

PAS-55 Overview

Global Perspectives & Implications For The US



UMS
group

Americas
Asia Pacific
Europe
Middle East/Africa

*NARUC Winter Meeting
February 14, 2010*

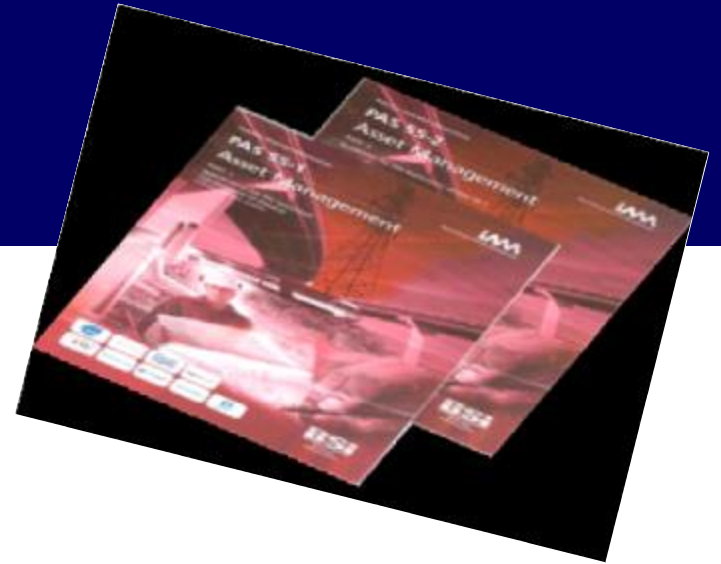
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Operational And Reliability Risks Are An Emerging Concern For Utility Regulators Around The World

Regulators worldwide are striving to understand and ensure that risks in the utilities they govern are effectively managed.

Today, Financial risks in the business are identified and measured through oversight by the rating agencies and security analysts. Safety risks are made more transparent with oversight from OSHA, and Environmental risks are overseen by the EPA.

However, operational and reliability risks in the business lack an equivalent oversight body or an organizing framework through which Regulators can assess such risks, or define standards to which utilities can be held accountable.



Publicly Available Specification (PAS) 55 Is Growing In Popularity As A Framework That Can Address This Gap

PAS 55 codifies standards for analytic rigor in decision making, defining and clarifying the competencies required for technical and operational risk management in the business, and driving transparency in Capital investment and system performance and reliability.

It is being advocated by many utility regulators and adopted by many utilities to serve as the organizing framework for ensuring better operational performance and lower reliability risk in the business.

It has great potential to deliver direct short term improvements in:

- Management analysis and option evaluation*
- Capital investment - optimization and transparency*
- Lifecycle rationalization – through reliability driven maintenance and investments*



PAS 55 – An Emerging Global Standard For Utility Asset Risk and Reliability Management

Originating through a multi-industry collaborative effort in the UK in 2004, PAS 55 has been championed by the Institute of Asset Management and sponsored by the British Standards institution For All Asset Intensive Industries.

OFGEM, the UK regulator has mandated that all UK utilities be compliant with the Specification, and a growing number of regulators around the globe (North and South America, Europe, and Asia) have expressed interest and encouraged their utility charges to consider adoption of PAS 55.

But here in the US, there appears to be more interest coming from the Oil and Gas and manufacturing sectors, than from utilities.



The Ongoing Ability Of Utilities To Meet Ever More Stringent Requirements For T&D Reliability In The Face Of Aging Assets Is One Of The Greatest Operational Risks In The Business Today

This is likely to be exacerbated by investments in smart metering, with resulting growth in customer expectations for even better reliability.

More effective and transparent strategies, processes, management and organizational systems and “tools” will be necessary to balance these converging needs.

The strategic benefits for applying PAS 55 and the asset management model include:

- *Clarifying and focusing decisions to ensure capital investments provide customers *the full benefits of a modernized network* - from the source (i.e. generation) through the delivery system, and to the customer premise (i.e. expanding the discussion beyond SmartGrid and AMI to address the issues of an obsolete and aging infrastructure).*
- *Integrating a long-term strategic plan for the grid with the ever-present need to meet near-term network / system performance mandates.*
- *Mitigating the technology risk of investments, acknowledging that the emerging technologies related to SmartGrid and Smart Metering introduce a level of uncertainty regarding costs and benefits, and that the underlying assumptions of any business case will warrant continued challenge and refinement throughout implementation.*



Evolution ... Why Is PAS 55 Needed Now?

Ø Strategic, Tactical, and Technical Asset Management have developed at a rapid pace in recent years, leading to the development of organizations like the UK based Institute of Asset Management (IAM), and development of a formalised standards like PAS 55, covering the optimized management of physical infrastructure assets.

Ø This specification was issued in 2004 and updated in 2008 by the British Standards Institute as the result of a multi-industry working party of IAM.

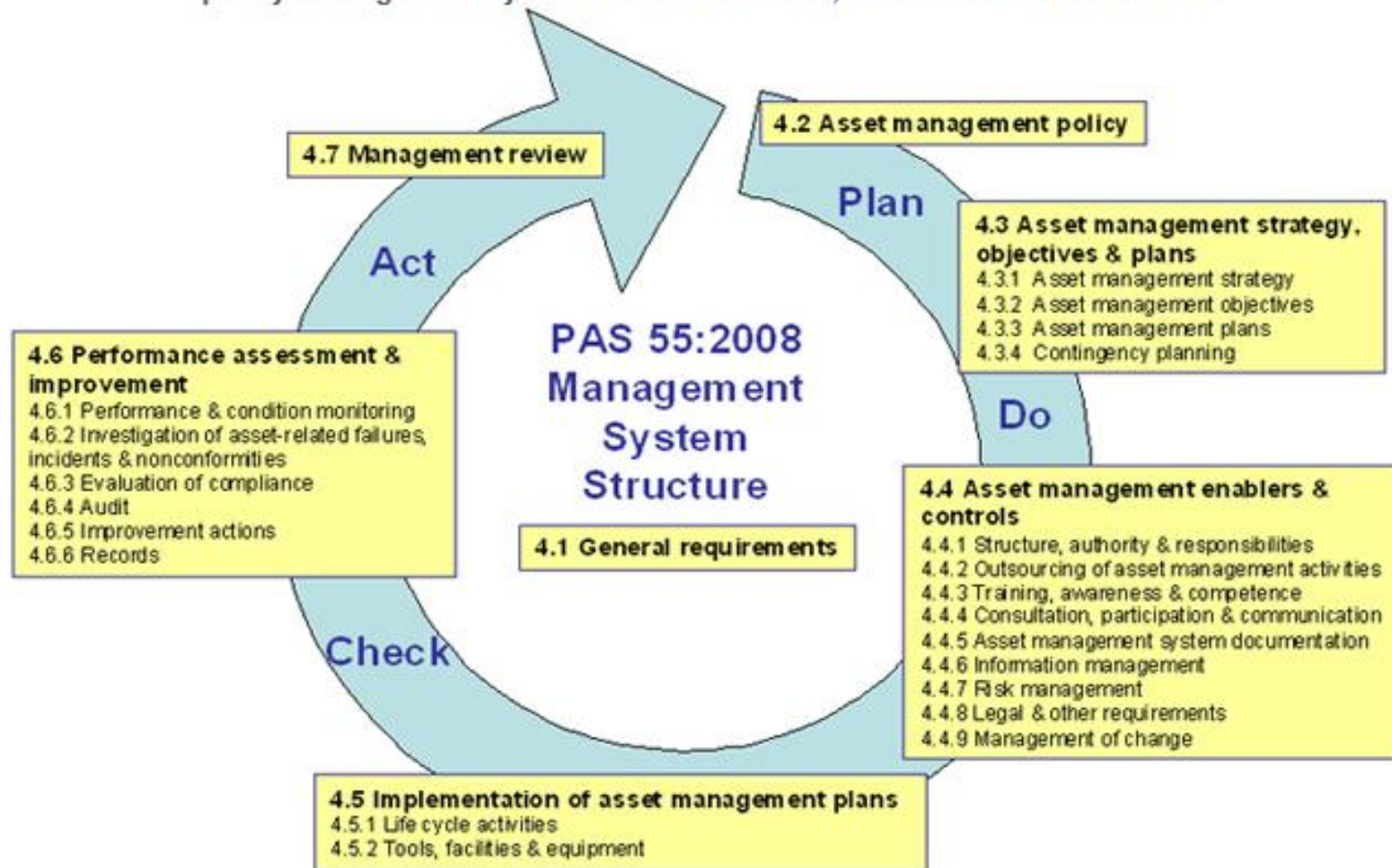
Ø It is currently a UK specification at this stage although it is structured to align with other commonly used standards, and planned to become a full ISO standard.

Ø It was drawn up to provide best practice guidance for organisations responsible for managing assets, and has been drawn from the experience of a wide cross section of industry (including gas and water utilities), and was initiated in response to the recognition that there was no existing reference standard for asset management.



PAS 55 Is Based On A Plan-Do-Check-Adjust (PDCA) Methodology And Drives The Optimal Mixture Of Capital Investments, Operations, Maintenance, Resourcing, Risks Performance And Sustainability

PAS 55:2008 is structured to interlock naturally with quality management systems such as ISO9001, and other ISO frameworks:



Global Developments

Ø Companies in all sectors are rapidly picking up on the potential benefits through higher reliability, stable and cost-effective asset performance, improved customer service, and enhanced relationships with Regulators.

