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IT PLATFORMS
FOR UTILITY COMPANIES
(in Developing Economies)

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Presentation Outline

- **Core utility business objectives**

- **IT's potential contributions to enabling achievement of the core business objectives**

- **IT investment planning**

- **Product acquisition options discussed**

- **Successful implementation - Critical Success Factors (CSF)**

- **Sustainability**

- **Lessons Learned**

Typical vertically-integrated utility structure
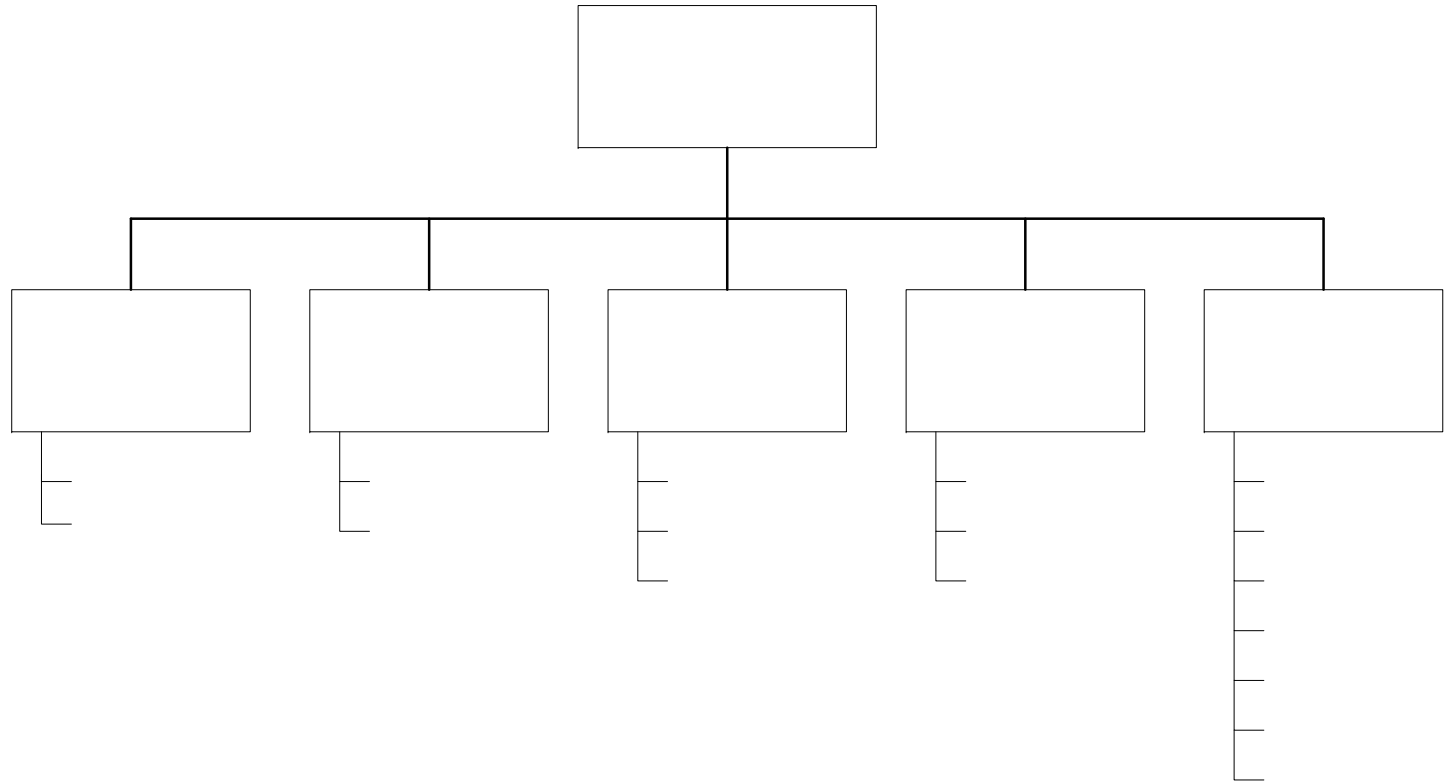
NEED TO OVERLAY INFORMATION AND PROCESS NEEDS TO ACHIEVE PERFORMANCE IMPROVEMENTS

What are the core utility business objectives?

