

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

**NAME OF CATEGORY- INNOVATIVE USE OF ICT BY STATE GOVERNMENT
PSUs'/ COOPERATIVES/ FEDERATIONS/SOCIETIES**

1. Coverage – Geographical and Demographic :-

(i) Comprehensiveness of reach of delivery centres,

- IR/RF/AMR technologies are being implemented by MSEDCL throughout Maharashtra State.
- The Project is implemented through 35 IT Centers under 40 Circles..
- AMR application is available to all offices of MSEDCL.
- MSEDCL is in the process of procuring single and three phase meters with IR communication port for rural area. (Tenders for 30 lakhs Meters are in the process).
- Approx. **37.93 lakh IR and 7.21 lakh RF** meters installed
- MSEDCL is in the process of procuring (40 lakhs Meters) single and three phase meters with RF communication port for urban area especially for Bhandup Zone and Pune Urban Area.
- IR/RF Meter Reading is started with HHU.
- Meter testing Laboratory established at Mumbai

(ii) Number of delivery centres

- 4000 offices up to Section level connected to DC/DR
- 35 IT Centers & 40 Operations & Maintenance Circles.
- Centralized Customer Care Centres (Bhandup-66 seaters & Pune- 44 seaters)
- 50 Consumer Facilitation Centers (CFC) in the state

(iii) Geographical

(a) National level – Number of State covered

(b) State/UT level- Number of District covered

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

(c) District level- Number of Blocks covered

Please give specific details:-

Project is implemented for all areas under MSEDCL.

(iv) Demographic spread (percentage of population covered)

- Project is intended to cover all MSEDCL consumers. Total MSEDCL consumers are approx. 2.2 crores which corresponds to roughly 19.26 % of Maharashtra Population.
- Around 24.37% of Residential, Commercial & Industrial Consumers covered.
- 69,674 modems installed throughout Maharashtra
- Total 59600 modems are successfully read at current instant
- The Meter reading through AMR is being done successfully in July 14 for
 - HT Consumers - 9981
 - LT Consumers - 2440
 - Feeders - 3106
 - Distribution Transformers - 13701
- MSEDCL has planned to expand the existing AMR System to all consumers (Industrial and Commercial) having connected load \geq 20 Kw. Total No. of Consumers covered will be 1,80,000.

2. Situation Before the Initiative (Bottlenecks, Challenges, constraints etc with specific details as to what triggered the Organization to conceptualize this project) :

- Manual reading of Energy Meters taken on paper.
- Physical visit to the Consumer's premises was required for taking Energy Meter readings.
- Data entry of all manual reading taken by Data Punching

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

agencies.

- Scope for corrupt practices due to Manual intervention (noting the reading, punching, etc)
- Manual submission of punched data to IT Centers for billing.
- Due to above time consuming activities, delay is carry forwarded to Demand and Collection processes thus affecting the MSEDCL's revenue.
- In case of New Metering Technologies such as IR(Infra-Red) and RF (Radio Frequency) where direct human Intervention is not required, each meter manufacturer had its own propriety Metering Technology/Protocols. This prevented MSEDCL from adopting universal, interoperable, cost-effective and enterprise wide Metering system.

3. Scope of Services/ Activities Covered (Relevance of choice of application for clients/ PSU, extent of e-enablement in terms of number of processes/services, extent to which step in each service/process have been ICT- enabled #)

For High value consumers MSEDCL implemented Automated Meter Reading solution. For LT Consumers (Residential and Commercial) single phase as well as three phase meter, MSEDCL decided to initiate embedded communication technology for Meter reading. In the earlier process, though the Photo of Meter is taken, the data entry happens manually by referring the image of the Meter. Due to errors of the data entry operator, accurate meter reading is an issue.

MSEDCL conducted various meetings with Meter Manufacturers for how to eliminate human intervention in meter reading. During the deliberation two technologies were discussed one is Meter with IR Port and other is Meter with RF Port. As a first step it is decided to introduce

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

Meters with Infra-Red Port. These meters will be read with Hand Held Unit (HHU). Meter reading will be taken from a distance of 1.5 Mtr. The meter reading (Kwh), MD and Date-Time stamp will be captured along with meter no. in 5 Seconds. The data captured in the HHU is to be downloaded on PC for which necessary software is provided at Sub Division end. The Hand Held Unit has a capacity to capture data of 2000 Meters.

