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Infrastructure Workshop Improving Power Distribution Company Operations – A Strategic Approach For Managers

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Washington, DC



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Agenda

- **Scope**
- **Setting the scene**
- **Tool kit for operational improvement**
- **Premises for implementing success improvement programs**
- **Transforming the utility: corporatize and commercialize**
 - **Programmatic approach**
 - **Managerial leadership**
 - **Securing funding**
 - **Measurement**
- **Select tactics for success**
 - **Segmentation**
 - **Geography**
 - **Customer service**
- **Practical lessons from the field**
- **Recommendations**



Scope of discussion

What is included

- ***Devising an approach to improve distribution performance based on project experience***
- ***Focus on what the company management can do***
- Topics:
 - Network balances
 - Metering
 - Customer information systems /Billing and collections
 - Improving cash collections

What is not covered

- Power sector reform programming
- Tariff redesign
- Optimal sector structure
- Policy guidance to Power Ministry or Regulatory Commissions
- Ownership issues
- Incentive plans for management
- Vendors
- Sample bid documents

Program for managers to plan for improving overall operational performance.



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Context

- Target audience: emerging market utility management
- Distribution sector is in a state of chronic disrepair, both technically and fiscally
- Disappearance of private investors; no white knight on the horizon
- This is a time for 'self-help'
- Acknowledgement:
 - Numerous efforts have been made in the past to address the issues that are the focus of this topic
 - These efforts have employed some of the best and brightest minds, yet the results have been decidedly mixed



Focus: Improvement of utility operations

There are three areas where improvements can be made in the utility sector

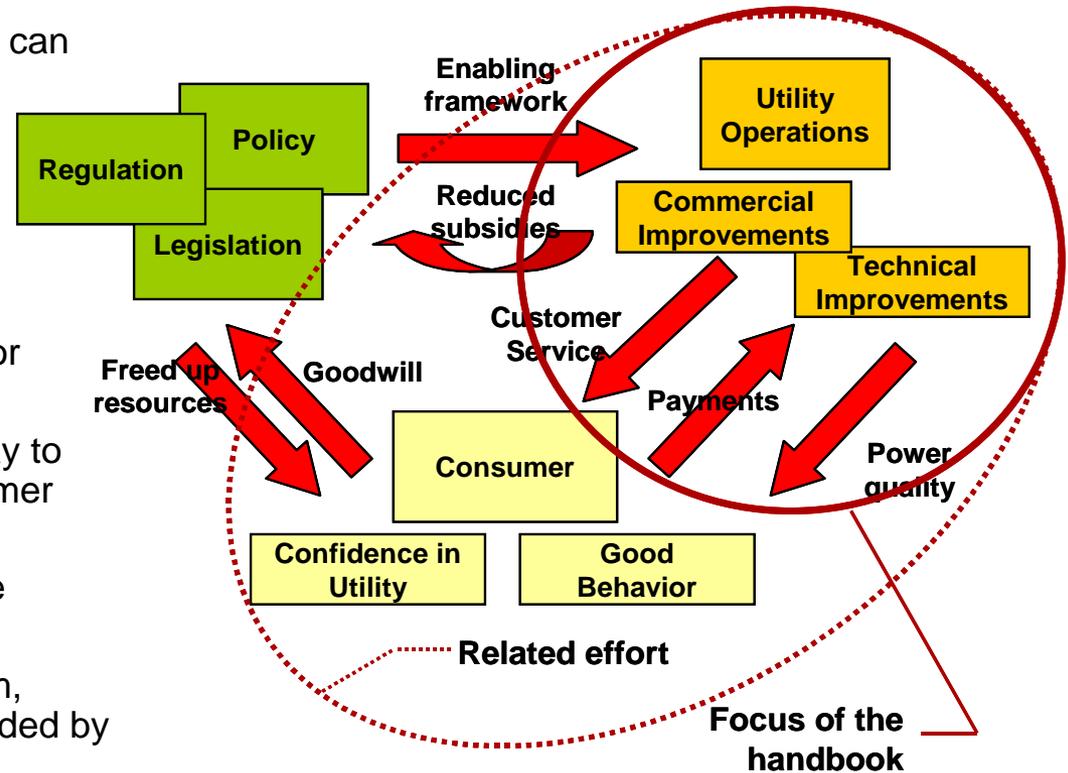
- Policy and legal
- Consumer behavior
- **Utility operations**

This presentation focuses on operational improvements within a utility as a catalyst for reform

Improved utility operations will go a long way to addressing chronic distrust amongst consumer groups

At the same time it will begin to alleviate the burden on government resources

Policy, while plotting a bold course of reform, should also pragmatically reflect and be guided by operational realities



The goal: Enhance the utility's core business

It is important to get the commercial foundation built and reinforced and use that strength to then systematically tackle pandemic challenges



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Condition precedent: Institutional support is needed to enable and sustain operational improvement

The operational improvement process requires support from the government and regulator in order for it to succeed.

There are number of areas from which this support can come:

- ***Political support***
 - Refrain from using the power sector as a political tool for currying favor from certain constituencies
 - Transparently grant subsidies and explicitly account for them in budgets but outside the operating environment of the utility
- ***Legislative support***
 - Cede utility oversight to an independent regulator
 - Criminalize theft of power
 - Give the utility the right to disconnect delinquent customers
- ***Regulatory support***
 - Create commercially oriented tariff policy
 - Monitor utility customer service performance
 - Audit utility finances to assure money is being spent wisely and to assure there is sufficient funding

We acknowledge that without enabling policy, legislation, and regulation and the will to enforce change, the utility's ability to institute operational improvements is greatly diminished.



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Setting the scene – the managerial challenge

**Picture yourself as the new chief executive of a developing market utility.
Here is the situation**

- Demand is growing at 5% per year and looks set to grow even faster
- Unaccounted for power is 35% of bulk purchases and growing
- Power quality is poor and there is a need for supply curtailment every day
- The tariffs charged to most consumer classes only cover a portion of cost
- Government subsidies are the on-going subject of political whim and you are under pressure to reduce them
- Industrial customers are begging for more supply and with higher quality
- Service complaints are backlogged for months
- Collection rates are low
- Theft and corruption are rampant
- The paying customers you do have are in rebellion
- The foreign private investors that were courting you a few years ago are nowhere to be found, and they haven't left a forwarding address



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What do you do?



02/06/2004



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What is management doing now?

Current approaches to the distribution problem range from frantic struggles to looking the other way; characterized by:

Managerial Traits

- Management focused on serving its government masters, both political and bureaucratic
- Relying on lower level management and field staff to take responsibility for change; characterized by senior level micromanagement for short periods when the government is concerned about the issue followed by long periods of hands off treatment
- Failing to implement a comprehensive change program – problem seems too daunting, overwhelmed with perceived scale and complexity
- Utility management taking a piecemeal approach to improvements
- Attempting pilot projects, but often
 - They are too small to make an impact and often result in failure
 - They do not have sufficient breadth of scope to handle major issues

Operational Norms

- Most day-to-day work effort is focused on putting out fires
- Restricting supply several hours per day in order to serve all
- Power quality is poor for most – frequency, voltage way off acceptable levels
- Underutilizing IT as a tool; reliance on decentralized paper records
- Holding customers in contempt; lack of desire to serve
- Tolerating or ignoring corruption amongst staff

Management is often in a state of paralysis: where to start?



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A strategic approach to operations improvement

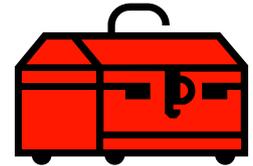
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Tool kit for operational improvement



Focus on four areas that are within the utility's purview to affect change and that can dramatically improve their fiscal and operational health

- **System energy balances** Enables utilities to determine where the greatest sources of technical and commercial loss take place by measuring at multiple points in the distribution system the difference between purchased power and power ultimately billed.
- **Expanded metering** Covers metering for revenue, network monitoring, and regulatory mechanisms
- **Upgraded customer information systems** The general category of CIS has the goal of providing an accurate customer database, improved billing and collection results, and ultimately providing improved customer service
- **Improved cash collection efficiency** There are many ways to improve both top line revenue and bottom line profitability of the utility; some employ technology, others are simple human processes.



