STRATEGIES FOR UTILITY COMPANIES SEEKING TO MOVE TO IMPROVED MOBILITY

Task Force D2.09

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CONTENTS

1. EXECUTIVE SUMMARY

1.1 Introduction

Utility companies have to provide what are now considered to be essential services within a wide range of social, geographic and economic pressures that are created from differing technical/economic surroundings. The population they serve may be dense or scattered, technical solutions may be mandatory or optional, the pressure to give up frequency spectrum may be more or less intense, initiatives for public communication and emergency services communication may be strong or weak.

The technical and operational aspects of different mobile communication solutions have already been analysed by Cigré Study Committee SC35. The choice of technology, however, is also affected by the strategy that a utility uses, directly or indirectly, to improve the effectiveness of its mobile workforce. If the strategy is to safeguard emergencies at all costs a utility may well end up funding and launching its own network. If the strategy is to move towards mobility as quickly as possible, due to economic pressures a public standard GSM service may be the most effective solution. If a national emergency services network is established a utility may have an option to use this for everything or to have the emergency network for voice and a public network for normal operation.

Such choices are leading companies to break new ground in the provision of their telecommunications services by moving to the outsourced/managed service environment for their mobile systems.

This report, the work of Task Force SCD2.09 seeks to determine the different strategies, consider why they are worthy of consideration and the risks, understand the current expectations of utilities and identify the success stories.

1.2 Industry Context

In the last 15 years the utility sectors in many countries in the world has been subject to massive change in two key areas, ownership and the regulatory environment.

The ownership structure has been changed through the process of privatisation, the selling of utilities out of government ownership and into the private sector. This process changed significantly the aims of those companies and created a profit led philosophy.

The energy sectors in most countries are subject to the scrutiny and control of a regulatory body. The role of such organisations is the protection of the interests of customers by promoting competition and through regulation of some areas of the industry.

1.2.1 The Need for Mobile Communications

As the power networks increased in size and complexity, telecommunications played an increasing role in the management and support of the infrastructure. Electricity companies in particular, evolved working practices in the control and management of the electricity network and field based operational staff came to rely upon effective, resilient mobile communication systems which had, by their nature the capability to continue working during power outages.

1.2.2 The Telecommunications Environment

The world of telecommunications has been revolutionised by the introduction of digital technology, initially in the fixed line businesses and within the last 10 years, in the mobile sector.

Digital mobile technology has been an enabler for the explosive growth in the mobile phone networks and the introduction of enhanced services in the PMR/PAMR markets.

The success of the mobile phone networks has been exceptional. The scale of the market has driven down costs and produced many competing suppliers of handset equipment and value add services all of which bring value to utility businesses.

1.3 A Change in Sourcing Strategy

Pushed by market competition, a regulated environment and the business need for improved efficiencies and customer services, companies are reconsidering their traditional methods of providing telecommunications systems and services and are examining the benefits and risks associated with outsourcing and/or facilities management.

1.4 Requirements for Mobile Communications

There are three classic issues which dominate Utility attitudes to mobile communications these are network access, resilience and coverage. These are the primary requirements of a mobile communications system and they are generally required in all environmental conditions and at all times. It is the availability or unavailability of these three key features that will determine a Utility's strategy for mobile communications. Other traditional functionality such as dispatch and control, open channel communications, group calls, prioritisation and direct mode communication are also important when considering voice communications.

Utilities in the current economic and regulatory environment also require the most cost effective communications available in the marketplace. Cost is now a major determinant in developing strategies for mobility. Each investment decision is now subject to the rigours of business case analysis and unnecessary capital expenditure is to be avoided. In many cases spending on telecommunications is subject to regulatory scrutiny to ensure that the utility is achieving and providing value for money.

One further consideration is the degree of control that a utility requires over the performance of its communications infrastructure. Utilities who use or intend to make use of mobile communications to manage and control their critical infrastructure may require greater degrees of control then those who don't.

1.5 Business Drivers

A common theme in utilities whether they are State or investor owned companies is the drive for containment and indeed reduction of the cost base. This, coupled with the need for improvement of safety standards whilst maintaining and improving business efficiency, performance and revenues, is having a significant impact on the way utilities are doing business. There are a number of key business drivers that influence strategic direction in the selection of mobile services.

1.5.1 Lack of Alternatives to Self Provided Systems

Where alternatives are not available in the form of PAMR or GSM services the Utility may be forced to develop its own mobile solution to meet these needs. This has been the case for many utilities in the past.

1.5.2 Regulatory Environment

In the Utility Industry regulatory requirements in terms of public and staff safety and cost considerations are important factors. Mobile communications have always been essential to maintain safe working practices and public safety but the choice will be influenced by service and cost constraints imposed by industry regulators.

Regulators in industries where natural monopolies are deemed to exist are placing greater pressure on Utilities to eliminate perceived inefficiencies and to drive out unnecessary cost.

They are demanding that utilities provide high levels of service to their customers by meeting strict targets for response, service provision, availability and information provision.

Utilities that do not operate in a safe manner are likely to be subject to litigation and compensation claims from government, staff and the public.

1.5.3 Asset Ownership/Investment Policy

A Utility's attitude to asset ownership and its investment policy will be drivers for its Mobile Communications strategy. An inclination towards asset ownership will drive the utility towards an owned infrastructure. An outsourced solution creates several options such as shared ownership, service provision in the form of a PAMR service provider or, at the other extreme, full service management for those utilities with a negative attitude to ownership.

1.5.4 Government Policy

In some countries governments will mandate emergency communications networks. These networks are often confined to the so-called 'Blue Light Services'. Some countries include the utilities in this category, although the ITU-world radio regulations don't catagorise utilities among this class of service. . Access to such a network for emergency purposes may reduce the Utility's need to invest in a Mobile Communications network.

1.5.5 Attitude to Risk

The Utility's attitude to risk will have a significant bearing on its Mobile Communications Strategy. A risk averse organisation may want to have a network that will survive during major storm conditions, as a communications network of last resort in the absence of public operators' services that may be unavailable.

1.5.6 Creation of Telecoms Business

Where few alternatives exist and market conditions are favourable the Utility may offer services on its network to other users, in effect setting up as an operator and service provider.

Energy regulators may have problems with regulated assets being used to provide a non-regulated service. At best, 'use of system charges' would apply; at worst the regulator may block the use of regulated assets to offer PAMR services.

1.6 The Mobile Strategies

There are two main options, the first one is 'PMR world' based and the second is 'public service' based.

1.6.1 The PMR/PAMR-Strategy

There are three potential options to consider:

- Build a Utility Owned PMR - Building a dedicated private mobile radio service ('PMR'). The only possible solution in former times and still may be a valid, but capital intensive approach.
- Build a PMR/PAMR with Partners - to mitigate costs, finding partners for a private mobile radio system or a public access mobile radio system ('AMR') - e.g. TETRA based - may be a solution. Teaming up with non-Governmental emergency organisations or emergency services would seem to be most appropriate.
- Use a 'Managed Service' - in areas, where 'Managed Services' - e.g. Dolphin in UK and Virve in Finland are already offered, use of such services may provide a more cost effective solution for a utility than building a PMR or PAMR solution.

1.6.2 The 'Public Service' Strategy

Without any doubt the most economical solution is to use one of the public services - e.g. GSM mobile phone network. The main issues with such a solution are the utilities requirements for coverage, resilience and access. A public operator - utility partnership may address these issues.

One special solution for a utility may be to gain 'Mobile virtual network operator (MVNO)' status and to be able to use the base station subsystem of the public operator although there are special technical issues to resolved with this solution

1.6.3 The 'Mixed Service' Strategy

Using a 'Public Service' for general traffic and either a PMR/PAMR Service for critical applications or a separate service during emergency conditions (e.g. satellite based services or simple direct mode radios). This may be a strategy to overcome the disadvantages of public services at a minimum of additional cost.

1.7 Comparison of Strategies

It is important to compare the five solutions proposed in Section 6 with the main criteria for a mobile solution: future proofing, cost, time to implement, functional coverage and quality of network.

The table below outlines the authors' ranking of the five strategies against the main criteria identified earlier. The ranking is based on the analysis carried out by the authors.

		Build Your Own	Build With Partners	Manage Services	Public Services	Mixed Service
Future Proof						
Cost	Capital					
	Operation					
	Revenue					
Time to Implement						
Fit to Specific Requirements						
Access						
Coverage						
Resilience						

It is not appropriate to create an average 'score' by adding up the columns within the table. A true comparison should only be made by allocating relative weightings in accordance with the prevailing conditions within each country. These will include Regulatory, Legal etc.