Ø There is growing regulatory interest, particularly from Europe:

Ø Examples include UK regulator OFGEM pushing for utilities to be PAS 55 compliant by 2008; the Dutch regulator DTe has stated that PAS 55 certification is an appropriate answer to the regulatory requirements set on utility distribution companies.

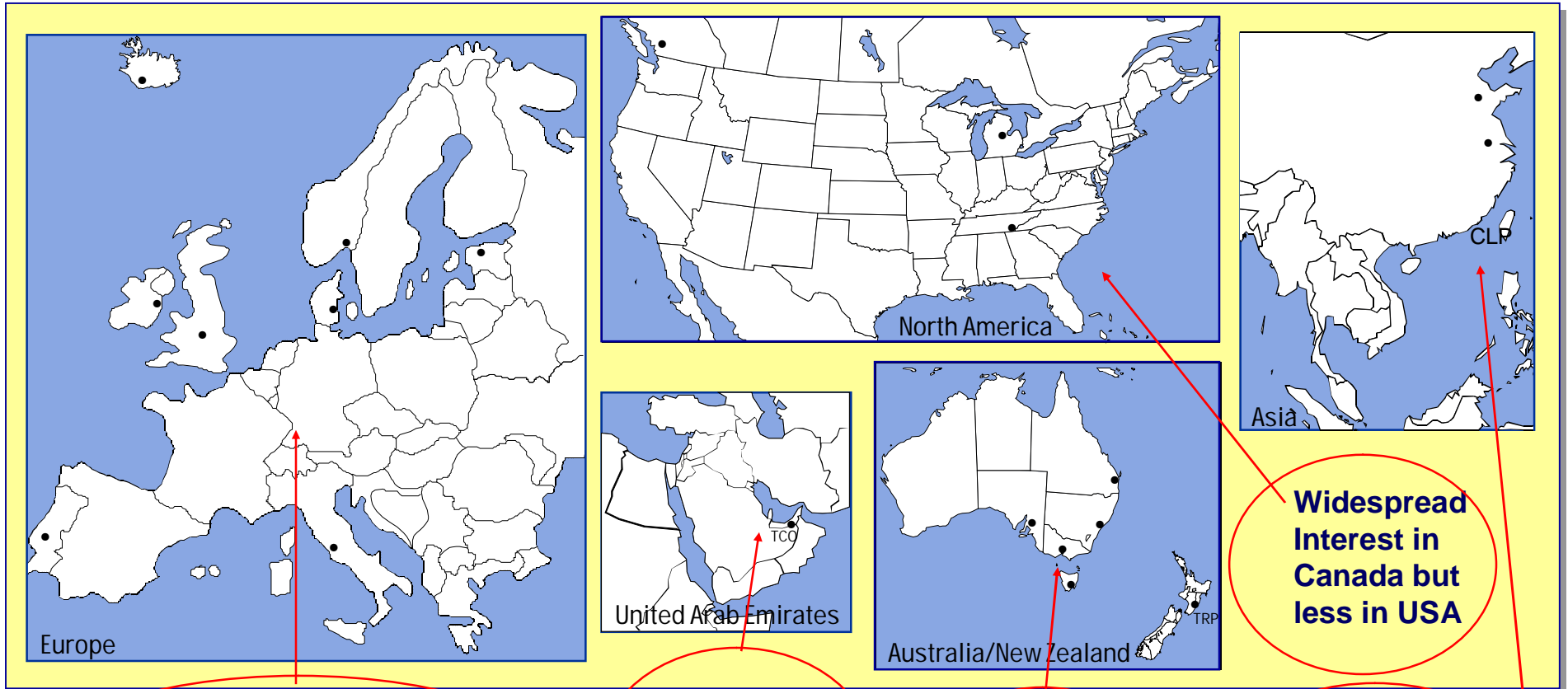
Ø Ofgem advised Network Companies that PAS 55 certification would help provide assurance of long term asset stewardship and establish greater clarity of asset management policy and processes that underpin the investment decisions of T&D Network Companies.

Ø The flow of companies preparing for PAS 55 Asset Management certification is growing, and we can expect equivalent ISO Certification for asset intensive businesses to ultimately become a widespread regulatory requirement.



Local & Global Developments

Interest and Take Up Rates



Strong Interest In UK/Europe
-Regulatory drivers; most UK utilities certified, Complementary Standard Proposed By ESSA

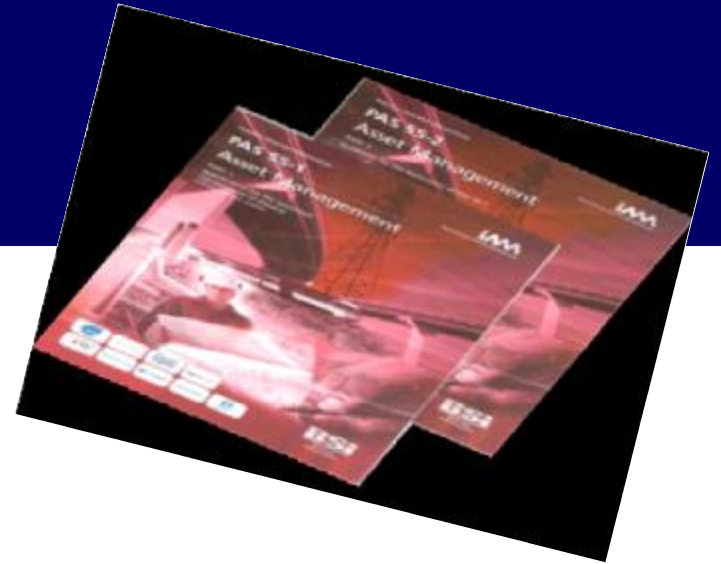
Strong Interest in Mid East (eg Certification in UAE and Oman)

Australia/NZ varying degrees of interest, Complementary Standard Proposed By ESSA

Strong Interest in Asia eg, Certification at CLP – seeking Level 2



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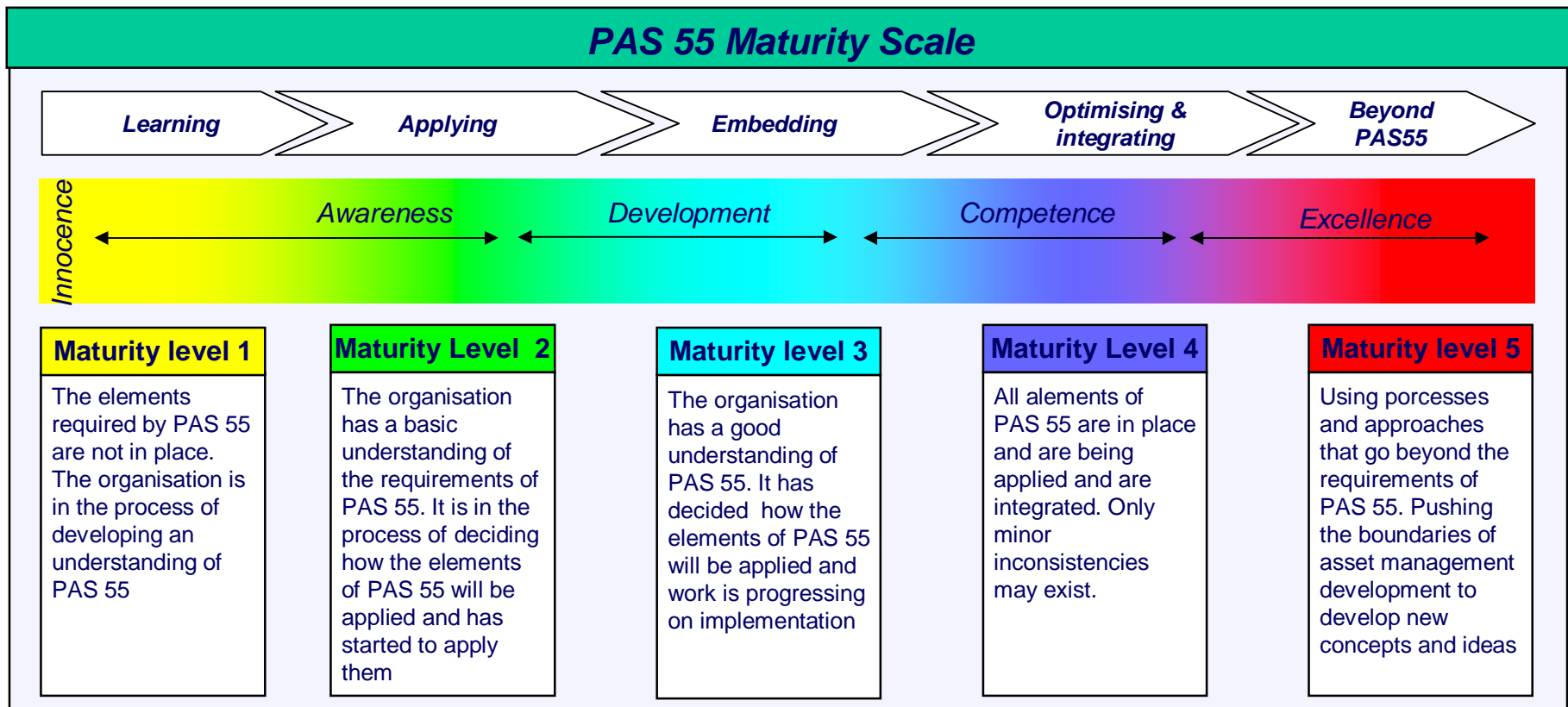
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PAS 55 Defines Required Competencies And A Maturity Scale For Each – Enabling Assessment Of Asset Management Competencies Across The Full Range Of Development



