Web-enabled Consumer Management and Energy Billing System*

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ABSTRACT
The needs of human beings have been growing over the years and it is not possible to think of a world without electricity. It has become one of the basic necessities of the human kind. The population is increasing over the years the needs and demand for electricity also has been increasing. The organization providing the electricity consumer services also has to grow to meet the demand. As the organization grows it becomes more and more difficult to control, manage and ensure efficiency particularly in geographically remote locations where transport and communications facilities are very poor. It is at this stage the Information Communication Technology (ICT) tools available are put to use to provide services to the doorsteps of the people in a transparent, accurate and efficient way.

The Union Territory of Lakshadweep is a group of 36 coral islands and islets of which 11 are inhabited. The Islands are scattered randomly in Arabian Sea about 220 to 420 Kms from off Malabar Coast. These Islands are geographically isolated and each Island is almost like a country by itself. The Lakshadweep electricity department has the responsibility of generation, transmission and distribution of power in these remote islands. Lack of adequate transport facilities and deficiencies in communications is a major constraint in providing the best services to consumers and for monitoring major activities.

This Project was, therefore, undertaken to bring the electricity consumer services to the doorsteps of the people in the remote islands of Lakshadweep and to provide accessibility, transparency and accountability in the consumer services. The project also envisages timely and systemic monitoring of complaints, revenue collections and also for generating various MIS reports. The required E-governance infrastructure and Internet connectivity are made

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available to all the offices and cash counters of the department in Lakshadweep including the remotest and smallest island of Bitra having a population of around 300 people. The centralized database of the entire consumers of Lakshadweep is created and hosted along with web-enabled work flow applications which provide services from anywhere. All the offices and the entire energy billing activities in the entire territory are automated.

1. Introduction

The Union Territory of Lakshadweep is a group of 36 coral islands and islets of which 11 are inhabited. The Islands are scattered randomly in Arabian Sea about 220 to 420 Kms from off Malabar Coast. These Islands are geographically isolated and each Island is almost like a country by itself. The Lakshadweep electricity department has the responsibility of generation, transmission and distribution of power in these remote islands. Lack of adequate transport facilities and deficiencies in communications is a major constraint in providing the best services.

The Department of Electricity is one of the major departments of the Administration of Union Territory of Lakshadweep. The main activity of the department is to uninterrupted generate and distribute power supply at minimal cost and Eco-friendly manner for the entire Lakshadweep islands. The department is headed by an Executive engineer with his head quarters at Kavaratti. He is in charge of the Electricity Divisional office and is having over-all control of the department. The Secretary (Power) and Administrator are key to the functioning of the department and plays important roles in policy decisions. There are ten Sub Divisions working under this division. These entire sub Divisions are reporting to the Divisional office. The Junior Engineers are the work force managing different field personnel and carry out the field activities. They are reporting to the Assistant Engineers under whose guidance the works are carried out at the Sub Division level.

The generation of power and transmission and distribution of power generated to its end users is the major activity of the department. The department has to make a lot of interactions with the public as well as the government both being the consumers of electricity. The department has to provide better and transparent
services to the citizen who comes for various purposes like, applying for a new service connection/reconnection, terminating a connection, registering a complaint, paying the Energy charges etc. The consumers may be provided with detailed information about all his interactions with department.

This project was initiated with a vision to provide ‘any service to the consumers from any where at any time’ and is having the following objectives:

i. Consumer services to the doorstep of the people of Lakshadweep
ii. To provide accessibility, Ensure transparency and Monitor accountability in the energy billing process
iii. Citizen Services through Internet for Greater Transparency.
iv. Provide ‘any service from ‘anywhere’
v. Accurate and Timely Energy Billing
vi. To optimally utilize the resources available and to improve the efficiency of the energy billing system
vii. To optimally utilize human resource of the territory for the development of Lakshadweep and hence the nation
viii. Need for a Powerful Management Information System (MIS)
ix. Provide better services to the consumers by providing a comprehensive complaint management system
x. An efficient system for Revenue Monitoring
The Challenges