- **Keeping the Lights On (operations & maintenance)**
  - Adequate Supply
  - Quality and Reliability of Supply
  - Minimize Technical Losses
  - Improved Customer Service
- **Avoiding Bankruptcy (financial viability)**
  - Maximize Sales & Collections
  - Minimize Costs / Maximize efficiency
  - Minimize Commercial Losses
  - Aggressive Internal Controls (it's a cash business!!)
 - Cost-Reflective Tariff (Government decision)

Does IT Investment Address These Core Issues??

- **Delivers performance improvements (aligned to business objectives) …properly implemented**

  - Realized financial targets (improved sales, improved collections, cost control, less inventory shrinkage)

  - Improved network ops (quality and reliability of supply)

  - Improved customer service (product quality; responsiveness)

  - Improved internal controls (corruption, audit trails, commercial losses)

  - Improved governance - provides management information (accurate and timely info for decision support and performance monitoring)

  - Access to industry best practices / processes and workflow (don't reinvent the wheel)

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Applications Architecture
(electricity utility)
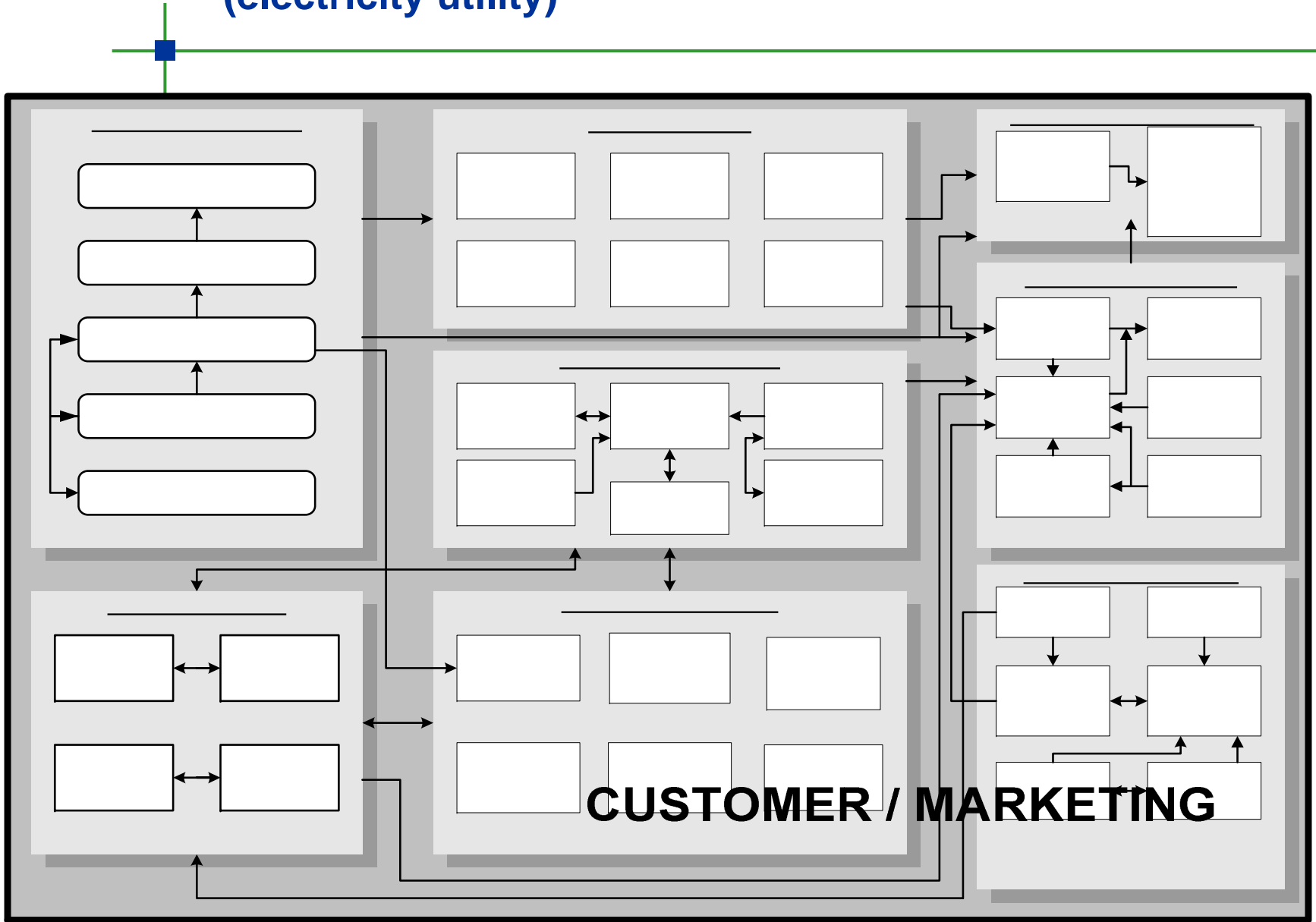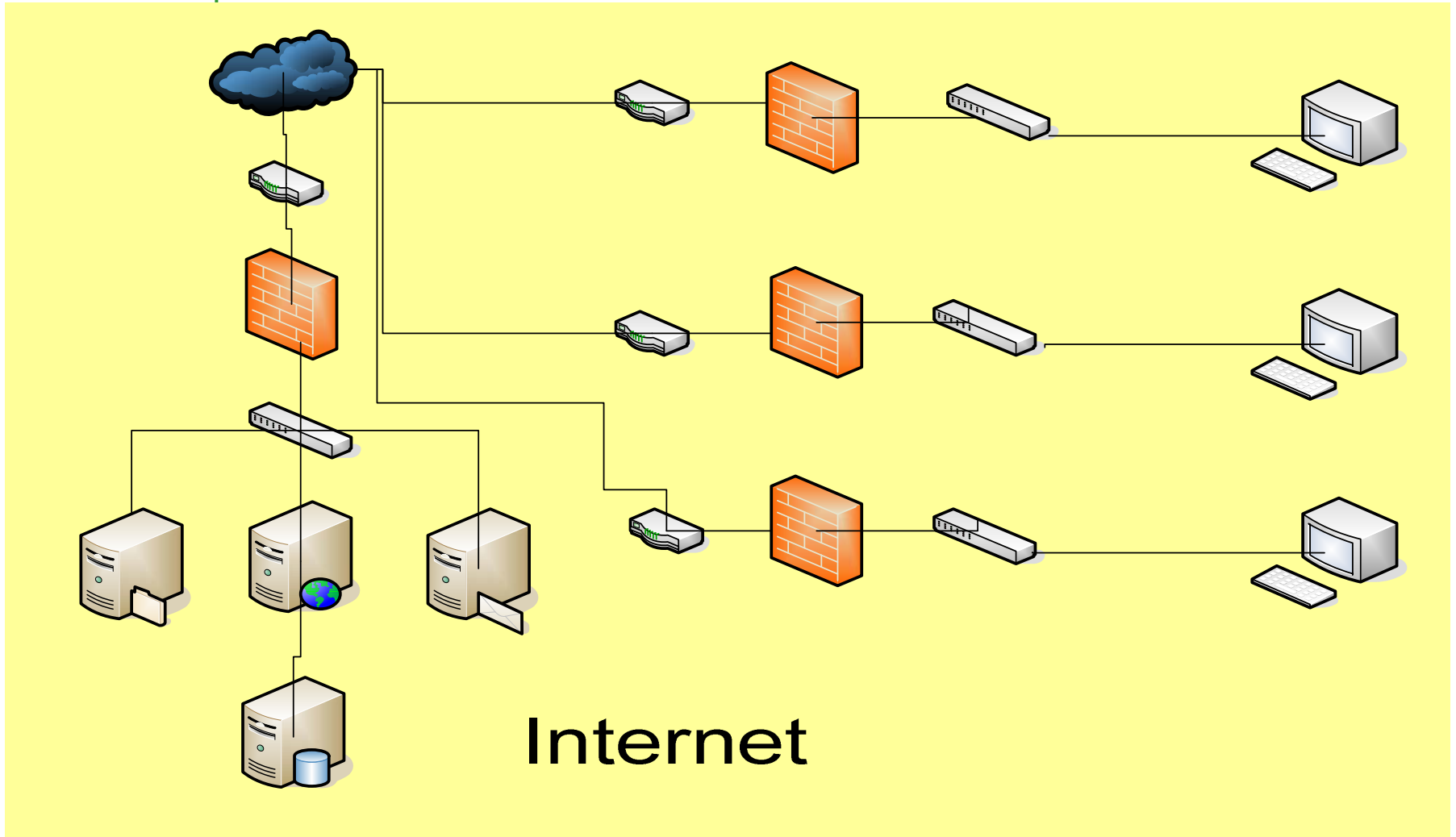
CUSTOMER / MARKETING