Notes on the use of the maturity scale:

- 1 As indicated by the colour transitions, the boundaries of the maturity scale are not hard values
- 2 The interpretation of assessment results onto the maturity scale is best done by an experienced assessor
- 3 Compliance with PAS 55 is at maturity level 3
- 4 There is no upper limit to excellence as defined by the red coloured zone



Focused Interviews Within An Organization Often Reveal Key Gaps In Risk Management and Investment Planning Processes, Systems and Skills ... in The Opinion Of Key Managers Across The Business

“A Process to determine the optimal combination of projects - really only happens on an Ad Hoc basis in the operations group”

“Risk is not understood in some decisions”

“We’re Too conservative when it comes to risk”

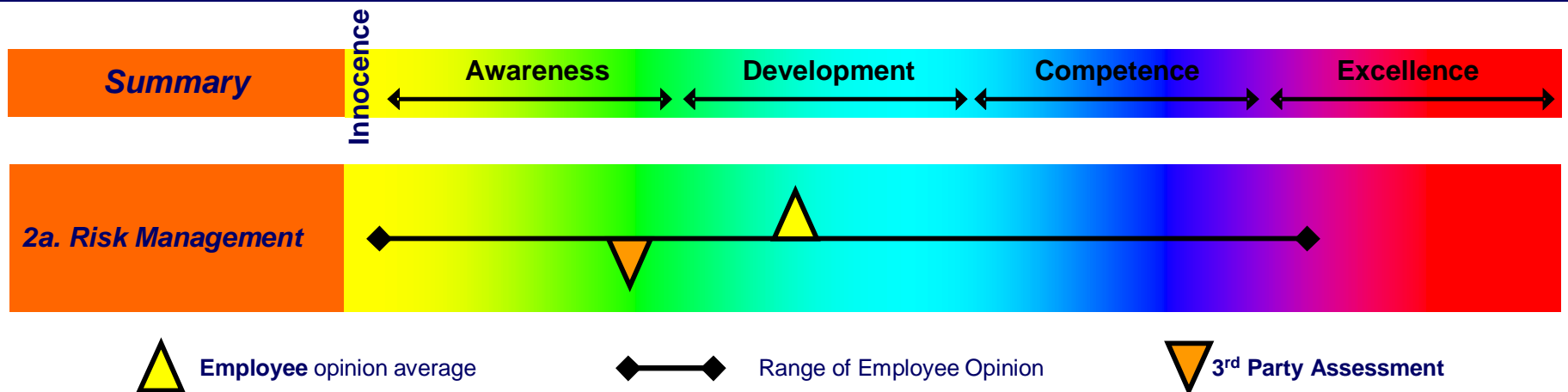
“We are efficient but do not know if we're working on the right things”

“The budget this year is under Finance, *but they don't have the responsibility to identify the projects* (that is under the Distribution engineers) - the budget should also be under Distribution”

Assessment - Risk Management is done on a ad hoc basis, there is no day-to-day Risk Management process in place. Scenario based Portfolio Optimization is not done



But The Opinions Of Employees Often Vary Widely And Demonstrate A Lack Of Standards For Measuring The Effectiveness of Individual Competencies. (E.g., Risk Management)



Key Observations	Complications / Barriers to Change
Goals and objectives are not well translated into an easy to handle Risk management framework (risk Valuation, risk tolerability, risk reduction valuation, etc.).	<ul style="list-style-type: none"> Risks are evaluated in different ways. No standardize/formalized risk register available
No formalized risk management process available or documented	Risk management is done on an ad hoc basis
Risk analyses capabilities are immature	Difficult to do risk modeling and analysis



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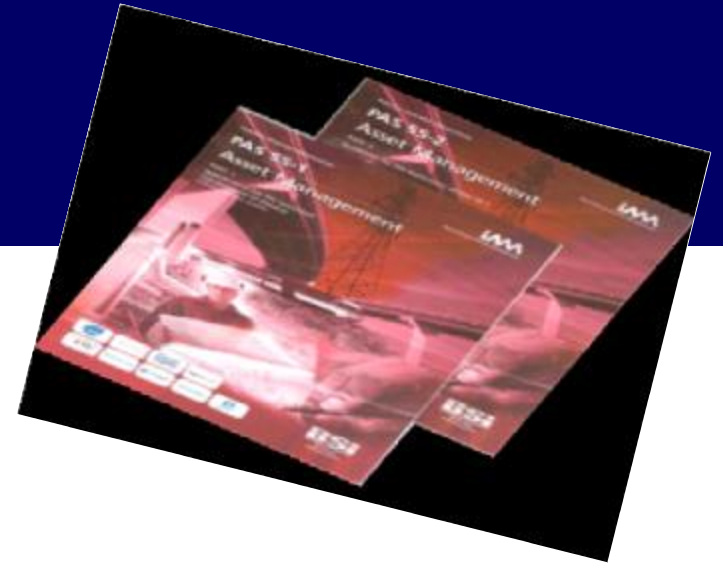
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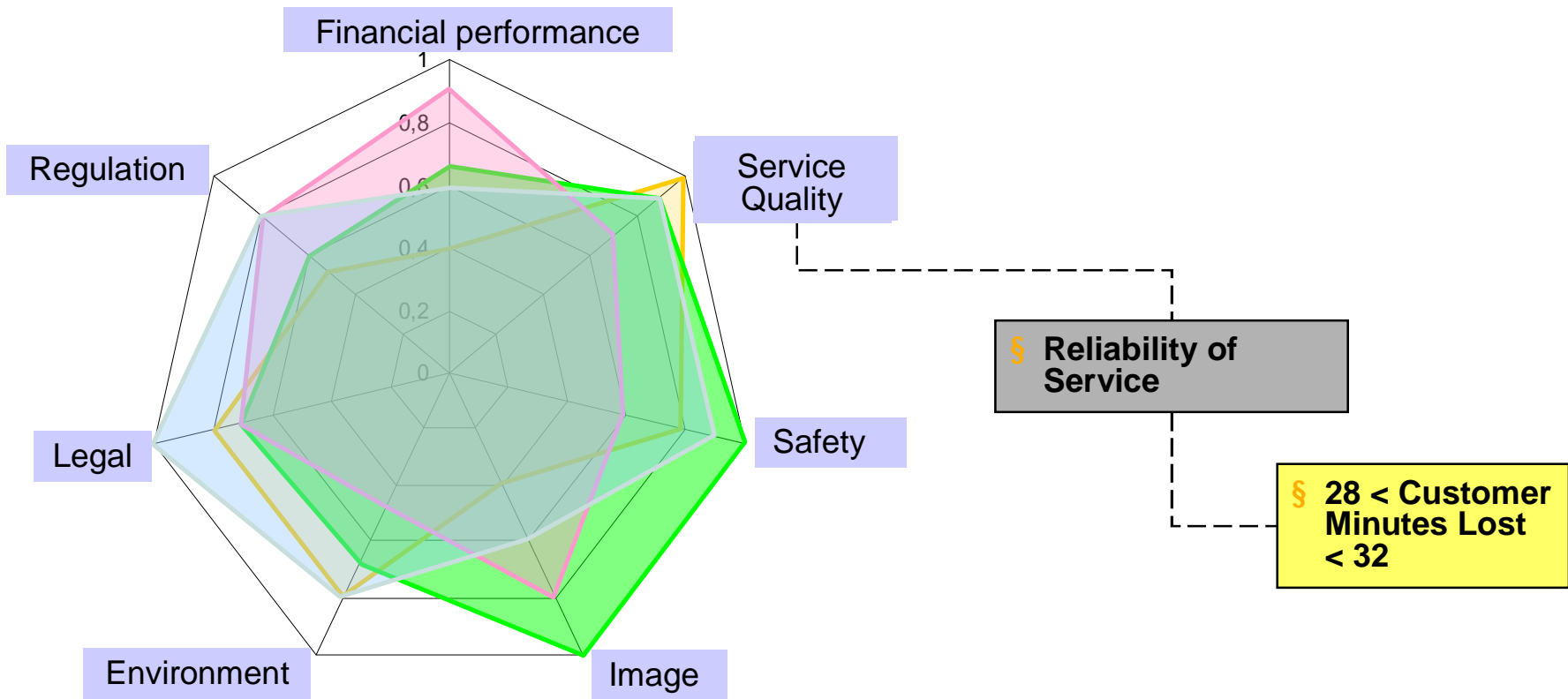
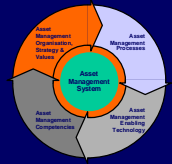
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Stakeholder needs & objectives must be translated into asset management business mandates, Critical Success factors and Key Performance Indicators