- Geographical isolation & Remoteness of the islands
- Average time required for inter-island sea travel to Kavaratti and back
  - Around 8 Days in Normal Season
  - Around 15 Days in Monsoon Season
- Lack of proper data Communication facilities
- Lack of Internet facilities in all the islands

2. The ICT solution
An existing age-old procedure for processing application for service connection, collecting of Energy bills and complaint booking was replaced by a refined and re-engineered work flow system with specified roles and responsibilities assigned to different levels of personnel. Through the re-engineered system the status of any activity at any time can be monitored. The system is

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re-engineered keeping in mind that the department has to maintain maximum transparency to the processes and made sure that the data is captured in the lowest level and no data is entered more than once. The other points considered while reengineering the system are adoptability by all without much resistance for a change and provide maximum security to the data and protection of privacy of the consumers.

The existing procedure for providing service connection, billing system and complaint booking and rectification has been re-engineered to bring more citizen-centric and to provide services over the Internet.

A new Web-enabled Consumer Management and Energy Billing system for the Department of Electricity is designed as a workflow system automating the entire process of Consumer Management of the department. It has three components.

i. Consumer Management

ii. Energy Billing

iii. Complaint Management

i. Consumer Management: The process of providing service connection to the applicants and all the procedural steps are fully automated and a role based system is implemented. The system keeps a Data Base for the maintenance of entire data related to all the power consumers of Lakshadweep Electricity Department spread over 12 island locations.
The applications received for service connection, its scrutiny, inspection, service connection order, security deposit and service connection execution are the natural flow involved with a service connection. All the intermediary processes involved in a service connection establishment, its disconnection on request etc. are automated with roles defined for all hierarchy of officers. The citizen can avail all the facilities on-line.

The following process for the new connection is automated and can be performed by the officers/staff from anywhere through web based on the roles assigned to them.

- Generation of Intimation Letter of inspection
- Updation of estimation details
- Demand Note for the applicants for service connection
- Generation of Service Connection Order
- Execution of Service connection Order

**Work Flow of providing service connection** is as follows:
The Junior Engineer JE initiates the process by entering the application form. JE then has to serve Intimation letter for Inspection. Then after inspection the Estimation Details have to be entered and the DEMAND NOTE to be served to the applicant. The applicant once paid the Security Deposit SD will be allotted a consumer no. and he will be listed as a consumer. Assistant Engineer AE will then issue the Service Connection Order [SCO] and the JE executes the SCO to ultimately establish the service connection. Temporary Connections and their disconnection also are automated. The Contractual Obligatory Fee [COFee] also are billed once the consumer requests for disconnection before the agreed upon mandatory service connection duration of 3 years. COFee, if applicable is levied on those consumers who get deactivated [permanently disconnected] after 6 months of non-payment. In their case the COFee will be reflected on the month when they get deactivated.

**ii. Energy Billing:** The energy Billing is done at the billing counter. Generally bill payments and miscellaneous payments are

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collected at the counter. Each payment will be recorded with a unique receipt no. and the receipt can be printed on the pre-printed receipt form. Every consumer has to make at least one payment during a month to be stated regular. For Government consumer previous month bill must be already served. And on entering their consumer no. the bill will be shown and the payment can be made straight away. For Private Consumers, current bills are not previously served as they are given the SELF READING AND SPOT BILLING facility.

The Consumers are supposed to produce the meter reading to the billing counter and the clerk can enter them and produce the bill for viewing purpose. After confirmation of the consumer on the bill amount, he can collect money and generate the receipt for the current month bill. Once if the payment is made, the Bill also may be generated and served to the consumer if demanded so.