In the table the 'Build' columns relate to the ability of a strategy to meet the specific requirements defined by a utility.

The 'services' strategies provide greater advantages in terms of costs and evolution.

The ‘managed services’ solution is currently available in a relatively small number of countries. It is a new approach for many utilities and it should be recognised that there could be a greater commercial and technical risk associated with this strategy.

However, it is quite clear that a reasonable approach is to check as to whether full functionality can be provided by a Public network.

1.8 Identification of Risk

All organisations develop risk policies for their business and the potential for failure of telecommunications should always be seen as an element of risk to the functioning of the business. Interruption or loss of differing telecommunication systems and services will have a greater or lesser effect on different aims of the business.

However, systems can be described as ‘mission critical’ if the loss of the system would cause the primary aim of the company to fail. This is certainly the case for a utilities mobile communications service when the core network is under stress through adverse weather conditions.

Two major risk types can be identified in terms of the strategies for mobile services. These are the risks associated with building a company owned network and the risks associated with purchasing a managed service. The different variants of the strategies will encompass elements of the different risk types to various degrees.

With the build strategy the risks relate to capital exposure, costs of maintaining the network, staff skill sets and supplier support. The risk of obsolescence is significant due to the scale of the market as is the risk of excessive supplier influence on costs, technology and support due to limited competition. Many of these risks will apply to the company owned element of the Mixed Strategy variant.

In the context of managed services the risks are primarily operational. Generally competition is available in the market both for the technology and the service, thereby minimising the risks outlined for the ‘Build Strategies’, further to this there is little investment involved for the basic service.

However, in terms of operational issues the risks here are significantly higher. These services based strategies are predicated on using networks that are designed with a relatively low common denominator in terms of access, coverage and reliability. The networks are designed to be shared by as many users as possible and their primary reason for existence is to generate revenue for their owners.

These networks are not designed to meet Utility needs for Coverage, Access and Resilience. Coverage is generally concentrated around areas of major population or highways, often missing Utility locations, which are typically in remote or hidden locations. Access is optimised to ensure that costs due to excess capacity are minimised, meaning that networks can be congested and do not have the capability of supporting surges in demand caused by emergency conditions. This means that access, which is essential for utilities, cannot be guaranteed, In terms of resilience the managed and public systems are limited in their robustness and will under certain conditions not offer full availability. This is not sufficient to meet the needs of utilities as the period of unavailability can often coincide with the period of greatest need for utilities (i.e. major storms).

1.9 Conclusions

When you take into account the diverse requirements, drivers and environmental conditions in which a utility may operate it is apparent that no single strategy can be recommended which will meet the needs of all utilities. The need for mobility is clear, however, the strategy that a utility adopts will be influenced by the many factors such as, financial, state of the telecommunications industry in the country, availability of capital, attitude to risk, attitude to investment, legal environment and regulatory environment. Evidence of this is seen in Section 7 where the state of the market in several countries is outlined.

The comparison table in Section 7 illustrates that ownership based strategies tend to provide the best fit to the utility's technical and operational requirements but these strategies are most demanding in terms of capital investment. Strategies which rely on managed or shared services require less capital investment but may require the utility to compromise on the certain aspects of the service such as coverage, access and availability.

The advent and ubiquity of publicly available mobile services such as GSM and GPRS data have provided utilities with a low cost option, which meets many of the utility's requirements under normal conditions.

The mixed service strategy, in which a utility uses managed services such as GSM, for general day to day requirements and a limited owned network to meet emergency needs, often appears to provide an acceptable compromise but utilities need to be wary of compromising on both cost and performance.

In considering a strategy for a new mobile service, a utility should consider whether the telecommunications services employed to support their core business is a 'mission critical' service. Support systems should be considered 'mission critical' when the loss of such a system would cause the primary aim of the core business to fail. Such systems demand a high level of 'resilience' and there is no option but to fund the cost of providing such guarantees.

What should also be considered is the fact that it can be quite impossible to switch from one solution to another. For example, if a utility decides to move from an owned network to a public service one, after a certain time it will be almost impossible to change strategy because the resources such as licences, skills and property may no longer be available.

When determining their strategy for mobility Utilities must examine their particular circumstances and determine a solution which best meets their needs. It important to remember the any decision is likely to dictate service levels and costs for a long period of time as costs to change, once a particular course of action has been decided may be very substantial.

2. INTRODUCTION

Utility companies have to provide what are now considered to be essential services within a wide range of social, geographic and economic pressures that are created from differing technical/economic surroundings. The population they serve may be dense or scattered, technical solutions may be mandatory or optional, the pressure to give up frequency spectrum may be more or less intense, initiatives for public communication and emergency services communication may be strong or weak.

The technical and operational aspects of different mobile communication solutions have already been analysed by Cigré Study Committee SC35. The choice of technology, however, is also affected by the strategy that a utility uses, directly or indirectly, to improve the effectiveness of its mobile workforce. If the strategy is to safeguard emergencies at all costs a utility may well end up funding and launching its own digital (in Europe TETRA) network and adding some mobile data applications to this network will be looked upon as cost effective. If the strategy is to move towards mobility as quickly as possible, due to economic pressures a public standard GSM service may be the most effective solution and adding mobile data to this may be a natural progression. If a national emergency services network is established a utility may have an option to use this for everything or to have the emergency network for voice and a public network for mobile data services under normal operation.

Some utility companies are breaking new ground in the provision of their telecommunications services by moving to the outsourced/managed service environment for their mobile systems.

This report, the work of Task Force SCD2.09 seeks to answer the following questions:

- What are the different strategies?
- Why are they worthy of consideration and what are the risks?
- What are the current expectations?
- When will we see the success stories?

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3. UTILITY INDUSTRY CONTEXT

3.1 Introduction

Historically, all utilities in the Gas Water and Electricity sectors were created out of a Government's wish to provide essential services to the majority of the population. The most effective way to develop an infrastructure capable of delivering these services was through Government owned organisations, indeed the level of capital investment could only be provided by local or central governments.

The primary business focus for these organisations was the creation of major infrastructure networks and the safe, reliable operation of those networks. The new infrastructures became an essential element in the improvement of economic performance of countries and the quality of life for the population at large.

In the last 15 years the utility sectors in many countries in the world has been subject to massive change in two key areas:

3.1.1 Ownership

The ownership structure has been changed through the process of privatisation, the selling of utilities out of government ownership and into the private sector. This process changed significantly the aims of those companies and created a profit led philosophy.

3.1.2 Regulatory Environment

The energy sectors in most countries are subject to the scrutiny and control of a regulatory body. The role of such organisations is the protection of the interests of customers by promoting competition and through regulation of some areas of the industry. To do this the regulatory authority will focus on:

- The effective working of energy markets
- Regulating monopoly businesses
- Security of supply
- Social and environmental responsibilities.

This technical brochure discusses the strategies for mobility of those businesses in the electricity, gas and water sectors that own or operate assets and are seen to be monopoly businesses.

3.2 The Need for Mobile Communications

As the power networks increased in size complexity, telecommunications played an increasing role in the management and support of the infrastructure. Electricity companies in particular, evolved working practices in the control and management of the electricity network and field based operational staff came to rely upon effective, resilient mobile communication systems which had, by their nature the capability to continue working during power outages.

With safety a primary requisite, electricity companies developed and procured mobile systems that met their specific requirements and the control of the design, operation and maintenance of these systems remained within the electricity authority or company. Indeed, the requirements of the electricity sector in terms of radio coverage of the landmass were not likely to be met by any other organisation and the technology was considered to be very specialised.

Technological developments in mobile communication systems, generally in the form of narrower bandwidths and improved quality of service led a utility company to reinvest in new systems approximately every ten years. There was little or no choice for companies except to procure new equipment to comply with the demands of the Government telecommunications regulatory body.

3.3 The Telecommunications Environment

The world of telecommunications has been revolutionised by the introduction of digital technology, initially in the fixed line businesses and within the last 10 years, in the mobile sector.

Digital mobile technology has been an enabler for the explosive growth in the mobile phone networks and the introduction of enhanced services in the PMR/PAMR markets.

The success of the mobile phone networks has been exceptional. The scale of the market has driven down costs and produced many competing suppliers of handset equipment and value add services all of which bring value to utility businesses.

