

**CENTRAL
POWER**

DISTRIBUTION COMPANY OF A.P. LTD.

Lighting up your lives!

Andhra Pradesh Central Distribution Company Limited

**SARI/Energy Regional Distribution Utilities Partnership
Executive Business Trip**

**Restructuring Strategies in Indian
Distribution Sector**

Andhra Pradesh Power Sector Reforms

By

C. Rama Mohana Rao,

Director,

Central Power Distribution Company,

Hyderabad, Andhra Pradesh, India.

Background & Perspective

- The objectives set for Power Sector Reform Programme were to create the conditions for sustainable development by promoting :
 - Competition
 - Efficiency
 - Transparency
 - Attraction of private capital
- The ultimate goals of reform are to ensure that :
 - Electric power is supplied under the most efficient conditions in terms of cost and quality to support economic development
 - The power sector ceases to be a burden on the State's budget and eventually becomes a source of revenue for the Treasury
- “Sustainability” is now recognized as a vital requirement
- To achieve goals of the reforms there can be structural solutions and management solutions.

Background-Reasons for Decline in financial performance

The sector enjoyed a reasonably comfortable financial position till 1991-92 by meeting the operating expenditure from out of its revenues and State Government was giving assistance to the erstwhile APSEB only to the extent of providing 3 % return on the net fixed assets as prescribed in the ES Act.

The decline in the financial position over the years was due to various reasons such as

- Adverse change in Hydro - Thermal mix
- Steep increase in cost of power purchase
- Higher growth in consumption of subsidised categories like Agriculture and domestic compared to the subsidizing categories like Industries.
- Stagnation in industrial consumption from the grid and shift to captive and third party because of higher tariff and low quality of supply
- High level of T & D losses both technical and commercial.

Restructuring Strategies-Indian Distribution Sector

Privatisation or Corporatisation

Corporatisation is the formal and legal move from direct Government control to a legal corporation with separate management. This may be a Government owned corporation.

In view of many prerequisites for Privatisation it is suggested that the Distribution sector Privatisation exercise be commenced only after some of the critical activities/actions are taken by the Government /Utilities.

- Systems and procedures to be in place for getting reliable data on Losses and un-metered sales Agriculture consumption.
- Employees are allocated to the respective firms and their minimum requirements taken care off.
- Statutory laws on Anti theft in place and a system of control of theft and malpractice under implementation.
- Regulatory certainty demonstrated by implementation of Long term tariff methodology etc.
- Government support of paying the Subsidy in time demonstrated through a legal frame work.
- Assets and liabilities clearly identified and allocated to these companies.

Reform Milestones.....

1	Government issued a policy statement in February, 1997.
2	AP Electricity Reforms Bill was passed in the Assembly on 28th April, 1998 and has become effective February 1, 1999
3	The erstwhile APSEB was been unbundled in February 1999 into two independent corporations-APGenco &APTransco
4	Independent Electricity Regulatory Commission was established in 1999 March.Commission has so far issued four tariff orders.
5	Unbundling of APTransco in to 4 Distribution Companies with effect from 1st April, 2000.
6	Regular license to the four distribution companies issued with effect from 1st April, 2001.
7	Financial autonomy provided to the distribution companies with effect from 1st April 2002.
8	Employees allocated to various companies through Options exercise providing full administrative autonomy to the DISCOMS from October 2002.
9	APGenco and APTransco operate effectively in a commercial and regulated environment through PPA (Power Purchase Agreement)
10	APTransco and Distribution Companies operate effectively in a commercial and regulated environment through BSA (Bulk Supply Agreement).

Present Structure of AP Power Sector

Generation

- **Installed Capacity : 10336 MW**
- **Units Handled : 45804 MU**
- **Average Plant Load Factor : 88.9%(Genco)**

Transmission

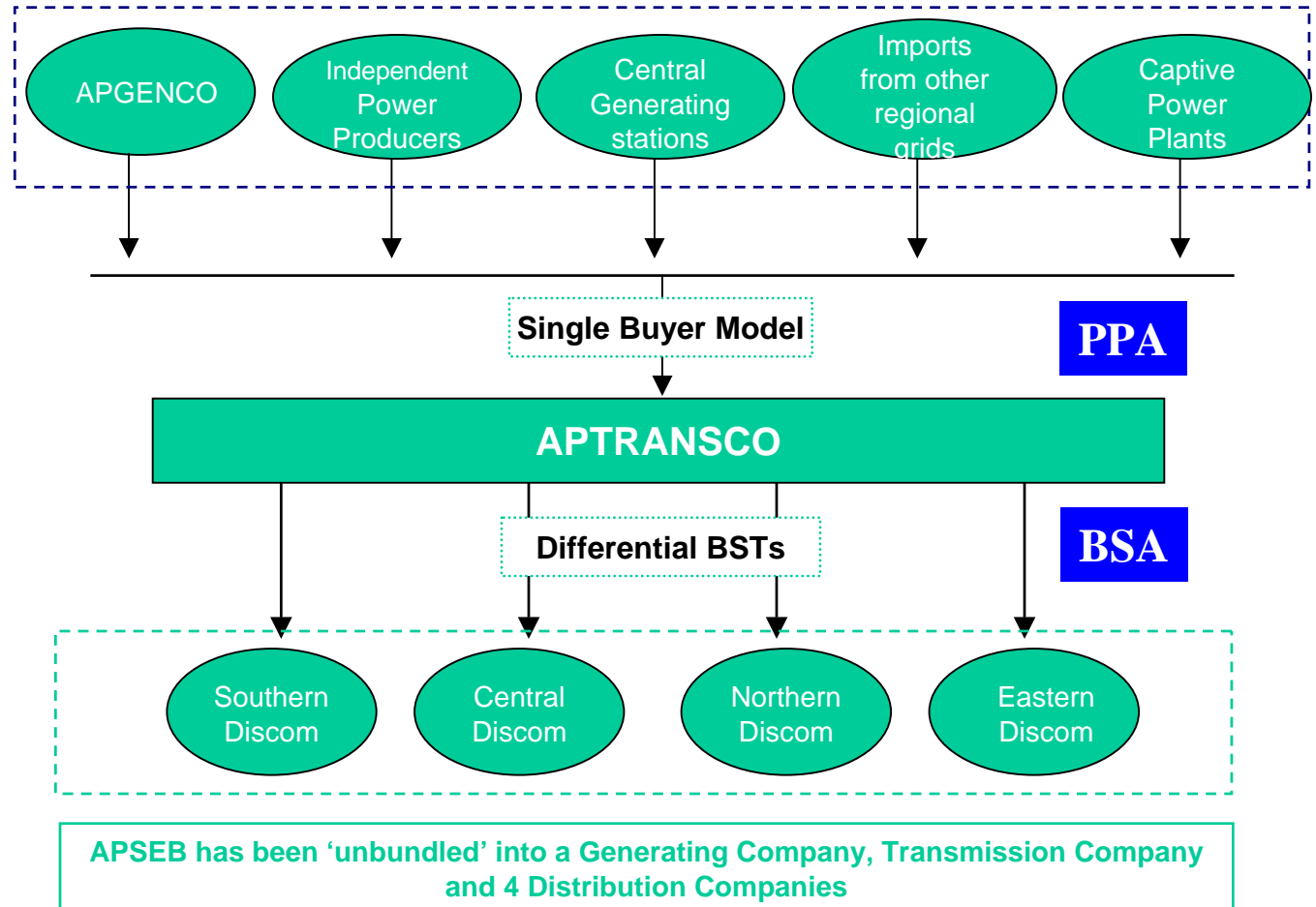
- **Length of transmission network : 668,401 km**
- **No. of substations : 2,196**

