Revenue Administration through Computerized Energy (RACE) Billing, Bihar State Electricity Board (BSEB)

S.N. Behera Technical Director National Informatics Centre Patna, Bihar behera@nic.in

Abstract

Energy billing computerization of Bihar State Electricity Board (BSEB) is one of the early e-Governance projects of NIC in energy sector. The project was conceived when BSEB was in search of an appropriate application software solution, which can help in enhancing the revenue realization through effective data management.

In the manual system, the Board had hired five to six private agencies for preparing the bill showing the details of arrears and previous meter reading information only. The Meter Reader (MR) goes to the consumer's place, notes the current meter reading, then calculates the bill on the spot with the help of a ready-reckoner and hands it over to the consumer. The counterfoil part of the bill is filled up with the current meter reading by the Meter Reader and is provided to the private agency through the Division. With the help of counterfoil payment receipts provided by the collection counters, along with meter reading data and corrected full ledger, the private agency prepares the fresh full ledger and the bill for further spot billing. In this process the frequency of the Meter Reader visiting the consumer's place to deliver the spot bill and to take the current meter reading data takes place every two to three months. This indicates that the bill cycle of the consumer of the locality is 3–4 months depending on the speed of processing by the Agency. At the Division level, the books (group of Consumers belonging to a particular area) were distributed among the Bill Clerks to handle bill related activities/ processes along with any grievances relating to billing.

After implementation of Revenue Administration through Computerized Energy (RACE) billing, the manual system has been completely stopped and every activity relating to billing data is automated. Bills for more than 3 lakh consumers are being generated on monthly basis at the divisions. With the introduction of barcoded bills and billing data on net, consumers can now see and down load their bills and also pay in any of the collection counters. With new value additions in process, consumers can benefit from any-time payment shortly.

1. Project Conceptualization

Patna Electric Supply Undertaking (PESU) is one of the seven Area Boards of BSEB spanning the Patna Urban Area and catering to the energy requirements of more than 3 lakh consumers. There are 10 Electricity Divisions for bill preparations and 31 collection counters spread across the city. The entire billing process was manual and done with the help of a Private Agency till 2001. The bill collection process at the counters was also manual. There were long queues in the counters and the average time taken to complete the payment formalities for a consumer was more than 5 minutes. Bradma crunching machines were used at a few counters to provide acknowledgement receipts and manual receipts at other locations.

There were a large number of shortcomings in this process as:

- De-regulated and delayed bill cycle resulted in loss to the Board. Sorting of the bills route-wise for distribution in many cases took more than 2 days.
- Previous meter reading data on the sheet prompted many Meter Readers for intentional manipulation in calculating the current bill in collusion with the consumers.
- There was no verification of the full ledger prepared by the Agency at the Division level. In many cases the consumer ties up directly with the Agency to manipulate their arrear figures.
- In case of error in the bill prepared by the Agency, the consumer goes two or three times to the Division for correction in the bill. Handling consumer grievances and issue of duplicate bills, if required, was at the mercy of the Bill Clerks.
- Consolidation and collation of collection figure at Counter, Division and Board headquarters was very cumbersome.
- There was no control or ownership of consumer database on power consumption and payments at the Board level. Whenever top management required any report, the Division used to pass it on to the respective Agencies. As different agencies were involved for different Divisions, the report hardly got prepared on time.

In view of the above crisis, RACE implementation was initiated at Kankarbag division in 2001. Initially, in the absence of any working manual, it was very difficult to understand the system and proceed. Mr. Rajiv Amit, the then Asst. Engineer took personal interest in explaining the detailed processes involved in billing. He was also instrumental in testing various components of the system to check correctness of the billing. Thereafter it was replicated to other Divisions and all collection counters.

To carryout the project smoothly, manpower with adequate training was arranged internally. A separate IT department was made functional at the Board HQ to coordinate all IT related activities. All divisions were connected with RAF Network with the Board HQ for flow of timely information on revenue figure. All counters were connected with their Division with dialup facility for data transfer. In the second phase in 2007, all counters, Divisions and Board HQ were connected with SAN Server of NIC Bihar through broadband and the entire billing data was hosted on SAN. This facilitated online bills and anywhere payment with the objective for any-time payment in future.