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Internet

Highest Priority "Front Office" and Engineering Applications / Infrastructure (keeping the lights on …)

- **SCADA – System Control and Data Acquisition: a category of software application program for process control, the gathering of data in real time from remote locations in order to control equipment and conditions. SCADA is used in power plants and on the transmission/distribution network .**

- **EMS – Energy Management System: software packages that interact with SCADA to optimize the performance of generating plants and transmission networks.**

- **TLMS - Transformer Load Management System: application program that estimates loading on distribution transformers, is based on an automated mapping/facilities management/geographic information system (AM/FM/GIS) to provide load forecasting, and power flow calculation capability to avoid overloading conditions.**

Highest Priority "Front Office" and Engineering Applications / Infrastructure (keeping the lights on …)

- **PSS/E – Power System Simulator for Engineering: provide transmission planning and operations engineers with tools for use in the design and operation of reliable networks.**

- **RADIO: for effective dispatch of operational personnel to provide outage management and customer services**

- **CMMS – Computerized Maintenance Management System: software to support scheduled maintenance activities; gathers data to support predictive maintenance.**

Highest Priority "Back Office" Applications and Infrastructure

- **Financials: G/L, Budget, A/P, A/R, Treasury/ Cash Management, Cost Accounting, Project Accounting, Fixed Assets.**

- **Supply Chain: Procurement, Warehouse Management, Materials Management.**

- **Human Resources: Personnel, Time Entry, Payroll**

- **Customer Billing**

- **Intranet/email**

- **Business Intelligence: Executive Information, Performance Monitoring – KPIs**

Implementation sequence varies by situation

IT Investment – Key Issues Requiring Management

- **Prudent Prerequisite Planning**

- **Investment Priority-Setting**

- **Capital Budget / Funding Availability**

- **Preparation of Bid Documents**

- **Vendor Selection**

- **Implementation**

- **Risk Management**

- **Ability to Cover Recurrent Operating Costs from Cash Flow**

- **Sustainability**

Prudent Prerequisite Planning Processes
(plan the work, work the plan …)

- **IT Strategy (key content) … why & what**
  - Confirm business objectives (strategic driver to IT investments)
  - Data / Solutions (applications) standards
  - Technology and Infrastructure standards
  - IT organization
- **IT Master Plan (key content) … how & when**
  - Business process / applications matrix
  - Cost / benefit analysis
  - Annualized investment sequence
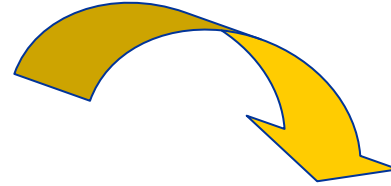 - Internal / outsourced institutional capacity

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Sorting Out IT Investment Priorities

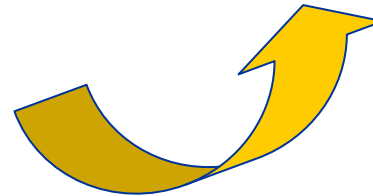## Business Impact

- **Mission criticality**
- **Contribution to financial viability**
- **Fit with key business issues**
- **Essential information flows**

