



Innovative Approach to an ICT Infrastructure

supporting Smart Grids and Smart Metering for Municipal Electricity Undertakings

AMEU 2012

Johannesburg 15 October 2012

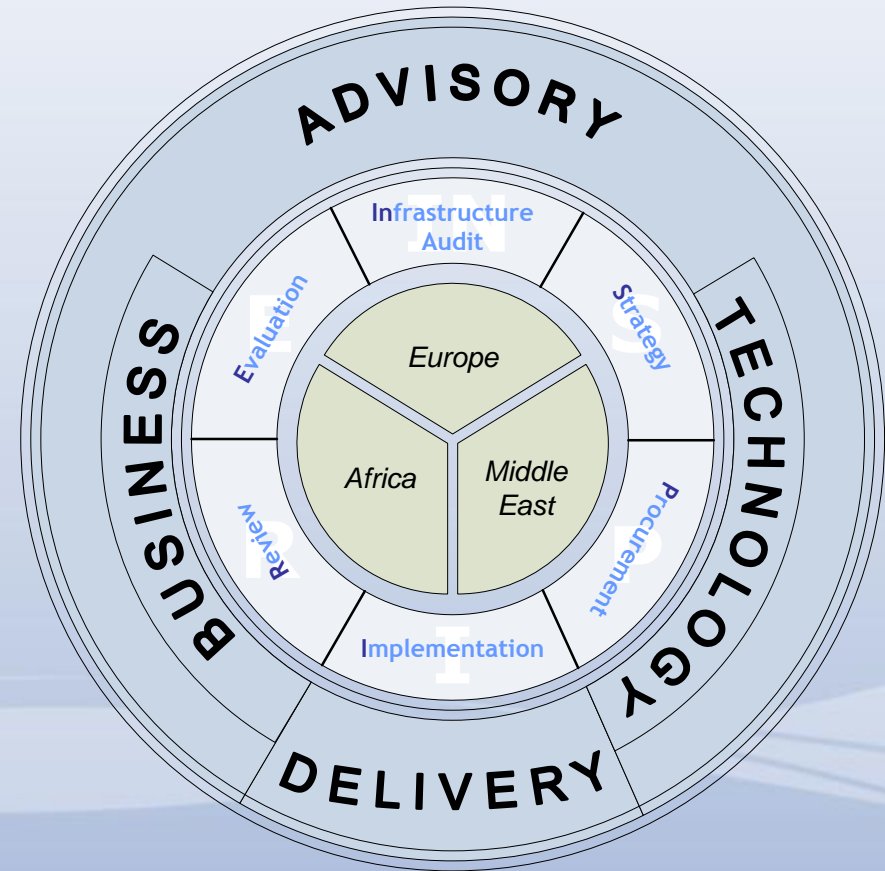


Mott MacDonald Technology and Communications for Utilities

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Communication Services within the Utility

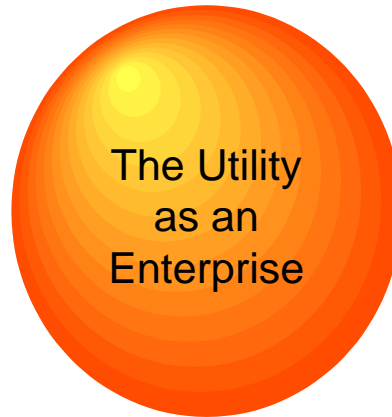
- ~~One~~ **Operational Comms** types of Comms Services within a Utility:

BUSINESS COMMS
SECURITY, SAFETY
&
ENVIRONMENTAL
SERVICES

CORPORATE
COMMUNICATION
SERVICES

OPERATIONAL
SUPPORT COMMS
SERVICES

LEADING THE ELECTRICITY DISTRIBUTION INDUSTRY



OPERATIONAL COMMS

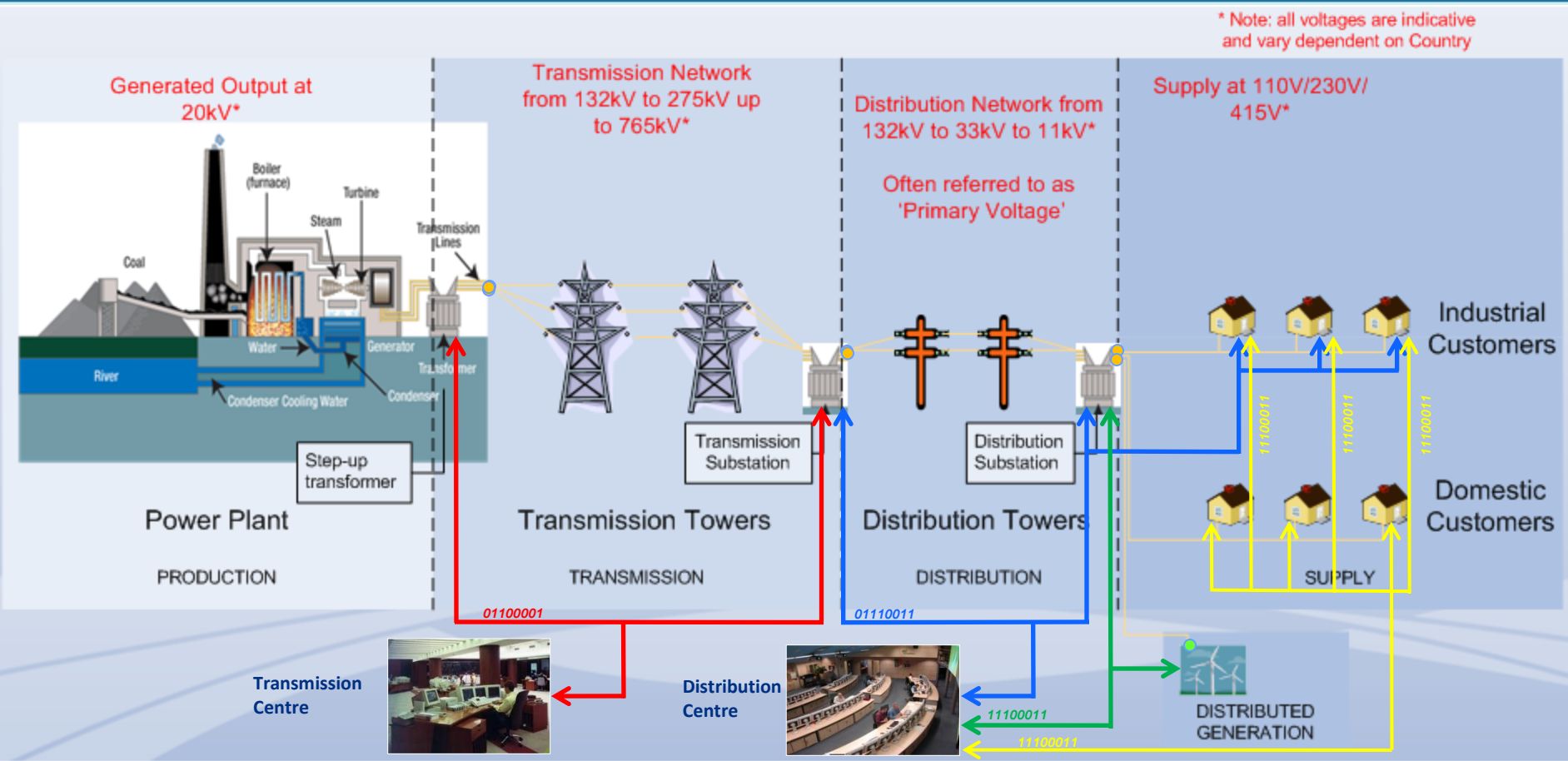
OPERATIONAL
COMMUNICATIONS
SERVICES

BUSINESS &
MARKET COMMS
SERVICES