■ Shareholder
 ■ Customers
 ■ Government
 ■ Employees

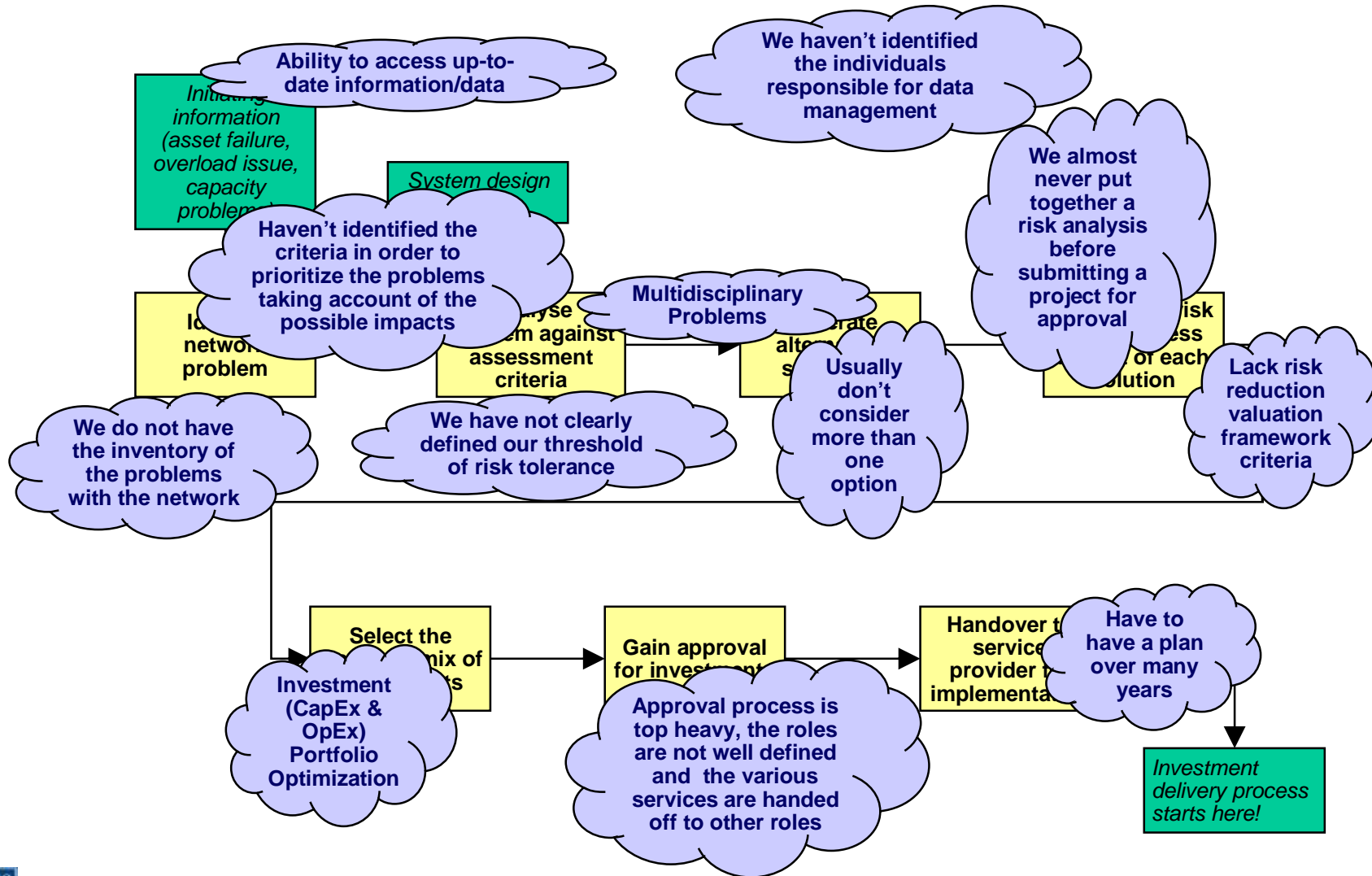


Business Values

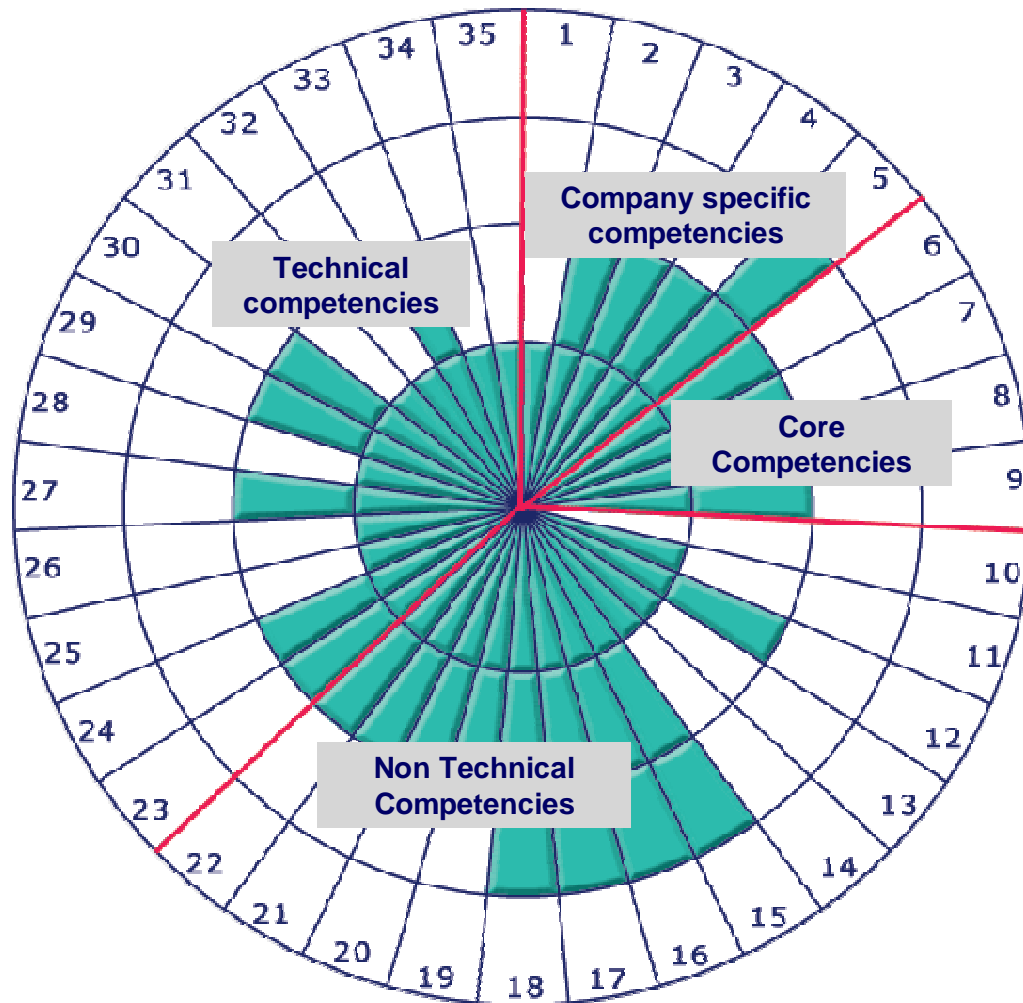
§ Critical Success Factors

§ Key performance Indicators

...However, Bottlenecks and Improvement Opportunities Are usually Common Knowledge And Can Emerge From Focused Interviews.



The Competences Involved In PAS 55 Span The Full Range Of Technical And Non Technical Skills, Systems and Processes.



- 1 Client oriented
- 2 Team spirit
- 3 Flexibility
- 4 Initiative
- 5 Professional Integrity
- 6 Listing skills
- 7 Oral communication
- 8 Written communication
- 9 Adaptively
- 10 Coaching and Leadership
- 11 Creativity
- 12 External Awareness
- 13 Vision
- 14 Organisational sensitivity
- 15 Negotiating
- 16 Decision making
- 17 Results-oriented
- 18 Progress monitoring
- 19 Market-oriented
- 20 Planning and control
- 21 Judgement
- 22 Analytical problem solving
- 23 Infrastructure calculations
- 24 Information/functional requirements
- 25 Risk inventory and assessment
- 26 Risk calculations
- 27 Risk management
- 28 Statistics
- 29 Asset life cycle management
- 30 Maintenance management
- 31 Strategy development
- 32 Financial quantification options
- 33 Make detailed project plans
- 34 Prioritising
- 35 Prognosticating

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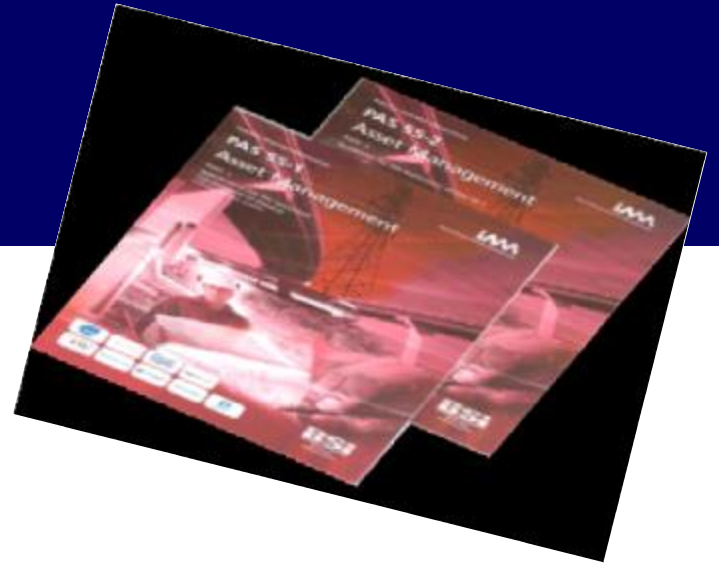
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Today, In The US Electric Utility Industry, The Greatest Risk Is That We Underestimate The Cost And Effort Required By Smart Grid Initiatives...

- Current priorities placed on Advanced Metering Infrastructure (AMI) and SmartGrid technologies at the highest levels of government are creating compelling pressure on every utility to commit significant investment to such initiatives.
- But the path to success (and rational investment priorities) involves far more than application and implementation of these new technologies.
- Grid Readiness is a major impediment, which requires substantial prerequisite investment in the health and condition of the T&D system and its foundational capacity to deliver the higher reliability demanded by today's customers and electric use technologies.
- Such Grid Modernization is therefore a necessary precursor to any hope of sustainably delivering on the promise of the "Smart Grid" or to any hope of customers receiving the full benefits of these investments.