Distribution

- **4 licensees**

T&D Losses

26.13% in 2002-03



ANDHRA PRADESH POWER SECTOR KEY STATISTICS – APTRANSCO & DISTRIBUTION COMPANIES

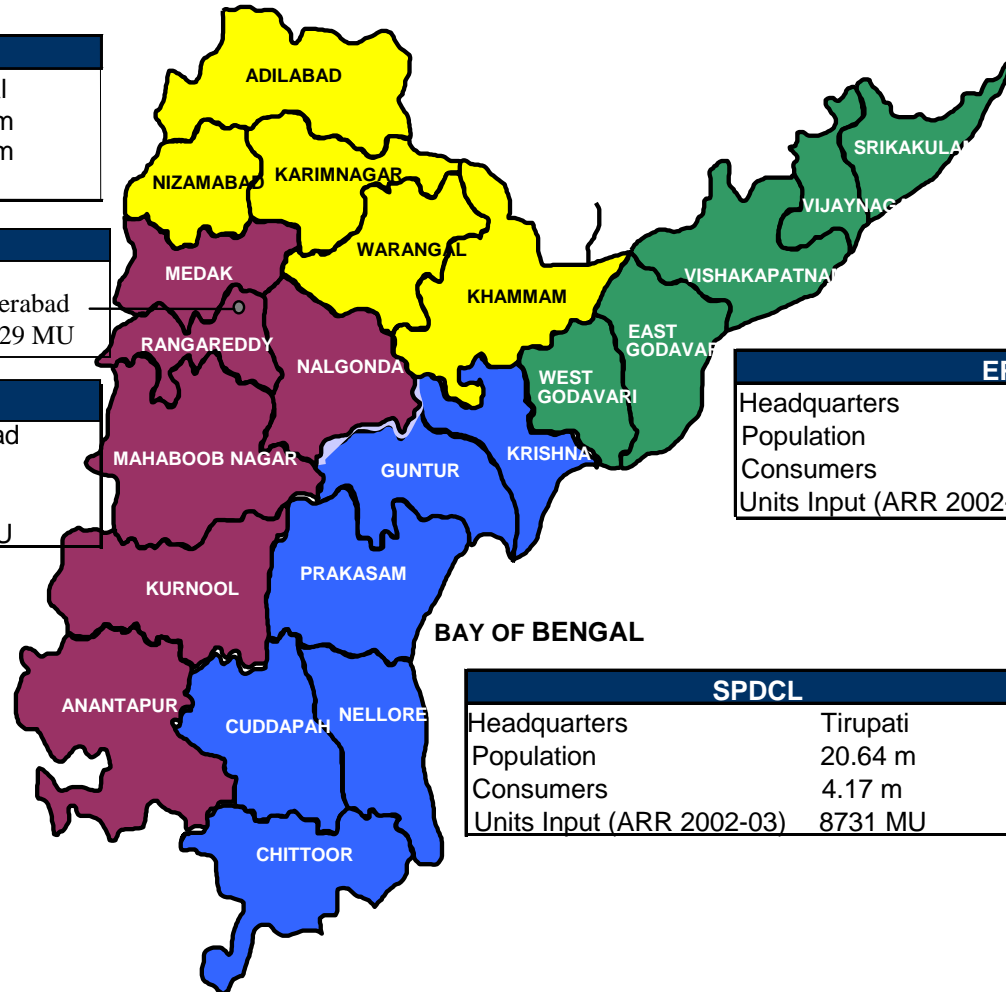
NPDCCL	
Headquarters	Warangal
Population	14.09 m
Consumers	2.96 m
Units Input (ARR 2002-03)	7219 MU

APTransco	
Headquarters	Hyderabad
Units Input(ARR 2002-03)	39529 MU

CPDCL	
Headquarters	Hyderabad
Population	23.75 m
Consumers	4.72 m
Units Input (ARR 2002-03)	14949 MU

EPDCL	
Headquarters	Vishakapatnam
Population	17.23 m
Consumers	2.89 m
Units Input (ARR 2002-03)	5468 MU

SPDCL	
Headquarters	Tirupati
Population	20.64 m
Consumers	4.17 m
Units Input (ARR 2002-03)	8731 MU

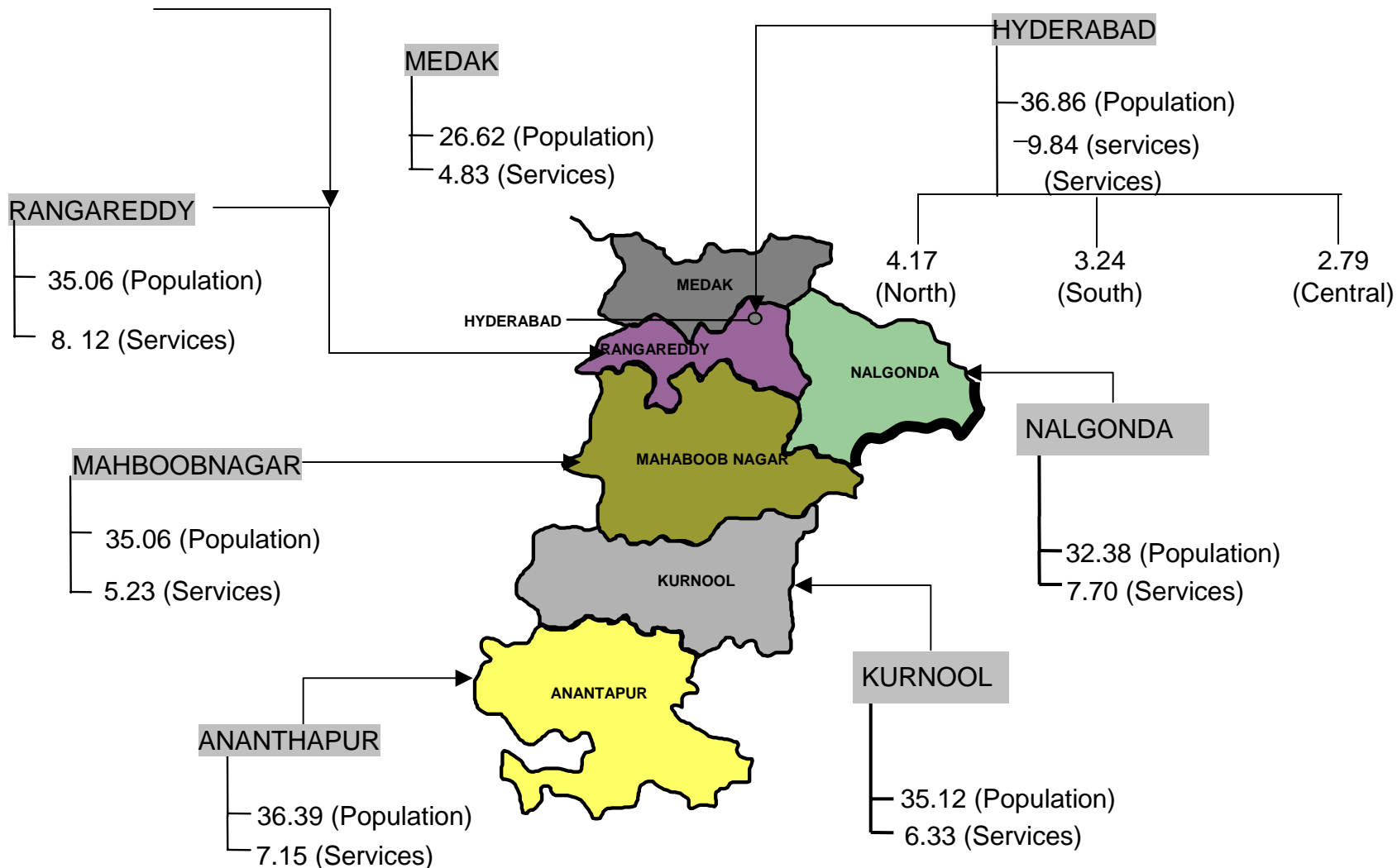


APCPDCL

23.75 Million Population
4.986 Million Consumers

(Figures in Lakhs)

As on March 2003



Restructuring Strategies-Indian Distribution Sector

Support from Government before and after restructuring

Support form the Government before restructuring.

