

Subject: - Uploading of best practices on e-platform of Central Electricity Authority in respect of Himachal Pradesh .

1. Reduction in losses-both Systems and Revenue losses:

The Year wise position of T&D (Transmission and Distribution) losses and AT&C (Aggregate Technical & Commercial) losses in respect of HPSEBL w.e.f. FY 2004-05 to FY 2011-12 are tabulated below;

Sr. No.	Financial Year	T&D Losses (%)	AT&C Losses (%)
1.	2004-05	22.44	35.89
2.	2005-06	18.98	30.98
3.	2006-07	15.94	26.16
4.	2007-08	15.41	25.85
5.	2008-09	14.24	24.29
6.	2009-10	14.72	26.28
7.	2010-11	13.42	24.12
8.	2011-12	14.29	19.98

From above, it is clear that the T&D and AT&C losses have drastically comedown i.e T&D losses from 22.44% to 14.29% and AT&C losses from 35.89% to 19.98% during the period of last eight years and more efforts are being made to bring T&D and AT&C losses down to the value of 13% and 20% or less, respectively.

The following steps have been taken by HPPSEBL to reduce T&D / AT&C losses and improvement of reliability of supply to consumers.

- i) Under RGGVY Scheme, 2062 DTRs, 1476.48 Km of HT line, 5089.99 Km of LT line & 8 No. augmentation schemes have been completed till date and all the completed works shall be energized during the year.
- ii) Restructured Accelerated Power Development & Reforms Programme (R-APDRP) of Govt. of India: - Part-A of R-APDRP is in progress. Under R-APDRP Scheme, 349 No. of Sub-Station Feeder Meters are to be installed, out of which 321 No. of meters are already in place. Whereas, 3130 No. of DTR meters (including 'CALMU' meters) are to be replaced/ installed, out of which 2101 No. of meters have also been replaced / installed. The rest of the Sub-station Feeder meters and DTR meters are expected to be installed in near future. Infrastructural works of R-APDRP (Part-B) including 66 KV line & Sub-Stations shall be completed by March, 2013.
- iii) 539646 No. electro-mechanical meters shall be replaced with the electronic meters.
- iv) 100% re-conductoring shall be done on the HT< lines having GI wires with an appropriate conductor, during the year.
- v) It has been seen that ratio of HT lines to LT lines in the State is 1:1.87 which is circle wise HT/LT ratio, not favorable especially in some Circles and HPSEBL has accordingly decided to formulate Circle-wise System Improvement schemes to ensure that need based DTRs/HT lines are provided all over.
- vi) An IT scheme for an amount Rs. 132 Crore has been submitted to M/s REC for approval. The rollover to computerized billing application all over the State is likely to be completed by December, 2012 (in 132 Sub-Divisions). In addition to this, remaining consumers under 68 No. Electrical Sub-Divisions of different Operation Circles have been proposed to be covered under computerized billing. Hardware for these 68 No. Sub-Divisions has already been included in the ERP hardware package and is in the process of award; thus, covering around 90% of company's revenue and around 85% of consumers. No doubt, billing and collection efficiency shall go up dramatically with Implementation of this billing application. With implementation of this package, consumers will have the facility of online payment of bills and efficient access to services through the Lok Mitra Kendrs. Apart from this, HPSEBL has planned to complete the GIS based asset mapping project along with consumer indexing. In addition, various modules of

ERP are scheduled to be completed on pilot basis by January, 2013 and rollover by August, 2013 which will facilitate better financial planning & control and also complete overhauling of HRD functions.