MSEDCL introduced Meters with Infra-Red Port in rural area or area having less / scattered population of consumers whereas RF meters are introduced in urban area or area having dense population of consumers. Presently, MSEDCL is capturing IR and RF Meter readings through Hand Held Units having IR port / RF port. Now MSEDCL is in the process of installing DCU (Data Concentrator Unit) at RF meter locations. The GPRS enabled DCUs will have RF port and meter data of approx. 2000 RF meters can be stored in a DCU. Using DCUs, RF meter readings will be made available remotely through GPRS network, at central AMR server.

At almost every HT consumer meter endpoint, modems are installed and meter readings are made available through GSM / GPRS network at a centralized AMR server.

MSEDCL is in the process of integrating these IR/RF technologies with AMR system, thus building a comprehensive, transparent, system based, truly automatic metering reading system without any scope of manual intervention. This will ensure Advanced Metering Infrastructure in MSEDCL- a step towards Smart Grid.

4. Strategy Adopted

(i) The details of base line study done,

MSEDCL in-house developed Protocol for Infra-Red Port Meter and published the same in the tender document. This ensured interoperability i.e. with single hand held unit meter reader can capture meter reading of any make of IR Meter. MSEDCL has set up a Meter Protocol Testing Lab for testing the interoperability in Mumbai. IR protocol is now implemented by 17 different Manufacturers and achieved interoperability. These meters installed in Rural Area. This resulted in MSEDCL adopting interoperable, cost-effective and enterprise wide Metering system.

MSEDCL developed Common Meter Protocol for HHUs with M/s Reliance and BEST for both IR and RF Meters. Following are the advantages of Common Meter Protocol:

- Different Types of Meters – Single Phase, Three Phase
- Different Make of Meters – Elster, Secure, L&T, Genius, PalMohan, HPL Socomec etc
- Single Handheld Machine

Both IR Meter as well as RF Meter ensures the Smart Energy Meter guidelines of CEA. Only connect/disconnect and load control feature is not provided. It supports TOD Tariff. An option is available to download Load Survey data.

Instead of using handheld units for reading RF meters, MSEDCL is in the process of the implementation of Meter Reading from RF Meters remotely using GPRS technology (Manual visits not required). Accordingly, DCUs are installed at RF meter locations at Pune. DCUs have following features:

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

- ✓ DCU with RF and GPRS Modem, will be installed with Transformer Meter.
- ✓ DCU reads data from RF Meters
- ✓ DCU communicates with Data Center Servers through GPRS Modem.
- ✓ RF Meters are read through web based Automatic Meter Reading (AMR) software solution.

(ii) Problems identified,

- Lack of interoperability of IR Meter protocol among different Meter manufacturers.
- MSEDCL started procuring new IR Energy Meters only as per this protocol, thus forcing meter manufacturer to adapt to this protocol.
- MSEDCL faced interoperability issues among RF Port Metering Technology implementation.
- For every Meter Procurement, Type Tests of Sample meters need be carried out from Laboratories which are accredited by the National Board of Testing and Calibration Laboratories (NABL) of Govt. of India such as CPRI, Bangalore /Bhopal, ERDA Baroda, ERTL to prove that the meter meets the requirements of specification. The Electrical Functionalities Test results from these Laboratories took significant time (such as 2-6 months) and cost to MSEDCL. Further, there is NO TESTING facility to test IR/RF communication functionalities/protocol in the country.
- User Acceptance

(iii) Roll out/implementation model,

- For Low Tension (LT) consumers in scattered area, MSEDCL has implemented Infra-Red (IR) Port Metering Technology.
- MSEDCL has set up a state of the art Meter Protocol Testing Lab for testing the interoperability in Mumbai. This resulted in MSEDCL

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

adopting interoperable, cost-effective and enterprise wide Metering system.