The system is having the following features:
The workflow of the Energy Billing system is detailed below:
The Energy billing is done at the billing counter. Any Billing Counter Clerk [BCC] can login and start collecting the payments. Generally Current Charge [CC] bill payments and miscellaneous payments are collected at the counter. Each payment will be recorded with a unique receipt no. and the receipt can be printed on the pre-printed receipt form. Every consumer has to make at least one payment during a month to be stated regular. For Government consumer previous month bill must be already served. And on entering their consumer no. the bill will be shown and the payment can be made straight away. For Private Consumers, current bills
are not previously served as they are given the SPOT BILLING option. They are supposed to produce the meter reading to the billing counter and the clerk can enter them and produce the bill for viewing purpose. After confirmation of the consumer on the bill amount, he can collect money and generate the receipt for the current month bill. The Bill also may be generated and served to the consumer if demanded so. Once if the payment is made there is no provision for modification or updation of the Bill. If any discrepancies found after payment the adjustment can be made in the next month bill for the consumer. Adjustment can be entered as a miscellaneous posting next month which will be adjusted against the next month bill.

The 'Belated' consumers are those consumers who do not make the payments regularly. Consumer who doesn't make the payment as stipulated will have to pay a Belated Payment SurCharge BPSC of 10% on the CC charges. Such consumers will be issued with a Bill Cum Disconnection Notice BDN which includes the BPSC. CC charges for such consumers are arrived using the 'Approximate Consumption Method' [ACM]. In ACM the consumption is calculated as the average of the previous three months' consumption for such consumers. The bill is raised on this arrived consumption. The consumer is liable to pay the bill amount. In case if he is producing the meter reading [in case of private consumer only], next month he is eligible for an adjustment in case of any excess CC charges levied previously. However this is done automatically and the clerk has nothing to worry about it. If the Belated consumer is further delaying payment beyond disconnection date he has to be 'Disconnected' by the JE using his login. JE will always get a list of such 'Due for Disconnection' consumers at any point of time. If they are not disconnected by JE, all of them will be auto disconnected at the month-end and the same will be reported. Disconnection here means temporary disconnection which can be reinstated when the dues are paid. List of such 'Due for Reconnection' consumers also will be available for JE all the time. However Reconnection has to be forced by JE
and will never be done automatically. If a disconnected consumer continues to be so even after 6 months of non-payment he will be deactivated [permanently disconnected] and de-listed from Active consumer list. However outstanding bills if any against the consumer will continue to be reflected till he is paying it.

iv. **Complaint Management** is done at the Complaint Cell. Complaint cell is looked after by the 'Complaint Cell Clerk' records the complaints received over telephone. Pending Complaints awaiting attention from Line staff will be listed on the same page itself. It can be printed and a copy can be given to line staff for reference. Once if the complaint staff come back from work and report the action taken to the complaint cell clerk it must be recorded using rectification interface. A complaint can have multiple actions taken before total rectification.
Daily Register will give the list of complaints posted during a day. This can be printed and filed for use of complaint register. Pendency reports can be viewed by top management as well. The features include:

- Registration of complaint on-line
- Updation of rectification details on-line
- Monitor the status of complaints from anywhere
- Generate pendency report
- A single database for the entire territory

**Workflow for Complaint Management:** The complaint registration is done at the Complaint Cell. Complaint cell is looked after by the 'Complaint Cell Clerk' (CCC). The CCC records the complaints received over telephone. Pending Complaints awaiting attention from Line staff will be listed on the same page itself. It can be printed and a copy can be given to line staff for reference. Once if the complaint staff come back from work and report the action taken to the complaint cell clerk it must be recorded using rectification interface. A complaint can have multiple action-taken steps before total rectification. Daily Register will give the list of complaints posted during a day. This can be printed and filed for use of complaint register. Pendency reports can be viewed by senior officers.

3. **Implementation**

- The system was rolled out to all the locations together after lab testing and simulations.
- The central database of entire consumers of Lakshadweep was created with the reading for the last three months.
- The system started operation on all the sub Divisions/Sections and cash counters of the department including the remote island having a population of only 300 people.
- Training provided to all officers/staff at all levels (Assistant Engineers, Junior Engineers concerned and all the clerical staff dealing with the system).
- On the job training provided to all the staff.
• User manual was made available in local Language Malayalam and was also made available on-line
• Update training programmes organised through video conferencing for the staff in the remote islands.