- vii) Commissioning of various EHV works amounting to Rs. 159 Crore and 25 No. new 33 KV Sub-Stations along with associated lines are also proposed to be completed during the year for the strengthening of the back bone of this sub transmission system and will have the desired impact on reducing AT&C losses.
- viii) Improving of Billing Efficiency: Appointment of billing franchisees under the scheme 'RGGVY' is under way and the same shall be completed during the year which will facilitate adherence to billing cycle by all ESDs. Moreover, the collection through Lok Mitra Kendras (LMK) a facility has been extended to consumers to deposit the bills with the designated center that has been authorized to collect bills on behalf of HPSEBL. Over 6.95 Lac bills, amounting to Rs. 24.60 Crore have been collected through Lok Mitra Kendras during the last 14 months.
- ix) HPSEBL has initiated the facilities to the industrial consumers to pay their bills through e-banking (RTGS mode) in addition to existing mode of payments by Cheque, Draft & Cash.
- x) Checking of thefts & pilferage of energy: Flying Squad units (Head Office & Field Level) have been directed to conduct raids/checks at various consumers' premises throughout the State to detect the theft of energy & other irregularities. The performance of Flying Squad Units (Head Office) during the year 2010-11, 2011-12 & 2012-13 (ending, 2012) is as under:

Sr. No.	Description	FY 2010-11	FY 2011-12	FY 2012-13 (ending May, 2012)
1.	No. of installation checked	3,645	2,852	826
2.	No. of cases of theft/ pilferage of energy detected	23	51	13
3.	Total revenue assessed of the Energy estimated as pilfered	5,27,06,671	2,59,91,219	3,07,876
4.	Total amount collected as penalty	1,55,64,090	2,06,71,787	2,42,918

- xi) Recovery of defaulting amount from the Consumers to avoid the accumulation of arrear/loss of revenue to HPSEBL.

2. Ensuring long term financial viability and sustainability-effective revenue management practices.

H.P State Electricity Board Ltd. (HPSEB Ltd.) is a Govt. Undertaking Company registered under Companies Act, 1956. The Company has initiated following steps for effective financial management.

- i. Reforms in Banking system is being undertaken such as reducing number of bank collection accounts at all Sub Divisions and maintaining a single collection account to be used by all the Sub-Divisions / Divisions to save interest on overdraft, instant availability of funds, avoid inter unit funds transfer.
- ii. The Company has also restructured its recovery schedule of energy charges form all consumers.
- iii. The HPSEBL is reviewing Advance Consumption deposit form time to time from consumers on the basis of the electricity consumption and ensuring to effect TDCOs to avoid nonpayment of energy bills.
- iv. The enactment of HPERC terms and conditions for determination of Retail Supply Tariff Regulations 2011 is expected in the coming years to provide for automation increase / decrease in tariff hike to Power Purchase Cost. With the new law in place, an automatic provision for quarterly review of Power Purchase Costs viz-a-viz the Power Purchase Cost approved by the Commission which will result in Tariff review, has been made which can be done by the Distribution Company at its own level without approaching the Regulator. The additional burden on account of Power Purchase over and above the approved Power Purchase Cost is allowed to be recovered on quarterly basis on an auto basis from the Consumers by levying of additional

charge (with ceiling of 10%). This Regulation would help to pass on power purchase costs to the consumers at the earliest, which would improve the fund flows substantially.

- v. The Company has laid major emphasis on IT based billing to expedite revenue collection and to cope up with rising staff costs. A project in this regard has been implemented in two parts viz Part-1 & Part -2. Part-1 consists a pilot project which has been successfully completed in Operation Circle Shimla for 94,000 No. consumers. Centralized Data Centre and Call Centre have also been established at Vidyut Bhawan, Shimla which is fully functional. Expected savings will be Rs. 2.00 Crore per annum in terms of interest savings on working capital due to increased collection efficiency and better staff optimization / utilization. In Part-II, the rollover project covering all the Sub-Divisions is expected to be completed very shortly. As a result collection efficiency will improve, billing cycle will be reduced and existing staff already in short supply would be optimally used. After full implementation of scheme, HPSEBL will achieve savings of over Rs. 20 crore per annum in terms of interest costs on working capital and staff costs.