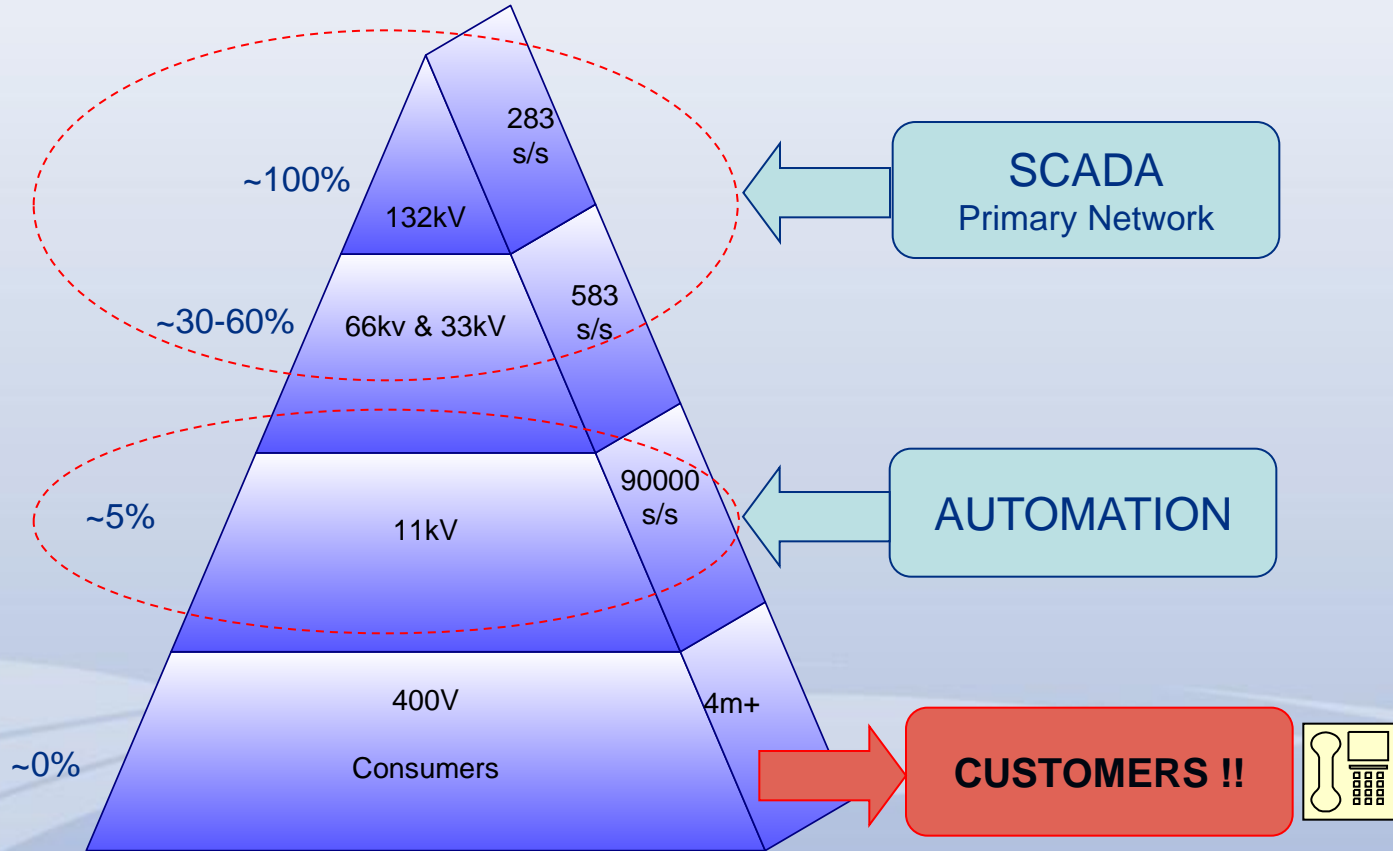
COMMERCIAL &
U-TELCO
SERVICES



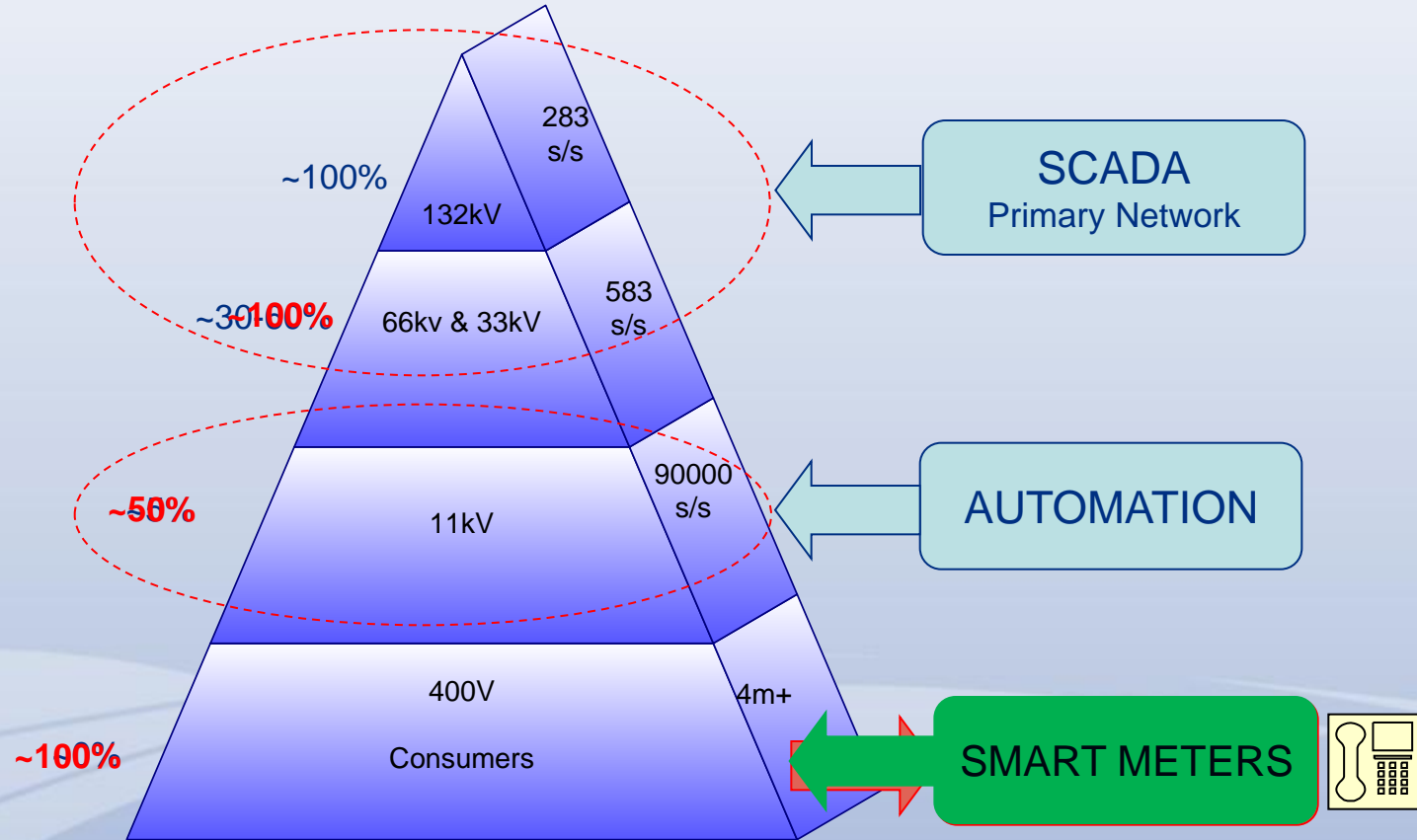
The Power Utility End-to-End Value Chain