- MSEDCL has procured RF Testing Tools to test the protocol as well as its interoperability.
- Automated Meter Reading (AMR) system has been implemented for energy meters of High Tension (HT) Consumers, Feeders, Transformers, LT industrial and commercial consumers having load above 50 KW.
- In AMR system, GPRS/CDMA modems are installed at each metering point for achieving low cost communication between energy meters and MSEDCL's servers at Data Center.
- MSEDCL's has developed in-house AMR software based upon IEC's Meter Interoperability Standard (MIS). It also support DLMS open protocol.
- AMR software also has triggers for Tamper events which can be used to detect any power theft.

(iv) Communication and dissemination strategy and approach used.):

- Core team of Experienced MSEDCL employees formed for effective design & implementation.
- All offices from Whole Maharashtra were imparted the hand-on training of AMR/IR/RF modules.
- AMR responsibility Matrix Circular was communicated to all field offices.
- AMR Application is available over Internal WAN Network only. In order to reach the offices where MPLS link (leased Line) was not available, MSEDCL issued around 4000 VPN over Internet connections.

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

- Easy to understand Help files and Power Point Presentations made available at MSEDCL Intranet Portal.
- Helpdesk service and onsite support established for all MSEDCL offices.

5. **Technology Platform used-**

(i) Description,

Application	Platform	Database	
MDAS Application	Java	Oracle DB	
Integration Middleware for integrating with existing software systems.	Microsoft Biztalk server	MS-SQL	

(ii) Interoperability

- For Low Tension (LT) consumers in scattered area, MSEDCL has implemented Infra-Red (IR) Port Metering Technology.
- MSEDCL took several initiatives to alleviate the Interoperability issues, such as creating its own protocol and publishing in the tender for Meter manufacturer, setting up a state of the art Meter Protocol Testing Lab for testing the interoperability in Mumbai. Total 17 meter manufacturers have adopted this protocol. This resulted in MSEDCL adopting interoperable, cost-effective and enterprise wide Metering system.
- For LT consumers in densely populated area MSEDCL has

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

implemented RF Port Metering Technology. To achieve interoperability among various RF meter manufacturers, MSEDCL used open protocol Zigbee 2007 Pro Smart Energy Profile metering cluster. However MSEDCL has defined the specific metering cluster in-house and published the same in the tender document. This protocol is also adopted by 12 Meter manufacturers

- For RF communication, free frequency band of 2.4 GHz is utilized.
- MSEDCL has procured RF Testing Tools to test the protocol as well as its interoperability.

(iii) Security concerns

- Tier III Data Center & Disaster Recovery Centers established with strong setup of Security Infrastructure.
- DC & DR received ISO27001:2005 ISMS certification from BSI.
- AMR application is available over MSEDCL's Intranet (WAN) network only.
- VPN users with valid credentials can access AMR software through Internet.

(iv) Any issue with the technology used

Network issues for AMR endpoints faced. MSEDCL involved multiple service providers based on their network strengths to alleviate the network issues.

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

(v) Service level Agreements(SLAs) (Give details about presence of SLA, whether documented, whether referred etc. #)

- MSEDCL has signed Service Level Agreements with Network Service Provider for guaranteeing Network Connectivity to all endpoints, failing which penalty is deducted from the Bills of Service providers.

6. **Enhancement of Productivity** (Give details about impact on volume of transactions handled per employee, Productivity of machines/ resources#)

- Human efforts for taking reading are significantly reduced. MSEDCL employees can now concentrate on core areas of Electrical Distribution Management and Loss reduction.
- Cost effective metering system is achieved as with the open protocol any meter manufacturer can bid for MSEDCLs' meter, thus resulting in more competition and considerable cost saving.
- Cost of paper and data punching while taking manual reading is saved.
- Carbon footprints consumed during physical visit to Consumer premises for Meter reading and use of paper (A3 & A4 size) is eliminated.
- On demand reading can also be taken anytime as per requirement.

7. **Efficiency Enhancement** (Give specific details about the following #)

(i) Volume of transactions processed,

IR/RF :

- 22 % rise in sale achieved in FY 2013-14 (IR - 21% & RF– 23%).
- Approx. 37.93 lakh IR and 7.21 lakh RF meters installed
- Around 24.37% of Residential, Commercial & Industrial Consumers

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

covered.