3. Improved consumer satisfaction:

The HPSEBL has started many schemes to improve the low voltage problem in the affected areas, by augmenting the existing 33 /11KV Sub-Stations / HT lines / LT lines / 11 / 0.4KV Sub-Stations as well as by erecting the new 33 /11KV Sub-Stations and DRTs to reduce the length of LT lines. In addition, HPSEBL has started toll free Number 1800 180 8060 at HPSEBL headquarter Shimla to lodge the complaints by consumers relating to electricity failure including other complaints and the complaints received at Data Centre Shimla on telephone, immediately intimated to field units telephonically by the Data Center for its speedy rectification and due weightage is given to rectify the faults and accordingly the feedback is sent to Data Complaint Center by the field Units after attending the complaints. The reduction in routine complaints on account of better maintenance of distribution system has increased the faith in HPSEBL services. The complaints lodged everyday in complaint centers, are being attended as per standard performance guarantee.

Initiatives to improve consumers' satisfaction;

- a) Provision of Web self services (www.hpseb.com) has been made wherein HPSEBL provides option for online bill payment. Currently HPSEBL is providing online bill payment services by registering at www.hpseb.com / mybill/ for H.P. State Electricity Board Ltd. online Services to residents of Shimla town only as 'Pilot Project' subsequently it would be replicated for entire state of Himachal Pradesh. Consumers are also able to download various information tools and forms e.g. tariff etc.
- b) Lok Mitra Kendra (LMKs), the Common Service Centre (CSC) scheme popularly known as Lok mitra Kendra project in Himachal Pradesh aims to establish 3366 e-Governance centers at Panchayat level in the state. HPSEBL has approved a proposal to provide services for payment of electricity bills through Lok Mitra Kendras (3366 CSCs) all over the state through 2 No. designated SCAs (Service Center Agencies) authorized by the Department of IT, Govt. of H.P. Shimla.

Benefits of LMKs:

- Easy access to Government information at the remotest corners of the State.
- Transparency in the working of the Government.
- Responsive and responsible Administration.
- Saving in time & cost of people visiting District headquarters time and again for getting information, lodging complaints & inquiring their status etc.
- Reduction in response time by the concerned departments and increase in their accountability to people.

4. Technological innovation & adoption thereof, and

- #### **5. Improvement in planning, design, construction and O&M activities and institutional measures adopted to achieve the objective of a well established, efficient, safe and secure power system and:**

Best practices in the area in planning, design, construction and O&M activities and technological innovation being followed, are given as under:

- i. Preventive Maintenance Schedules covering all the vital area have been made in order to diagnose replacement & to determine residual life so that the early action can be taken before any type of failure.
- ii. Each failure / tripping occurrence has been questioned with a) Why this occurred? b) How this occurred? and c) What is to be done to avoid its occurrence? This is helping to reduce failure rate to the greater extent.
- iii. On the basis of past history / records, the maintenance schedules are framed. Forced outages / breakdowns are minimized by proper follow-up of the maintenance schedules and the life of the equipment also enhanced.
- iv. Operating conditions are monitored and recorded continuously as such these records are very helpful / important to diagnose the causes of fault / failure.
- v. During replacement. It is ensured that the replaced part or equipment should be of improved version & latest technology having longer durability to meet all requirements so as to increase plant efficiency and reliability.
- vi. Procurement of the equipment spares has been planned as per rate of consumption, based on minimum requirement to optimize the inventory.
- vii. Regular trainings to O&M staff are being arranged to refresh their knowledge and to give them advance technical information to improve work quality & quantity.
- viii. Interaction sessions amongst working staff of various Power Houses are organized to improve performance of equipment and part.
- ix. Afforestations in the catchments area are being carried out to help in reduction of silt content in the inflow water.
- x. Periodic physical inspect of water conductor system from inside as well as outside to know its condition, silt deposition, rusting / erosion of conduit system is being carried out to find out various changes and these are compared with the installation data. Any abnormality is further investigated by carrying out testing and accordingly remedial measures are taken. Inside / outside painting (wherever possible) to protect the conduit system is carried out.
- xi. Anticorrosive painting schedules are being followed.
- xii. Healthiness of control and protection for isolating gates /valves &for cranes has been ensured.
- xiii. Timely maintenance, as per preventive maintenance schedule of trash rack/ intake gate filter has been ensured.
- xiv. Regular inspection of runners of turbines is being carried out and record to that effect is being maintained. The silt content is being monitored continuously on the basis of which action to mitigate the damaging effect to under water parts are initiated. It reduces the down time of unit / station.
- xv. Periodical maintenance of speed governors along with all associated mechanical, electrical, electronic component is being carried out. The electronic component and cards are carefully maintained to achieve desired performance, Periodical calibration and resting of transducers meters etc. is being done.
- xvi. Desired purity level of hydraulic oil is being maintained to give trouble free operations.
- xvii. Inspection & testing of the runners from experts is being carried out to decide residual life and accordingly actions are initiated for procurement of runners for replacement.
- xviii. Polishing of the various under parts of the turbine is being carried out once in a year to minimize the white pitting.
- xix. Periodic maintenance of the servo valves and motors after carrying out inspection is being carried out and leaking seals are replaced.
- xx. Regular recording of IR values of stator and rotor winding are maintained at regular intervals. The cooling system is maintained to limit rise in stator winding temperature and consequently increase the life of stator wining.
- xxi. Periodic checking of foundations is being done and bolts are tightened and foundations are filled with epoxy.
- xxii. The generator air coolers and bearing oil coolers are being cleaned periodically / replaced.