But To Justify It, Requires A Far More Expansive View Of Benefits Than Most Utilities Can See Within The Boundaries Of Their Traditional Perspectives ...



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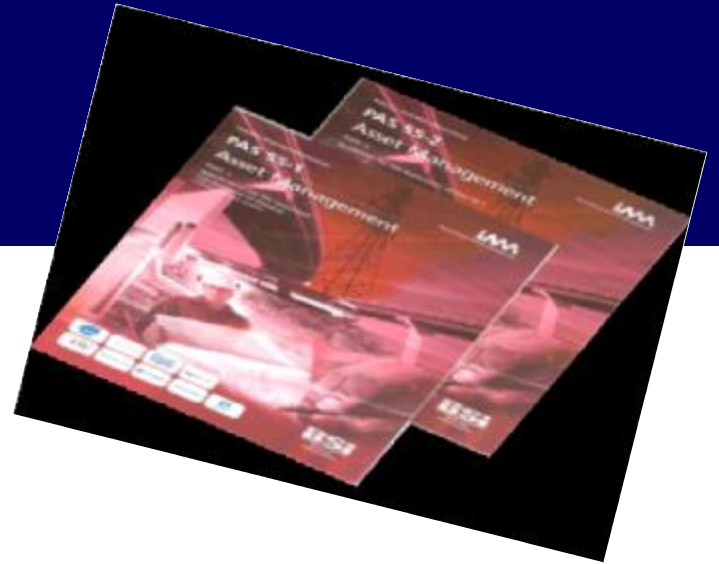
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Utility Case Study: Investor-owned, 550,000 Customers, 1,984 Square Kilometers, 200+ Distribution Substations, 700 Circuits, ~9,000 Circuit Kilometers

3 to 5 year planning and budgeting horizon, with most discretionary capital focused on:

- Maintaining SAIFI, CAIDI, and SAIDI,
- Addressing “worst performing circuits,” and
- Forced replacement.

Result = functioning but technically obsolete assets, operating beyond accounting and engineering lives, diminishing returns on reliability investments

Commissioned two studies:

- Grid Modernization
- Development of a Smart Grid roadmap

It quickly became apparent that benefits of Smart Grid/AMI could not be realized without a comprehensive T&D Strategy:

- Scope and cost
- Holistic customer oriented view of benefits
- Regulatory and funding strategy
- Community Outreach / communication strategy



UMS Group Was Asked To Assess Their T&D Plan And Reliability Management Processes. We Applied PAS 55 Standards For Asset Management...

Ø PAS 55 is not an end in itself but reflects a broader, highly valuable asset management approach.

Ø Results can be integrated into a pragmatic and integrated roadmap, with two levels of planning detail:

Ø The first is a 3-5 year strategic objective (a timescale that is sufficiently long for significant change to be achieved in staff competencies and behaviours, yet soon enough for the establishment of personal commitments to its achievement)

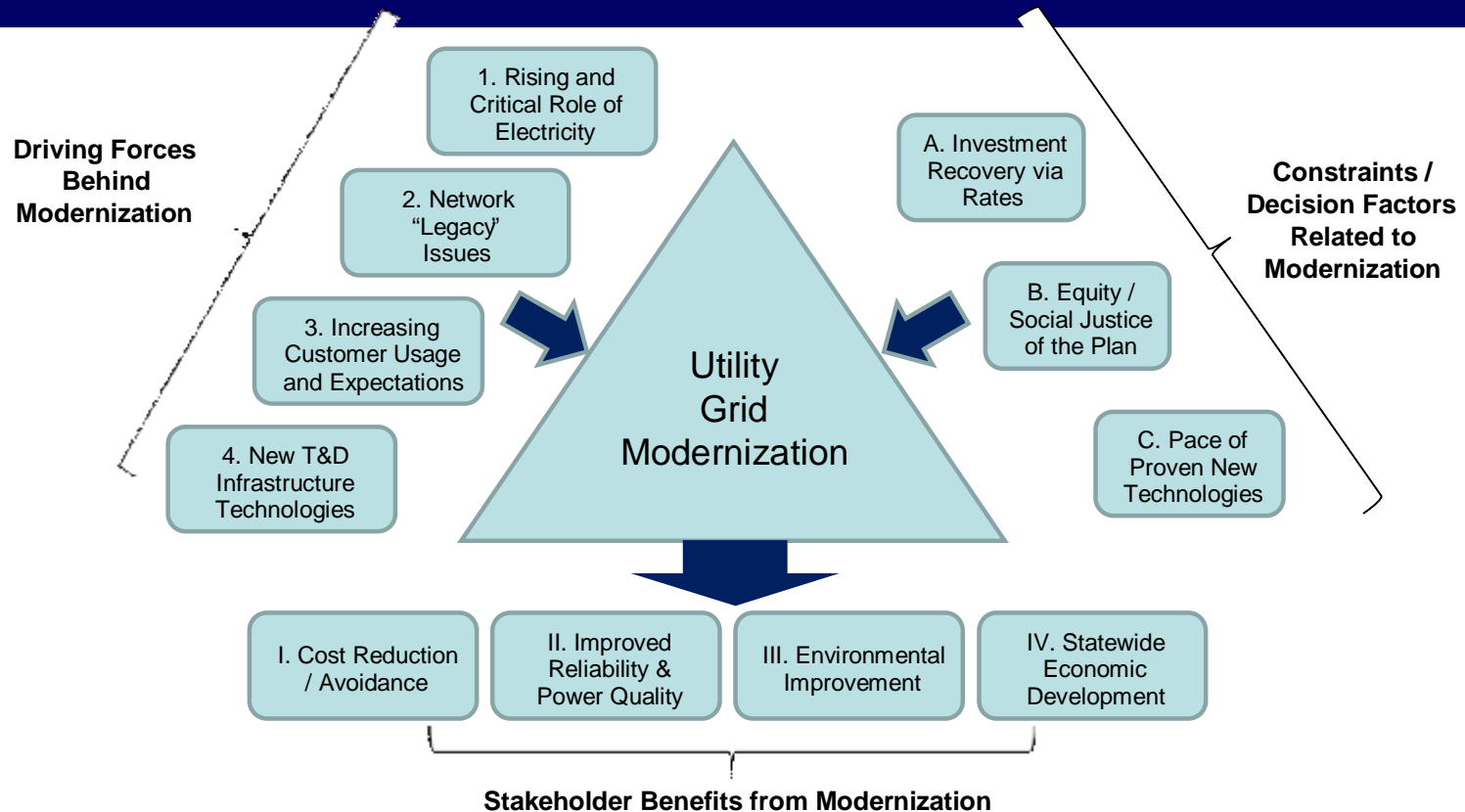
Ø Linked to these specified longer-term goals are the specific actions required in the first 12 months to:

- a) obtain “quick wins” and demonstrate to all the benefits and realism of the asset-centric approach and
- b) lay the necessary foundation for the longer lead-time changes (organisational, educational, and behavioral)

Ø The PAS 55 standard has enabled many organisations to position themselves well with respect to regulatory and stakeholder pressures and to identify fully optimised and sustainable business improvements.



Our Integrated Approach Addressed Myriad Complex Issues, Leveraging A Comprehensive Analytical Framework