2. Vision

To provide value added services to the consumers on demand thus making Board transparent, accountable and consumer friendly

3. Stakeholders

- 1. Bihar State Electricity Board (BSEB)
- 2. Patna Electric Supply Undertaking (PESU)
- 3. Dept. of Energy Govt. of Bihar
- 4. Different types of consumers of the Board
- 5. National Informatics Centre as Service Developer
- 6. Hardware supplier NICSI, a section 25 company under NIC

4. Objectives

To overcome the difficulties of the manual system and to make the service convenient for the customers, it was imperative for the Board to re-define the strategy for achieving the new objectives with the help of ICT technology.

- Accurate and timely energy bill preparation and its distribution by different divisions
- Tracking the habituated defaulters in bill payment thus enhancing the revenue collection.
- Building up appropriate Management Information System (MIS) for monitoring revenue collection in its totality, thus helping decision making
- Establishing modern web-based interface for greater transparency between the Board and its consumers. This will act as a grievance monitoring system, effective medium for distributing notifications regarding changes in tariffs, announcement of upcoming load-shedding schedules and an explanation for power failure (if any) in their area of residence, source for telephone numbers of local helpdesks for consumers across the city and future plans
- Total interconnectivity for single-point monitoring of revenue collection. This will facilitate the convergence of data across the network at the Board HQ for the convenience of the Board Management for taking decision in real-time basis.

5. Services

The following services are rendered by the Board by implementing RACE

- Generation of monthly energy bills for the consumers at the Division level
- Maintaining ledgers of each consumer at the division level
- Calculating arrears and dues and incorporating the same in the bill
- Generating notices to the consumers as and when required
- Generation of various statutory forms
- Collection of energy bill from the consumer at the collection counters and issue of receipt to them
- Preparations of daily collection report and summary reports at the counters
- Maintaining collection figures and related accounts at the counter
- Collation of collection figure at the counter and bank-wise segregation of collected cheques for deposit
- Reconciliation of dishonoured cheques

7. Project Plan

RACE has been implemented as an in-house model with funding from the Board for creation of required ICT infrastructure. A total of 3.14 cores was spent by the Board for creation of required ICT infrastructure for the project. Details of the ICT infrastructure includes setting up of computer centres at Board HQ, 10 billing divisions, 31 collection counters and two circles. Establishment of RF network in each billing division and interconnecting them with Board HQ was also met from the same expenditure. The necessary manpower to manage the divisional computer centers and the Department of IT of the Board was organized by internal adjustments and trained accordingly. RACE software was developed free of cost by National Informatics Centre, Bihar. The implementation, rollout and maintenance of RACE have been carried out under the technical guidance/supervision of NIC RACE Project team. In the second phase, broadband connection between Divisions, Counters and Board HQ with SAN server of NIC Bihar was also met by the Board.

RACE application has been documented as per ISO requirement of NIC. It has also been subjected to Quality audit by Internal Quality Auditors of NIC.

The need for implementation of RACE can be understood form the following points

Irregular billing cycle: Bill preparation for about 3 lakh consumers in all 10 billing Divisions was in a mess. The private party looking after the job (using Bradma systems) was not able to cope with the changing requirements of the Board from time to time. Bill preparation and circulation to the consumers

was not in time and generally bills get served to the consumers at the last moment. The report of manipulations in consumer bills in collusion with some of the employees of Board was a serious matter.

Ineffective data management: In the absence of any effective data management on consumer billing, the Board was not in a position to monitor the defaulters. It was also not in a position to monitor the individual consumers with respect to their dues, payments and arrears. Calculating dues on Government users was a difficult task. Dues on correction and adjustments in the bills were not recorded and reflected properly; sometimes old records were also not available on demand.