- xxiii. CTs, PTs and bus bars are being inspected regularly for overheating temperature rise etc.
- xxiv. Transformer bushings & insulator strings are cleaned periodically.
- xxv. Switchyards are kept neat and tidy. Area surrounding the yard kept free from growth of scrubs and bushes.
- xxvi. Oil and winding temperature of transformer are monitored and control circuits are checked for healthiness of their operation.
- xxvii. Running of DG sets has been ensured at regular interval.
- xxviii. Station batteries and battery chargers are checked regularly for their healthiness.

6. Securing the interest of consumers:

The HPSEBL is providing the regular supply to the consumers to help them in their day-to-day activities. Due to induction of L.T., the role of power supply is most important for the smooth implementation of the L.T at every level. Many public interaction programmes have been launched by the HPSEBL to facilitate the consumers. The HPSEBL is also paying the interest on ACD to the consumers as per the RBI reports through their energy bills every year. The billing of the consumers has brought to monthly in urban area and bi-monthly in rural area for easy payment. In addition, the work of digitization of the consumers is in progress to shift all the consumers' online billing. A fifteen days clear notice is being served to the consumers to pay their electricity bills before disconnecting power supply on defaulting amount. The facility to pay the electricity bill through local cheque is in operation to facilitate the consumers, which save the time of the consumer by standing in Que. The Collection of energy bills has been made through LMKs at the Panchayat level and further ATMs for collection of bills at District headquarter are being installed for 24 Hrs. payment of energy bills.

Against the several complaints / grievances, consumers can approach the various forums established for redressal of their complaints such as;

- Forum of Redressal of grievances of the consumers (FRGC).
- Electricity Ombudsman.
- Himachal Pradesh Electricity Regulatory Commission (HPERC).

7. Skill development measures of employees:

The best practices initiatives in Skill Development are as under:

- i. The HPSEBL has envisaged a comprehensive training Plan to up-date the skills of its personnel by deputing them to undergo trainings / attend Workshops / Conferences at various institutes within / outside the state. During the financial year 2011-12, 1290 No. personnel of HPSEBL have undertaken the trainings at various reputed institutes.
- ii. The HPSEBL has targeted to train about 2000 personnel during the current financial year i.e. 2012-13 as per the training plan envisaged for the year 2012-13.
- iii. In addition to training Centre at Solan imparting training to the operational staff of HPSEBL, the HPSEBL has established two more departmental training Institutes, at Larji and Pandoh for imparting training to the field technical staff of Electrical System (ES) and Generation Wings respectively round the year.
- iv. HPSEBL has conducted a series of in-house workshops for the various field officers during the financial year 2011-12 at Mandi, Dharamshala and Solan to abreast them with the latest Commercial, Operational and IT related issues comprising 90-100 participants at each locations and these types of in-house workshop will also be conducted during the current financial year for the HPSEBL employees.
- v. Apprentice trainings are also being imparted in HPSEBL. At present, 50 AEs, and 100JEs and 200 Linemen / Technicians are taking the said training (for one-year duration) at different location of the HPSEBL.
- vi. Induction level training was also imparted in HPSEBL during FY 2011-12.
- vii. The line staff of HPSEBL is also being deputed to undergo ITI training in various trades at different ITIs of H.P to enhance their technical qualification under the SCVT Scheme. Presently, 52 Nos. personnel of HPSEBL are taking training at various ITIs with in Himachal Pradesh.