- Reading Cycle is reduced to 1 day as compared to 15-20 required earlier.
- Increase in sale of 901 MUs (17.57%) observed.
- Total Rs. 1165 Crores (39.77%) rise in Demand witnessed,
- Increase in Collections Rs. 1091 Crores (46.66%) achieved.
- The average speed for meter reading through HHU is 7 seconds.
- IR/RF Meter reading is started with HHU(Hand Held Units) for all areas.

AMR:

- 69,674 modems installed throughout Maharashtra
- Total 59600 modems are successfully read at current instant
- Meter Data of 15 minutes interval is available through AMR
- 10705 nos. of HT Consumers were billed through AMR system in Aug-14.

(ii) Coping with transaction volume growth

- State of the art, Tier III Data Center & Disaster Recovery Centers established with strong setup of Security Infrastructure.
- MSEDCL procured additional 40, 00,000 Meters RF meters for urban area.
- In addition to over 1006 MPLS Links, 4000 VPN connections issued to cater maximum users for AMR access.

(iii) Time taken to process transactions,

- AMR- Meter Data of 15 minutes interval is available through

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

AMR.

- IR/RF- The average speed for meter reading through HHU is 7 seconds.

(iv) Accuracy of output,

- **100 %**

(v) Number of delays in service delivery

- **NO DELAY**

8. Service Delivery – Business/ Client Centricity (Give details about improvement in interaction with clients and outcome for clients, relevance of access points, Length and Breadth of services provided online etc. #)

- With the use of IR/RF/AMR technologies, scope of any human error in meter reading is completely removed. Thus consumer is satisfied with the bills as per accurate meter reading.
- With the correct Meter reading cycle, consumer receives bills on regular interval.
- With the use of these New Metering Technologies resulted in huge savings in Meter reading expenses for MSEDCL. MSEDCL has improved Annual Revenue Realization and achieved substantial reduction in AT&C losses thus burden on consumers (higher tariff) is reduced.
- No complaint about faulty readings received where RF and IR meters are installed
- Wide appreciation from MSEDCL consumers & media.

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

9. Citizen Centricity (Give specific details on the following#)

(i) Impact on effort, time and cost incurred by user,

- With the use of these New Metering Technologies resulted in huge savings in Meter reading expenses for MSEDCL.
- MSEDCL has improved Annual Revenue Realization and achieved substantial reduction in AT&C losses thus burden on consumers (higher tariff) is reduced.
- Cost effective metering system is achieved through New Metering Technologies as with the open protocol, any meter manufacturer can bid for MSEDCLs' meter, thus resulting in more competition and considerable cost saving.
- Cost of paper and data punching while taking manual reading is saved.
- Carbon footprints consumed during physical visit to Consumer premises for Meter reading and use of paper (A3 & A4 size) is eliminated.
- Due to use of Information & Communication Technology, time taken for Meter reading and bill processing is significantly reduced.
- Meter Data of 15 minutes interval is available through AMR
- The average speed for meter reading through HHU is 7 seconds
- Increase in sale of 901 MUs (17.57%) observed.
- Total Rs. 1165 Crores (39.77%) rise in Demand witnessed,
- Increase in Collections Rs. 1091 Crores (46.66%) achieved.

(ii) Feedback/grievance redressal mechanism,

- 66 seater Call Centre established at Bhandup (Mumbai) and 44 seater at Pune to take

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

calls/enquiries/complaints/requests/grievances, etc. from MSEDCL consumers.

- Complaints/Requests are forwarded to concerned authority with system based tracking.

(iii) Audit Trails,

- Each Complaints/Requests are logged into system for system based tracking by consumers/MSEDCL user.

(iv) Interactive platform for service delivery,

-IVRS based Call centers with soft spoken skilled Customer Service agents cater to all consumers queries and concerns regarding New Metering Technologies initiatives of MSEDCL.

(v) Stakeholder consultation

- Core Team of experienced MSEDCL employees was formed before the start of the Project.

10. **User convenience** (Give specific details about the followings #)

(i) Service delivery channels (Web, email, SMS etc.)