IT Improvement Potential

- **Adequacy of legacy applications**
- **Alignment to IT Architectures**
- **Availability of Commercial-off-the-shelf (COTS) solutions**
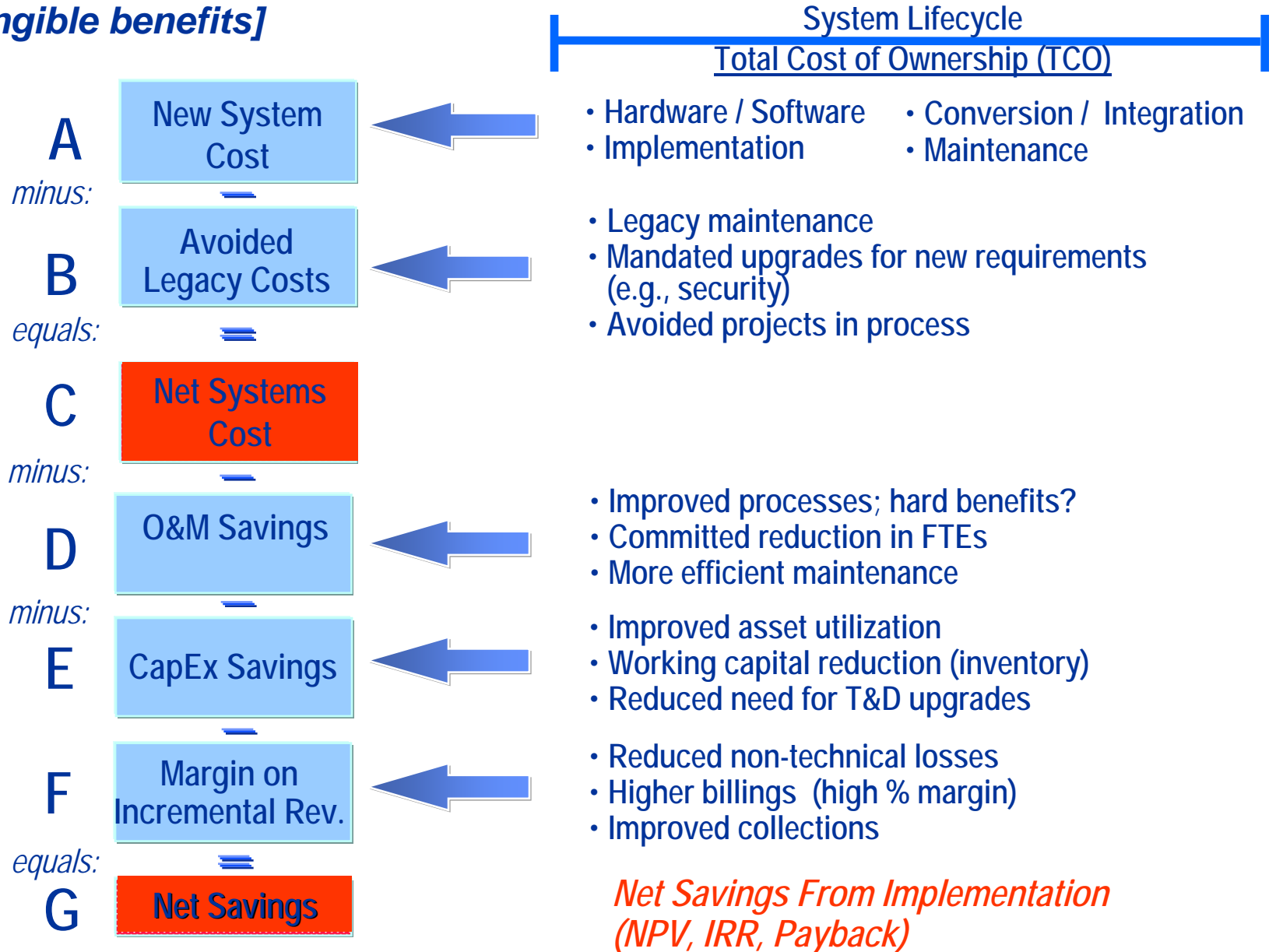- **IT infrastructure requirements**
- **IT synergies**

Cost/Benefit

IT Business Case Framework

[For tangible benefits]

System Lifecycle
Total Cost of Ownership (TCO)

A — New System Cost

- Hardware / Software
- Implementation
- Conversion / Integration
- Maintenance

minus:

B — Avoided Legacy Costs

- Legacy maintenance
- Mandated upgrades for new requirements (e.g., security)
- Avoided projects in process

equals:

C — Net Systems Cost

minus:

D — O&M Savings

- Improved processes; hard benefits?
- Committed reduction in FTEs
- More efficient maintenance

minus:

E — CapEx Savings

- Improved asset utilization
- Working capital reduction (inventory)
- Reduced need for T&D upgrades

minus:

F — Margin on Incremental Rev.

- Reduced non-technical losses
- Higher billings (high % margin)
- Improved collections

equals:

G — Net Savings

Net Savings From Implementation (NPV, IRR, Payback)

IT Strategy – One Key Issue

- **Which Option to Deliver New Information Systems is Best?**
  - Custom development (in-house or outsourced)?
  - Procure locally-built packaged software solutions?
  - Best of Breed? (multiple vendors)
  - Single Vendor (ERP)?
  - "Utility in a box"?
  - Open Source Systems?