ICT in a Typical Distribution Network

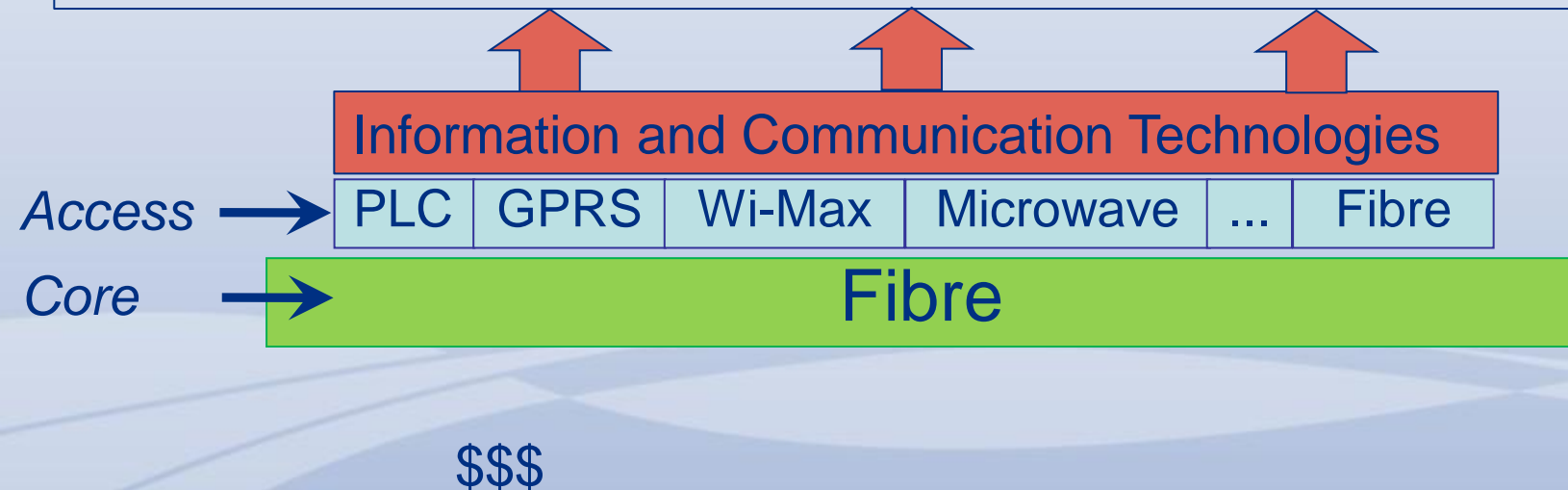


ICT in a Future Distribution Network



ICT - a Key Enabler

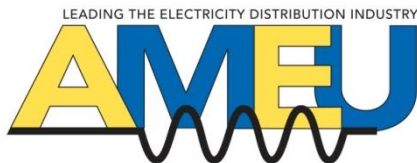
- In the near future, utilities will rely upon:
 - Greater visibility of network operation and performance
 - Real-time information capture, processing and analysis
 - Greater automation



Op-Tel Sourcing

- OpTel Services are generally delivered in-house or through a U-Telco*
- Drivers include:
 - Prior to competing PTOs, government owned authorities would not invest in utility needs
 - Utilities are risk averse – reliability, availability, dependability can be controlled
 - ‘Only the industry knows what the industry needs’
 - PTO standard service portfolio may not offer required services or SLAs
 - CNI security concerns over transferring service delivery risk
 - Technology development and implementation more controlled

* Mott MacDonald Benchmark 2011



Challenges of Op-Tel Sourcing

- Building, Operating and Maintaining your in-house OpTel network is challenging:
 - Expensive – with limited customer base or revenue stream to spread cost
 - Network upgrades and extensions can come under the scrutiny of the regulator
 - Slower rate of communications technology change
 - “Mesh of technologies”
 - Resource pool diminishing – skills and retention issues
 - Telecoms is not the ‘core business’ of the utility

The Dilemma

- How does a utility deliver telecoms services that:
 - Meet the demanding performance requirements of Op-Tel;
 - Support the security requirements for CNI;
 - Are scalable to support growth and capacity cost effectively;
 - Support new technical innovation and services cost effectively?