8. Imparting consumer education:

Through the citizen interface tab on the web portal (www.hpsebl.com), information for consumer regarding the electricity is available, such as:

- How to apply for a new connection / Extension of load.
- Complaints regarding Low / High Voltage / Failure of supply.
- Schedule for Bijli Adalat.
- Power shut down announcements.
- Tariff orders etc.

9. Load & demand management measures:

DEMAND FORECASTING & CONTROL

Demand estimation for both active and reactive power plays an important role in the operation of grid and future planning for generation & transmission system. Load forecasting on Long term, Medium term and short term is done by HPSEBL and timely arrangements for meeting the demand so forecasted are made. Demand forecasting for each 15 minutes time blocks for the next day is being done on daily basis and efforts are made to keep the deviation in demand within 3-4% of the estimated demand during real time operations.

Demand Control:

In order to keep the demand / draws for the grid within limits, the following conditions / factors are considered:

- i. Unforeseen generation / transmission outages resulting in reduced power availability.
- ii. Heavy reactive power demand.
- iii. Critical loading on inter-regional corridors.
- iv. Elimination of over draws from grid particularly during low frequency.
- v. Elimination of under draws from grid particularly during high frequency.
- vi. Commercial reasons

A) Under low frequency conditions:

Demand control under low frequency conditions is done by taking the following actions:

- i. Scheduled load shedding.
- ii. Un-scheduled load shedding for the load generation balancing.
- iii. Distress load shedding due to load generation imbalance in real time leading to frequency going below 49.5 Hz.
- iv. By curtailing load as under:

a) Automatic Under Frequency Load Shedding:

In line with decision taken in NRPC meeting HPSEBL has installed 5 No. of Automatic under Frequency relays at consumer premises which provide load relief of 20MW, 40MW & 115 MW at frequency of 48.8Hz, 48.6 Hz & 48.2 Hz respectively. Similarly, HPSEBL has installed df/dt relays at 3 No. sub-stations which provide load shedding of 50MW, 70MW, and 70 MW whenever frequency is below 49.9 Hz & rate of change of frequency is 0.1 Hz/sec, 0.2 Hz/sec & 0.3 Hz/sec respectively.

It has been ensured that there is no overlapping between the areas covered by under frequency load shedding, df/dt relay load shedding and that included in the manual load shedding plan as part of demand control.

b) Automatic Under Voltage Relay Load Shedding:

HPSEBL is utilizing the df/dt relays installed at 3 No. sub-station for achieving load shedding whenever grid voltage dips below predetermined value to prevent voltage collapse in the system.

c) Scheduled Load Shedding

The scheduled load shedding is done by imposing restrictions on industrial / bulk consumers during evening peak load hours.

d) Unscheduled Load Shedding

The unscheduled load shedding is effected through different set of feeders other than those selected for scheduled load shedding.

Unscheduled load shedding is done only when the frequency dips below the acceptable level.

e) Distress Load Shedding

In case of sudden loss of generation / breach of TTC / grid contingency, distress load shedding is carried out immediately to ensure security of the grid.

The distress load shedding is carried out by tripping of identified 66 / 132 / 220kV radial feeders which are opened by emergency call from State Load Despatch Centre.

B) During Load Crash:

In the event of load crash in the system due to weather disturbance or other reasons, the situation is controlled by taking the following measures:-

- i. Lifting the load restrictions, if any.
- ii. Exporting the power to neighboring regions by STOA
- iii. Surrendering costly thermal / gas power shares in Central Sector Projects.
- iv. Backing down or closing down of hydro generation wherever storage capacity is available.