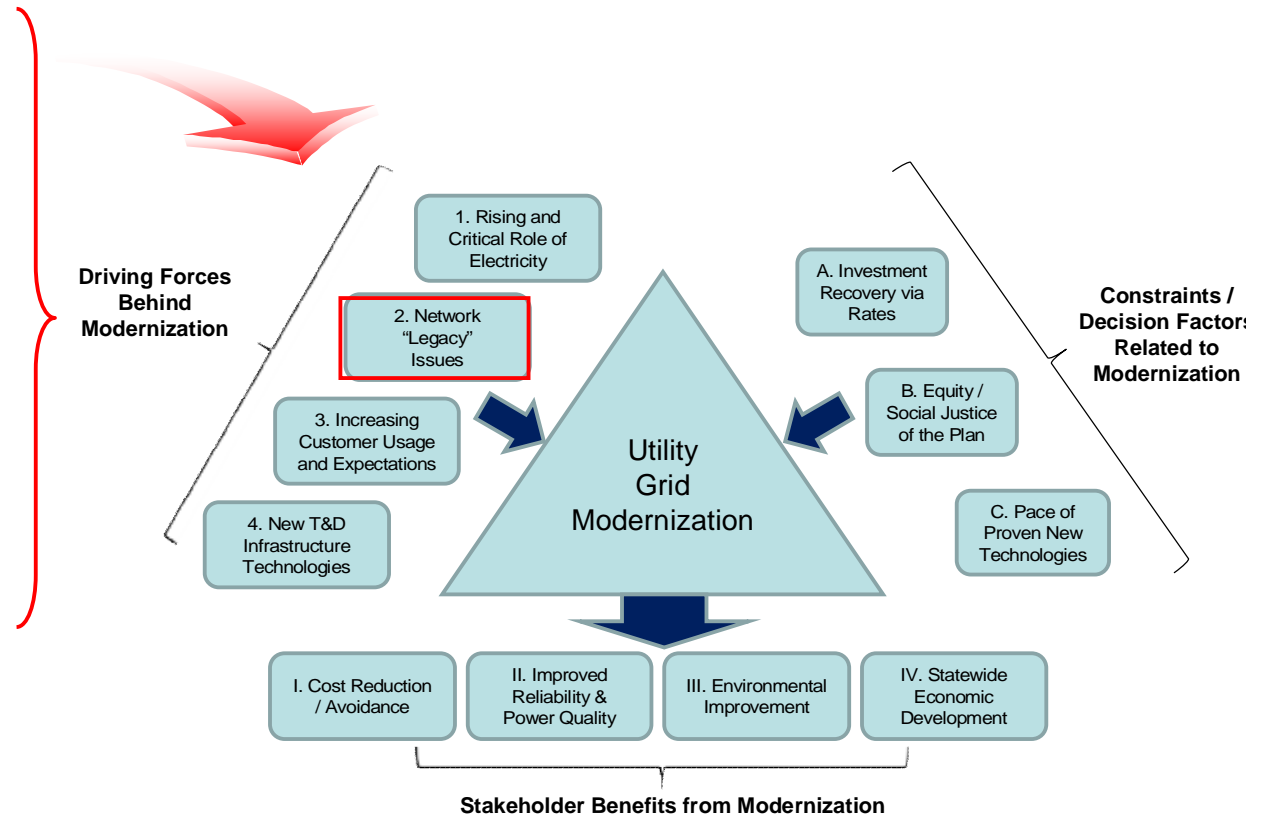


- They reached out to and engaged a broad and varied constituency,
- Integrated a broader-view of grid strategy with ongoing operational planning process,
- Captured and translated all technical and societal benefits,
- Committed to complete transparency which facilitated ongoing refinement during implementation.

Major Initiatives Were Identified, Employing Over 65 Modernizing Actions Across The 200 Substations And 700 Circuits.

Technical Legacy Issues

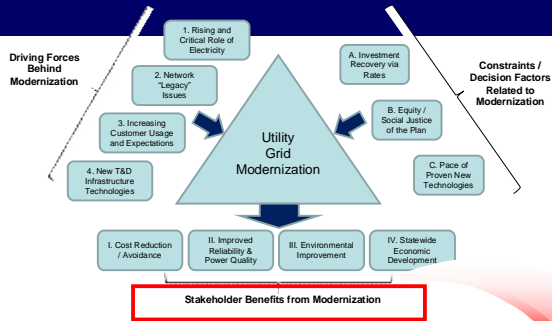
- 4.8kV Distribution
- Use of 34.5kV Subtransmission for Distribution
- Pre-1984 Installed URD Cable
- Secondary UG Networks
- 13.2kV in need of Hardening and Pre-Modernization
- Capacity insufficient to support automatic switching



A total estimate of \$1.7 billion (\$3,000+ per Customer) was produced (This was a factor of 5 greater than the original SmartGrid estimate of \$250 - 275M).

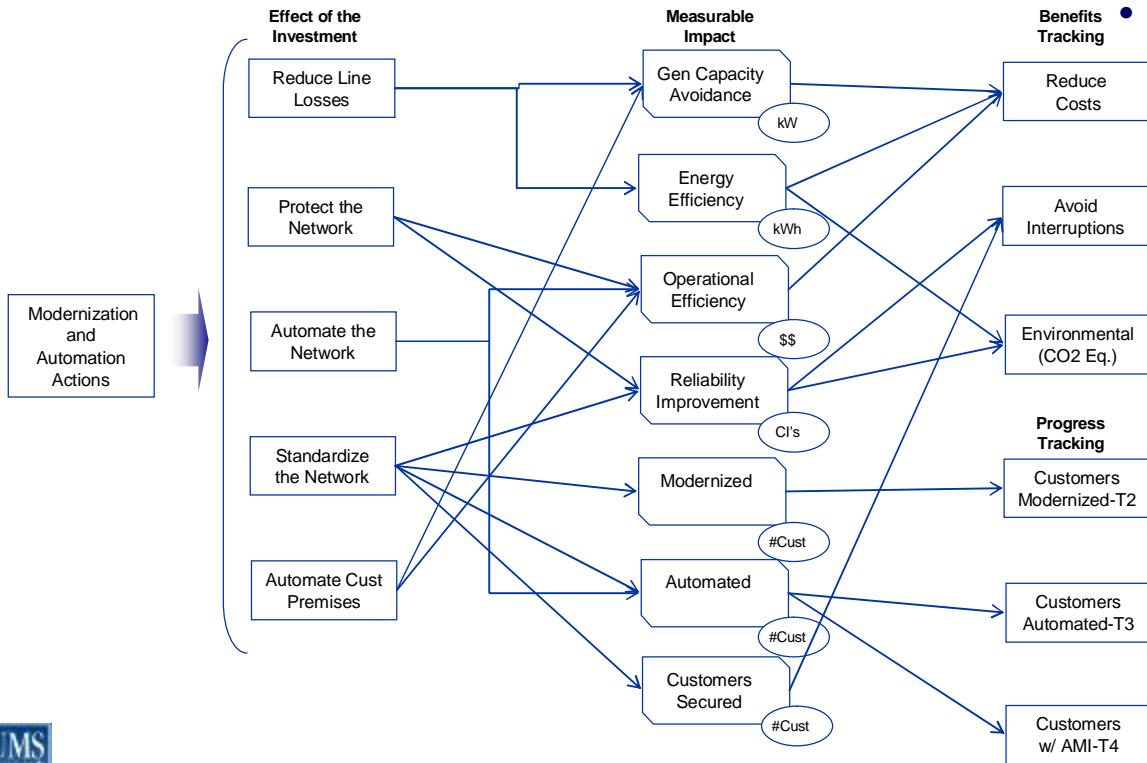
Case Study (Continued)

The Size Of The Estimate Drove The Need For A Comprehensive View Of All Benefits:



Benefit Analysis Framework:

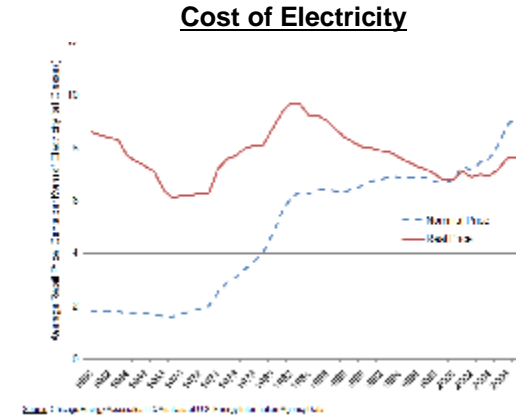
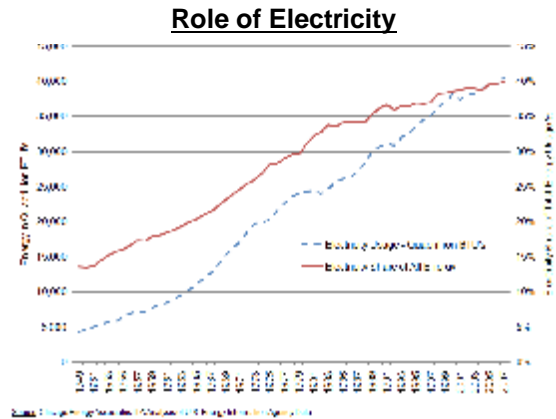
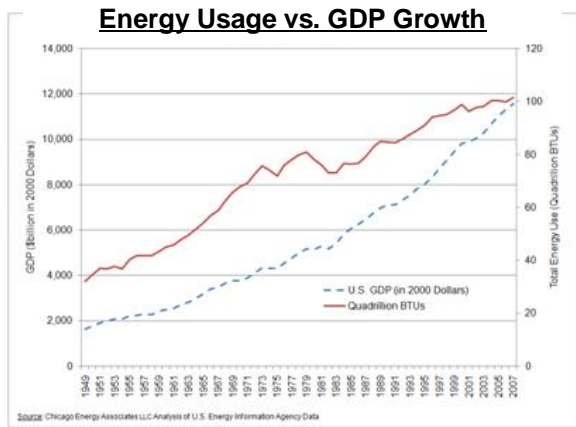
- Technical actions translated into non-technical benefits
- Captured the “many-to-many” relationships between actions and benefits
- Comprehensive portrayal of all benefits:
 - 1.5% decrease in electricity usage
 - 213,000 metric tons reduction of carbon emissions
 - \$70 million in energy savings
 - \$29 million annually saved in variable Opex costs
 - Deferral of 75 MWs of Required Generation Capacity for 5 years
 - 40% reduction of customer interruptions
 - 500 new jobs in the State



Case Study (Continued)

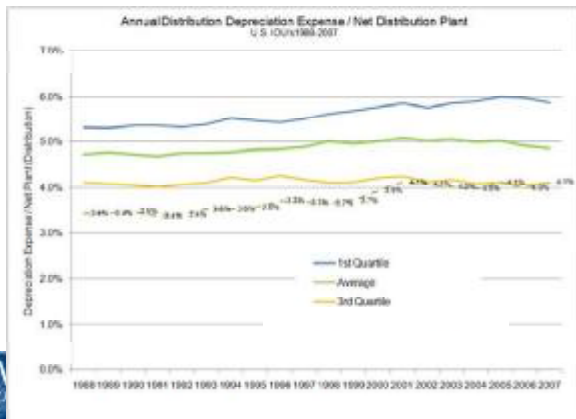
The Issue Of Funding Was Addressed From 2 Perspectives...