The Co-Operative OpTel Network



A possible answer - The Co-operative Network

- Creating a comms network that:
 - Is owned and operated by a group of utility companies
 - Delivers dedicated services to the industry (Op-Tel. B2B etc)
 - Has the capability to generate additional revenue through leasing spare capacity
- It could be multi-discipline – Electricity, Water, and Gas
- Layered across Generation, Transmission, Distribution and Supply businesses
- Provide a platform for Smart Grid – with a customer centric approach



Case Study Overview

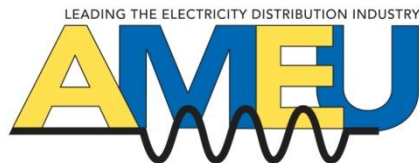
- Case study is from a 2008 MML client engagement in the UK
- It provides an interesting insight into what could be achieved
- It presents a unique approach to communications solutions for the utility industry
- UK scenario is illustrative of the potential across the world
 - Recognition that such a solution may be more applicable to some territories than others



Project Background

- TNO was considering its OpTel Strategy:
 - Reviewing its ageing telecoms assets and platform
 - Updating and upgrading the fibre network
 - Impact of Next Generation Networks Implementation from PTO
 - Reviewing state of readiness for Smart Grid and Smart Metering
 - Sourcing Strategy Review

Fundamental decision – the most flexible platform was fibre based



The Vision



- To create a national fibre network through a combination of TNO and DNO fibre
- UK :1 TSO, 7 DNOs, 14 Regions = 15 OpTel Networks
- Backbone network created primarily from TNO
- Access networks created primarily through DNO networks
- Leverage the fact that primary DNO substations are located adjacent to TNO substations
- Additional fibre would be installed (either underground or OPGW) to support the closure of rings to enhance network resilience

Challenges

- Opening the discussion – generating the interest
 - Important for a ‘neutral’ party to lead discussions
 - Not everybody has to be convinced from day 1 !!
- Negotiating a fair and equitable deal – with unequal partners
- Managing competing interests
- Ensuring that the solution delivers compatibility between participants
 - Starting point will be from multiple technology platforms and solutions for multiple OpTel services

Assessing Scheme Viability

- Finding time to investigate the opportunity
 - Are there enough assets to share?
 - Imminent and future roll-out plans for new fibre?
 - Refurbishment program for existing fibre?
 - Scale of build?
 - Can the ancillary service market support the project?