Digital PMR/PAMR systems can be expensive to procure and implement but are being adopted extensively by the Emergency Services segment of the mobile market. These systems will provide all of the features and facilities utility businesses need for the operation of their networks.

3.4 A Change in Sourcing Strategy

Pushed by market competition, a regulated environment and the business need for improved efficiencies and customer services, companies are reconsidering their traditional methods of providing telecommunications systems and services and are examining the benefits and risks associated with outsourcing and/or facilities management.

There is now available in the marketplace a range of companies that can provide service management and full service delivery for fixed and mobile, voice and data services that will largely meet the needs of utility companies.

It is recognised that such change is not without risk but companies in some countries have made the decision to move into the service delivery environment such activities as SCADA/telemetry and mobile services as well as call centres, fixed voice and data services and Information Technology.

This paper assesses the benefits and risks associated with the outsourcing or the Facilities Management of mobile services.

4. UTILITY REQUIREMENTS IN MOBILE TELECOMMUNICATIONS

4.1 Introduction

In general utilities, driven by the new economic and regulatory environment will look to systems and networks that enhance their effectiveness in terms of cost and efficiency of operation. Strategies for communications and mobility will be determined by the capabilities of the systems to meet the demands of the new environment and their ability to facilitate the business process changes that are contemplated by the utilities.

Traditionally mobile systems comprised of analogue voice systems and were used primarily for field force management communications and dispatch.

There are three classic issues which dominate Utility attitudes to mobile communications these are network access, resilience and coverage. These are the primary requirements of a mobile communications system and they are generally required in all environmental conditions and at all times. It is the availability or unavailability of these three key features that will determine a Utility's strategy for mobile communications. Other traditional functionality such as dispatch and control, open channel communications, group calls, prioritisation and direct mode communication are also important when considering voice communications.

On the data side we can include items such as speed, reliability and ease of use. Other issues will include flexibility of the network to accommodate change, reconfiguration and additional features, scalability namely the ability to accommodate additional users, cover larger areas or provide higher speeds and work with newer applications such as imaging, GIS systems and location based systems. The availability or otherwise of these features, facilities and functionality will be important driver in the business strategy and decision making process.

Because of the nature of electricity transmission networks, mobile telecommunication needs are considered mission critical to enable compliance with regulatory standards for availability of the electricity network. Therefore, many companies have chosen to invest in their own telecom-infrastructure to ensure reliable and secure transmission circuits and to be certain that specific requirements such as physically separated circuits are setup and maintained in the future.

4.2 Voice and Data Mobile Requirements

4.2.1 Introduction

The traditional requirements of coverage, access and resilience are still key for power utilities when considering mobile communications strategies. It is the necessity for, and availability of, these common features and the cost of their provision that ultimately dictate telecom strategies.

These requirements will not diminish and will become more onerous due to the changing nature of how business in performed. Availability of features such as high-speed data, whilst not essential, will provide additional benefits to utilities seeking to improve their business processes but will remain secondary to the key requirements of coverage, access and resilience.

The issue of ownership and control of the mobile communications system is also a critical issue. The use of privately owned systems up to the present date has allowed utilities to optimise their communications systems to their own geographic, demographic and business needs; and has minimised the impact from other sources, albeit at a cost to the utility.

Consideration of shared networks from public operators may significantly reduce the control and, subsequently, flexibility that traditionally, utilities have had over their mobile communications. This could impact on levels of coverage, accessibility and resilience for the utility, as it may not be in the interest of public operators to match the needs of the utility. It is, therefore, essential for any utility whose strategy encompasses the use of publicly operated ‘shared’ mobile systems to ensure that their requirements are well defined and stated, and that their service provider is amenable to meeting these requirements.

4.2.2 Coverage

The utility’s critical coverage requirements are typically based around the company’s electrical facilities, which include transmission, distribution, switching and generating stations. Many companies have indicated that coverage requirements for mobile services these should be 90% and potentially 95% of the core business network. In many cases indoor, outdoor and in some cases underground (transport systems) coverage is required. In many instances coverage is required in geographically isolated locations which are not always amenable to radio propagation.

4.2.3 Access

It is a key requirement for the electrical utility that users can gain access to voice and data services with an agreed Grade of Service.

The grade of service provided by the mobile system must be sufficient to cope with the anticipated busy hour traffic.

Quality of service is also important. The parameters to be considered are ‘dropped call rate’ call setup time and voice quality.

In addition to providing this grade of service, the mobile system shall support **guaranteed** voice and data access for the utility by using one or both of the following mechanisms:

i) Pre-emption - i.e. if network resources are busy, the user shall have the facility to initiate a priority call (in the case of a voice call). This will clear down and free up network resources necessary to establish the priority call.

ii) Dedication of bandwidth to the utility under congestion conditions - this may not be easy to implement in the event of localised or short periods of congestion.

These requirements are particularly important during storm or emergency situations where the utility must be able to continue to communicate.

4.2.4 Resilience

It is a key requirement that the mobile system has sufficient resilience. This is particularly important during onerous conditions such as storm situations.

The mobile system may often be required to be independent of mains supply and be capable of continuing to operate during power failures under normal and critical situations. Power standby times for installations are frequently determined by the accessibility of sites. Minimum standby times demanded by utilities range from twelve hours to five days, depending on site accessibility, for all mobile system network infrastructure including base stations, transmission equipment and switching equipment. Central switching locations require power standby for at least one week.

The network must be designed so as to minimise dependency on any one element. All key central installations must have full redundancy such that no single failure can cause a major network outage.

4.3 Cost Effectiveness

Utilities in the current economic and regulatory environment require the most cost effective communications available in the marketplace. Cost is now a major determinant in developing strategies for mobility. Each investment decision is now subject to the rigours of business case analysis and unnecessary capital expenditure is to be avoided. In many cases spending on telecommunications is subject to regulatory scrutiny to ensure that the utility is achieving and providing value for money.

4.4 Control

The degree of control that a utility can have over its communications infrastructure is a requirement that must be considered seriously. Utilities who use or intend to make use of mobile communications to manage and control their critical infrastructure may require greater degrees of control then those who don’t.

The level of control of the network may vary from total control over all aspects of design and operation, to just exercising control of provisioning rights priority privileges or restriction of access. The requirement for control will impact on ownership decisions, technology decisions and outsourcing decisions. Each of the aforementioned decisions will impact on the strategy adopted by the utility.

4.5 Applications Requirements Overview:

Applications requiring mobile communications can be broken into two categories, voice and data. Within these categories there are differing demands of the system in terms of coverage, access, resilience, capacity, speed time sensitivity and availability. These requirements and their criticality depend on the situations and uses to which the system is applied. The following sections outline some of the applications and their requirements. The most common applications of telecommunications that system operators needs are:

4.5.1 Voice

- **Telephony**
  Mobile communications have been traditionally used by utilities to provide mobile voice solutions. This was typically the only form of voice communications available to utility staff in the field prior to the development of public cellular systems. In many areas where coverage from public cellular systems is not adequate, utility owned PMR systems are still the only available option.

- **Dispatch and Control**
  Many utilities need to organise and control maintenance and repair crews throughout their areas of operation. In many cases the facilities provided by traditional PMR systems such as Control Room Dispatchers, closed user groups and other traditional PMR features are essential requirements for the control and co-ordination of line crews.

- **Emergency Communications**
  In emergency situations such as those caused by major storms or natural disasters, utilities require as a minimum, the availability of voice communications to allow the co-ordination of emergency repair crews in order to restore supply. In these instances utilities require mobile communications systems that provide all of the three facilities described above, coverage, access and resilience. In these extreme circumstances the utility will also require features such as priority and call teardown. When using ‘all informed’ techniques, capacity is not a major requirement in these conditions but where solutions use trunking techniques congestion can be a major issue.

Other concerns in these circumstances include to ability to communicate with emergency services, regional administrative centres and possibly the media.

4.5.2 Data

The potential of mobile systems to connect to more modern IT infrastructure to provide solutions for utilities to more efficiently and effectively manage their electrical networks is leading to a requirement for a wide range of data speeds to support numerous applications. Some requirements for data type applications are outlined below.

- **SCADA/Tele-Control**
  In this instance utilities require secure reliable communication, often to remote, inaccessible areas. Typically mobile systems can provide, low cost back up facilities to the primary telecommunication facilities for applications such as tele-protection, tele-switch-off, tele-control and tele-measures.

  In terms of capacity data volumes and speeds are low, however, reliability and availability are critical.