First - The Relative “Real Value And Cost” of Electricity

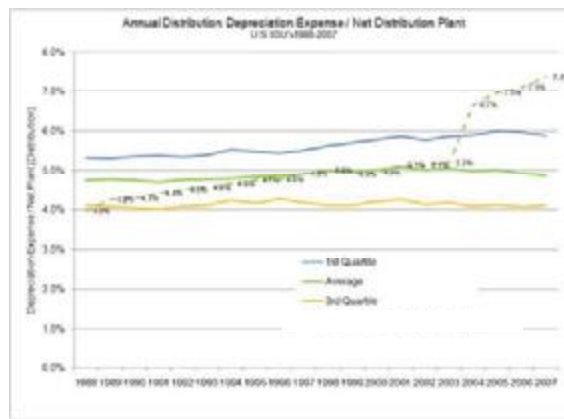


And 2nd - Cash Impact of These Changes - Relationship between depreciation and the potential to raise rates

Typical Profile

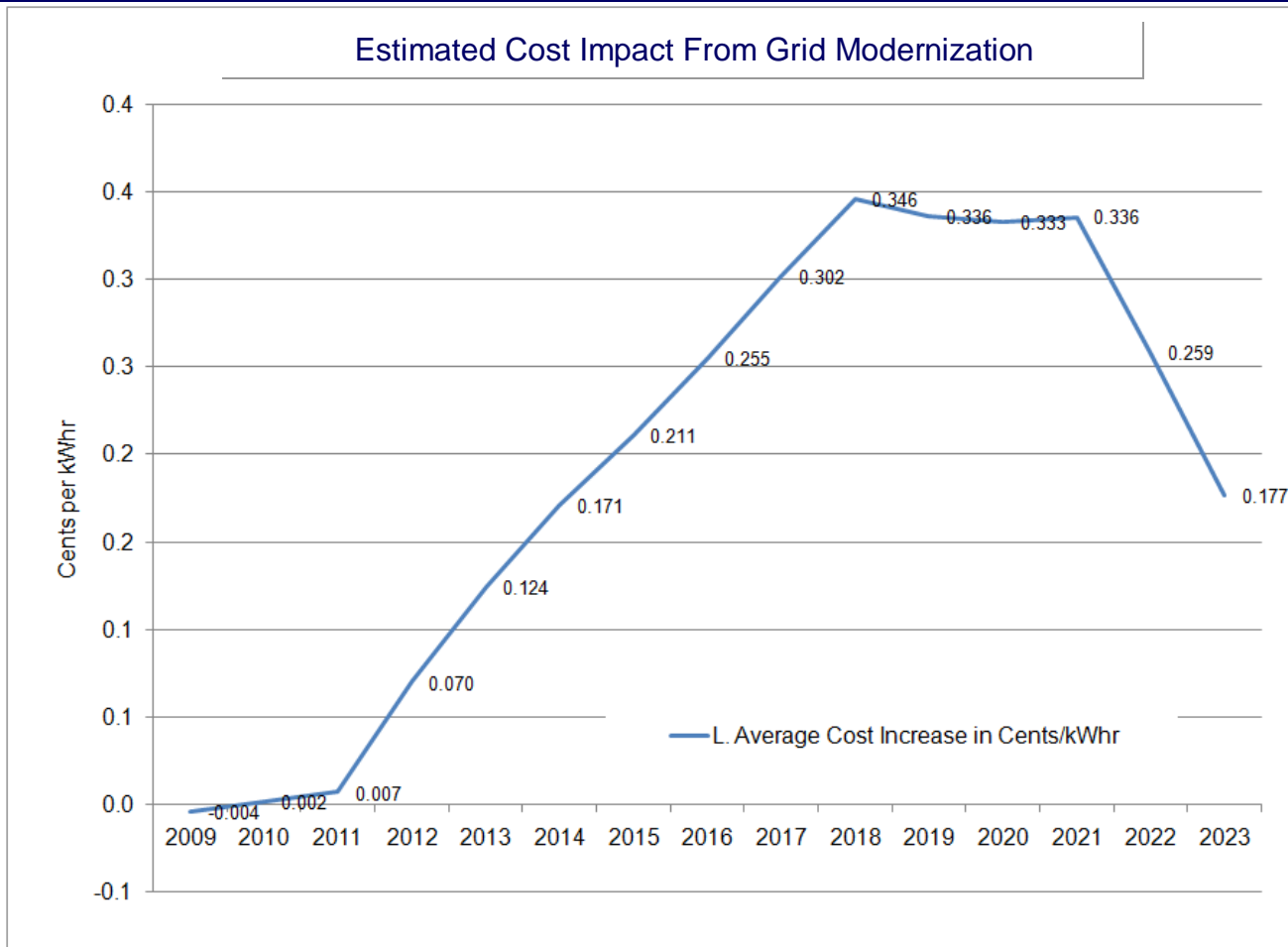


Planned Profile



Key Point: Enabled the Regulator to grant the utility sizable funding relief without a dramatic rate increase

Net Rate Impact Of \$1.7 Billion Portfolio To The Customer (5 – 6 X Normal Capex)

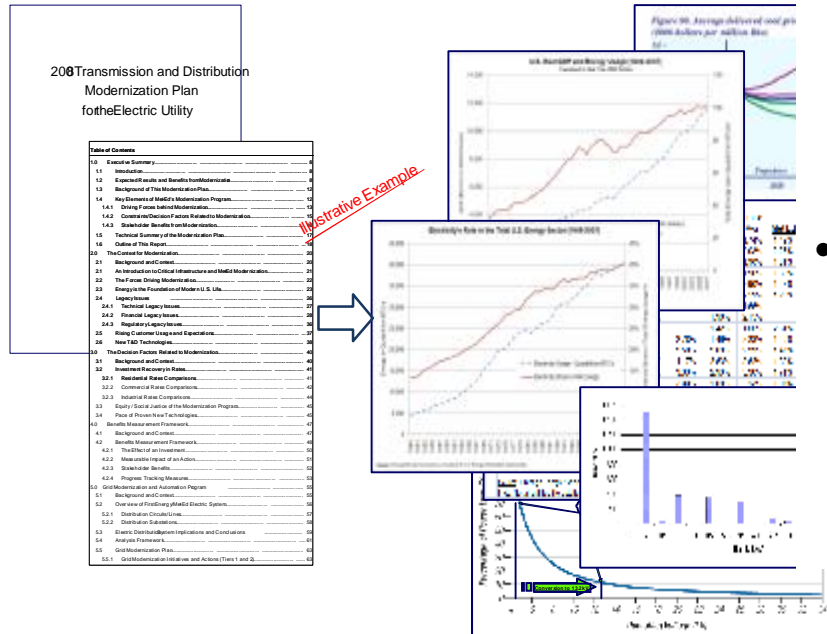


At its peak, the program added approximately 0.346 cents per kilowatt-hour = \$3.37 per month for the average customer.



Case Study (Continued)

Supported By A Well-documented Plan, The Utility And Regulator Shifted Their Dialogue From Tactical To Strategic



- The utility's rate case management had traditionally been more tactical than strategic:
 - Investment-centric
 - Reactive
 - Lacking a clear risk or socio-economic context
- Enabled a more strategic approach to the Carbon debate (and anticipated pressure from legislators)
 - Focused on the capture of benefits
 - Positioned the discussion around investment portfolio value and risk
 - Presented investments as part of an overall T&D strategy that supports regional economic growth
 - Utilized high-level benchmarks
- Tactics were still important, but they were employed within a strategic context and shared goals between the Utility and the Regulator.

Case Study (Continued)

The Resulting Modernization Plan Document Itself Then Organized the Content of Stakeholder Communication And Was A Useful Tool For Aligning Expectations and Priorities Of the Utility And Regulator...

2008 Transmission and Distribution Modernization Plan for the Electric Utility

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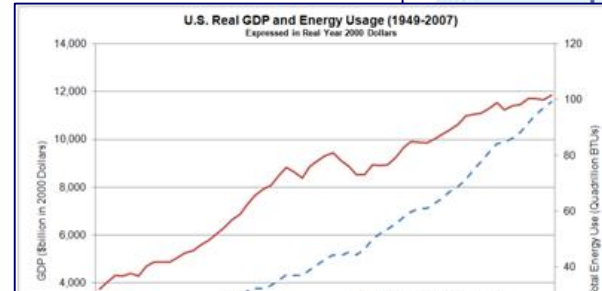
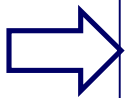
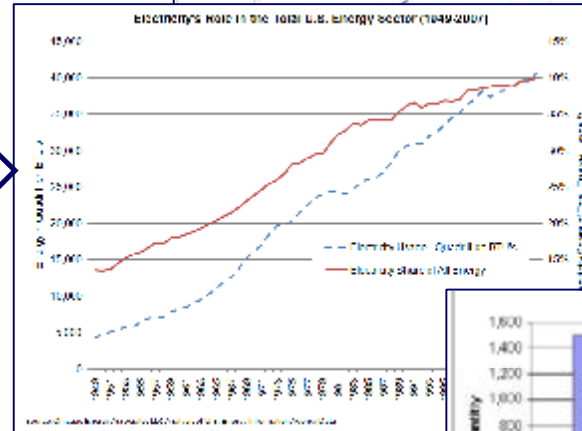
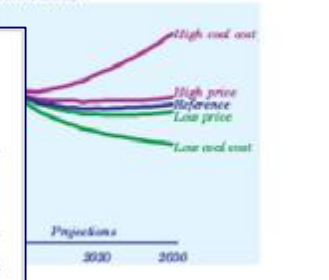
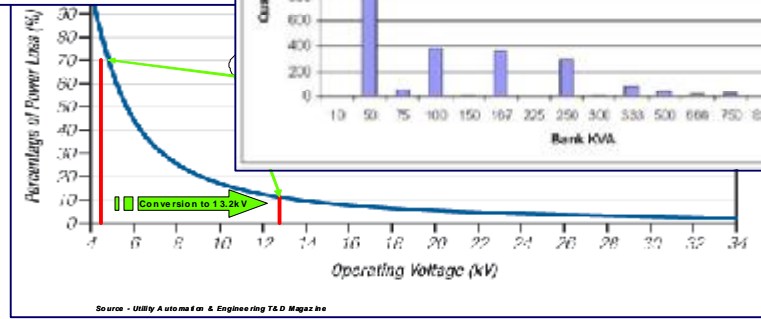
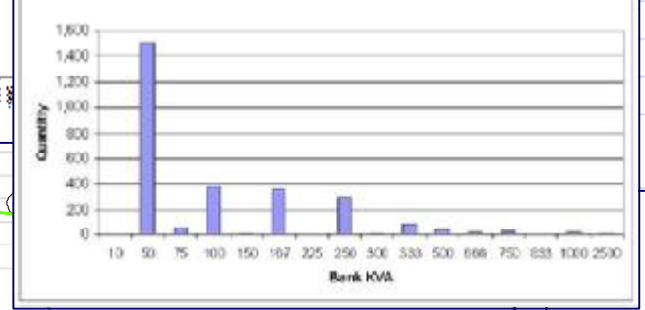