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Premises applied

There are four key principles we recommend to guide planning for improvement

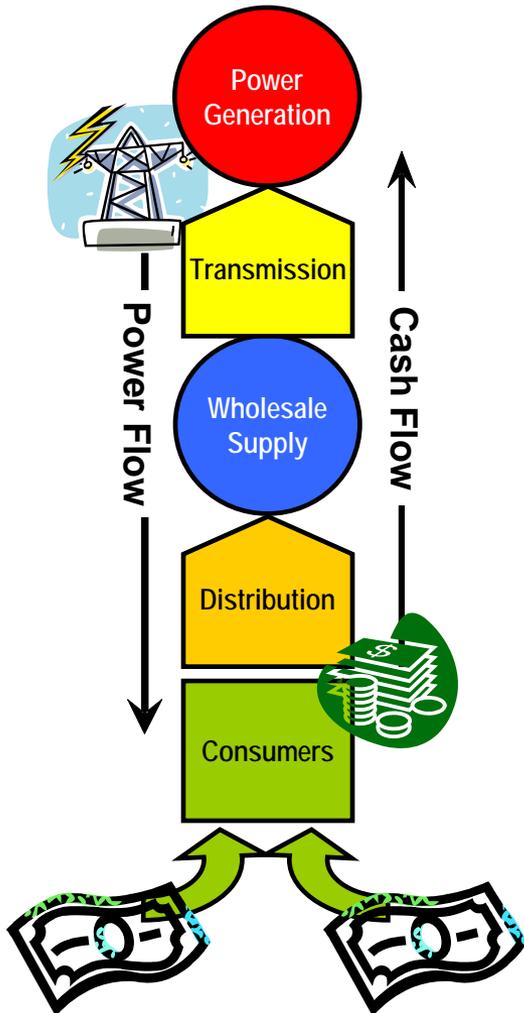
- 1. The primary source of money flow into the power sector should be from collections**
- 2. Ownership is not an issue for achieving improving commercial performance**
- 3. Customer service and financial health go hand in hand**
- 4. A program of incremental change is the key to success**

We discuss these in turn...



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Premise 1: Money flows into the utility value chain from collections



The best way to improve operations is to get more cash into the system from customers

Whether or not tariff covers costs, the principle of payment for service must become habitual; it is the only hope for increasing tariffs in the future

In a commercially operating utility system, consumer collections are the only true source of money for the rest of the value chain

- Generators sale price of bulk power includes fuel costs, operation and maintenance costs, and capital recovery
- Bulk power purchases embody costs for transmitting the power purchased from generators
- The distribution utility collects consumer tariffs to pay for distribution operations and maintenance, capital investment and bulk power purchases

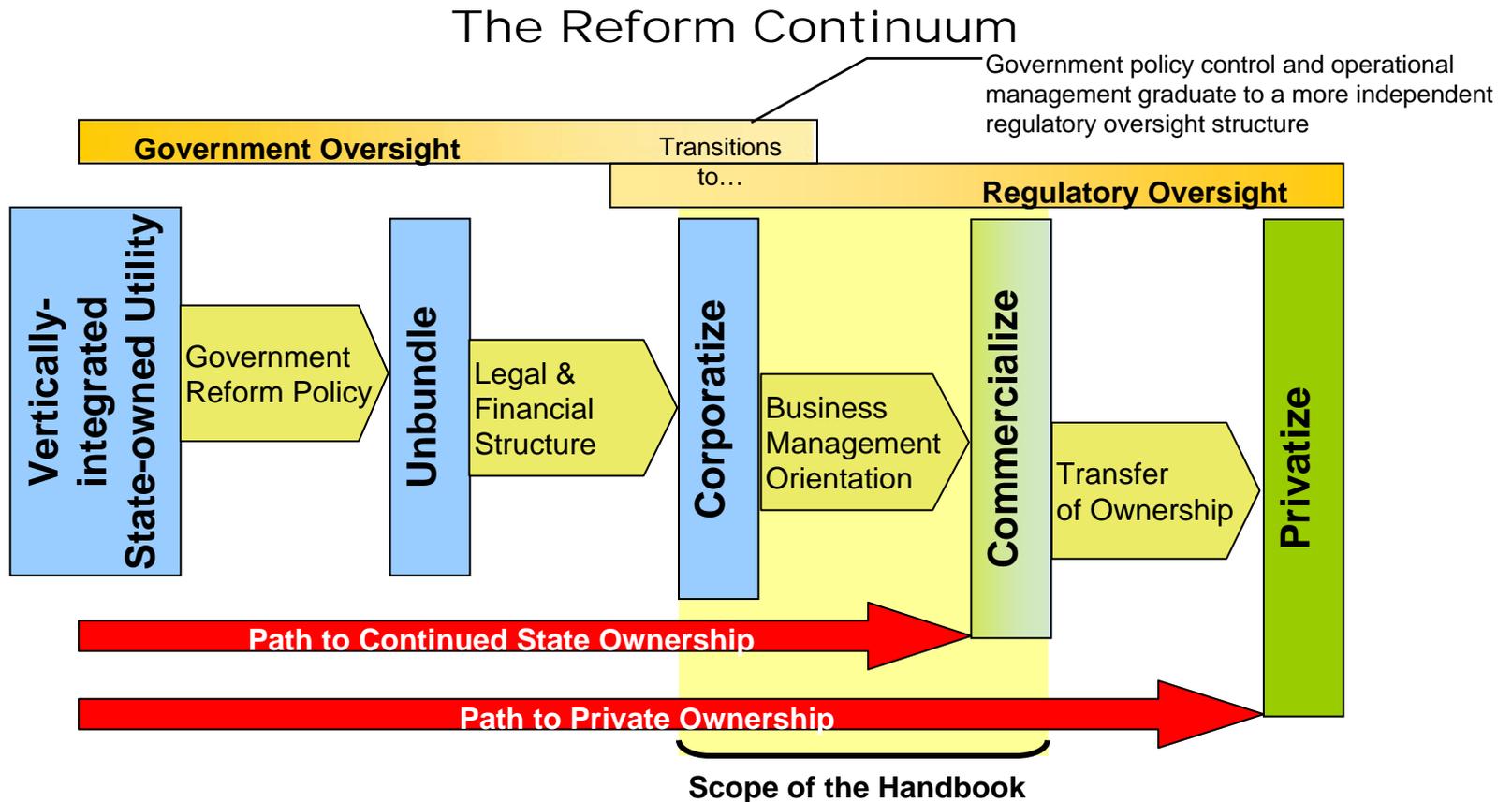
In the event of a shortfall in consumer revenue, there are few alternatives

- Government subsidies
- Chronic indebtedness
- Bankruptcy



Premise 2: Ownership is not an issue for improved commercial performance

Whether a utility is privatizing or commercializing, operational improvement requires the same steps