- **Remote Metering**
  In the context of metering applications, utilities require systems that provide widespread coverage. Capacity and speed requirements are not seen as critical and availability is not as important in this instance as it is in the tele-control requirement. Speed, ease and cost of deployment are key requirements in this application.

- **Rural Automation/Control**
  Many electricity distribution companies are seeking to improve the quality of service they offer their customers. A primary requirement for the extension of this network control philosophy is the provision of a reliable cost effective communications network that operates satisfactorily in remote areas of the rural networks. Utilities are looking to mobile infrastructure as an effective and inexpensive means of achieving this. The primary requirements in this instance are coverage and reliability.

- **Work Force Management**
  Utilities in the current environment are required to redefine and redesign their business process to meet stringent customer service targets (often with penalties for non-compliance set and monitored by regulatory agencies) and to minimise costs in their field service divisions. Older work practices led to inefficient use of time, slow deployment of resources and delays in disseminating information.

  In order to improve efficiency and meet requirements set in customer charters, utilities are required to distribute information in an accurate and timely manner to staff in the field. Mobile communications provide a means of meeting this requirement. The requirements of mobile systems in this instance are for ubiquitous coverage, high-speed data and ready and easy access to network resources.

- **Customer Relations Management**
  With the introduction of competition and service metrics evaluate performance the importance of Customer Relationship Management is growing. CRM data is being gathered, constantly updated and made available online to all areas of the business. It is important to underpin the effectiveness of this innovation with the ability to access, display and update live data from the clients' premises in order to input or retrieve valuable and strategically important corporate data.

  A mobile data solution will help to meet this requirement and brings much needed commercial intelligence to the people in the front line.

  Requirements of the mobile system in this environment are for general access at high speeds and with large data capacity.

- **Alarm Handling**
  When an electricity substation is can no longer be supervised by a remote dispatch centre, due to a failure in primary communications there may be an obligation for the company to have personnel on site to maintain local supervisory services. The cost for this can be significant, especially when the restoration of the remote supervision takes a long time. In the case of a leased line failure between the dispatch centre and the substation, restoration could take up to three days, during which time the site must be manned. Mobile systems have been mooted as an alternative, using an automated solution that provides a very good method of reducing costs and reducing the reliance on qualified personnel. In the substation all the alarms are grouped into one general signal, for backup purposes. This signal is transmitted to the dispatch centre, using the backup mobile system every time an alarm is generated in the substation. This facility would only function when the backup system has been remotely activated by the operator.

  The requirements in this instance relate to coverage, reliability and availability. Capacity and speed are not an issue.

4.6 Conclusion

From the above it can be seen that the requirements of utilities are growing in terns of application and capacity. Some areas of the organisation will put great emphasis on the three traditional requirements of coverage, access and resilience but other internal businesses will consider that the latter two are of less importance because they do not need real time access to their field staff.

These requirements and the relative emphasis that is placed upon them by the utility will form a major influencing factor in determining the strategy for improved mobility to be adopted by the utility.

5. BUSINESS DRIVERS

A common theme in utilities whether they are State or investor owned companies is the drive for containment and indeed reduction of the cost base. This, coupled with the need for improvement of safety standards whilst maintaining and improving business efficiency, performance and revenues, is having a significant impact on the way utilities are doing business.

The drive to promote competition encouraged by the privatisation of core utility business, the deregulation of energy and supply businesses and consolidation within the market place is creating significant change within the industry context. These changes are being used to deliver reductions in the cost base by eliminating inefficiencies and improving productivity. In some countries restructuring and rationalisation programs, mergers and acquisitions lead to staff reductions, greater centralisation of many functions and larger areas of operational responsibility all of these factors drive the need for a coherent mobile communications strategy.

Coupled with the above are newer factors, in the utilities industry context, such as speed to market, customer satisfaction and customer relations' management.

The authors have identified several business drivers for Mobile Communications in the Utility industry. It is important to examine these as they will determine the nature of the strategy to be adopted by or proposed for the Utility. These are generally shaped by the Utility industry context and include factors such as telecom industry development, legal and regulatory framework, financial, business, demographic and geographic considerations.

5.1 Lack of Alternatives to Self Provided Systems

This driver is based on the necessity for the utility to provide mobile voice and/or data communications to its operations and maintenance staff in order for them to carry out their work. Where alternatives are not available in the form of PAMR or GSM services the Utility may be forced to develop its own mobile solution to meet these needs. This has been the case for many utilities in the past.

5.2 Regulatory Environment

In the Utility Industry regulatory requirements in terms of public and staff safety and cost considerations are important factors. Mobile communications are becoming essential to maintain safe working practices and public safety and to meet the service and cost constraints imposed by industry regulators.

5.2.1 Economics

Regulators in industries where natural monopolies are deemed to exist are placing greater pressure on Utilities to eliminate perceived inefficiencies and to drive out unnecessary cost, to ensure that consumers are receiving value for money. To this end the Regulator is scanning budgets and vetting costs, allowing only those deemed to be needed for the running of the business. To meet the Regulatory pressures Utilities are having to become more effective and efficient.

5.2.2 Service Levels

Regulators are demanding that utilities provide high levels of service to their customers by meeting strict targets for response, service provision, availability and information provision. In many cases the Utility is liable to penalties outlined in voluntary or imposed customer charters. In these instances it is essential for the Utility to be able to act quickly and effectively.

5.2.3 Safety

Concerns over the safety of staff and the public are becoming ever more important for the utility industry. Utilities that do not operate in a safe manner are likely to be subject to litigation and compensation claims from government, staff and the public. Also public owned companies reduce their shareholder value by ignoring safety principles guidelines and policies. Mobile communications can assist in meeting targets set for safety, especially during emergency conditions where no alternative communications mechanisms are available.

5.3 Timescales

Many utilities have PMR networks. These networks are in effect early generation analogue systems with little or no data capability and are near the end of their useful lifespan in terms of functionality, features and in terms of maintainability and support. These Utilities are now faced with an urgent need to improve their mobile communications. This need will shape and drive the decision making process in terms of the adoption of PMR, GSM or alternative technologies.

5.4 Asset Ownership/Investment Policy

A Utility's attitude to asset ownership and its investment policy will be drivers for its Mobile Communications strategy. An inclination towards asset ownership will drive the utility towards an owned infrastructure. The company may decide to operate the system itself or outsource the operation. An outsourced solution creates several options such as shared ownership, service provision in the form of a PAMR service provider or, at the other extreme, full service management for those utilities with a negative attitude to ownership.

In the latter strategy the company may decide to outsource all aspects of its mobile communications requirements, from infrastructure to hardware provision to operation and support of the system.

5.5 Telecommunications Market Context

The state of the telecommunications market in any given country will be an important driver of an organisations' mobile communications strategy. The availability or otherwise of adequate and effective communications facilities will impact on whether a company will invest or purchase services.

The presence of a vibrant and competitive telecommunications market generally ensures keen prices for bought in services. In a less developed market context it is more likely that the organisation will have to build its own capability. However, this may offer opportunities for provision of services to other users, this will impact on the scale of, as well as the need for, the operation.

Availability of PAMR operators in the market place will obviously make the case for a Utility owned network harder to justify, on financial grounds and also provide comparators when attempting a business case.

However, any decision to move to a managed (outsourced) service could create risks for the utility company to consider. These include the big three concerns, access, coverage and resilience. The issue here will be to determine a monetary, and indeed operational value for these items, in order to allow valid comparisons.

5.6 Government Policy

In some countries governments will mandate emergency communications networks. These networks are often confined to the so-called 'Blue Light Services'. Some countries include the utilities in this category, although the ITU-world radio regulations don't catagorise utilities among this class of service. . Availability of, and access to such a network for emergency purposes may reduce the Utility's need to invest in a Mobile Communications network.

5.7 Attitude to Risk

The Utility's attitude to risk will have a significant bearing on its Mobile Communications Strategy. A risk averse organisation may want to have a Mobile Communications network which will survive during major storm conditions, as a communications network of last resort in the absence of public operators' services that may be unavailable.

Traditionally the Utility has minimised risk in this context through ownership and control of its mobile communications system. Privately owned systems up to the present date have also allowed utilities to optimise their communications systems to their particular geographic, demographic and business needs.

5.8 Creation of Telecoms Business

Where few alternatives exist and market conditions are favourable the Utility may offer services on its network to other users, in effect setting up as an operator and service provider.

