consumption in 2002-03 is 562,572 GWh and the consumption by Agri-pump sets is 118,029 GWh, which works out to only 20.98% say 21%. By taking 6.5 Kw per pump set and 1800 pumping hours, the total power consumption by agri-sector will be 184,172 GWh, and the % works out to 32.7%, which reasonably matches with the other studies.

Estimated improvement in efficiency of new stock of pumps:

Numerous field studies have revealed that 90% of the agri-pump sets used in India are far inefficient and wasting Crores of Rupees worth of power. Pump rectification work carried out by PCRA, GEDA, REC indicate achievement of 15-50%[5] energy savings. Other studies indicate, 20-25%[3] energy savings by replacing sub-standard pumps with efficient ones. And another 10-12% by replacing substandard foot valves by energy efficient ones. So, the estimated efficiency improvement of 38% in the present table can be treated as the savings potential available in India.

With the above data incorporation, annual electricity consumption of new stock works out to 9360 GWh instead of 6000 GWh and the annual electricity savings go up further from 2280 GWh to 3556.8 GWh. The data for agricultural pump sets in new table may look as follows:

Sl.No	Parameter	Value
1.	Annual Electricity Consumption of equipment GWh	184,172
2.	Annual sales of equipment in 2002-03, Millions	0.8
3.	Annual electricity consumption of new stock Gwh	9390
4.	Electricity consumption of new stock to total electricity %	1.66
5.	Estimated improvement in efficiency of new stock %	38
6.	Annual electricity savings, Gwh	3556.8
7.	Organsied sector	55
8.	Informal sector	45

Conclusion:

Though lot of saving potential is available, the poor farmer has no interest in replacing in-efficient pump sets nor in incorporating capacitors or to spend any money on existing pump set other than for rewinding burnout motors etc. Subsidized or free power situation largely pampers this mind-set to go for slightly costly efficient pump set. Since most of the savings, that we are talking for new replacements, this can better be achieved at the design stage itself. BEE needs to stipulate minimum efficiency standards for Agricultural Pump sets through its Standards & Labeling programme. Since the agricultural sector is responsible for the greatest losses for power distribution companies, as well as for state governments, there is an urgent need to tackle this sector on a priority basis.

References

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