- Online Web Self Service facility available for MSEDCL Consumers.
- AMR software available to all MSEDCL offices for easy reading of Metering endpoints.

(ii) Completeness of information provided to the users,

- Detailed information is provided to user through Web Self Service.
- AMR is robust and very effective software applications which besides giving Meter Reading, it provides host of Meter Data including Tampering Events which proves to be very useful to

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

detect Electricity thefts.

(iii) Accessibility (Time Window),

- Real-time
- Historical reports are also available for analysis.

(iv) Distance required to travel to Access Points

- Depends on endpoint.
- AMR application removes the efforts of visiting consumer endpoints for taking meter readings.

(v) Facility for online/offline download and online submission of forms,

- All Online/offline facilities available.

(vi) Status tracking

- Each Complaints/Requests are logged into system for system based tracking by consumers/MSEDCL user.

11. Innovation (Give details on how the usage of technology is exemplary, any use of new and emerging technology, impact on number of steps required, identification and removal of bottlenecks/ Irrelevant steps etc. #)

IR Protocol Development

MSEDCL is State Govt. Utility and to have transparent tendering process, it has developed an open protocol for Infra-Red Port Meter as every meter manufacturer was having the own protocol. MSEDCL in-house developed Protocol for Infra-Red Port Meter and published the same in the tender document. This ensured interoperability i.e. with single hand held unit meter reader can capture meter reading of any make of IR Meter. MSEDCL has set up a state of the art Meter Protocol Testing Lab for testing the interoperability in Mumbai. MSEDCL's IR protocol now implemented 17 different manufacturers and achieved interoperability. These meters are installed in Scattered Area.

RF Protocol Development

For densely populated area, RF Port Meters are used. To achieve interoperability among various manufacturers, it is decided to use open protocol Zigbee 2007 Pro Smart Energy Profile metering cluster. However MSEDCL has defined the specific metering cluster in-house and published the same in the tender document. For RF communication free frequency band of 2.4 GHz is utilized. MSEDCL has procured RF Testing Tools to test the protocol as well as its interoperability. This protocol is also implemented by 12 manufacturers.

While commissioning the meter it is required to be defined one meter as coordinator and other meters as its routers. This creates RF Mesh Network by giving a Permanent Area Network Identification No.(PAN-ID). This commissioning is one time job. Meter Reader can capture meter reading (Kwh., Date-Time Stamp & MD) along with meter no. in the circumference of 30 Mtr. Area with the HHU. The data captured in the HHU is to be downloaded on PC for which necessary s/w is provided at Sub Division end. The Hand Held Unit has a capacity to capture data of 2000 Meters.

Both IR Meter as well as RF Meter ensures the Smart Energy Meter guidelines of CEA. Only connect/disconnect and load control feature is not provided. It supports TOD Tariff. An option is available to download Load Survey data.

12. Defined and Achieved outcomes (Give details about extent of improvement in terms of organizational objectives, output targeted in the beginning of the project and output achieved, extent to which the project is able to reach/ fulfill the requirements of planned beneficiaries etc. #)

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

MSEDCL desired for Enterprise wide Metering System with following features:

- Interoperable: With single hand held unit meter reader can capture meter reading of any make of IR/RF Meter
- Accurate readings
- Cost-effective Metering system
- Transparent process
- Easy to use technology

Noticeable Outputs:

- MSEDCL has successfully developed (In-house) its own protocol for IR meters and customizing open Protocol for RF meters for achieving all of the above objectives.
- Energy Meter Reading Automation to remove Manual intervention for bringing accuracy, transparency and efficiency and detection of metering abnormalities (Tamper events) and network faults.
- Automated process of Meter Reading and Billing and Energy Accounting is achieved.
- Monitoring and profiling energy consumption of key consumers is easily achieved through AMR solution.
- Due to exemplary use of above technologies, other states have also adopted these metering technologies.

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

13. Sustainability (Give details about sustainability w.r.t. technology (technology used, user privacy, security of information shared- Digital Signature/ Encryption etc. #), Organization (hiring trained staff, training etc#), financial (Scope for revenue generation etc. #)

Instead of using handheld units for reading RF meters, MSEDCL shall very soon begin the implementation of Meter Reading from RF Meters remotely using GPRS technology. (Manual visits not required).