Lack of Transparency in the billing system: Consumer grievances with respect to their bills could not be addressed properly. There were instances of unfavorable means and approaches in settling the bill of consumers. There were reports of manipulation of meter reading data and the bill amount by the Meter Reader while preparing the spot bill with the help of the ready reckoner. Manipulation was easy as previous meter reading data was made available to the Meter Reader when visiting consumer premises for spot billing. Secondly, in the manual process, the bill cycle of a consumer ranges from 2–4 months. This had eroded the credibility of the Board on the revenue front and harmed its image in the society.

Delayed Accounting: Getting up-to-date data on revenue collection for all the Divisions was a difficult task for the management. It used to take months to compile the figure correctly. Separating various heads of the collections like surcharge, fuel cost and energy duties was equally difficult. Urgent reports hardly got prepared in time.

Providing value added services at the collection counters: Handling consumers at the counter was a slow process due to manual activities. Fewer consumers could be served in a given period. Sometimes it was difficult to cope with the large number of consumers at peak periods, especially near the rebate period of each month. There were long queues at the counters and the average time taken to complete the payment formalities for a consumer was more than 5 minutes. Bradma crunching machines were used only at a few counters to provide acknowledgement receipts, while receipts were issued manually at other locations. This resulted in delayed services to the consumers.

8. Technology Architecture

- A new department, that is, the Department of Information Technology was created in the Board HQ and the equired human resources were mobilized internally to support and take up the ongoing computerization from NIC.
- Kankarbag Division was the pilot division for the implementation of the RACE Software. As the collection counter was attached to the

division, bill generation and its receipt at the counter were tested effectively under the guidance of the user. Then it was implemented at New Capital Division and its counters before replicating at all other locations.

- During the implementation the manual as well as the computerized work ran parallel for a month and thereafter the manual methods were discontinued.
- After RACE was established in all locations, data transfer from Divisions to Board HQ was initiated with the help of established RF network and dial-up modem for the counter to send collection data to the Division and get bills from the Division.

RACE deploys two-tier Client-Server Architecture with Oracle at the backend and Developer at the front end. The server runs on WinNT whereas the clients use Window NT workstation/98.

9. Milestones

- The pilot run of RACE started in 2001 and by the end of the year all 10 Divisions and 31 collection counters were made RACE enabled.
- In July 2003, RACE was implemented at GPO Patna for collection of bills. At GPO bill collection was made possible at any of its customer service counters.
- In February 2004 another module was incorporated in RACE to take care of the cheques collected by the Meter Reader from the consumers.
- In July 2007 it was decided to facilitate the consumers to pay their bill at any one of the 31 collection counters as per their convenience. Bills with a barcode were generated and systems at the collection counters were equipped with barcode scanners. Consumers were given the option to download the bill from the net as per their convenience.

10. Project Management Structure

The pilot phase of project implementation was carried out with the help of hired technical manpower through NICSI. Thereafter the Board created a separate Department of IT and technical manpower was created from internal staff by imparting adequate training. Operational training to staff managing the RACE was imparted. Thereafter the IT department of the Board took over the implementation responsibilities and started coordinating with all Divisions and counters, facilitating smooth implementation of RACE. The Director, IT, became the Coordinating Officer between NIC and the Board.

11. Implementation

Kankarbag Division was selected as the pilot division for implementation of RACE Software. As the collection counters were attached to the division, various activities of the project got smoothly tested at this site. Here new systems and the manual system co-existed for a month. Then it was implemented at New Capital Division and its counters for a month. Minor changes were incorporated in RACE here. Thereafter it was replicated in the other 8 Divisions and its counters.

The IT department of the Board is acting as the coordinating department for RACE. Any change in the requirement of RACE is initiated by the IT department in consultation with NIC. NIC carries out impact analysis of the changes to be incorporated and thereafter initiates changes. Necessary changes in the project documents also get updated. Then it is tested both by NIC as well as Department of IT before implementing the same in the Divisions and counters. Required operation training is imparted to the operational staff.