- Enactment of Anti-theft law in the State.
- Support to the utility in implementation of this Law.
- Facilitate payment of C C dues of various Government departments.
- Entering into Tripartite agreements with Utility and Staff to provide enough comfort to the Utility staff.
- Regular payment of Subsidy to the Utility as per the SERC order.
- Support by way of guarantees to various financial institutions for loans to take up new investments.
- Additional support to the utilities in case the Utilities have a gap in revenue and expenditure at the end of the year.

Towards reducing commercial losses

Anti-Power Theft Act passed with severe penal provisions effective from July 2001. The Act provides for;

- ✧ Mandatory imprisonment for a minimum period of three months which can extend upto 5 years for those found guilty of illegal abstraction of energy .
- ✧ Levy of a minimum penalty of Rs.5000 and upto a maximum of Rs. 50,000/-.
- ✧ Denial of Power supply from the Grid for a period of two years to the consumers found guilty under the Act.
- ✧ Establishment of special tribunals for each district headed by a Sessions Judge to deal with theft of energy cases.

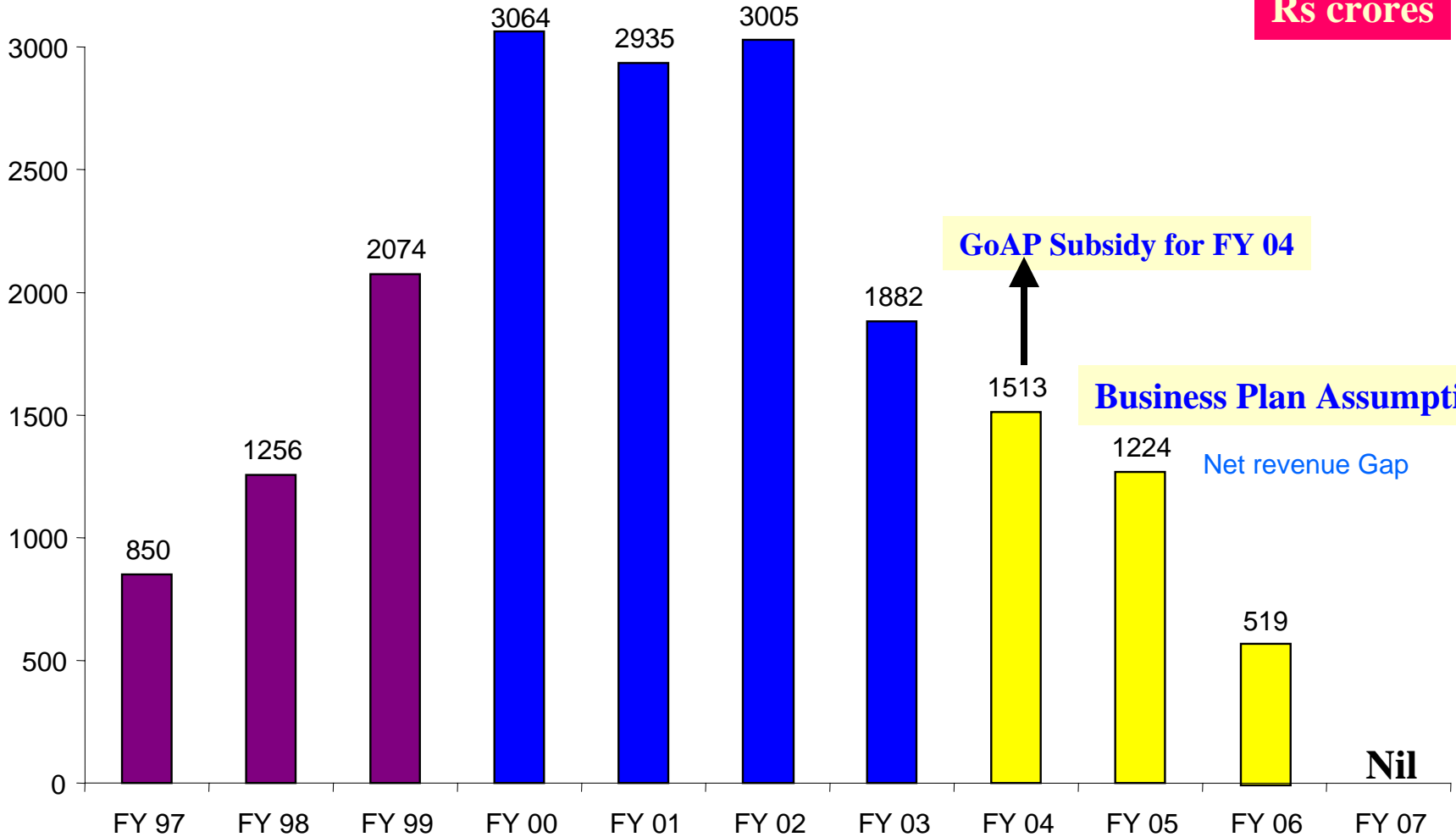
Towards reducing commercial losses (Contd...)

- ✧ Establishment a of a Special Court at Hyderabad headed by a High Court Judge with appellate jurisdiction over the tribunals and to dispose cases where the compensation is more than Rs.5 lakhs.
- ✧ Provision for compounding fees for first offence.
- ✧ Massive Statewide inspections have been taken up involving thousands of teams of operation staff and DPE staff.
- ✧ More than 48Lakhs of services were inspected and action taken in thousands of cases of irregularities such as thefts, malpractices, back billing etc.