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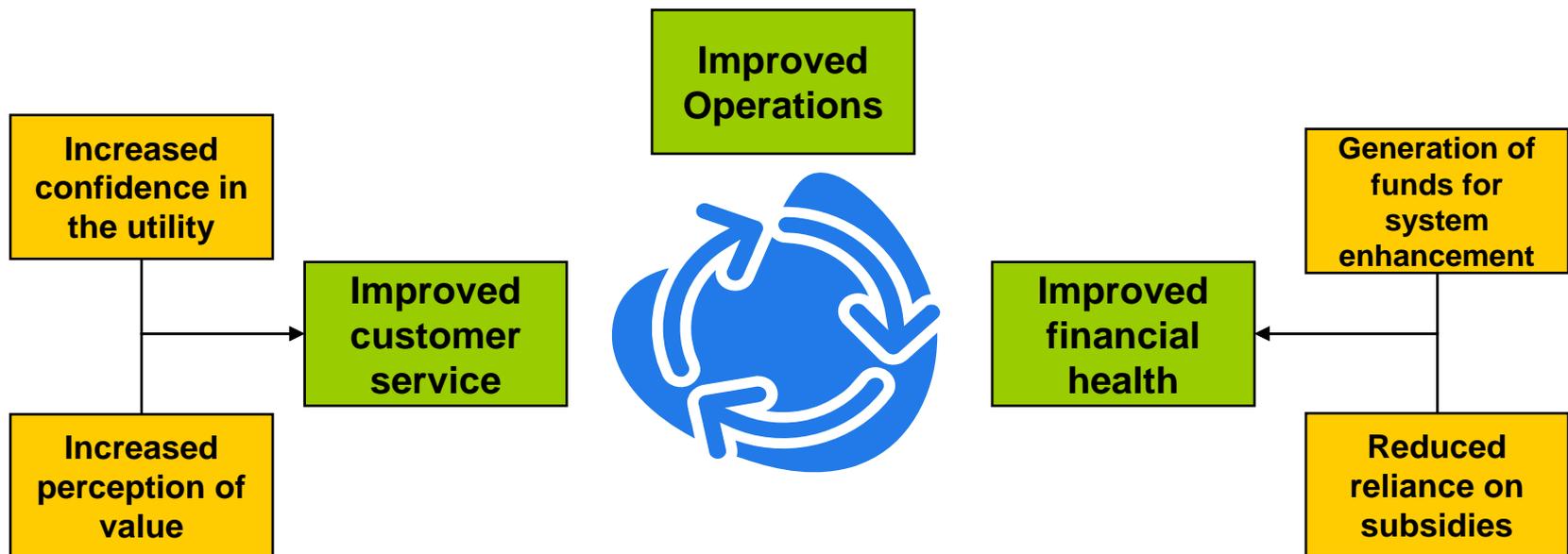
Premise 3: Customer service and financial health go hand in hand

We target two key outcomes from operational reform and improvement

- Improved financial health
- Improved customer service

There is a mutually reinforcing, symbiotic relationship between improved customer service and improved financial health:

Willingness to pay and Willingness to serve

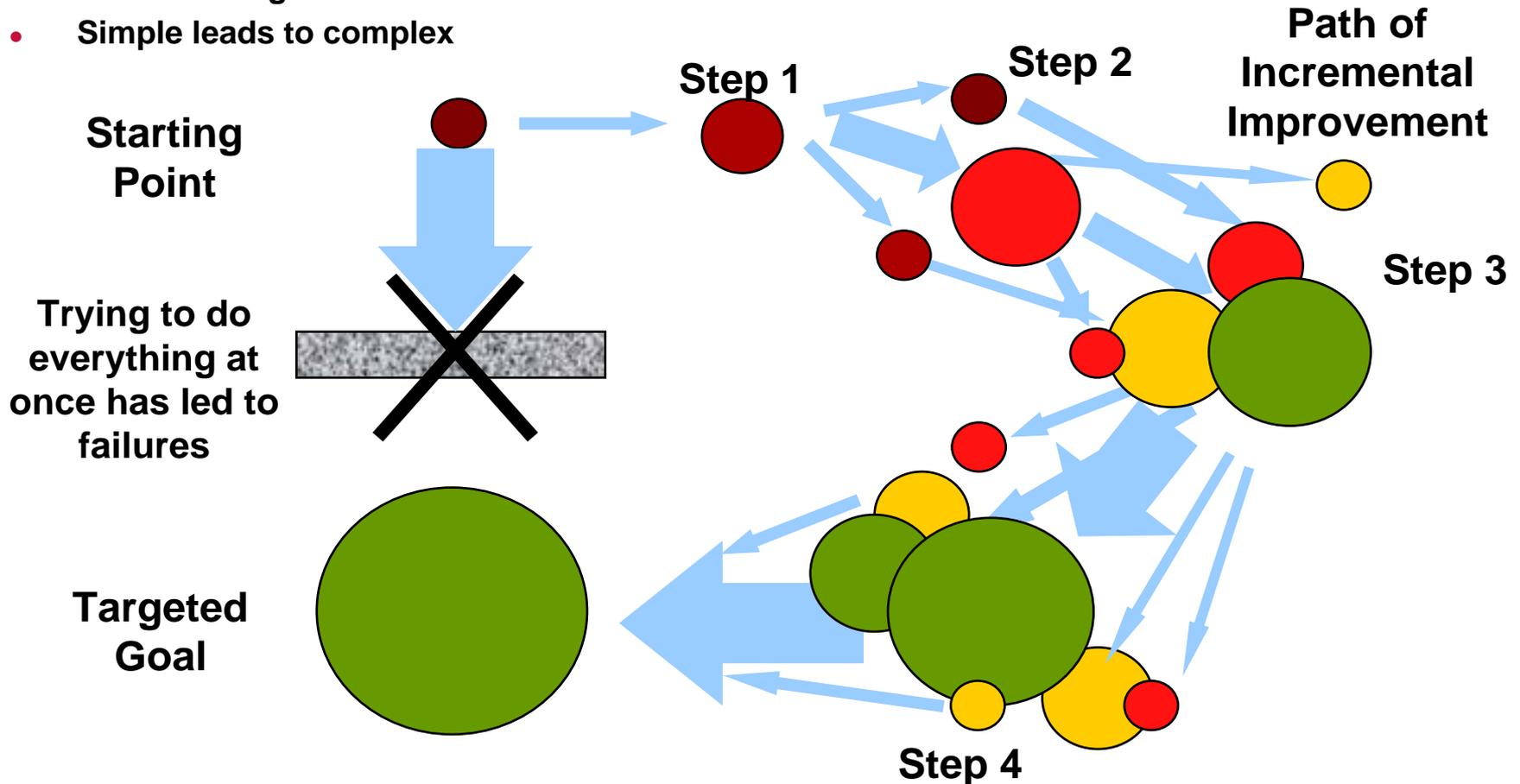




Premise 4: Incremental change is good

Experience supports a program of *incremental* improvement

- Success breeds success
- Set realistic goals
- Simple leads to complex





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How do we transition?

From this....



To this



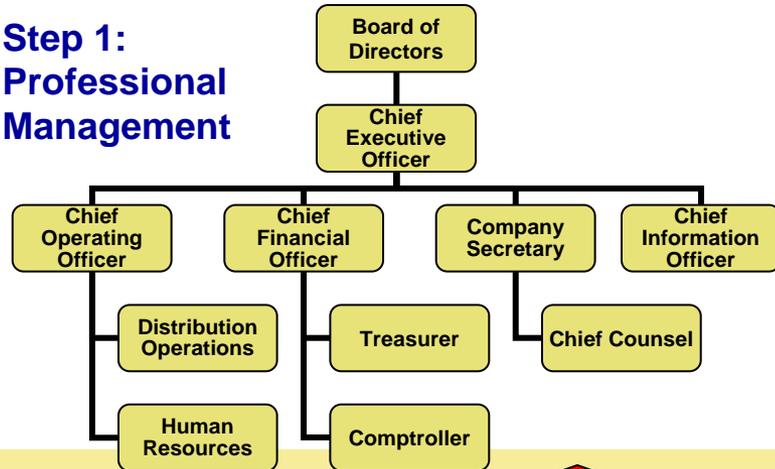
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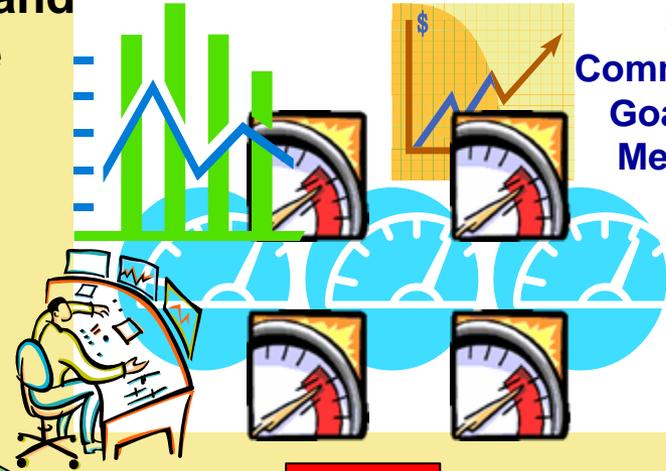
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Transforming the utility: corporatize & commercialize