Solution Options Examined: Custom Development

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▪ Pros

- ▪ Reasonably stable if infrequent changes

- ▪ Low cost

▪ Cons

- ▪ Functionality limited by vision / experience of developers and users – tends to be a new as-is

- ▪ External consulting support needed to assist in useful functional specifications

- ▪ No internationally accepted best practices embedded

- ▪ High level of in-house skills necessary / dire consequences without

Pros

- Often good functionality for transaction processing following existing processes

- Less costly than internationally available products

- Good local tech support

- Easy to upgrade if not customized

Cons

- Does not feature industry best practices

- May not utilize IT industry standard technology (development language / database)

- Integration usually difficult

- Minimal configuration options / unstable if customized

- No assurance of quality documentation

Solution Options Examined:
Best of Breed Applications

Pros

- Good functional fit

- Built-in configuration options

- Best practices

- Annual upgrades

- High quality documentation

- Ongoing tech support from vendor (may not be local)

Cons

- Not integrated with other applications / often requires middleware to integrate

- IT resource intensive to maintain integration

- Initial license costs high

- Custom integration renders upgrades difficult

Solution Options Examined:
Single Vendor (ERP)

Pros

- Mature, stable products

- Flexible modular implementation sequencing

- Integrated applications / Common data base

- Integrated workflows / Best practices

- Broad functionality / configuration scope

- Ongoing tech support from vendor (may not be local)

- High quality documentation

- Mgmt information w/assured data integrity

- Predictable ongoing costs

- Annual upgrades available

Cons

- Initial license costs high for top tier vendor's solutions

- Few lower tier vendors in utility-specific ERP space

- Implementation project needs strong management to contain scope and costs

- Implementation project typically spans years for full scope of ERP

Available ERP Vendors

- **Vendors are typically tiered based on customer revenues:**

  Tier 1 (>$250M in annual revenue) – SAP; Oracle (only)

  - Tier 2 ($20-250M) – Microsoft Dynamics - AX/NV/GP/SL; Lawson; IFS; Best; Epicor; SAP Biz1; CMS … (examples only)

  - Tier 3 (<$20M) – no real ERP solutions being marketed in this tier (except to US Munis e.g. HTE)– typically use a Financial product (e.g. ACCPAC, Peachtree) with broad functionality or a Tier 2 product.

  Note that due to saturation in the Tier 1 market, vendors are generally moving down-market into the SME space.

Solution Options Examined:
"Utility in a Box" (a concept)

- **DEFINED:** a bundle of core utility applications that are integrated and pre-configured to meet typical business processes and may be rapidly implemented out-of-the box. Minimal set-up required – utility would adopt embedded processes.

- **VALUE:** allows a utility with no IT infrastructure or skills and inadequate institutional capacity to get a kick start with a practical and minimum set of functions.

- **PROBLEM:** does not exist in the market per se, but could be readily configured/developed by competent utility or an experienced vendor.

- **OPPORTUNITY:** Any firm undertaking a management operating contract would be well-advised (or contractually obligated) to bring these IT solutions in the initial phase of their contract for operational use pending formal specification / procurement / implementation of longer term solutions. (Best source may be the US IT market that services Munis.) In circumstances where a management contractor is not involved, a viable option is to set up a Service Centre (Shared Services) to deliver such products and services (could be transferred into the utility or privatized later).

Solution Options Examined:
Open Source Systems

- **DEFINED:** systems that are based on open source code (code is provided to the buyer and is intended for customization); an emerging concept in the marketplace that in time may challenge the status quo vendors.

- **VALUE:** multiple vendors are now providing such products at reasonable up-front costs; quickly and easily customized and deployed if competent implementation resources available (in-house, some vendors, 3rd party contract)

- **PROBLEM:** typically little vendor support on implementation and for ongoing O&M – requires in-house capacity or contracted support; unstable vendors – come and go; no utility footprint; "bleeding edge" concept – risk is not the place for emerging economy utilities; access to source code is an internal control exposure.

- **OPPORTUNITY:** could be a cost-effective entry into institutional-level software.

So, which option is best ??