Government of AP Support & Subsidy

GoAP Support & Subsidy for the last 7 years

Rs crores



Restructuring Strategies-Indian Distribution Sector

Support from Government before and after restructuring

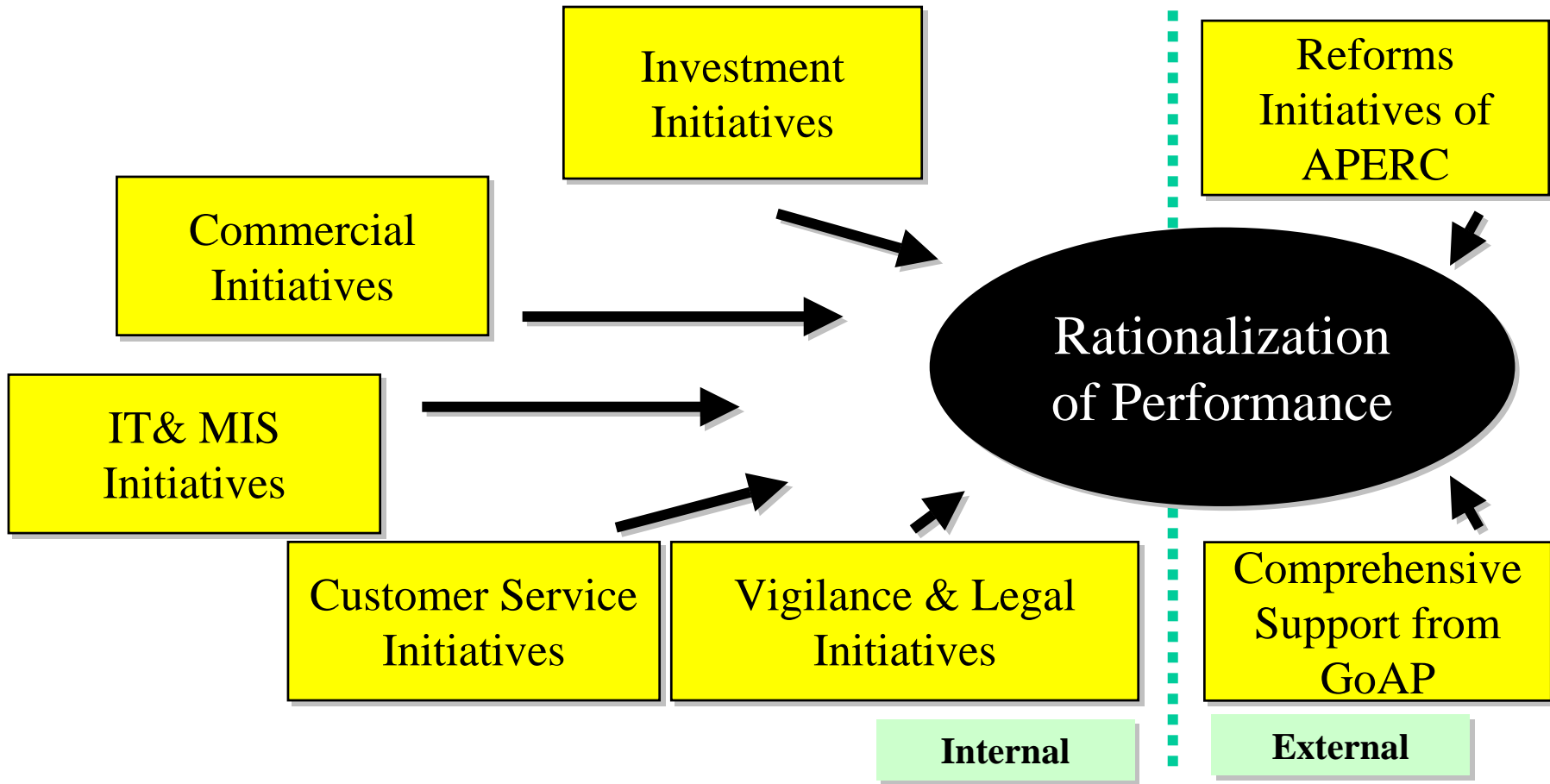
- Support from the Government after restructuring.
- Continued support to the utility in implementation of anti-theft Law.
- Facilitate payment of C C dues of various Government departments.
- Assistance on implementation of Tripartite agreements
- Regular payment of Subsidy to the Utility as per the SERC order.
- Assistance in implementation of Metering of the un-metered consumers.
- Assistance through local administration in case of natural calamities like earthquakes, floods, Gail storms etc.

Restructuring Strategies-Indian Distribution Sector

Strategies to increase efficiency in Distribution utilities

- Financial,Operational and Administrative autonomy to the Distribution companies.
- Accounting standards and norms as per international GAAP.
- Clear roles and responsibilities to the employees at various levels.
- Effective MIS by obtaining the data from the source and improved information.
- Implementation of effective Energy Audit and energy reconciliation systems.
- Introduction of IT in Billing system.
- Refining the sales data base and consumer database and running programmes like CAT to improve collection efficiency and inspection efficiency.
- Asset management systems implementation
- Employee Grading and marking system..Skill development programmes based on grading.
- Initiatives like HVDS,Reconditioning ,Capacitors installation to reduce Technical loss and improve voltages.
- Infrastructure improvement works at the level of DTRs and Structures to minimize interruptions
- .Implementation of Common Billing System.
- Customer call centers and service centers establishment.
- Implementation of SCADA .

The improvement of the licensees has been enabled by a combination of internal and external initiatives



Investment Initiatives

- Segregation of industrial load from domestic load and setting up of industrial express feeders. This has been complemented by systems to ensure un-interrupted supply of power on such feeders
- Segregation of Agriculture feeders to provide single phase lighting supply to villages.
- Conversion of LVDS network to HVDS network.
- Implementation of massive metering plan by replacing around 40lakh meters.Out of this around 7.2 lakh meters were replaced in 2002-03.

HVDS – Erection of Single Phase Transformer



Introduction of HVDS in Distribution Network

Benefits

- LV System losses can be minimised to the lowest level.
- Reduction of No. of consumers per transformer, this will reduce number of outages to consumers
- Pilferage can be minimised by introduction of AB Cable
- Voltage profiles will improve at consumer level, results in reduction of failure of Agl. Pumpsets and Domestic equipment
- LT line per Transformer reduces from :
 - 2 – 3 KM to 0.5 KM in rural areas
 - 1 KM to 0.2 KM in Urban areas

Items	Before HVDS	After HVDS	Effect
DTR	63 KVA	5X25KVA	
LT line	2350 meters.	1075 meters.	reduced by 1275 meters.
HT Line	230 meters.	855 meters.	increased by 625 meters.
HT+LT Line	2580meters	1930meters	reduced by 650meters

BENEFITS

- Quality & reliability of supply substantially improved.
- AB cable is used for pumpset connection from DTR, hence hooking is not possible and also the Consumers under DTR will be doing watch & Ward.
- Neutral is brought close to the pumpset , hence motor burnout will be reduced
- Anticipated Energy saving is about 29000 Kwh (units) per year

Commercial Initiatives

- Gradual alignment of retail tariff with their Cost of Service ('COS') have been proposed for industrial consumers
- Reduction in Industrial Tariffs and incentives to Industries.
- Improvement in commercial attractiveness by offering easy installment schemes on payment of Development Charges by the Industrial Consumers .
- Implementation of Spot billing.
- Inter state buyers has been identified for sale of surplus power available with APTransco and this assisted in reducing the COS in Andhra Pradesh
-

Vigilance Initiatives

- Regular inspection have significantly improved the efficiency levels of the company.
- Inspections assisted in removing irregularities like wrong categorisation, unauthorised connections, defective meters and erroneous reporting of connected load.
- During 2002-03 around 1,08,934 cases were registered and around 67,000 cases compounded compared to 35,000 registered and 31,376 compounded during 2001-02.
- During 2002-03 an amount of Rs 34.74 was assessed compared to Rs 30.19 crores in 2001-02.
- During 2002-03 an amount of Rs 12.8 crores was realised as 1st installment and Rs 7.37 crores as compounding amount. The 1st installment amount realised during 2001-02 was Rs 12.96 crores and compounding amount collected was Rs 11.61 crores.
- 1732 persons were arrested under theft and malpractice cases in 2002-03 compared to 860 during 2001-02.