**Step 1:
Professional
Management**

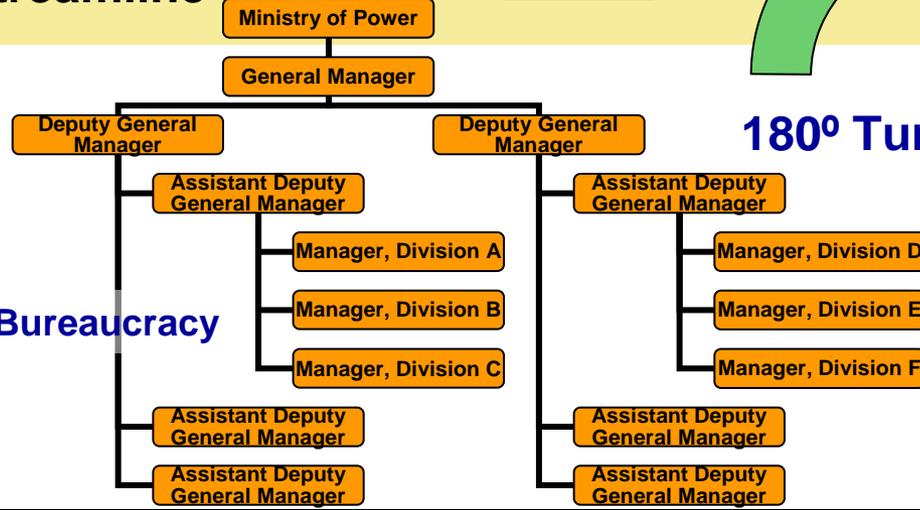


Measure and Refine



**Step 2:
Commercial
Goals and
Measures**

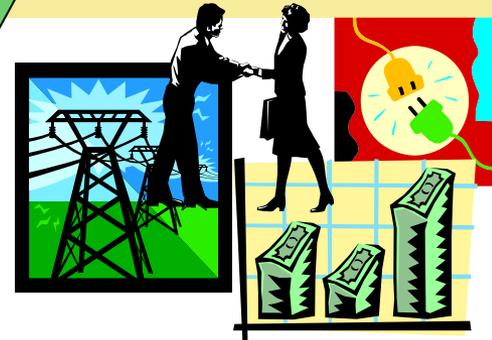
**Corporatize and
streamline**



Bureaucracy

180° Turnaround

Serve and Succeed



**Customer Service
Quality Service**



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The first steps: Transition from state bureau to commercial enterprise

- **Introduce professional management**
 - Restructure management to reflect a modern corporation
 - Functions and titles need to be matched with management expertise/capability
 - Incentivize individual performance
- **Focus on increasing revenue and reducing costs**
 - Work with current tariff structure first
 - Measure inputs and sales – meter everything
 - Reduce outstandings by issuing proper bills and collecting those bills
 - Plug leaks, remove illegal connections
 - Improve customer service and, by extension, customer satisfaction
- **Create a master program for commercial change**
 - Management needs to preside over development of an integrated, global, master plan for performance improvement
- **Measure performance**
 - You cannot manage what you do not measure
 - What gets measured gets done
 - Establish baselines
 - Track improvements and struggles
 - Back measured by incentives



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Management must believe in change and lead it



Operational reform, particularly a rapid transition to commercial-minded performance, should be executive management's *top* priority. That is simply part of good governance.

- **Strong leadership will be the catalyst for change**
 - 'C-level' executives (CEO, CFO, COO, etc) should plan, discuss and monitor performance improvement above all other items on their agenda
 - Recognize that the utility is the problem, and tirelessly focus on it
- **Senior management must develop and lead the change program**
 - A holistic view of the operational improvement program must be taken;
 - Only executive management can create the corporate vision and see that it is implemented
 - Only executive management can assure adequate human resources and capital are allocated to the effort
- **Accept that operations improvement program is a permanent process**
 - There is no end date to an improvement program
 - It should become an inherent part of utility operations and management
 - Management must understand and review performance metrics continually to assure the company is on the correct course

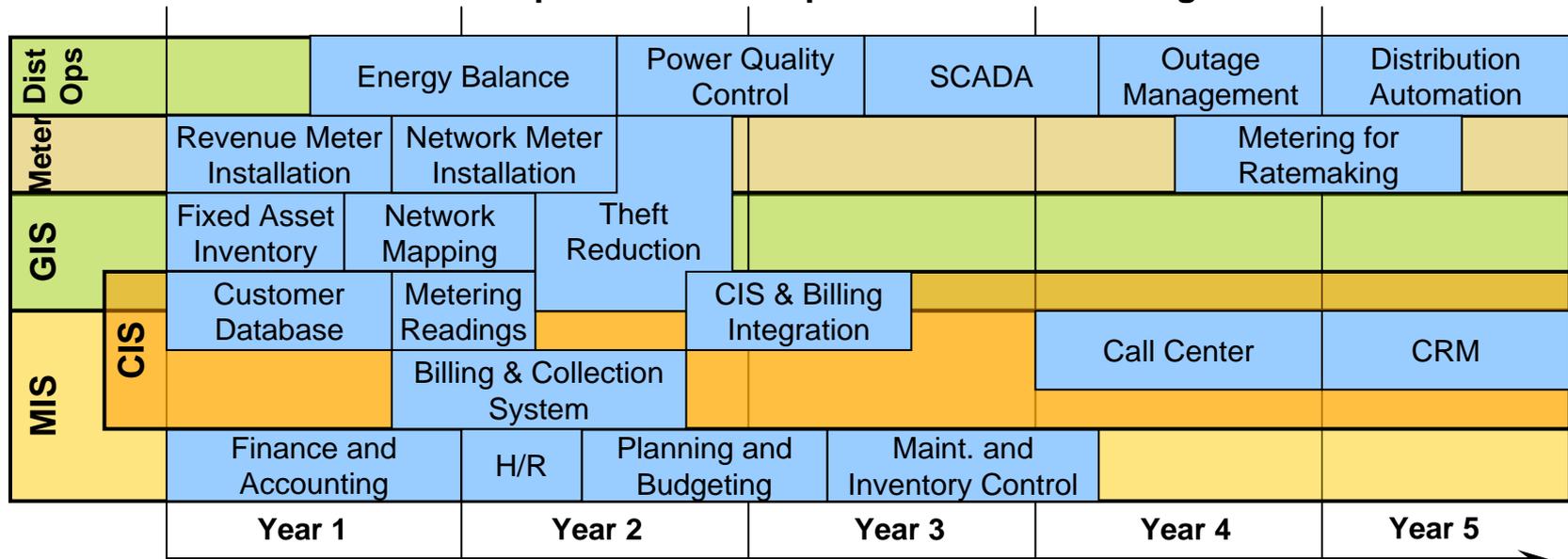


A Programmatic Approach: Prioritization and integration is essential

Management needs to take a holistic, long-term, comprehensive view of its performance improvement program in order to set the course for the future

- It is of critical importance to prioritize operational improvement investments.
- Focus should be on elements that are easy to implement, have high benefit to cost ratios and support the most basic operational elements of the utility.
- Typically a good starting point is a focus on assuring all customers are accounted for in company records, receive bills and pay those bills

Sample Prioritized Operational Reform Program





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Implementation: Assure funds are available

Funding improvements is critical but initially difficult; consider developing a professional treasury function to tap a variety of capital sources



Outside funds are necessary to kick start the improvement process; initially donor agencies are an emerging market utility's best resource

- Given the increased recognition among donors agencies of the distribution sector's importance to the long-term stability of developing market utilities, the savvy finance director should attempt identify willing funding sources that support master plan implementation