For this following procedure will be adopted:

- Use of DCU (Data Concentrator Unit) along with RF Meters.
 - DCU with RF and GPRS Modem, will be installed with Transformer Meter.
 - DCU will read data from RF Meters
 - DCU will communicate with Data Center Servers through GPRS Modem.
 - RF Meters will be read through web based AMR software solution.
- ✓ AMR module is hosted at MSEDCL's own Data Center in Mumbai.
 - ✓ Disaster Recovery Center established at Nagpur (747 kms away)
 - ✓ Data Center and Disaster Recovery conforms to stringent Information Security Management System (ISMS) policy.
 - ✓ AMR application is available over MSEDCL's Intranet (WAN) network only.
 - ✓ VPN users with correct credentials can access AMR software through Internet.
 - ✓ Single Sign-On functionality: AMR module is available through R-APDRP portal, which can be securely accessed through correct Login ID & password.
 - ✓ Strict Password policy implemented.
 - ✓ User roles define as per their Designation and Office thus prevents

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

unauthorized use.

- ✓ Helpdesk and local Support services for end users.

14. Adaptability Analysis

(i) Measures to ensure adaptability and scalability

- Meter reading format is kept intact.
- Prior end user training before the start of the project

(ii) Measures to ensure replicability

All the components of the project are developed in-house by MSEDCL. Source code is available with MSEDCL.

(iii) Restrictions, if any, in replication and or scalability

No Restrictions.

(iv) Risk Analysis

In progress.

15. Result Achieved/ Value Delivered to the beneficiary of the project-(share the results, matrices, key learning's, feedback and stakeholders statements that show a positive difference is being made etc):

(i) To organization

- Taking manual meter reading for energy bill calculation is discontinued.
- Due to use of Information & Communication Technology, time taken for Meter reading and bill processing is significantly reduced thus resulting in shorter billing cycle and increase in revenue realization.
- HT Consumers & Billing process for 8422 consumers has been fully automated and does not require any human intervention. Meter readings are automatically captured remotely and used by the in-house billing system after carrying out due validations in the Automated Meter

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

Reading (AMR) system.

MSEDCL has benefited in following ways:

- Distribution Loss Reduction
- Increases/faster Revenue Realization
- Consumer satisfaction and reduction in complaints
- Transparent system
- More focus to core activities as employees are relieved from manual meter reading.
- Manpower reduction
- Expenses on meter reading reduced
- Effective utilization of power
- Improve Voltage Profile

(ii) To citizen

- Accurate meter reading hence no grievances about meter readings.
- Consumer receives bills on regular interval
- No burden on consumers (higher tariff slab) as delay in reading cycles is reduced
- Protection from overloading is achieved through these new metering technologies.
- Quicker Fault location & Restoration is done at consumer place
- Proper load shedding is implemented

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

(iii) Other stakeholders

- Manual efforts significantly reduced due to automation through applications
- Effective implementation of Business processes using Automatic Meter Reading (AMR) application.
- Accuracy of Meter Readings has improved efficiency
- Online Theft & Tamper detection
- Load Profiling of key
- Proper planning of the network

16. Extent to which the Objective of the Project is fulfilled-(benefit to the target audience i.e.G2G, G2C, G2B, G2E or any other, size and category of population/stakeholder benefited etc):

- Approx. **37.93 lakh IR and 7.21 lakh RF** RF meters installed
- IR/RF Meter Reading is started with HHU(Hand Held Units).
- 69,674 modems installed throughout Maharashtra
- Total 59600 modems are successfully read at current instant
- Meter Data of 15 minutes interval is available through AMR
- 10705 nos. of HT Consumers were billed through AMR system in Aug-14.
- On demand reading can also be taken anytime as per requirement.
- Energy Meter Reading Automation has brought accuracy, transparency and efficiency.
- Achieved major milestone towards Smart Grid implementation
- Detection of metering abnormalities (Tamper events) and network faults
- Other states have also adopted MSEDCL's metering technologies.
- R-APDRP project which includes AMR software was awarded Maharashtra State e-Gov 2013 award for 'Innovative Use of IT in Governance'

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

- IR/RF/AMR implementations demonstrated and appreciated by host of dignitaries including Humble Union Minister of Power in Sep 2012 and Secretary, Ministry of Power, Govt. of India.