State Wide Picture of Pilferage Cases

	2000-01	2001-02	2002-03	Total
Services Inspected	26,06,834	12,73,089	9,75,334 *	48,55,257
Cases booked	18,845	35,535	1,08,934	1,63,314
Cases compounded	11,605	31,376	67,630	92,140
No. of Arrests	1,972	860	1,732	4,564
Assessed Amount (Rs. Millions)	277.30	301.91	347.42	926.62
First Inst. Of Assessed Amount Collected in Compounded cases (Rs. Millions)	102.64	129.61	128.02	360.27
Compounding Amount Collected (Rs. Millions)	78.47	116.18	73.74	268.39

Around 40% Of services are inspected

Introduction of Spot Billing

- Spot billing was introduced in order to reduce several functions to few in metering and billing.
- Spot billing was introduced first in Hyderabad, the capital city of A.P. in November '2001, wherein the bills were issued on the spot to the consumers with the help of a hand held computer.
- With the remarkable results noticed (improvement in the billing demand and customer satisfaction), spot billing has been extended to all the districts of the State.

Spot Billing with Hand Held Computer



- ❖ Fast
- ❖ Versatile
- ❖ Intelligent
- ❖ Affordable
- ❖ Light weight
- ❖ User Programmable

Payment of Electricity Bills

- Tie-Up with State e-Seva centers for bill payment for the convenience of the public.(37 e-seva centres across the Hyderabad and Secunderabad) and in all the towns of the state
- Payment through the company's website www.apcentralpower.com
- Payment through certain agencies like www.billjunction.com (Group of ICICI Bank)

Comprehensive Support Provided by GoAP

- GoAP has demonstrated its commitment for improvement in efficiency of the power sector .
- Enactment of the anti-theft law in Andhra Pradesh has provided impetus to speedy reduction of commercial loss in the system.
- The utilities in Andhra Pradesh have received prompt and timely payment of revenue subsidy from GoAP
- In its role as the owner, GoAP has also extended interim cash support to the utilities to meet financial adversities arising from external and uncontrollable business conditions.

MIS-Performance Monitoring Initiatives

- **Performance Management and Reporting System (PMRS) in place for review and analysis of performance at various levels**
- **Information updated at the district headquarters on a monthly basis**
- **MIS cells established at all Discom headquarters**

PMRS is used for:

Monitoring Key Performance Indicators (KPI)

- **Financial KPI's**
 - **Revenue Billing**
 - **Revenue Collection, including Daily Cash Collections**
 - **Arrears**
- **Operations statistics**
- **Customer Complaints**

Viewing relevant aggregated data at each level of the hierarchy

- **Relevant reports available circle level upwards, online at all levels of the organization**
- **Identification of exceptions at all levels**
- **Centralised reporting facilitates timely updation of data**

APTransco-Performance Grading for Employees drilled down up to Section Level 2002-03(Based on PMRS)

Cadre	Strength	Grade			
		A	B	C	D
SE	23	1	10	10	2
DE	88	28	22	24	14
ADE	324	95	92	57	80
AE	1266	321	315	217	413
Total	1701	445	439	308	509

- 92 Workshops held for those in C & D Grade to motivate improved Performance.
- Disciplinary action initiated on 604 employees.