Telecommunication regulatory issues need to be considered in this instance. Many regulators permit utilities to build networks on the basis of satisfying their particular operational requirements. This was especially the case in the absence of viable public service alternatives. Attitudes to and conditions for utilities building networks to offer PAMR services may be significantly different to those used for the traditional needs of a utility for mobile communications.

Energy regulators may have problems with regulated assets being used to provide a non-regulated service. At best, 'use of system charges' would apply; at worst the regulator may block the use of regulated assets to offer PAMR services.

5.9 Economic Climate

The economic climate in a country or market at any point and time will impact on any investment decision. Many utilities have existing, albeit limited by modern standards, mobile communications infrastructure. Decisions to renew, replace or retain this infrastructure will be influenced by the economic climate and outlook pertaining at any time. If the economic climate is not conducive to investment an organisation may decide either to retain its existing infrastructure, probably voice only, or to buy a service, even if it is not optimal for their needs.

On the other hand, if there is an appetite for investment the organisation may pursue a strategy which reflects this and build its own network and may even pursue a strategy as a service provider, selling excess capacity or indeed become a full blown PAMR operator.

6. BUSINESS STRATEGIES

The potential business strategies for implementing mobile services in utilities are explained in this chapter. The particular advantages and disadvantages of each option are analysed in the following chapter. There are two main options, the first one is 'PMR world' based and the second is 'public service' based.

6.1 The PMR/PAMR-Strategy

In this section we describe three business strategies that belong to the 'PMR world'.

6.1.1 Build a Utility Owned PMR

Building a dedicated private mobile radio service ('PMR'), completely tailored to the utilities needs was the only possible solution in former times and still may be a valid, but expensive approach.

6.1.2 Build a PMR/PAMR with Partners

To mitigate costs, finding partners for a private mobile radio system or a public access mobile radio system ('PAMR') - e.g. TETRA based - may be a solution.

As utilities have almost the same requirements concerning access, coverage and resilience as emergency services, teaming up with the state, other non governmental emergency organisations or private mobile network operators and obtaining a licence for operating PAMR or emergency services would seem to be most appropriate.

6.1.3 Use a 'Managed Service'

In areas, where 'Managed Services' - e.g. Dolphin in UK and Virve in Finland are already offered, use of such services may provide a more cost effective solution for a utility than building a PMR or PAMR solution. There are several options in the value chain ranging from simply purchasing the service, or operating own mobile equipment, up to complete outsourcing of the mobile service.

6.2 The 'Public Service' Strategy

Without any doubt the most economical solution is to use one of the public services - e.g. GSM. The main issues with such a solution are the utilities requirements for coverage, resilience and access. A public operator - utility partnership may address these issues.

One special solution for a utility may be to gain 'Mobile virtual network operator (MVNO)' status and to be able to use the base station subsystem of the public operator. This requires a dedicated mobile switching centre and may, in addition, need a special intelligent network ('IN')-solution, tailored to the utilities needs. Whilst this option has some merit and has been used by commercial enterprises with a large customer base and excellent branding; no utility has yet become an MVNO to cover their own communications needs.

6.3 The ‘Mixed Service’ Strategy

Using a ‘Public Service’ for general traffic and either a PMR/PAMR Service for critical applications or a separate service during emergency conditions (e.g. satellite based services or simple direct mode radios). This may be a strategy to overcome the disadvantages of public services at a minimum of additional cost.

7. STRATEGY ANALYSIS

This section seeks to analyse the strategies identified in Section 6. The analysis is carried out against the applications requirements and business drivers discussed in sections 4 and 5.

A description of mobile communications offerings in several countries is also outlined in this section giving practical examples of how utilities are progressing their strategies for mobility in various different environments.

Finally a basic comparison of the various strategies is outlined in tabular form with a brief commentary attached.

7.1 The PMR/PAMR-Strategy

7.1.1 Build a Utility Owned PMR

Building a dedicated PMR service allows the utility to design a network optimised to its needs. However, this will require the highest level of capital investment of all the options considered.

It has to be considered That PMR is a limited market compared to public services, such as GSM. Not every desired feature will be available at reasonable cost. If specific features are required for the network, there is a risk that only a limited number of suppliers will offer the system. This will mean limited sources and, therefore, lack of competition.

Due to small market size there is a danger that the technology used will rapidly become obsolete. R and D will be expensive and the cost of keeping the systems current will be prohibitive.

The Utility bears the complete risk of the capital investment for the system, which will be difficult to justify on a return on investment basis

7.1.2 Build a PMR/PAMR with Partners

For a PMR/PAMR established with partners everything stated in the paragraph before is true. The advantages of lower commercial risk and shared costs may be offset by reduced flexibility, as the system must be designed to meet the needs of more than one owner.

7.1.3 Use a ‘Managed Service’

Using a managed service can mean a reduced level of control and requires a lot of trust in the performance and long-term stability of the operator. Managing the network quality by service level agreements (SLA) requires special skills and the real network quality maintained by the network operator has to be evaluated carefully to avoid surprises during emergency conditions. Also a lack of involvement in network operations and maintenance leads to a deskilling of the utilities workforce.

The advantages of managed services include a reduction in the resources required within the company, little or no capital expenditures and fast implementation time, where available.

7.2 The 'Public Service' Strategy

Using a public service offering may be the fastest and most convenient solution for everyday traffic. But a very careful examination has to be made as to the capability of the system to meet the three main criteria demanded of mobile solutions for power utilities namely coverage, resilience and access.

Coverage of public networks is optimised according to traffic volume and, therefore, may not normally be sufficient for power utilities needs. Power plants, substations, high voltage lines etc. are located in sparsely populated areas where a public operator never would establish a base station.

Resilience is also a key issue for utilities. There is a need for maintaining mobile communications especially during power outages. Base stations and base station controllers normally have little or no emergency power backup. The length of time the base station is able to operate without mains supply is often too short for utilities needs. Additional emergency power supplies may have to be provided for base stations at extra cost, which would probably be borne by the utility.

Public services in general are heavily overloaded during emergency situations. This is often the case in densely populated areas during normal operating conditions. In emergency situations immediate and uninterrupted access to the system by the utility workforces is required. This will require either the provision of additional channels or priority access. Although specified in GSM Phase 2+ this is not very popular with service operators or customers. In some countries the use of priority service is not permitted. As mobile operators normally do not provide guaranteed SLAs, any additional service level requirements will result in extra operational or capital cost (for additional emergency power supplies, base stations etc.).

A public operator / utility partnership could address the above-mentioned issues. One special option for a utility could be to obtain 'mobile virtual network operator (MVNO)' status and this way share only the base station subsystem with the public mobile operator. Operating a mobile switching centre and possibly an 'intelligent network (IN)' solution dedicated to the utilities needs may make additional features available. However, this will not overcome any inherent weaknesses in the air access infrastructure.

As public mobile services are mass-market products the big advantages are cost, reduced need for capital investment and downward pressure on price. The service is also future proofed due to market size and competition. It is also highly convenient and generally easy to use and, therefore, creates user acceptance.

7.3 The 'Mixed Service' Strategy

This strategy suggests the use of a 'Public Service' without improving coverage, resilience and access, but supplementing it with additional service to overcome the issues described above. This may be a more cost effective solution than committing funds to enhance public systems.

If a PAMR service is available, it could be used for critical and emergency applications. A separate service, e.g. satellite based or simple direct mode radios, could be used during emergency conditions to overcome resilience and access problems in areas not covered by public services.

Of course increased complexity and reduced flexibility are the drawbacks of such solutions but in many cases such a combined solution is feasible and offers an acceptable level of service.

However, it must be recognised that such combined solutions need additional management, support and training, as it must be ensured that the workforce retains skills required to use and operate the emergency system.

A variant of the mixed service strategy that is being considered by some utilities is the use of public services, PAMR or GSM for the majority of requirements during normal operating conditions. This system is then augmented with a very low capacity PMR system built, owned on operated by the utility. This system would provide a basic service that would be available in emergency conditions. This strategy has the benefit of meeting day to day use at relatively low cost and provides a guaranteed minimum level (defined by the Utility) of access, coverage and resilience in exceptional periods at the lowest possible capital cost. Of course the complexity issues still apply.

7.4 Comparison of Strategies

It is important to compare the five solutions proposed in Section 6 with the main criteria for a mobile solution: future proofing, cost, time to implement, functional coverage and quality of network.

The table below outlines the authors' ranking of the five strategies against the main criteria identified earlier. The ranking is based on the analysis carried out by the authors.