4. Best Practices

*All the services to the consumers are provided through Internet.*

• All the offices/cash counters in the geographically isolated remote islands were provided with Internet connection from the nearest NICNET node.
• A single central database is maintained for the entire territory. Each and every transaction is reflected in the central database instantly.
• Any report can be generated at any time which gives up-to-date information about the transactions completed up to the last second.
• Motivated the officers/staff by involving and informing them at the design stage and whenever there was a change in the design of the system.
• There was frequent interaction between the head of the user department and head of development team (NIC) and both of them were very clear about the objectives of the project and are involved in each phase of the project and have advised the team members from time to time.
• All users are provided with role-based logins.
• An online user-manual which clearly explains each process and procedure and the work flow of the system and operation of the system was made available in Local Language; Malayalam.
• A centralized system for controlling the counter timings with flexibility for the head of sub divisions to change the timings whenever required.
• All the required consolidated information was given in first screen itself so that as soon as a user logs in he gets an idea about sum of all the major activities like no. of transactions, revenue collected, applications pending, complaints pending, etc.
• The consumers are also made aware of the introduction of the new system and it was advertised in advance in the local newspaper.

5. Benefits accrued
• The Electricity Consumer Services at the doorstep
• The process of providing service connection become transparent and structured and is free from human manipulations.
• Centralized management of the Consumer services and centralized accounting & monitoring
• The dispersed offices in the islands and mainland ‘Virtually’ integrated.
• No need to physically send the reports/documents etc. to Kavaratti from outlying islands not required at all. Money and Time are saved.
• Citizen Time taken for submitting application and time taken for processing the application is minimized
• Citizen get opportunity to check the status sitting at home
• Various statistical reports easily generated
• Centralized management of all the consumers of Lakshadweep possible.
• The awareness about ICT and its benefits reaches the poor, the uneducated in the remote and isolated islands.

6. LESSONS LEARNT – CRITICAL SUCCESS FACTORS
  o Leadership and motivation from the highest level
  o Use of right technology in the right place with appropriate administrative reforms benefit the masses at the base of the pyramid of society
  o Web based services are most suited for hinterlands like Lakshadweep and other geographically isolated territories.
  o The availability of user manuals/instructions on-line in local language.
  o The availability of more than one NICNET nodes in all the remote islands.

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7. **Issues and their solutions**

- **Poor data communication infrastructure and geographic isolation.** The department has to depend on one of the two NICNET VSAT’s for accessing the system. The implementation of State Wide Area Network to be done on priority or a dedicated VSAT for the electricity department may be installed.

- **Non-availability of broadband in the islands**
  The consumers have to depend on the CIC’s and limited dial-up connections for accessing the services. Action may be taken to introduce broadband facility in all the remote islands. Installation of information KISOKS and opening of community Service centers.

- **Low level of usage by consumers**
  To promote the usage by consumers, incentives like discount in bill charges, faster processing of applications, rectification of complaints etc may be given to the consumers who avail services on-line.

8. **Replication in other states**

- The system can be implemented in any state/electricity board having similar services and procedures. The billing system can be used for the states where ‘self reading’ system is in practice. This can be tailored to the requirement of the states with necessary performance tuning.

- The system can also be tailored and upgraded as a generic transaction processing system for any similar applications like water billing etc.

9. **Status and results**

- The application is rolled out and all the bills in all the counters for all the consumers in Lakshadweep are collected through this system. All the consumer services are available through the Internet. The consumers can find out the status of their bills, payment details for last one year. The complaints can be booked on-line/telephone/in person and the status also can be monitored on-line.
o The head of departments and other senior officers are watching the revenue collection, pendency of complaints etc. through the portal.
o The average number of transactions per month is more than 15000 and average revenue collected per month is around rupees fifty Lakh per month.

10. **Future plans**
o Introduction of e-payment, payment through online banking, credit cards, and cash cards etc.
o Introduction of Interactive Voice Response System (IVRS) to get the status of registration/complaints etc.
o Complaint booking and monitoring/rectification alerts through SMS
o Services through information KIOSKS
o Bill alerts/details through SMS

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