Utilities need to make efficient use of donor funds; funds are not unlimited

- Looking at the universe of development assistance
 - Whether in the form of grants or loans, development aid often targets specific technical assistance, materiel or processes; see how these sources fit with the utility master plan
- Manage development aid on a portfolio basis
 - The opportunity to pull from multiple sources of assistance should be looked on as a strategic source of funds by utility management.
 - Managing relationships with multilateral and bilateral donors, banks and investors can be a full-time job
 - Finance directors should be encouraged to be proactive in their soliciting of funds to meet their goals



Implementation: Assure funds are available



Foster development of own capital resources

- Utilities should not neglect other capital resources available to them
- Tapping the savings generated from commercial reform will give the utility more flexibility to carry out investment programs as they see fit
- During the period of transition, utilities can structure their funding to be leveraged against savings derived from commercial performance improvement programs
 - For example, strike an agreement with the government to continue subsidies while the utility uses benefits from operational improvements to fund further improvement projects

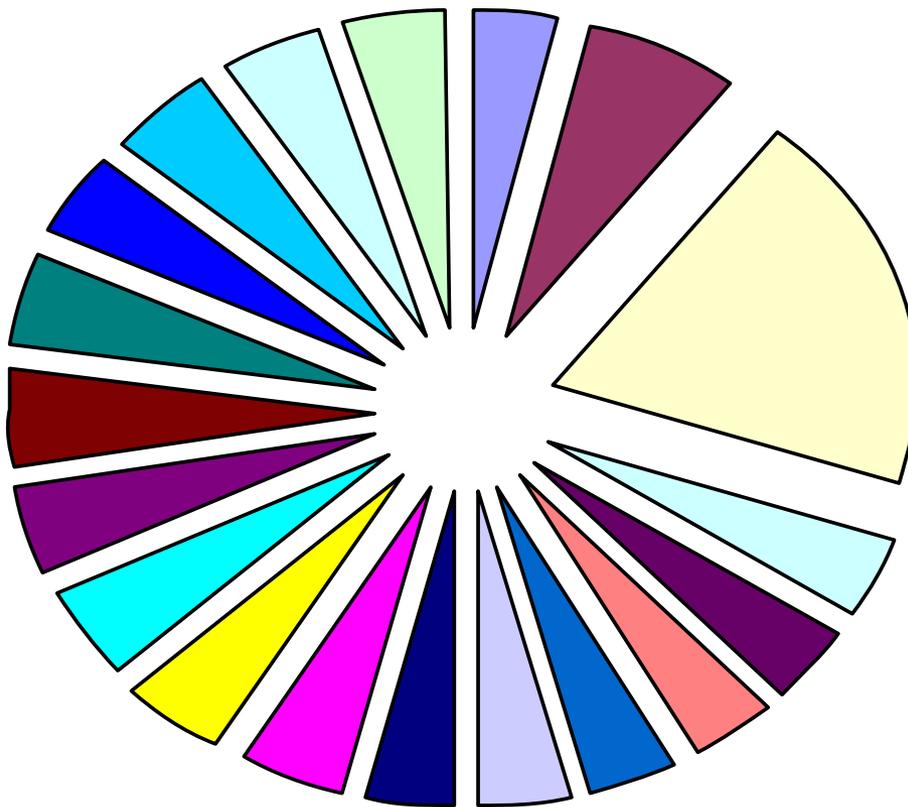
Look to local capital

- As the utility's health improves, it needs to monitor commercial markets to know when to transition to those sources
- In countries where local capital markets are not robust, the utility can help to develop them; investment in the domestic utility may be an attractive starting point for domestic investors either in the form of equity or debt (bonds)



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Loss Reduction is more than technical losses and theft



Loss Pie Chart

Source: BSES Yamuna presentation, 2004

- Imp / Exp metering errors
- Technical losses (66 & 33KV)
- Technical losses (11 kV & below)
- Theft
- CT ratio/MF error
- Stop meter
- Slow meter
- Defective meter
- Meters not read
- Consumers not billed
- Unregistered consumers
- Bills not delivered
- Misuse of category
- Consumers billed but not credited
- Part payment
- Deliberate under billing
- Provisional billing
- Bills on a/c of old meter when changed
- Line disconnected consumer



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Tactical approach: Segmentation

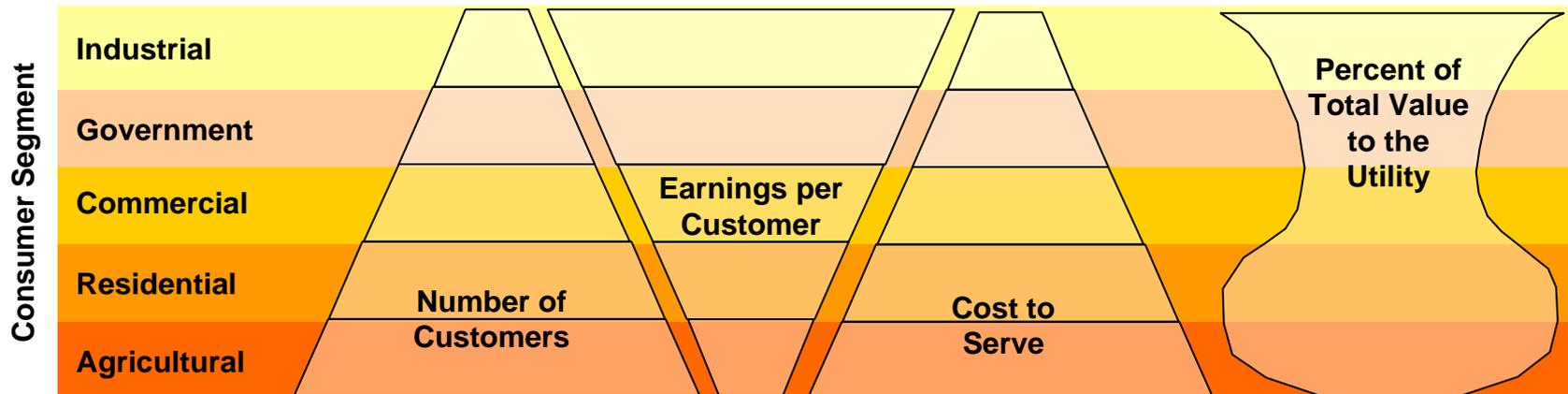
Prioritize improvement programs by customer class

It is easier to focus initially on a small number of high value customers first and expand toward more numerous and complex constituencies as the improvement program progresses

Example:

- There may be only a small number of large industrial customers, but the associated earnings per customer have the potential of being very high
- On a per-kWh basis, the cost to serve these customers is very low
- Accordingly, their value to the utility is very high
- Correcting billing and collection issues with industrial customers can, therefore, be very remunerative

Sample Emerging Market Utility Customer-Value Relationship Comparison





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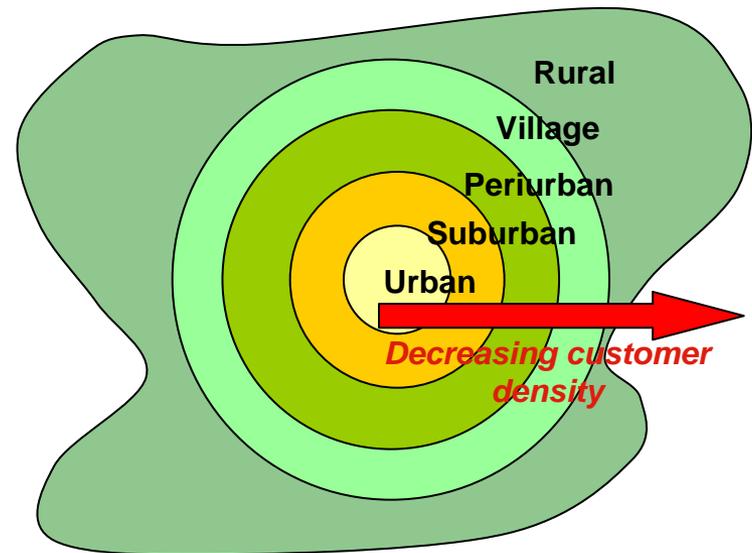
Tactical approach: Geography Focus on 'low hanging fruit'

Prioritize reform efforts on the easiest to serve, highest value customers first, then move outward.