17. Comparative Analysis of earlier v/s New system with respect to the BPR, Change Management, Outcome/benefit, Change in legal system, rules and regulations

Earlier System	New System
Manual Meter reading process	Automated Meter Reading through GSM/CDMA network via modems connected to DTC/HTC/Feeder Meters.
Electro-mechanical / static meters	Electronic Meters with IR Port in rural area & RF meters in urban area
Meter manufacturer's had proprietary Protocol & also had interoperability issues.	With the open protocol developed by MSEDCL, the Interoperability is achieved. Any meter manufacturer can bid for MSEDCLs' meter, thus resulting in more competition and considerable Cost saving.
Meter readings were taken throughout the	Correct monthly billing cycle and increase in revenue Realization.

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

Month & also delayed.	
Manual MD reset	All the meters are set in MD Auto Reset Mode.
Time taken for Meter reading and billing processing was too high.	Due to use of Information & Communication Technology, time taken for Meter reading and bill processing is significantly reduced.
Meter reading process takes lot of human efforts	MSEDCL employees can now concentrate on core areas of Electrical Distribution Management and Loss reduction
Cost of paper and data punching needed to carry operations involved in manual meter reading activities.	Cost effective Metering systems
Chances of inaccurate data feeding to generate energy bill of consumers with manual meter reading.	Accurate Meter Reading
Monthly readings were generally taken once in a month	Readings are downloaded after every 15 minutes cycle. On demand reading can also be taken. Bills of 9981 HT consumers were generated as per AMR readings in Jul-14.

18. Other distinctive features/ accomplishments of the project:

- 1. Accurate readings:** With the use of IR/RF/AMR technologies, scope of any human error in meter reading is completely removed. Thus consumer is satisfied with the bills as per accurate meter reading.
- 2. With the correct Meter reading cycle, consumer receives bills on regular interval.**
- 3. Cost-effective Metering system:** With the use of these New Metering Technologies resulted in huge savings in Meter reading expenses for MSEDCL. MSEDCL has improved Annual Revenue Realization and achieved substantial reduction in AT&C losses thus burden on consumers (higher tariff) is reduced.
- 4. Interoperable:** With single hand held unit meter reader can capture meter reading of any make of IR/RF Meter
- 5. Transparency:** Energy Meter Reading Automation to remove Manual intervention has brought accuracy, transparency and efficiency. Detection of metering abnormalities (Tamper events) and network faults is now possible.
- 6. Monitoring and profiling energy consumption** of key consumers is easily achieved through AMR solution.
- 7. Due to exemplary use of above technologies, other states have also adopted MSEDCL's metering technologies.**

19. Capacity building and Change Management:

- ✓ Meter testing Laboratory established
- ✓ AMR software module (69,674 meters' data) hosted at MSEDCL's

AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE
INITIATIVES

Project Name- NEW METERING TECHNOLOGIES (IR,RF & AMR) IN MSEDCL

own Data Center

- ✓ Hands-on Training given to concerned employees
- ✓ User roles defined as per their Designation and Office
- ✓ Software Support team established at HO
- ✓ Multiple Service providers allocated for network bandwidth
- ✓ RF Testing Tools procured
- ✓ Meter Reading for HT Consumer is captured 00 Hrs of 1st of every month.
- ✓ AMR Responsibility Charter is prepared & published
- ✓ One Asstt. Engineer from each Circle Office is designated as Asstt. Engr.(AMR)
- ✓ Centralized BCS established for IR/RF meters
- ✓ RF mesh network commissioning & configuration is simplified
- ✓ HHU menus standardized
- ✓ Additional HHUs provided to each office
- ✓ Meter Reading is captured from the distance of 1.5 Meter in case of IR Meter and 30 Meters in case of RF Meter
- ✓ Meter Reading Data gets captured in approx. 5 Seconds per meter