		Build Your Own	Build With Partners	Manage Services	Public Services	Mixed Service
Future Proof						
Cost	Capital					
	Operation					
	Revenue					
Time to Implement						
Fit to Specific Requirements						
Access						
Coverage						
Resilience						

It is not appropriate to create an average 'score' by adding up the columns within the table. A true comparison should only be made by allocating relative weightings in accordance with the prevailing conditions within each country. These will include Regulatory, Legal etc.

In the table the 'Build' columns relate to the ability of a strategy to meet the specific requirements defined by a utility.

The 'services' strategies provide greater advantages in terms of costs and evolution.

The 'managed services' solution is currently available in a relatively small number of countries. It is a new approach for many utilities and it should be recognised that there could be a greater commercial and technical risk associated with this strategy.

But it is quite clear that a reasonable approach is to check for all functionality, if it can be handled by a Public network.

7.5 Identification of Risk

All organisations develop risk policies for their business and the potential for failure of telecommunications should always be seen as an element of risk to the functioning of the business. Interruption or loss of differing telecommunication systems and services will have a greater or lesser effect on different aims of the business.

However, systems can be described as ‘mission critical’ if the loss of the system would cause the primary aim of the company to fail. This is certainly the case for a utilities mobile communications service when the core network is under stress through adverse weather conditions.

Two major risk types can be identified in terms of the strategies for mobile services. These are the risks associated with building a company owned network and the risks associated with purchasing a managed service. The different variants of the strategies will encompass elements of the different risk types to various degrees.

With the build strategy the risks relate to capital exposure, costs of maintaining the network, staff skill sets and supplier support. The risk of obsolescence is significant due to the scale of the market as is the risk of excessive supplier influence on costs, technology and support due to limited competition. Many of these risks will apply to the company owned element of the Mixed Strategy variant.

In the context of managed services the risks are primarily operational. Generally competition is available in the market both for the technology and the service, thereby minimising the risks outlined for the ‘Build Strategies’, further to this there is little investment involved for the basic service.

However, in terms of operational issues the risks here are significantly higher. These services based strategies are predicated on using networks that are designed with a relatively low common denominator in terms of access, coverage and reliability. The networks are designed to be shared by as many users as possible and their primary reason for existence is to generate revenue for their owners.

These networks are not designed to meet Utility needs for Coverage, Access and Resilience. Coverage is generally concentrated around areas of major population or highways, often missing Utility locations that are typically in remote or hidden locations. Access is optimised to ensure that costs due to excess capacity are minimised, meaning that networks can be congested and do not have the capability of supporting surges in demand caused by emergency conditions. This means that access, which is essential for utilities, cannot be guaranteed, In terms of resilience the managed and public systems are limited in their robustness and will typically offer 95% (?) availability. This is not sufficient to meet the needs of utilities as the period of unavailability can often coincide with the period of greatest need for utilities (i.e. major storms).

7.6 Position on Mobile Systems in Europe

7.6.1 Austria

Three utilities (two regional, one municipal) - besides using GSM for administrative purposes - own and operate, a dedicated TETRA-based PMR-Network.

Almost all the other utilities use the 'mixed network' - solution by using GSM and old analogue PMR-networks during emergency conditions and in areas not-covered by GSM. But most of these utilities are unhappy with the present situation and are considering different options for the future.

There is no 'managed solution' or public Tetra solution available in Austria at present.

7.6.2 Belgium

Elia, the national grid operator has switched off its PMR systems in the year 2000.

Now, it relies mainly on GSM for mobile communications, and a limited number of dual handhelds (GSM/satellite) as a backup.

The distribution companies still have their PMR systems running, but in limited numbers. These include those who are frequently in contact with the control rooms. A lot of people use GSM exclusively for their communications needs.

FLUXYS, the national gas transmission company invested in a trunked network in the late 90's and still uses it. It has looked, however, at other public services.

Emergency services including the police, fire and ambulance services are migrating from various local PMR systems to the national Tetra network called ASTRID, where coverage is available. The target for ASTRID is to offer a national coverage by the end of 2005. They are willing to offer this service to utilities such as Elia and Fluxys, with the limitation that the emergency services have priority during major emergencies.

A public TETRA service is also offered by Entropia (own infrastructure) but there are no plans yet to extend the existing coverage nationwide.

7.6.3 Ireland

In Ireland the main users of mobile communications are the emergency services (Garda (police), fire service and ambulance service) the utility companies and transport companies.

The police use a nationwide analogue PMR system that is owned and operated in-house. In recent years the police force piloted a Tetra system in the Dublin area. Whilst it is understood that they were very pleased with the functionality of the system no further work has been done on implementing a nationwide system.

The fire and ambulance services use regional based PMR systems. These are owned by the Services but operated by third parties.

ESB the electricity utility owns and operates a nationwide PMR system to serve its field force. Currently the majority of mobile communications are carried out using public GSM networks with the PMR system being used as a standby system or in areas where GSM coverage is poor. The PMR system is old and limited in functionality (compared to Tetra) and future mobile strategy is currently being debated within the company.

There has been some interest in building an Emergency services/Utilities based PAMR Tetra system (underwritten by Government); however, there have been no major developments to date.

7.6.4 France

The Police and the Gendarmerie are working on two separate TETRAPOL networks. The firemen have local analog networks, but are planning to move onto the TETRA network of the Gendarmerie.

It is no longer possible to buy service on a national TETRA network as the company operating this network closed.

The electricity and gas distribution company operates a nationwide analog network, as does the department in charge of road and transportation equipment.

The electricity transmission company, RTE, operates a trunked network over half of the country.

7.6.5 UK

The National Grid Company has come to rely on GSM phones and a limited number of strategically placed GSM/Satellite phones for emergency conditions.

Two strategies have evolved for the Distribution businesses; five companies have switched off their PMR systems and rely on GSM mobile phones backed up by a number of GSM/Satellite phones. The remaining ten businesses continue to use their MPT1327 trunked PMR systems and, in addition, use GSM mobile phones as part of their day-to-day communications.

The Gas and Water sector companies in the UK have requested permission to share on the Police TETRA Network, now known as Airwave.

Airwave will be a nationwide TETRA network for the Police Services. The network is currently being rolled out and accepted by local and regional Police services and is due for completion in 2005. The Ambulance and Fire Services are currently reviewing their requirements for mobile communications and decisions have yet to be reached on their approach to new mobile systems.

Dolphin a PAMR operator in the UK, has been promoting a TETRA service, targeting utilities, transport and localised on-site applications. The company has recently run into operational difficulties and its future is uncertain.

7.6.6 Sweden

RAKEL, the new TETRA radio communications system for Public Safety authorities will be constructed in Sweden between 2004 and 2009. RAKEL is the abbreviation for radio communication for efficient command. KBM, the Swedish Emergency Management Agency, is responsible for the purchase, implementation and operation of the RAKEL system.

Most power utilities today own, aging, analogue radio systems and have problems keeping them in operation. Some have already closed their systems and rely on GSM, which is considered to be a high-risk strategy during weather related outages. The utilities want to become users of the RAKEL system but without success to date. They hope to be included when the system is in full operation in 2010.

7.6.7 Finland

The VIRVE Network is the new TETRA radio network for the Finnish Authorities. It promotes the co-operation of different organisations under all circumstances. The network's main users are the security authorities of the Finnish State and Finnish Municipalities.

VIRVE is open to the power utilities.

8. CONCLUSIONS

The Task Force members have examined factors that influence utilities when planning strategies for improving mobility. It is the opinion of the members from their knowledge of and experience in the utility sector that improved mobility can offer significant advantages to a utility company.

The report identifies three generic strategies with a number of sub-strategies beneath these as follows:

- The PMR/PAMR-Strategy
- Build a Utility Owned PMR
- Build a PMR/PAMR with Partners
- Use a 'Managed Service'
- The 'Public Service' Strategy
- The 'Mixed Service' Strategy.

The options are evaluated using criteria based upon the industry context, applications requirements and business drivers.

The report has outlined several applications for mobile technology through which companies can gain competitive advantage and meet many of the demands being placed upon them. These include the drive to improve efficiency, productivity, cut costs, and improve service and availability. Further to these are the needs to ensure safety of staff and the public, increase value for the shareholder and protect the environment. Many of these drivers impose counteracting forces on the utility. Improved technology, including mobile technology can assist in meeting these demands.