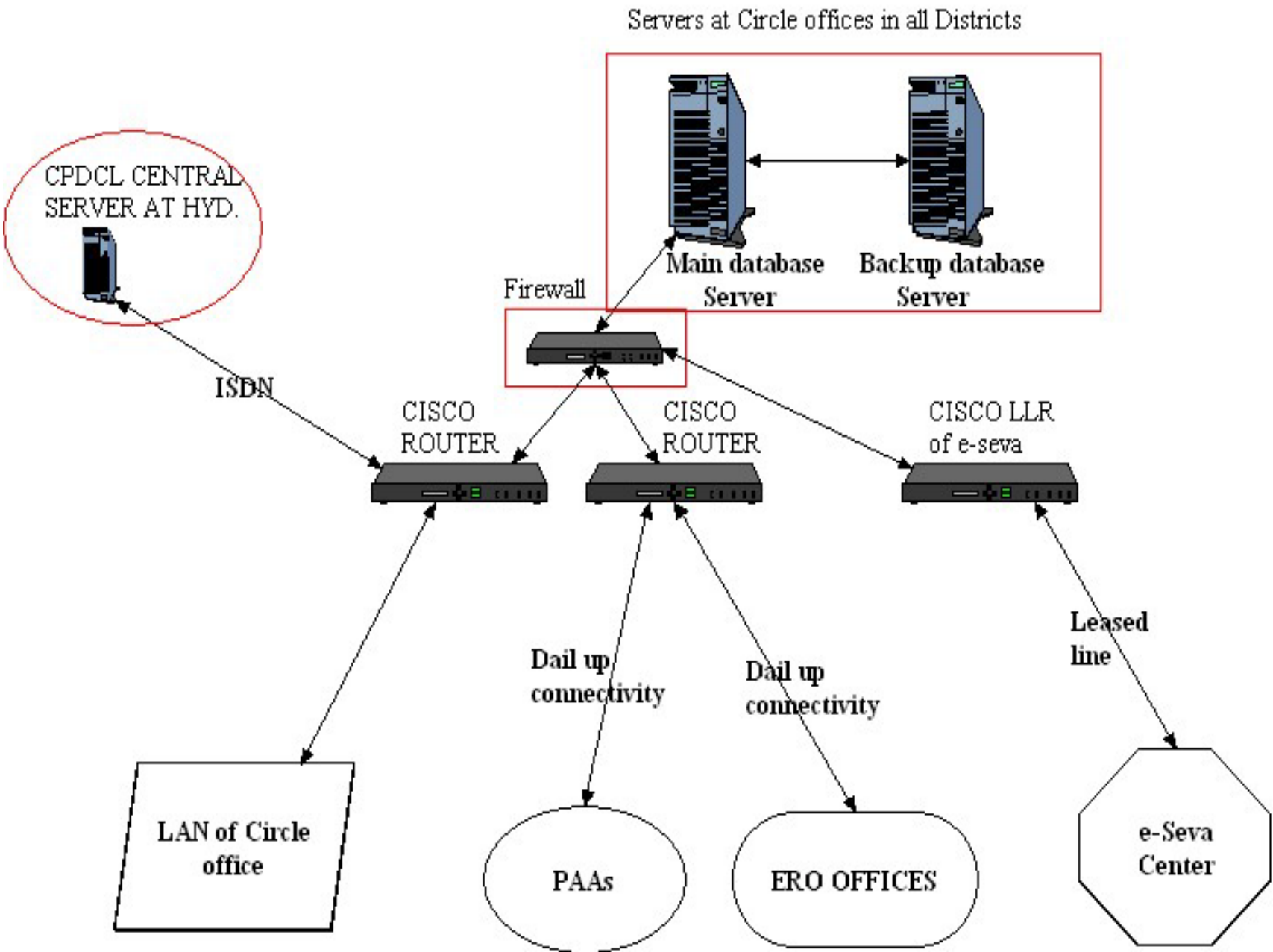
IT & Efficiency Improvement Initiatives

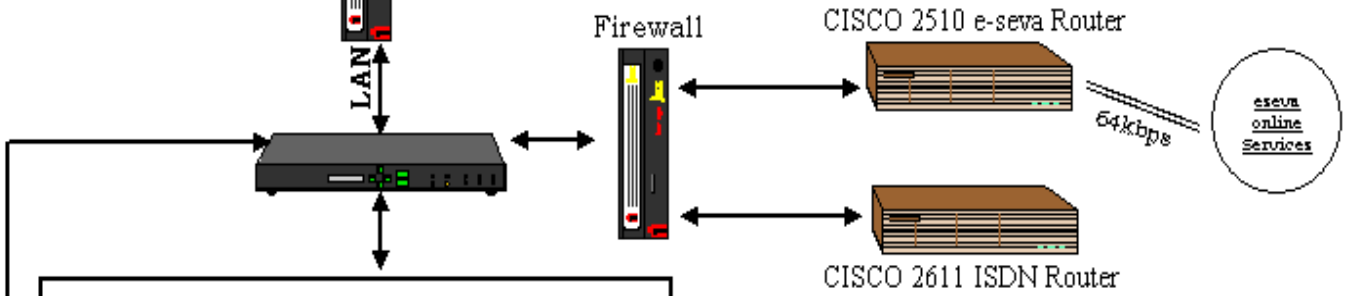
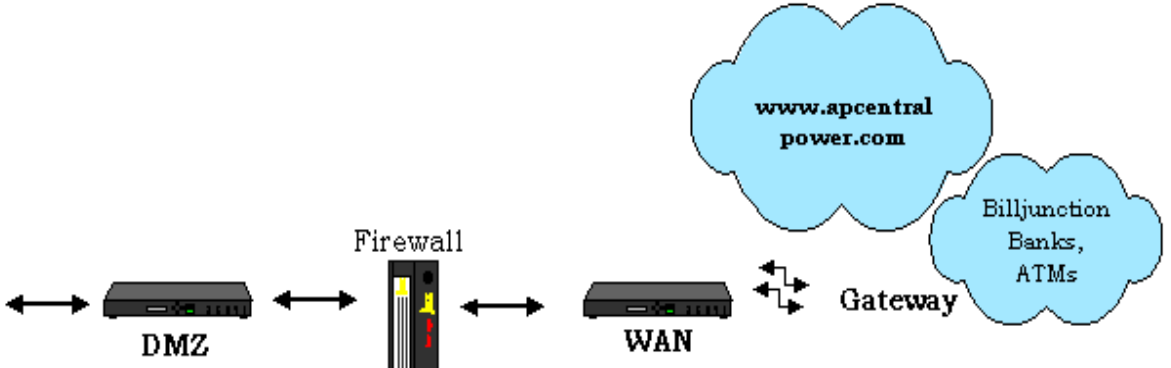
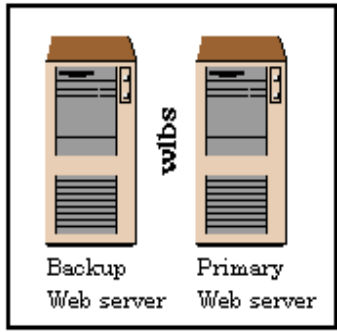
- Consumer Analysis Tool (CAT), a tool for targeting irregularities in Metering, Billing and Collections
- Monitoring and Tracking system (MATS), aimed at regularisation and improving the efficiency of Inspections.
- Transformer Information Management System (TIMS) is a tool which assists in analysing reports for effective and faster decision making by the Top management
- Book Consolidation Module (BCM), a tool for aggregation of trial balances at Circle level.
- Energy Billing Centre (EBC) - established on April 1, 2001 to produce accurate monthly invoices in accordance with Bulk Supply Tariff awarded by APERC

IT & Efficiency Improvement Initiatives

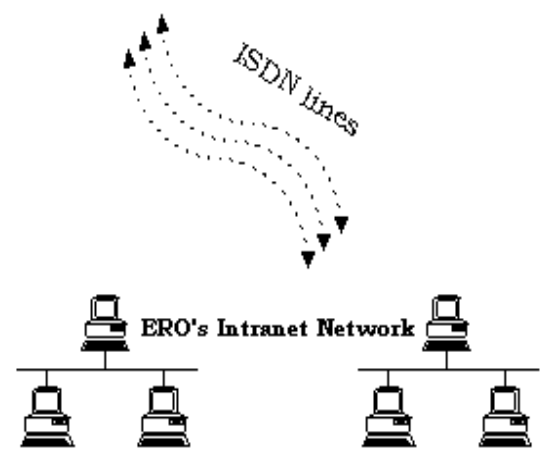
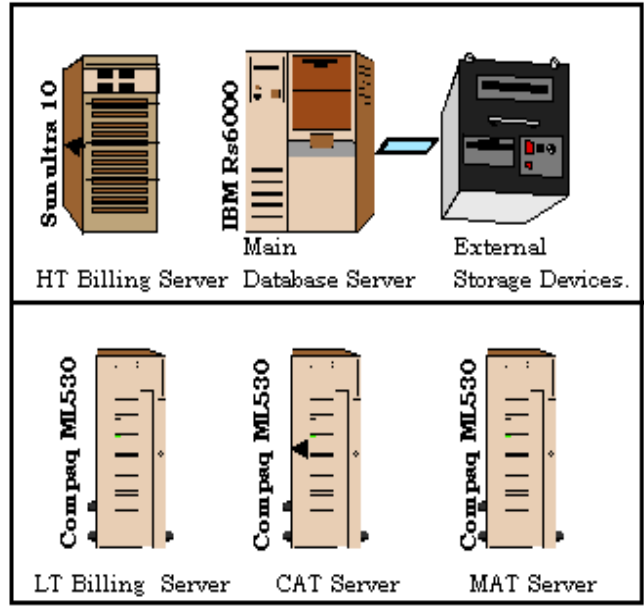
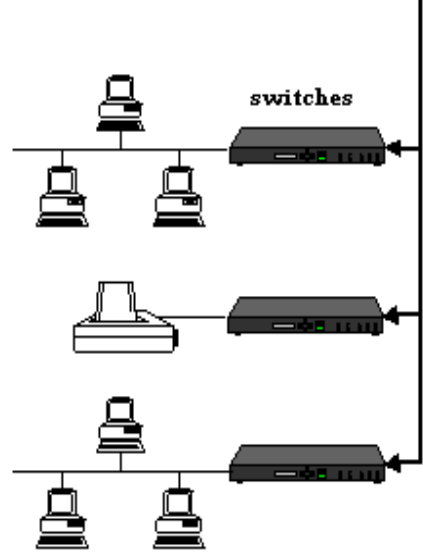
- Building up modern IT centres in all four Discoms to meet new challenges and laws .
- IT – Strategic Enabler for the Initiatives under the reform process.
- IT – Acts as a Catalyst by providing an information- Infrastructure essential to the reform processes and practices.
- IT – Provides information base for decision making at operational and strategic levels.
- Building up Data warehouse and mining the data by using specially developed tool CAT (Consumer Analysis Tools)
 - Detect and inspect rather than inspect and detect.
 - Helps in load forecast.
 - Helps in Identifying Irregularities in Metering and payments.
- Books Consolidation Module for speedy accounting.