- **The correct answer is … it depends!!**
  - *Before any option is selected, a competent professional should examine the situation in detail, determine needs / constraints through some reasonable level of planning study, and match needs / constraints to the available solutions.*
  - *No one approach fits every utility, and no one approach fits each utility.*

- **There is no silver bullet …**

- **But the choice needs to be able to be successfully implemented, sustainable and affordable over the life of the system.**

- **Utilities in developing economies with capacity and sustainability issues (all of them!) need to minimize institutional and technical risks (thereby maximizing chances of success)**

Successful Implementation

- **CRITICAL SUCCESS FACTORS:**
  - **SENIOR MANAGEMENT COMMITMENT / PARTICIPATION (planning through implementation)**
  - CAPABLE CONSULTING SUPPORT
  - ADAPTATION VS CUSTOMIZATION
  - DEDICATED AND COMPETENT PROJECT TEAMS
  - APPROPRIATE VENDOR SELECTION
  - CLEAR AND ACHIEVEABLE GOALS
  - CLEARLY DEFINED ROLES AND RESPONSIBILITIES
  - PROACTIVE CHANGE MANAGEMENT
  - EFFECTIVE PROJECT MANAGEMENT
  - INTERNALLY-FOCUSED SKILLS & KNOWLEDGE TRANSFER

Sustainability / Realization of Expected Benefits

- **IMPLEMENTATION PLANNING NEEDS TO ADDRESS SUSTAINABILITY**

- **CHANGE MANAGEMENT**

- **KEY FACTORS**
  - Management *capacity*
  - Staff *capacity*
    - **Operational**
    - **Financial and Administrative**
  - In-house IT *capacity*

Management Capacity

- **Improved institutional governance mechanisms**
  - Information vs. Intuition
- **Operating Management Contracts may be appropriate to augment typical shortfall in skills and experience – to kick start institutional recovery**
  - Relevant utility management experience essential
  - Success fees featured
  - Strong emphasis on internal managerial capacity building

Operating Staff Capacity

- **Utilities in emerging economies are typically strong in staffing engineering and technical areas**

- **Effectiveness is limited by availability of effective supporting information systems and communications networks (and tools, materials and equipment)**

Financial and Administrative Staff Capacity

- **Most not formally trained**

- **Under skilled / underpaid / over staffed**
  - Labor is cheaper than systems regardless of effectiveness

- **Inadequate structured capacity-building mechanisms**

- **Likely not integrated processes / workflow; often yields more work than manual processes**

- **Not motivated to support success of IT initiatives**

In-House IT Staff Capacity

- **Likely little or no useful capacity in place**

- **Acquiring / retaining experienced staff very difficult:**
  - *Scarceness of IT skills in local marketplace*
  - *Competition for skills often drives cost beyond public sector pay scales*
  - *Ongoing retention strategy required*
  - *Capacity-building is not short term solution*

- **Outsourcing also expensive but may be only viable option initially**

- **Operating Management Contractor should bring core IT skills up-front, w/capacity building mandate**

- **IT senior management officer needs executive visibility and (preferably) status**

Real Life Examples Discussed …

- **Kenya Power and Light (World Bank)**
  - 2/3 year management contract – a condition of effectiveness of a major T&D infrastructure investment
    - **Includes an as-is IT assessment**
      - **SAP ERP and Soluziona CIS (good products, implementation and operating issues)**
    - **Includes IT remedial planning and implementation**
    - **Provides IT-related capacity building (technical and managerial)**

Real Life Examples Discussed …

- **FMIS in the three Elektroprivredas in BiH (World Bank)**
  - provide an educational paper on modern IT concepts in respect of utilities
  - Prepare bid documents
    - **SAP selected**
- **EPs funding implementation T/A**

Real Life Examples Discussed …

- **Jordanian Water and Wastewater Sector (USAID project)**

  - Assess as-is, including institutional and technical perspectives

  - Provide an IT Master Plan which (in part)

    - **Provides strategic enterprise-wide IT standards**

    - **Recommends appropriate solution options (focus on systems integration)**

    - **Provides a prioritized implementation plan**

Lessons Learned

- ✓ Unless company management are continuously involved in IT issues, there is little likelihood the significant investments will meet the needs of the enterprise or yield expected performance improvements

- ✓ Corrupt practices may be constrained with an effective implementation; conversely, corrupt practices can be facilitated with an ineffective implementation

- ✓ Each solution option is appropriate in specific cases – the trick is to match the circumstances to the solution options; and no one option will meet the scope of back office application requirements for any utility

Lessons Learned (cont'd)

✓ **Many more IT implementation projects fail than succeed. A common underlying theme is leaving IT to IT – that would be akin to having the inmates design the prison. 'Scope creep' is another common project killer.**

✓ **Operating management contractors (and contracts) do not place enough emphasis on institutional strengthening through effective information systems and their underlying technologies.**

✓ **Sustainability depends on internal capacities – not only IT but managerial, operational, financial and administrative.**