When you take into account the diverse requirements, drivers and environmental conditions in which a utility may operate it is apparent that no single strategy can be recommended which will meet the needs of all utilities. The need for mobility is clear, however, the strategy that a utility adopts will be influenced by the many factors such as, financial, state of the telecommunications industry in the country, availability of capital, attitude to risk, attitude to investment, legal environment and regulatory environment. Evidence of this is seen in Section 7 where the state of the market in several countries is outlined.

The comparison table in Section 7 illustrates that ownership based strategies tend to provide the best fit to the utility's technical and operational requirements but these strategies are most demanding in terms of capital investment. Strategies which rely on managed or shared services require less capital investment but may require the utility to compromise on the certain aspects of the service such as coverage, access and availability.

The advent and ubiquity of publicly available mobile services such as GSM and GPRS data have provided utilities with a low cost option, which meets many of the utility's requirements under normal conditions.

The mixed service strategy, in which a utility uses managed services such as GSM, for general day to day requirements and a limited owned network to meet emergency

needs, often appears to provide an acceptable compromise but utilities need to be wary of compromising on both cost and performance.

In considering a strategy for a new mobile service, a utility should consider whether the telecommunications services employed to support their core business is a ‘mission critical’ service. Support systems should be considered ‘mission critical’ when the loss of such a system would cause the primary aim of the core business to fail. Such systems demand a high level of ‘resilience’ and there is no option but to fund the cost of providing such guarantees.

What should also be considered is the fact that it can be quite impossible to switch from one solution to another. For example, if a utility decides to move from an owned network to a public service one, after a certain time it will be almost impossible to change strategy because the resources such as licences, skills and property may no longer be available.

When determining their strategy for mobility Utilities must examine their particular circumstances and determine a solution which best meets their needs. It important to remember the any decision is likely to dictate service levels and costs for a long period of time as costs to change, once a particular course of action has been decided may be very substantial.

9. BIBLIOGRAPHY

Previous task force mobile documents.

APPENDIX A

THE EFFECTIVE SOURCING OF MOBILE SERVICES

The Effective Sourcing of Mobile Services

Background

- This presentation outlines a typical methodology for Telecommunications Infrastructure Sourcing
  - Successfully used in over 40 sourcing initiatives in the UK and Europe
- Body of this presentation was discussed at a regular Task Force Meeting
- Request from the TF team that a copy should be included as an Appendix to this report.

Key Issue - Setting the Scene

- Sourcing approach for current Utility Mobile Services identified two generic strategies :
  - In-house provision
  - Buying in Services
- In the world of ICT, a third approach has been developed, a desire to move to a 'Buying Relationship' for whole environment.
  - This is likely to include mobile services, taking the control of the utility mobile environment further away from the utility company.

The Business Challenges that arise from The Changing Market are shown on the following slide

Business Challenge – The changing market

Buying Technology

- In-house DIY mobile services
- Multiple components
- Multiple suppliers
- Multiple, non-standardised services
- High complexity
- High management overhead
- Low added value
- Technical skill base
- Technology focus
- Internal "SLA" with no guarantees

Buying Service

- Outsourced mobile services
- Services not components
- Few suppliers
- Standard service portfolio
- Lower complexity
- Low management overhead
- High added value
- Contract management skill base
- Commercial/Service focus
- Contracts backed with service level guarantees

Buying Relationships

- Outsourced whole office services
- Service and products
- Potentially fewer suppliers
- Wide range of services via Partnership
- Increased Complexity
- Shared management overhead
- Shared Equity , Adding Value based on 'Cost+' approach
- Mature contract management skill base
- Innovative Commercial/Service focus
- Contracts backed with revised service level guarantees

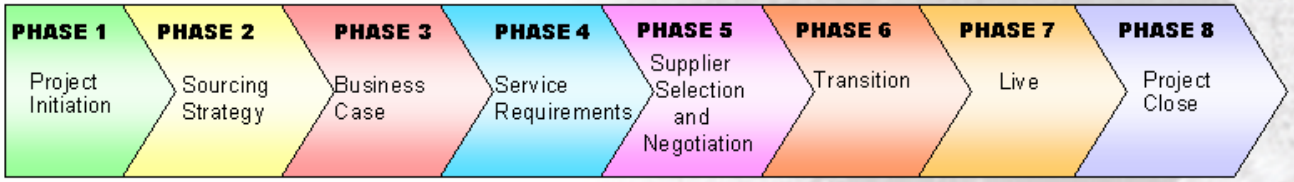
Mason

Sourcing - Critical Success Factors

- Board level understanding of sourcing projects
- The selection of a sourcing approach that is able to provide the level of service required
- The commitment of all parties to a successful sourcing arrangement
- The clarity and common understanding of the sourcing contract, services and service level
- Maintaining an internal function to:
  - provide solutions to the business to develop their capability
  - manage the supply of services from the supplier(s)
  - monitor service level quality and enforce significant penalties for failure to meet them
  - plan for change, through team capability with contractual flexibility
  - operate on a commercial basis with competitive justification for activities and investment
  - develop strategy going forward

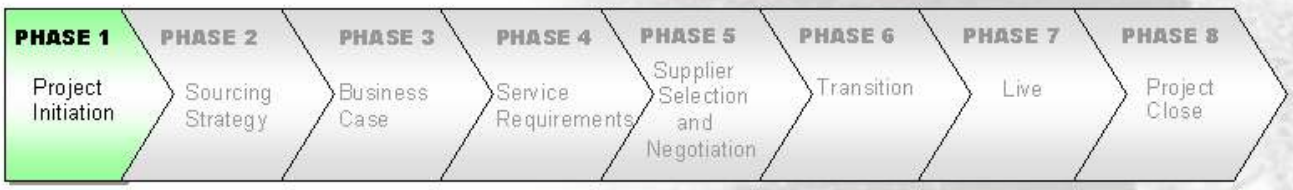
Sourcing – A Typical Process for Sourcing Services

A structured approach to sourcing, ensuring that any selected sourcing partner(s) provide best value for the stated business requirements:



- This methodology has been successfully applied in many major outsourcing projects
- This can apply to the provision of a total turnkey service
  - From feasibility through to service commencement and migration
  - Or provide focussed advice in particular areas
- The scope can be applicable to all telecommunications services
  - Including voice, data, contact centres, mobile and desktop

Phase 1 – Project Initiation



Objective:

- To gain board level sponsorship for the Project
- To establish the project team and rigorous project control mechanisms

Input:

- Drivers
- Resource
- Timescales

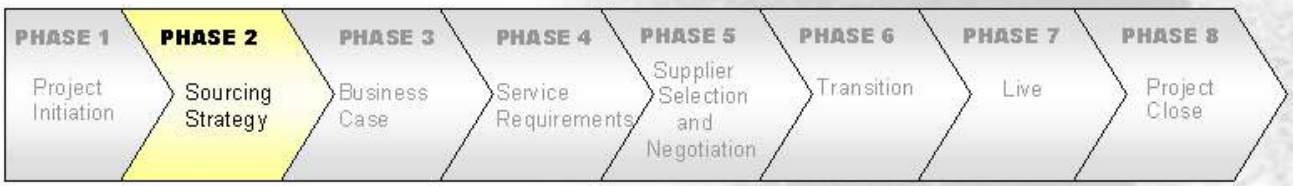
Process:

- Gain Board level sponsorship
- Identify and understand drivers and objectives
- Identify Project Team
- Produce high level project plan
- Establish Project Management framework
- Establish Project Board
- Submit Plan to Project Board for approval

Output:

- Project Board established and Project approved
- Project Team in place
- Project Management controls in place

Phase 2 – Sourcing Strategy



Objective:

- To define and obtain approval for the overall sourcing approach
- To explore other potential sourcing options such as Joint Venture

Input:

- Project Board steering and objectives
- Business Requirements
- Current Service Delivery
- Financials
- Risks/Benefits

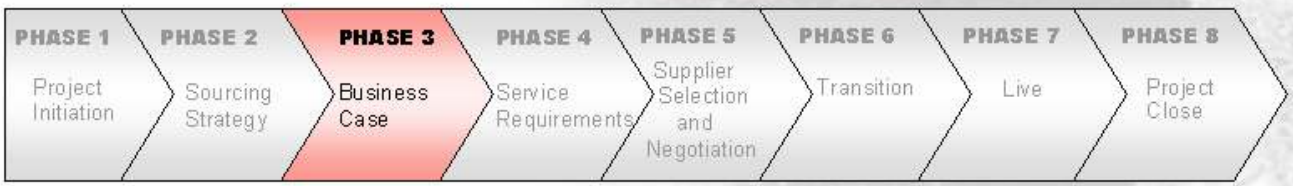
Process:

- Understanding of current sourcing strategy and arrangements
- Understand high level drivers such as cost reduction, capital expenditure avoidance and headcount reductions
- Define Current and future business requirements
- GAP analysis for current sourcing strategy
- Customer satisfaction definition and benchmark
- Performance metrics definition and benchmark
- Document Sourcing Strategy, including high level business case

Output:

- Sourcing Strategy submitted to Project Board
- Go/No go decision

Phase 3 – Business Case



Objective:

- To develop the framework for the detailed business case
- To understand in detail the current cost base

Input:

- Infrastructure Costs
- External Service Costs
- Staff Costs
- Growth
- Tax and VAT

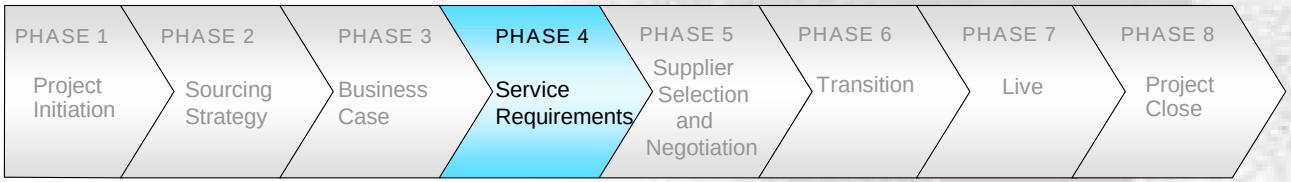
Process:

- Build cost model for current situation
- Involve finance representatives from outset
- Establish rigorous cost model change controls
- Build current baseline first, then include other sensitivities such as growth assumptions
- Explore TAX and VAT reduction opportunities

Output:

- Detailed model for current base
- Flexible model that will be refined throughout the process

Phase 4 – Service Requirements



Objective:

- To define the scope of services required from the Supplier

Input:

- Sourcing Strategy
- Business Requirements
- Technical Requirements

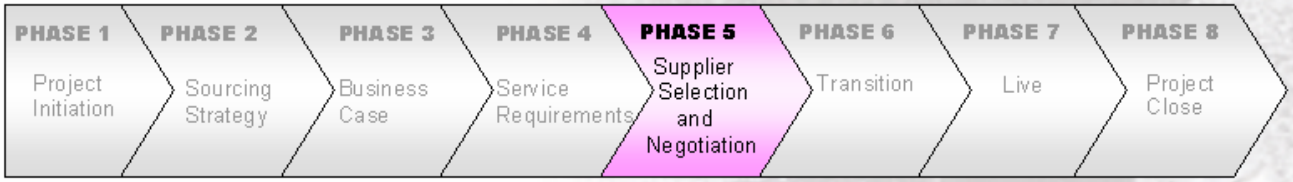
Process:

- Develop SSR (Statement of Service Requirements)
- Definitions should be service based, not technology based
- SLA definition forms a critical part of the SSR
- Obtain sign-off from service delivery managers
- Consider obtaining approval from businesses
- Identify Internal Contract Management requirements

Output:

- Approved SSR

Phase 5 – Supplier Selection



Objective:

- To select strategic Supplier(s) to deliver the defined services
- To negotiate a win/win contract

Input:

- SSR
- Technical
- Commercial
- Legal
- HR

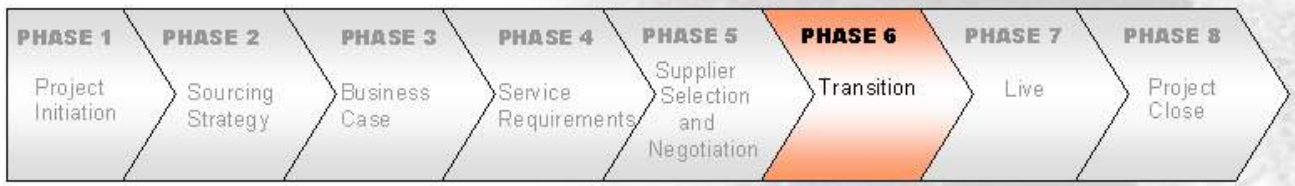
Process:

- RFI / ITT preparation and issue
- Response Evaluation (Strategic, Commercial, technical)
- Selection on 2-3 shortlisted Suppliers
- Negotiation with shortlisted Suppliers
- Selection of preferred Supplier(s)
- Negotiation and contract development (Ts&C's, charges, SLAs, Services, Technology refresh, Benchmarking, Service Management, HR)
- Due dilligence

Output:

- Signed Contract

Phase 6 – Transition



Objective:

- To ensure a minimum risk and seamless transfer of service delivery responsibilities to the Supplier(s)

Input:

- Contract
- Due Diligence

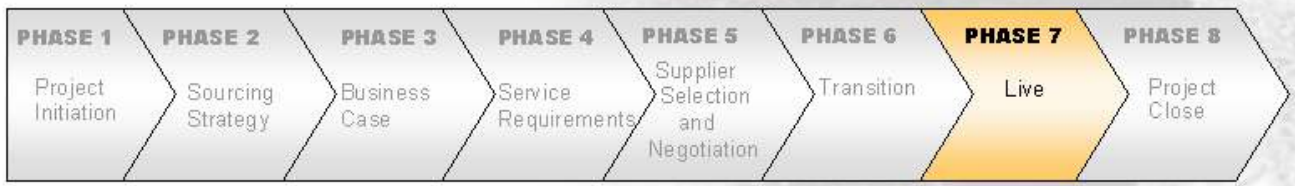
Process:

- Transition project management
- Staff communication strategy
- Develop Operational Service Manual (processes, contacts, change management, problem management, escalation, service review framework)
- Customer and Supplier system interfaces
- Accommodation and logistics
- Staff transfer arrangements
- Migration Strategy and planning

Output:

- Seamless Service Commencement
- No significant dip in SLAs
- Happy Staff

Phase 7 – Live



Objective:

- To ensure smooth running of the contract and monitor supplier performance
- To manage any required infrastructure migration

Input:

- Contract
- Operational Service Manual

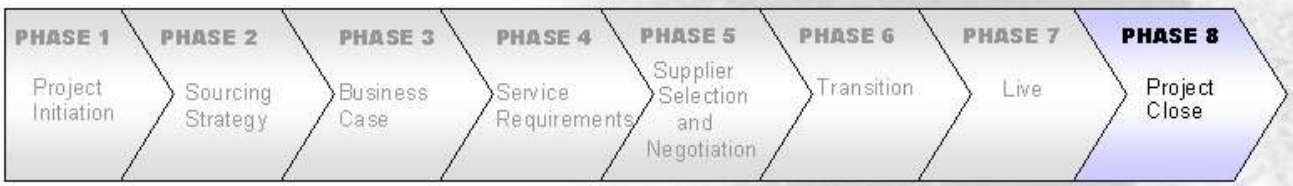
Process:

- Overall contract management and strategy development
- Customer Satisfaction benchmarks
- Annual external service and cost benchmark
- Performance measurement
- Management of Supplier contractual obligations
  - Charges
  - SLAs and service credits / penalties
  - Migration
  - Technology refresh
  - Migration
  - Change management
  - Problem management

Output:

- All contractual obligations delivered
- Close relationship between Supplier and customer

Phase 8 – Project Close



Objective:

- At the end of the project we will formally hand over the deliverables and conduct a project close meeting to review the success of the project, share project feedback and identify any next steps

Input:

- Key outputs from transition and live phases

Process:

- Project review with key stakeholders
- Formal handover of deliverables
- Identify next steps

Output:

- Project completion

Typical Timescales

- Phase 1–3 timescales depend on the organisation and scope of work, often slow as at this stage there is often a lack of impetus behind project from senior levels – Business Case alone can take up to 6 months to get signed off
- Phases 4-5 (including a market analysis to identify suitable potential suppliers) estimate 12-18 months to contract signature. Contract development and negotiation can become protracted
- For Phase 6 - Transition is dependant on the scope/size of the outsource, estimate 3-6 months, however the quicker the better as this will minimise the period of change that the company experiences
- Phase 7 covers the migration to a new service e.g. system and equipment upgrades – timescales for this depends on scope and size of task
- Some of these timescales can be condensed, and various activities undertaken consecutively, however, still estimate about 24 months from Phase 1 to Phase 6