10. Energy accounting practices, results achieved etc;

Energy accounting and auditing process have been carried out in the field units which have been monitored regularly by the HPSEBL Management. The following practices are being adopted in the field units of HPSEBL for accounting the energy.

- i. At all the distribution sub-station points, energy meter to record the energy fed to particular group of the consumers in the area have been provided so that losses in that area could be monitored. The readings of DTR meters is to be taken by the Junior Engineer In-charge of the section in each month of billing cycle and has to be submitted in Sub-Division office for the calculation of T&D losses. The energy accounting at consumer premises is being taken in record by the MLC / Clerks of Sub-Division.
- ii. The billing cycle is to be prepared by the SDO In-charge of the Sub-Division, so that each feeder could be streamlined for the purpose of energy accounting with number of consumers billed in that particular month.
- iii. The regular inspection is being carried out by the M&T wing for the check / calibration / accuracy of energy meter installed on each feeder emanating from the Sub-station.
- iv. HT / EHT consumers of whose energy data is downloaded with the help of MRI on monthly basis and later on uploaded in computer software in the sub division.
- v. The energy billed during the month of billing cycle at consumer premises, energy recorded on energy meter provided on DTRs and energy sent out from Sub-station is compiled at Circle level from where all data is processed at management level for monitoring of energy. Thus high loss area feeders have been identified and accordingly instructions have been issued / imparted for analyzing the causes of high losses. After knowing the factual position the scheme for improvement is to be framed for meeting up the standard parameters i.e. Voltage, voltage regulation, energy efficiency & losses etc.

11. Energy efficiency and demand side management;

i. Distribution of CFLs under "Atal Bijlee Bachat Yojna "ABBY":

Under this scheme, each of the domestic consumers across the State (total of about 16.50 Lac) had been given 4 No. CFLs (2x20 Watts+2x15 Watts) free of cost as a replacement of an equal number of incandescent bulbs. This scheme was conceptualized on the 15th April, 2008 and launched by the Hon'ble Chief Minister, Himachal Pradesh on 23rd November, 2008. Further, HPSEBL is also in process of availing the benefits of carbon credits under CDM mechanism of Kyoto Protocol and latest status is that the validation process is almost at final stage. HPSEBL

will be entitled for estimated 1,30,000 CERs which can fetch revenue of Rs. 6.0 to 7.0 Crore per year for entire crediting period i.e. 10 years subject to successful Validation & Registration.

- ii. Retrofitting & replacement of existing lighting system with energy efficient street lighting (LED). This work was implemented on demo basis at the Mall Road, Shimla with technical & financial assistance (Rs. 75 Lac) from the Bureau of Energy Efficiency (BEE).
- iii. **Distribution of LED bulbs:**
Under the Scheme, 4 LED bulbs had been distributed free of cost to each household in the village Makhnu Majra, Tehsil Nalagarh, District Solan. This work was implemented on demo basis with the financial assistance of Rs. 15 Lac from the BEE.
- iv. **Awareness campaign about energy conservation:**
The Bureau of Energy Efficiency (BEE) had provided financial assistance of Rs. 18.20 Lac under Energy Conservation Action Plan and out of which Rs. 9.34 Lac has been utilized for the awareness campaign about energy conservation throughout the State during FY 2008-09 & 2009-10.
- v. A DSM Cell was established within the Utility on 11.11.2010 for formulation / preparation of DSM Master Plan and implementation of the same on year to year basis after the approval of the Commission in compliance to HPREC (Demand Side Management) Regulations, 2011 notified on 30.09.2011.
- vi. **Investment Grade Energy Audit (IGEA) of Vidyut Bhawan:**
Investment Grade Energy Audit (IGEA) of HPSEBL headquarter (Vidyut Bhawan Complex) had been conducted by M/s Zenith Energy, Hyderabad (empanelled with BEE) in the month of March, 2009 with the financial assistance of BEE. The SLSC (State Level Steering Committee) of State Energy Conservation Funds (SECF) in its 2nd meeting held on 28th March, 2012 has sanctioned Rs. 13.29 Lac to implement the EC measures as suggested in the audit report and it is expected that this work shall be completed within a period of three months.