As part of NIC QMS strategy, Feedback forms were distributed to officials in DIT and at different divisional offices with a request to provide their feedback on the performance of RACE and support from NIC. One set of feedback was collected in August 2004 providing an average 48% satisfaction index. Low level of satisfaction was in expected line due to inherent differences between DIT and the Divisions on different aspects of RACE implementation. Another round of feedback was collected in May 2005. This time the satisfaction index was 64%. Individual components in the feedback form were analyzed and the appropriate strategy was devised with an objective to get higher satisfaction level in the next survey. It was communicated to the Project Manager, that is, SIO.

A formal internal quality audit was carried out by the Project Leader (who happens to be Internal Quality Auditor of NIC and was a core member of NIC QMS documentation group) in July 2004. Many deviations from the practice standard were noticed in terms of non-conformities. This helped the project team in setting things in right. Another IQA was conducted in September 2005 and most of the things were found to be in order, except non-availability of formal test logs.

In addition to the above, whenever any change request comes from the user, after incorporating the same and testing by the user on site, NIC insists on an acceptance certificate. As per NIC QMS policy, implementation of any changes for 2 months assumed by default that the same is accepted by the user.

12. Issues and their Solutions

The learning gained throughout the RACE project have been enumerated below:

- As the user had set the target for implementation of the new system, there was not adequate time to carryout seminars, workshops, trainings and brain-storming for various stakeholders to sensitize them towards the new system. As the IT culture had not percolated to all levels in the Board, the Department of IT was hesitant to own up that the application lacked support and coordination inside the user organizational structure. This internal problem had a bearing on the progress of computerization.
- Before starting the project and in the absence of any documented working manual, proper planning could not be made with respect to system study, clear requirement of technical manpower and provision of contingency expenditure. This is a perennial problem particularly with Government departments as they have their own style of functioning and progressing.
- In the course of change in tariff there is no coordination between sections like Commercial and Finance wings with the Department of IT at the Board HQ which involves clarifications on various aspects of rate structure for timely incorporation of changes into software.
- In the absence of active support from the Top Management there is unnoticed/un-spoken resistance in the Board to the goals of the project.

After successful implementation of RACE at BSEB, Patna, it has attracted interest from many SEBs. RACE was successfully demonstrated and appreciated by Dakshin Haryana Bijli Vitran Ltd., Meerut-based Pashimanchal Vidyut Vitran Sansthan, Delhi Vidyut Board and Jharkhand State Electricity Board,

The energy billing has been prepared in an almost similar pattern all over India. Only organizational structures and bill tariff are likely to change. RACE has been successfully replicated/customized in the states of Tripura, Mizoram and UT of Dadra and Nagar Haveli, catering to the requirements of the respective consumers.

RACE has been successfully implemented in PESU Area Board (Headed by General Manager or Chief Engineer) of BSEB. There is a plan to replicate RACE in six other Area Boards to cover the entire state. The solution may be provided in web application and consumers facilitated by providing a payment gateway and bill SMS alert.

13. Status and Results

RACE has been implemented in all the 10 billing divisions and 31 collection counters of PESU in Patna. It is generating and collecting the bills for more than 3 lakh consumers on a monthly basis. All counters, divisions and Board HQ are now connected with SAN server of NIC Patna for facilitating anywhere bill payment as per the convenience of the consumer.

Specific achievements during the year 2006–07

The concept of anywhere payment of electricity bills has been introduced. To provide this value added service, RACE has been web-enabled and consumers can download their bills and also see the history of bill payments. Entire billing data has been placed in SAN server at NIC connected with the divisions, collection counters and Board HQ with the broadband connection to facilitate online payment from any of the designated counters.

There is value addition in the generation of bills too. Each of the bills has been barcode enabled. With the help of barcode scanners at the counters, the process of bill collection has to been made error-free and fast.

14. Future Plan

Talks are in the progress with banks to introduce a payment gateway interface with RACE for online payment of bills at any time and from anywhere along with SMS alert.

With the help of barcoded bills using ATP (All Time Payment) machines installed by Canara Bank, bills can also be paid by the consumer any time at these designated ATP centers. The Board is in the process of discussion with the implementing agency. that is, Canara bank.