Viability achieved through an initial preliminary design exercise

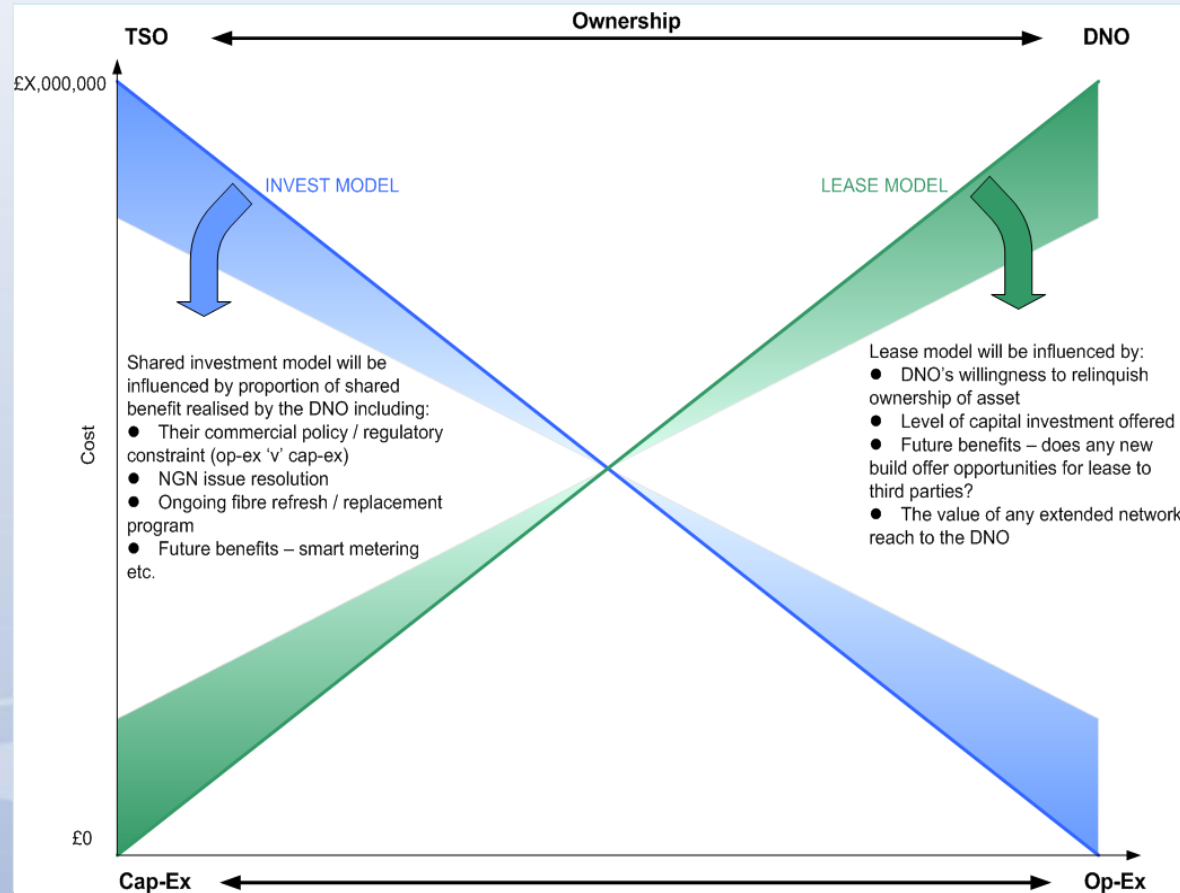
Fibre Requirements

Quantity of Fibre Pair (in km)					
	TNO Fibre	Existing OHL	New OHL	Existing U/G	New U/G
DNO 1	0	0	1093.8	0	687.5
DNO 2	242.8	700.1	0	0	92.5
DNO 3	0	1109.3	0	0	108.8
DNO 4	71	58	247.9	847.6	95.8
DNO 5	125	666.9	570	0	304.8
DNO 6	0	0	1064.9	0	432.2
DNO 7	0	1387	0	2332	136
Substation links	0	0	0	0	301
Total	438.8	3920.9	2976.6	3179.6	2158.7
Total Existing	7539				
Total New	5136				
Grand Total	12675				



Commercial Framework

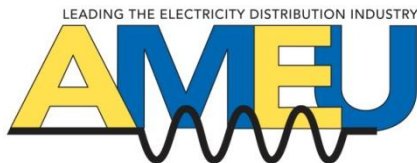
- Cost Effective
- Many commercial options available for cost sharing
- Shared cost for infrastructure (cap-ex) and service management (op-ex)
- Increased customer base (multi-utility) reduces unit support costs through economies of scale



Operating Environment

- Operational and Maintenance Environment has to be created
 - Provides an opportunity for sharing technical resources
- Of course issues will include:
 - Acceptable Operating Standards to all parties
 - Definition of SLAs

May be easier if U-Telco is formed to serve co-operative network



- Purpose built, bespoke network
 - Performance, topology and capability perfectly reflect utility requirements
 - CNI ‘in-house’ / ‘in-community’ solution advantageous – risk mitigation
 - Common industry focus – no exposure to any conflict of interests which may produce issues within a commercial environment (i.e. responding to changes in the market)
 - A platform for the future to support Smart Grid and Smart Metering

Opportunities

- Critical mass for creation of U-Telco service delivery organisation
- May create licence acquisition opportunity to support new services – e.g. Wi-Max?
- Opportunity to offer secure and robust backbone network to other CNI operators – other utility disciplines, civil defence, comms service providers etc.

The Co-operative OpTel network:

- Innovative solution created by sharing existing and new communications assets between utilities
- In South Africa this means collaboration between Municipalities and TSO
- The solution supports current and future initiatives:
 - Providing a level of future proofing...
 - ...whilst reducing overall investment and cost exposure of an individual utility

“Achieved outcome is greater than the sum of its parts”

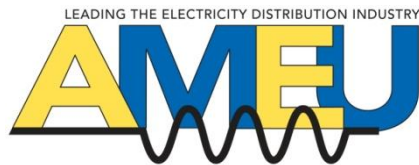
A Final Thought...

“Coming together is a beginning.

Keeping together is progress

Working together is success!”

Henry Ford (1863-1947)





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