Figure 96. Average delivered coal prices, 1990-2030 (2006 dollars per million Btu)



Category	Avg. 1990-2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Electricity	1.90%	2.14%	1.98%	2.31%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gas	2.73%	1.48%	2.38%	1.48%	-37%	1.90%	1.30%	1.47%	-38%	2.50%	2.86%	2.39%	1.47%	-38%	2.50%	2.86%	2.39%	1.47%	-38%	2.50%	2.86%	2.39%	1.47%	-38%
Coal	4.17%	2.63%	3.82%	1.30%	62%	3.33%	2.93%	3.30%	1.71%	-48%	2.00%	1.66%	2.13%	1.84%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%
Oil	1.90%	2.14%	1.98%	2.31%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nuclear	1.90%	2.14%	1.98%	2.31%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydro	1.90%	2.14%	1.98%	2.31%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Geothermal	1.90%	2.14%	1.98%	2.31%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Solar	1.90%	2.14%	1.98%	2.31%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wind	1.90%	2.14%	1.98%	2.31%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biomass	1.90%	2.14%	1.98%	2.31%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Other	1.90%	2.14%	1.98%	2.31%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA



Q&A / Thank You



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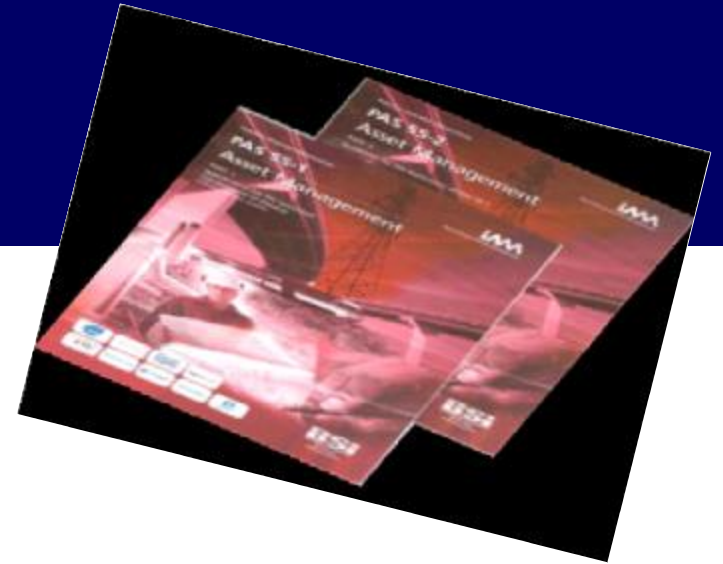
Ø Risk Management As A Cornerstone of PAS-55

Ø PAS 55 Assessment Case Study

Ø Implications for the US Market

Ø US Case Study – Electric Grid Modernization

➔ Ø Appendix



UMS has been at the forefront of Asset Management developments for over 15 years and our role with PAS 55 is influencing outcomes for the industry.

We are:

- Ø Closely aligned to and Member of the IAM**
- Ø A member of the Review Committee for PAS 55 Asset Management and the ongoing development and review of the specification**
- Ø At the forefront of how PASS 55 affects regulatory and business performance of major infrastructure organizations**
- Ø Our approach is based on kick starting organizations with an Awareness Training program with Certification recognizing such training has taken place.**

In general, our methodology assesses the asset management capability of an organization; and scopes and rates the potential impact of improvement activities to establish a best practice, risk based asset management approach – a core requirement of PAS 55



A Growing Number of Utility Companies Have Been Moving Toward PAS-55 Certification for the Past 5 Years

Company	Date Certified	Re-certification due
NGET	Oct 2005	Oct 2008
WPD	Nov 2006	Nov 2009
EDF Energy Networks	Nov 2006	Nov 2009
Essent Netwerk (Netherlands)	2006	
United Utilities	Jan 2007	Jan 2010
Central Networks	Feb 2007	Feb 2010
National Grid Gas Transmission	Feb 2007	Feb 2010
National Grid Gas Distribution	Mar 2007	
CLP Power, Hong Kong - Power Systems Business Group (PSBG)	Mar 2007	
Central Networks	May 2007	
CE Electric	Mar 2008	
SP Power Systems (SP	Dec 2007	
Northern Gas Networks	Apr 2008	
Manweb, SP Dist, SP Trans)	Mar 2008	
SSE (SHETL, SHEPD, SEPD)	Mar 2008	
Scotia	Apr 2008	
Transco UAE	2010	



Appendix

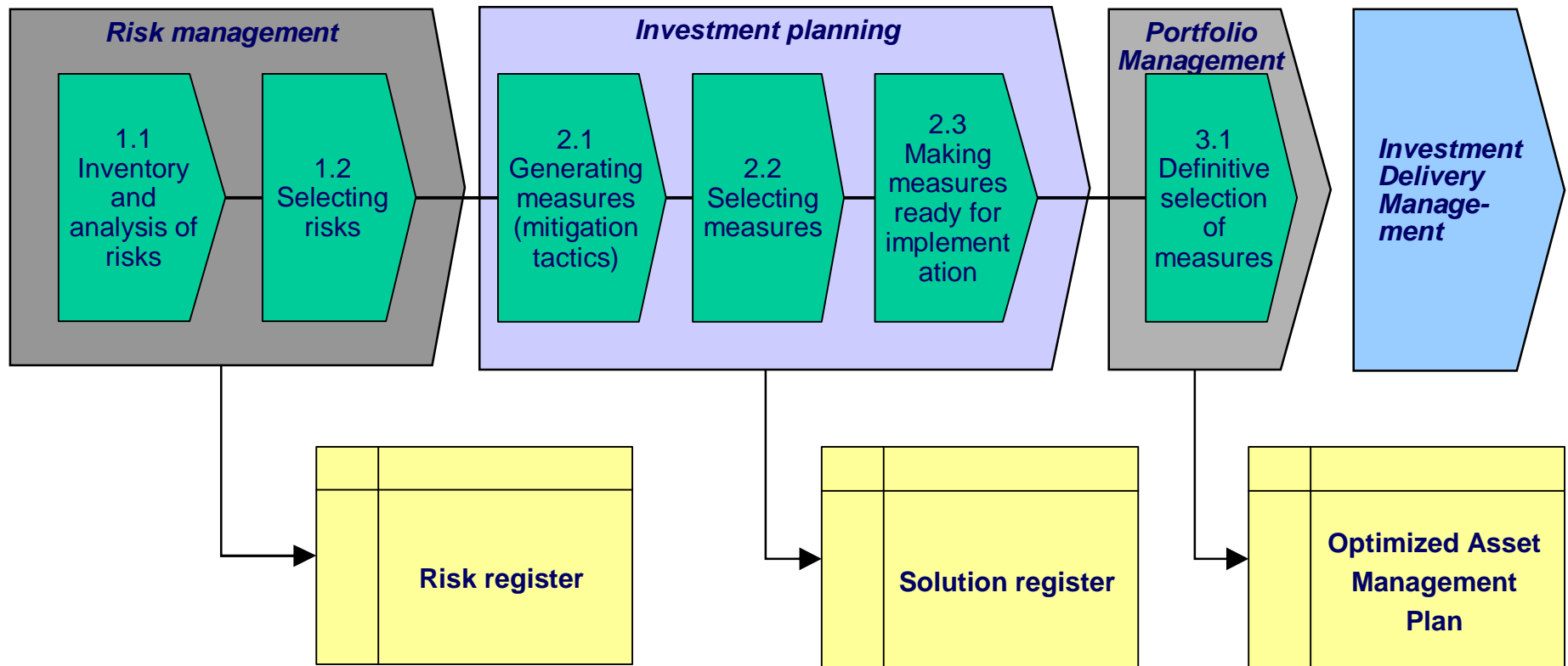
UMS Group Involvement In PAS 55



UMS Utility asset management experience has been Global – With Many strategic asset management transformation Projects



Standards Can Help Identify Specific Gaps. E.G., Level 1 Risk Management and Investment Planning & Portfolio Management processes and their outputs



Identified Opportunities Can Then Be Translated Into Activities And Plotted On A Transformation Roadmap