Density of customers is a good place to start.

- Urban customers offer the opportunity for easy-to-execute improvements, greater customer concentrations, higher probability of payment (due to higher incomes), and greater exposure/publicity amongst constituents
- Success and savings from urban reform programs can be leveraged to jump-start suburban and peri-urban programs, and so on

Geographic Prioritization





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Tactical approach: Customer relations

A need to win the hearts and minds



The more satisfied a customer is, the more likely that customer will pay

- It should be assumed that most customers in our prototypical utility are beleaguered; a state of siege mentality. Customers typically feel powerless to affect change and have a sense of hopelessness regarding their service situation.
- Customer outreach is the most powerful, positively reinforcing tool a utility can use to promote changes in consumer behavior and cement those changes into place. It should be used as counterbalance to more blunt enforcement methods, such as shut offs.
- Researching in the field; surveys are important for gauging customer requirements

Improved customer service pays dividends – on both sides

- People must feel they are getting something in return for their payment
- Addressing chronic problems is important, such as response time to service calls, time to connect/disconnect, power quality and interruptions, making it easier to pay a bill

Expand customer relations in the field during times of major change

- When big changes are planned, such as introducing metering in previously unmetered areas, advanced customer outreach is critical
 - Tell customers what is about to happen and the expected outcome for them
- Use of field-resident ‘customer care’ representatives, especially in rural areas, goes a long way to smooth the transition to new operating practices

If customers perceive the utility to be inefficient in providing service at reasonable cost, then it is incumbent upon the utility to first become more efficient, and secondly to communicate to customers the steps it is taking to make improvements, in an honest, straightforward manner.



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Lessons from the field

CIS/Billing & Collection

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Customer Information System

- Customer Information System (CIS) should be considered in the context of overall utility management information systems (MIS)
- CIS must also be considered as an integral component of an overall metering, billing and collection system



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Major elements of a Management Information System

Major MIS Components and Data Flow

The following schematic represents the major elements of a typical MIS system for an electrical utility company and the top-level data flows amongst the system components.

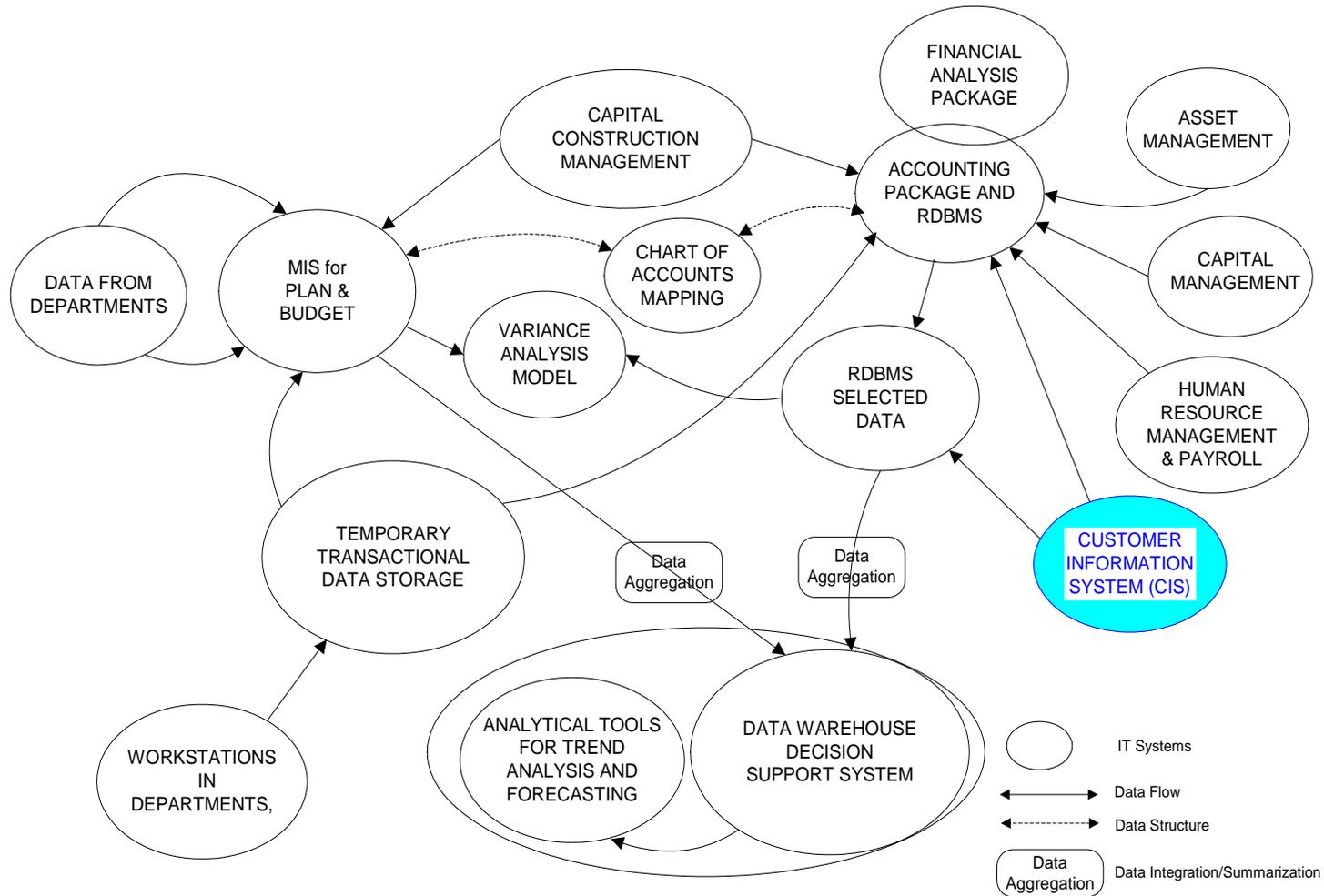
Integrated ERP systems may or may not include all of the components as standard elements. Each utility will have a unique system specification that will define the necessary components for the overall MIS.

- Planning and Budgeting Module
- Financial/Accounting Ledger Systems
- **Customer Information and Billing System**
- Human Resources and Payroll Systems
- Materials and Inventory Management Systems
- Capital and Asset Management
- Construction Management Systems
- Decision Support System
- Fleet Management System
- Customer Relationship Management System



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Management Information Systems and Data Flows



Every utility does some or all of these, either through manual or electronic systems



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Major Elements of a Customer Information System

- **Customer Information** – personal data, account type, feeder and transformer information
- **Meter Readings and Data** – meter data and maintenance records, meter reading history
- **Customer Invoices** – personal data, account type, reading date, usage data, tariff schedule, billing date, due date, aged debt
- **Payment and Receipt Modules** – cash register, checks and bounced checks, payment types, prepaid amounts and partial payments, payment locations, credit history, receipt printing, special tax receipt printers
- **Connections, Disconnections, and Reconnections** – list of customers and dates for scheduled services
- **Cash Control and Reporting** – cash books and daily cash reports
- **Report Module** – reports by account type, daily payments, daily breakdown by area/book, lists of clients with credit or in arrears, energy balances, ad hoc reports
- **Receivables Sub-Ledger** – current, aged, and total receivables
- **Customer Security Deposits** – amount, date paid, date refund is due to customer
- **Customer Project Risk Deposits** – for large customer hook-ups: non-refundable prepayment, refundable deposit, number of years to be credited against account



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CIS Implementation Plan: (assumes a commercial solution)

- **Engage an Advisor/Consultant** (typically through a rigorous bid process)
- **Project Plan** (outlined in a proposal)
- **Hardware Procurement and Installation** (typically long lead times)
- **Software Procurement and Installation** (vendor installs system)
- **Customize Application Software** (based on a gap analysis)
- **Develop a Test Database** (used for testing and training)
- **Acceptance Testing of Data Conversion Methodology** (for a legacy system)
- **Data Cleaning** (critical step)
- **Data Population** (snapshot of system state at system startup)
- **Operational Testing**
- **Parallel Operation** (utility staff operates system for a trial period)
- **Integration of CIS With Other IT Systems**
- **Acceptance Test for System** (must be done by client, i.e., utility)
- **Training (and Retraining and Retraining)**
- **Maintenance and Support Contracts**
- **Communications Systems** (network infrastructure – LAN, WAN, Internet)

This checklist reflects a CIS system, not a full-blown ERP application



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CIS System Procurement and Installation Costs: (based on common commercial models)

CIS Application Type	Size of System (assumed)	Total Vendor Costs ¹	Buyer Direct Expenses ¹	Total System Cost ¹	Monthly Operating Cost ²
In-House	100,000	\$20-\$30	\$5-\$20	\$25-\$50	\$0.15-\$0.30
Hosted	100,000			\$22-\$45	\$0.13-\$0.25
Outsourced	100,000			\$15-\$30	\$0.50-\$1.50

- Notes:
- 1) Installation costs are given on a per customer basis.
 - 2) Monthly operating costs are given on a per customer basis.