PROPOSED NETWORK DIAGRAM FOR e-SEVA CONNECTIVITY TO ALL MUNICIPALITIES IN DISTRICTS





INTRANET NETWORK



ALL 15 no. ERO Offices Connected through ISDN Lines

Consumer Analysis Tool

For the twelve month period, at individual consumer level the **collections made against the demand raised** are analysed and assigned a numeric code of 1, 2, 3, 4 or 5 based on the collection percentage

Each consumer analysed for 12 months period

Class Structure

Collection %

		1	2	3	4	5
		>90%	61%-90%	31%-60%	1%-30%	0%
Default %	A	A1				
	B	B1	B2	E	E	
	C	C1	C2	C3	E	
	D	D1	D2	D3	D4	
	F					F

Based on the **default percentage** of the consumer, the alphabetic code of A, B, C, D E and F are assigned

As entire billing information is available, reports related to key business processes of **Metering, Billing, Collection and Data maintenance** generated

consumer
d of twelve
ns parameter

Typical irregularities targeted

Collections



- High proportion of consumers not paying any amount to the Company in the last 12 months continuing to avail of electricity supply (CAT Class F consumers with live meter status)
- Significant proportion of arrears outstanding for over 12 months
- Defaulting consumers (consumers not paying the Company) continuing to avail of electricity supply
- Arrears of consumers not paying any amount to the Company in the last 12 months reversed via Journal Entries indicative of collusion

Metering



- High level of metering irregularities
- Significant stuck-up meters, with a high proportion continuing in that status for over 10 months
- High proportion of cases where readings are not furnished
- Constant Nil Consumption cases
- High proportion of consumers under disconnection status with progressive readings being noted, indicating theft of energy

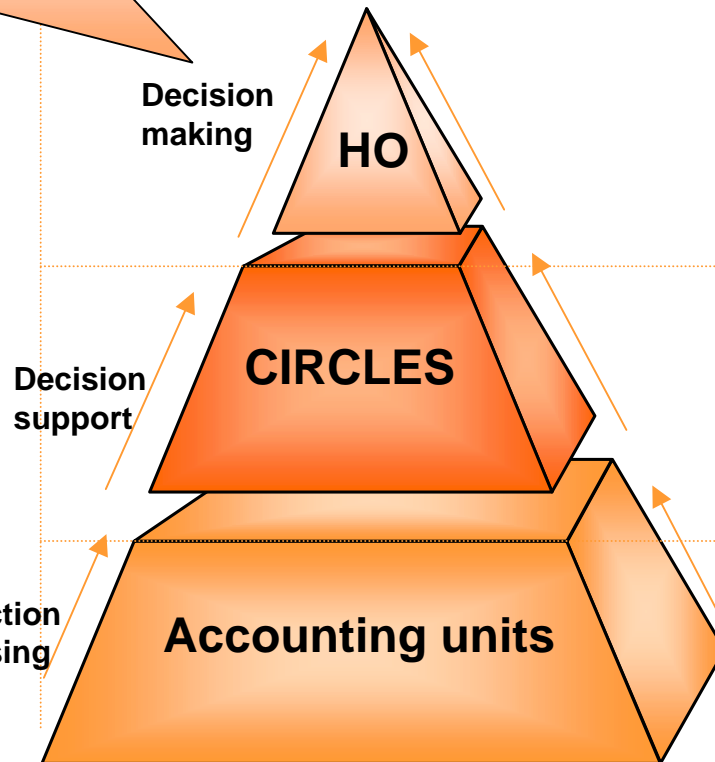
Billing & Consumption



- Billing shortfalls due to incorrect adoption of average by the billing agencies in abnormal meter status consumers
- Consumption much in excess of the declared connected loads noted
- Significant consumers with constant consumption pattern noted ie, standard deviation in consumption vis-à-vis the average consumption of last 12 months less than 1 per cent
- High proportion of consumers being billed on monthly minimum charges (lowest billing amount)
- Cases with significant variance in consumption noted

Books Consolidation Process

- Consistent and accurate information
- Timely consolidation of books of account
- Review and reconciliation mechanism
- Relevant for decision making
- Development of capabilities

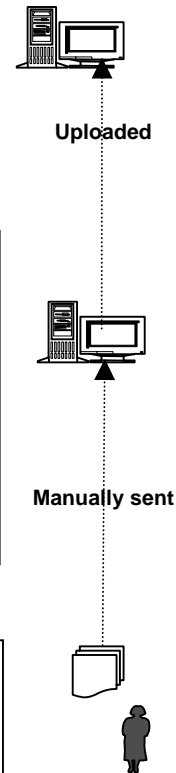


Key Activities

- Consolidated financial statements of DISCOM
- Regulatory compliance
- Decision making
- Performance measurement of circles

- Consolidation of TB's and preparation of circle balance sheet as per standardised COA
- Fixed Assets register Circle-wise
- Generation of MIS reports
- Manage interface with Accounting units

- Trial Balances as per COA
- Cash
 - Adjustment
- } Standardised formats



Restructuring Strategies-Indian Distribution Sector

Impact of restructuring on tariffs and reliability

Restructuring has many positive impacts on the tariffs

- Formation of regulatory commission and rationalisation of the Tariffs.
- The pattern of the last three tariff orders of APERC clearly brings out this aspect. The cross subsidy has been gradually reduced and tariffs for subsidised category increased. Similarly the tariffs of Industrial category have been rationalised by reducing the rates.
- The quality of information/data has improved after restructuring thereby the category wise /slab wise cost allocation has been more realistic .
- Measurement of unmetered consumption has been improved by following a scientific methodology in assessment.
- Internal efficiency targets have been more realistic and the utilities have been able to achieve these there by reducing the Gap and tariffs