Ref: CIS Pricing Considerations, Greg Galluzzi, UtiliPoint IssueAlert Emerging Technologies, September 2003, www.cisworld.com/articles/index.html.

These are typical US costs per customer for 3 different models.



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CIS and major MIS System Costs

CIS Example Costs:

- Malawi World Bank project (77,000 customers)
 - \$2.0 million ⇒ \$26 / customer
- Nevis Island CDB project (5,500 customers)
 - 1 bid including hardware ⇒ \$85 / customer
 - other bids w/o hardware ⇒ \$25 –\$35 / customer

MIS Example Costs:

- Public Accounting and Financial Management (Oracle, Platinum, CODA)
 - ERP type medium to large-scale installations w/o billing components
 - \$5 to \$15 million (some w/o LAN/WAN, training, management, building rehabilitation, etc.)

REF: World Bank Africa Region Working Paper Series No. 25

- Core Budgeting and Accounting System
 - \$10 to \$20 million

REF: Understanding and reforming public expenditure management, Guidelines for DFID, Version 1, March 2001



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CIS: Implementation Guidance (lessons learned)

Experience drawn from:

- USAID funded energy sector activities (restructuring, legislative, regulatory, implementation)
- USAID funded CIS (billing and collection) activities
- MDB (WB, CDB) supported projects
- World Bank review of African public accounting/financial management projects
- Private Sector Work
- Operational Experience – Management of a national utility company



CIS: Implementation Guidance (lessons learned)

- **Keep Goal in Sight** (increase revenues)
- **Guiding Principles** (each situation is unique)
 - Obtain corporate buy-in and engage upper management
 - Engage a design and/or implementation advisor
 - CIS is a tool – integrate with other actions
 - Understand the local culture and environment
 - Reform processes may be necessary (regulatory, corporate, staff habits)
 - Understand the cost magnitude of options
 - Fit the solution to the situation (ERP vs best of breed, small vs large)



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CIS: Implementation Guidance (cont)

Donor/Aid Considerations:

Provide for independent transaction advisors

Georgia Example

- Independent consultant as management contractor
- Three-way agreement between government, utility, and consultant

Include funds for maintenance and results evaluation (normally not included)

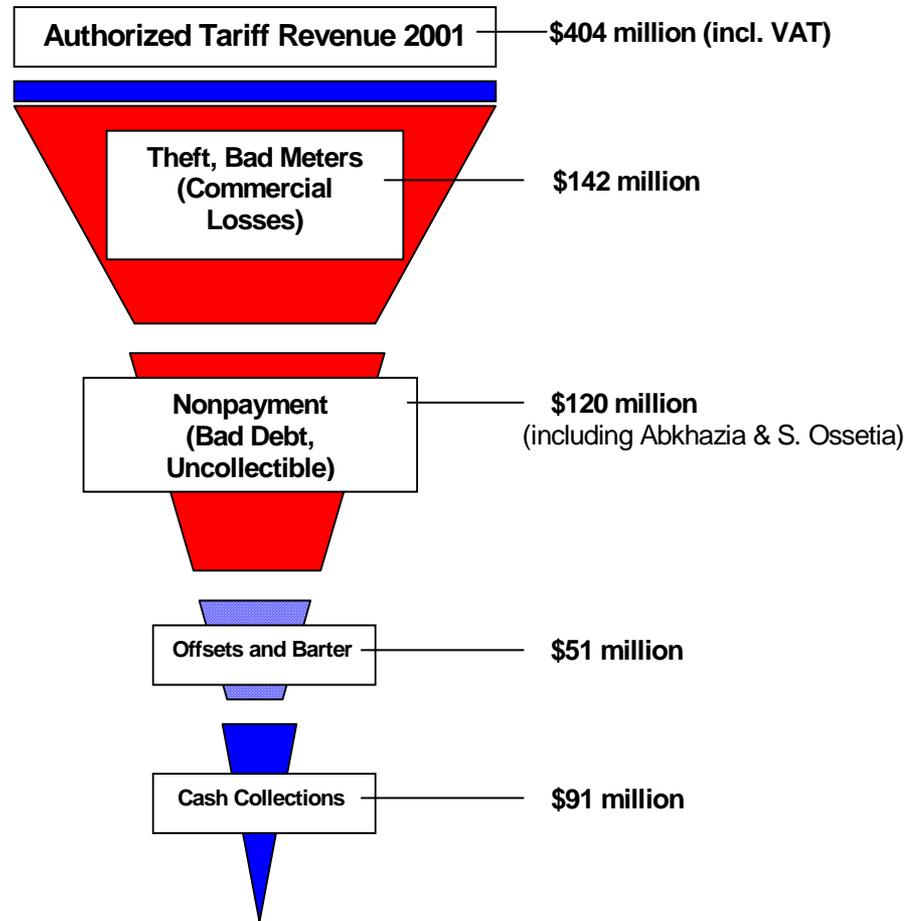
Malawi Example

- Maintenance of CIS was deemed important by management
- ESCOM - \$420K of local funds over 4 years (HIV/AIDS in poor country)
- But no funds for results evaluation



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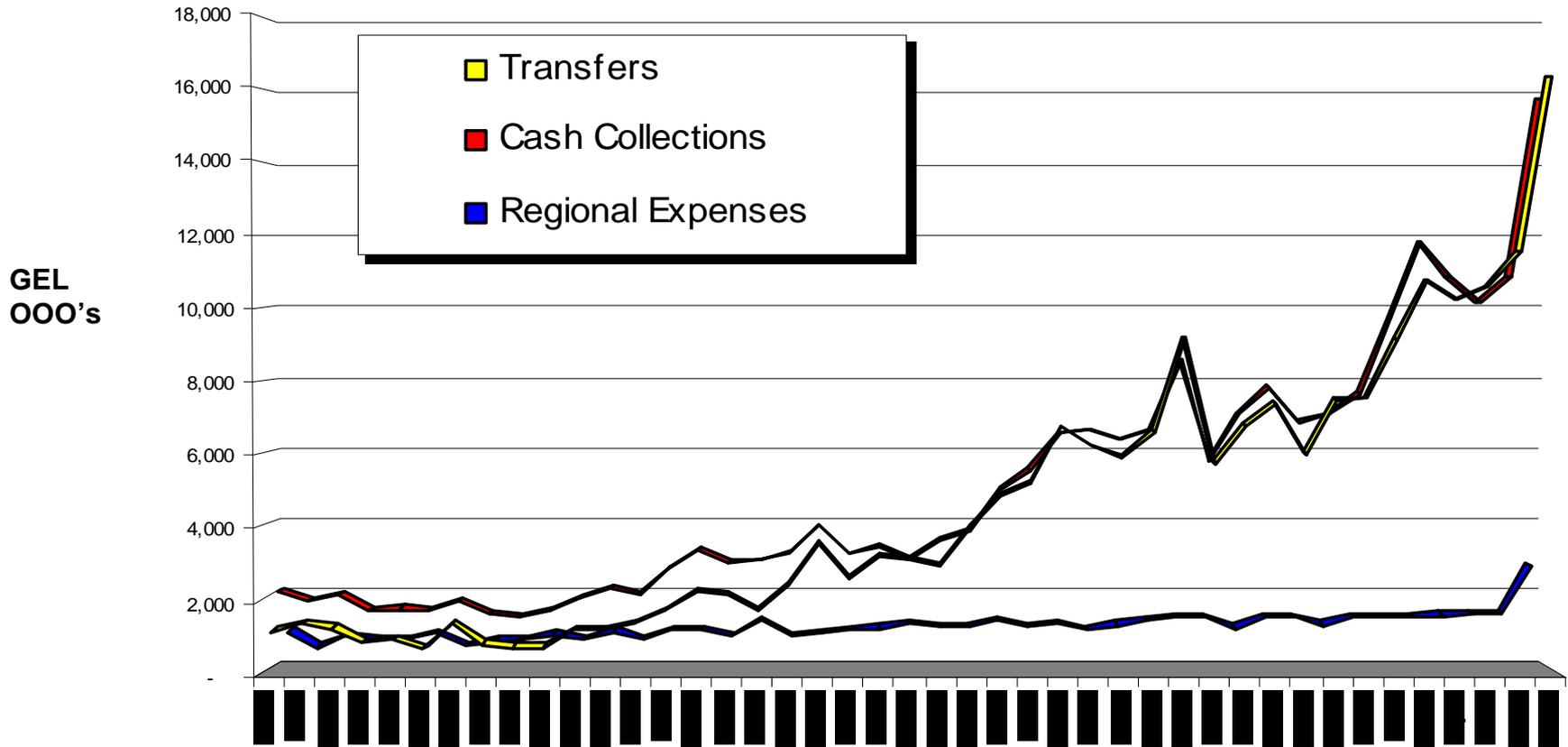
UEDC/Georgia - Poor Performance Throughout the Sector



Today, cash collections are ~US\$90m a quarter, an almost 4 fold increase since 1991.



Financial Performance – Cash Collected



Cash collected is way up, while expenditures have held relatively constant – December collections reached 94%

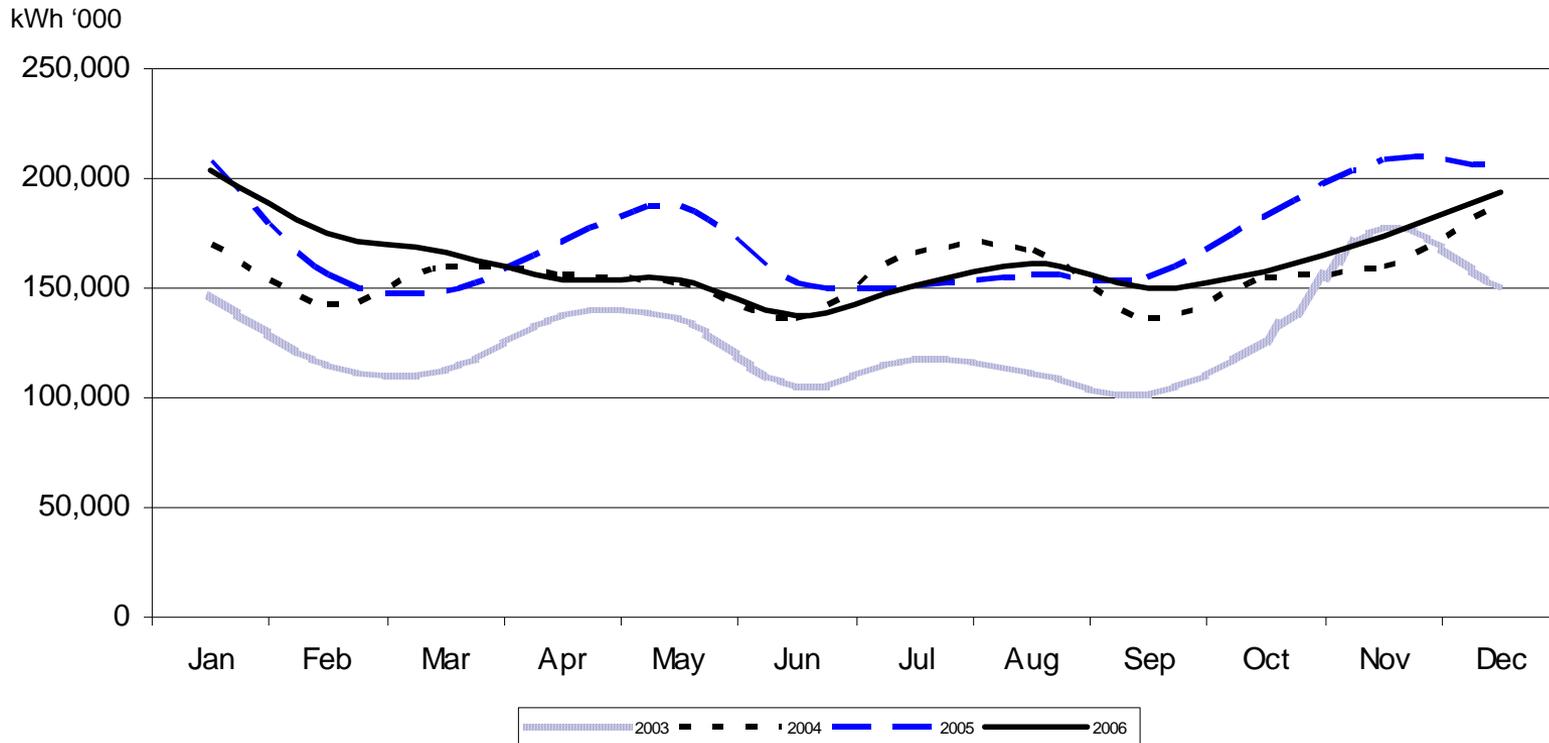
Transfers = total cash including govt subsidies

Regional expenses = operating costs (salaries, and discom operations), excludes debt, energy imports



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Electricity Delivered



Now, we are providing 24-hour supply using the same energy as two years earlier. But back then, we only had four to six hours of supply...



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CIS: Lessons Learned (Georgia case study, UEDC - USAID)

Regulatory:

- Regulatory environment is critical – mere existence of agency is not sufficient
- Billing without meters requires alternatives - such as communal billing
- Process and procedure must be approved
- Establish utility charter - “Small licensees” have been eliminated

Billing and Collection Strategy:

- Billing implementation must be phased – follow the money (commercial, urban, then rural)
- Energy balances via billing program are necessary
- Metering is critical - disconnections for non-payment are difficult w/o meters
- Implement CIS in 58 service centers – roll up results to regional branches and HQ
- Replace “biller/collector” with a CIS and payment centers
- Lack of reliable electricity supply makes billing problematic



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Recommendations

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Recommendations – what is different about this?

- You do not necessarily need to privatize in order to achieve improvement
 - But you do need strong political will and professional discipline
- Executive management needs to lead the change to a commercial orientation as its top priority
- Start simple and low-tech and grow in complexity
 - Recognize your initial technical limitations and starting competency endowment and nurture it
- Don't try to do it all for all customers at the outset
 - A gradual, step-wise approach may be more sustainable
- Build a fiscal base from which to launch additional improvements
- Policy reform needs to be accompanied by operational improvements
 - One will not automatically produce the other



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Recommendations – what is different about this?

- Lasting commercial improvements are fostered by both internal and external efforts
 - Internally, business processes must change and performance measures applied
 - Externally, improved customer relations and service quality will breed responsible consumer behavior
- Incremental progress is success; you cannot eliminate all losses and subsidies in a short period of time
 - Creating a habit of paying for what you use sets the groundwork for deficit reductions
 - Creating a culture of serving a paying customer well reinforces the will to pay
- Each market and each utility is unique; culture and conditions will dictate what is an appropriate approach
 - Solutions must be customized to each situation