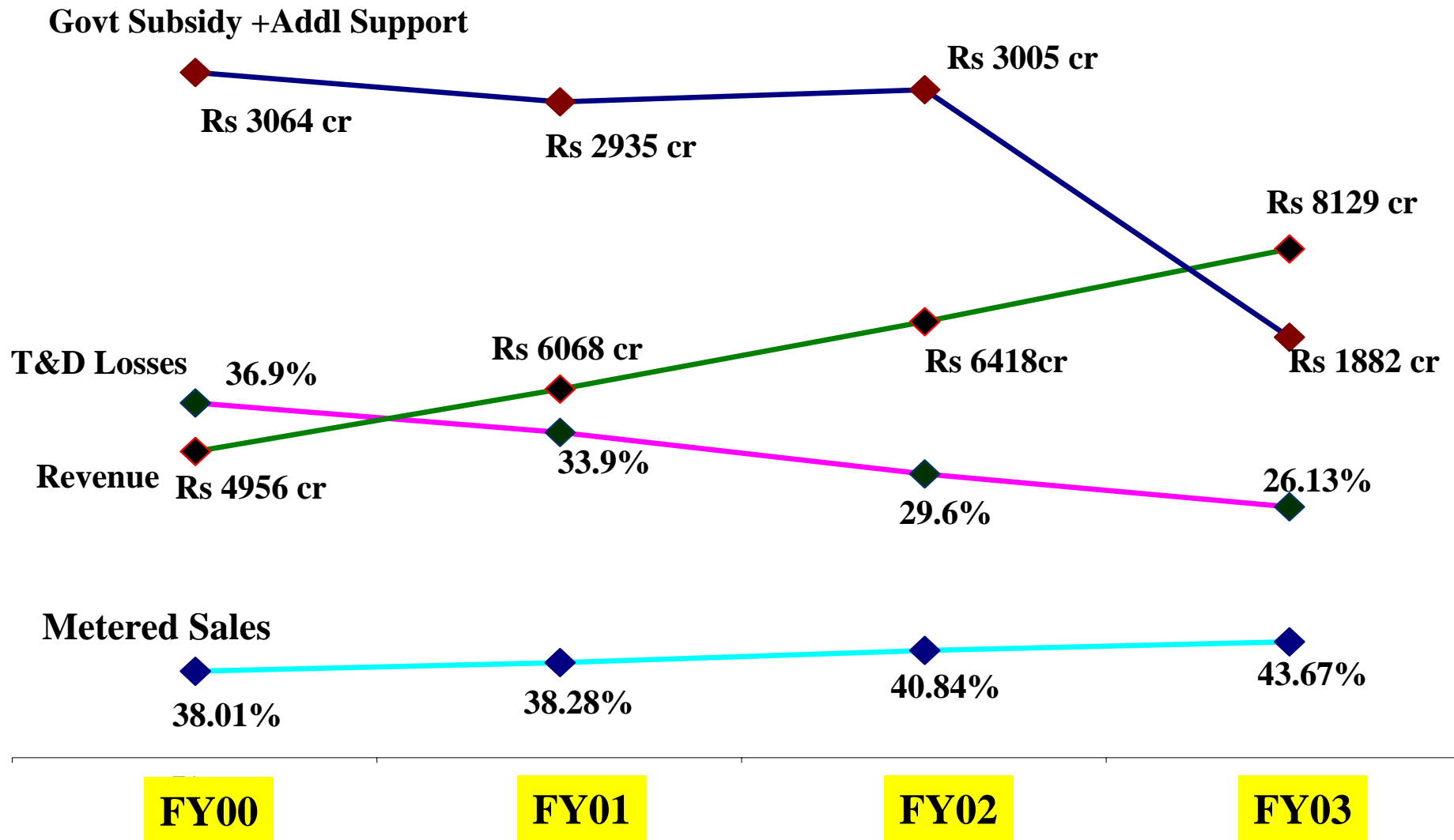
Regulatory Reforms Initiated by APERC

- Gradual alignment of retail tariffs for different customer categories with their COS levels. Significantly, the energy tariff for HT Industrial consumers has moved from Rs 3.90. per kWh to Rs 3.60 per kWh over a period of 2 years. This has led to significant energy repatriation from captive and third party wheeling sources
- Number of slabs are being rationalised and have been removed wherever feasible .
- Achievable but significant system loss reduction targets have been set for the utilities in Andhra Pradesh
- The regulator has assisted the utilities in prioritising operational improvements by issuance of suitable directives

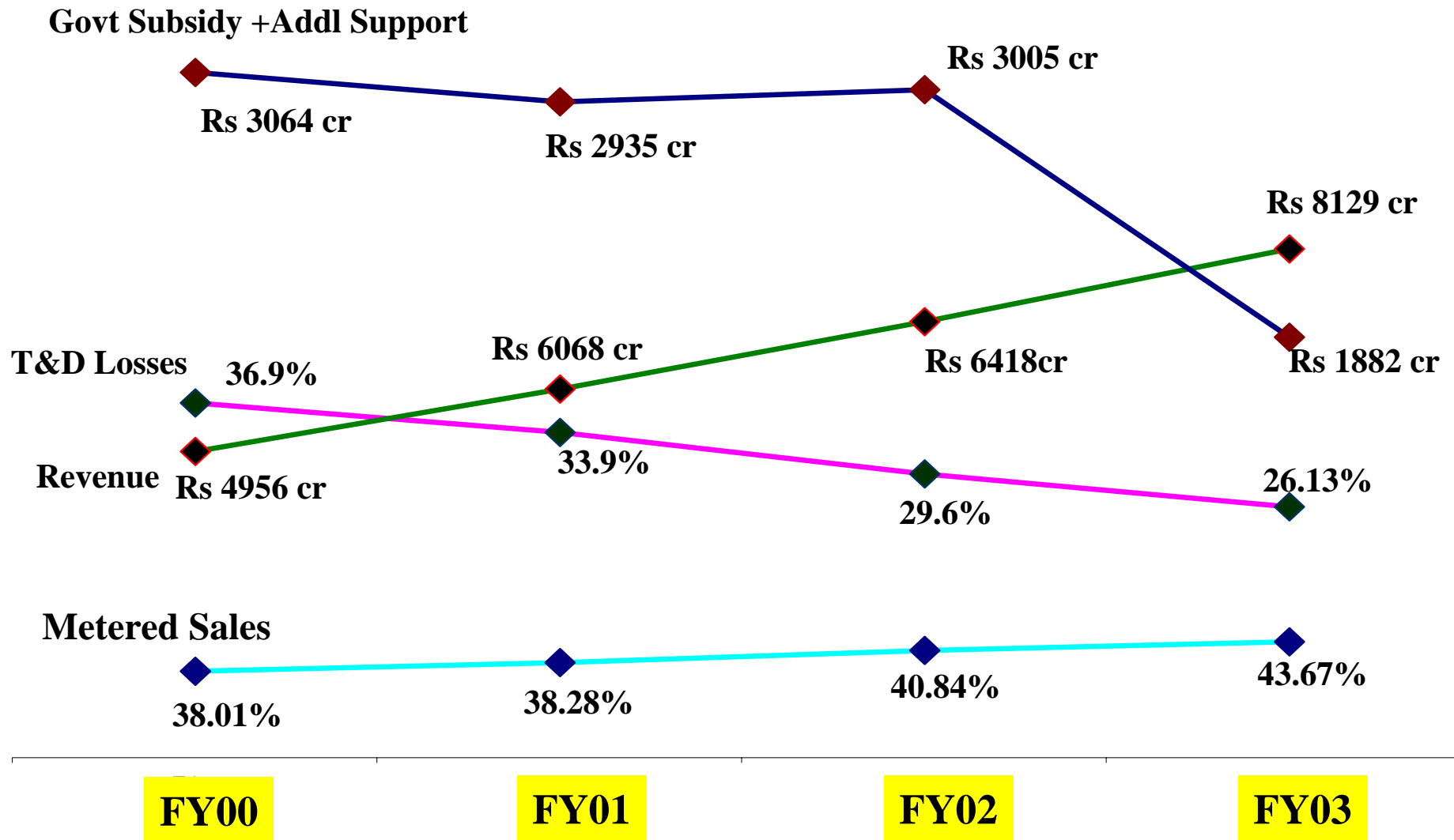
Regulatory Reforms Initiated by APERC

- Gradual alignment of retail tariffs for different customer categories with their COS levels. Significantly, the energy tariff for HT Industrial consumers has moved from Rs 3.90. per kWh to Rs 3.60 per kWh over a period of 2 years. This has led to significant energy repatriation from captive and third party wheeling sources
- Number of slabs are being rationalised and have been removed wherever feasible .
- Achievable but significant system loss reduction targets have been set for the utilities in Andhra Pradesh
- The regulator has assisted the utilities in prioritising operational improvements by issuance of suitable directives

Profile of Key Indicators during Reforms



Profile of Key Indicators during Reforms



Restructuring Strategies-Indian Distribution Sector

Impact of restructuring on tariffs and reliability

- Restructuring has many positive impacts on reliability.
- Improvement of data and information flow has helped in measuring the Reliability indicators like Interruptions, Power Quality aspects. This has helped in bench marking the indicators and achieving these targets.
- Improved quality in investments and taking up investments which bring the required improvements like eliminating under voltage pockets, reduce losses .
- Implementation of IT applications like remote metering, remote control through SCADA etc have helped in identification of faulty areas and rectify in time thus improving reliability.
- Adherence to Quality standards during procurement and installation has improved the availability of the system.

Hyderabad Integrated SCADA Project

