Model user guide for UCLL hybrid bottom-up model

28 November 2014

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Contents

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1 Introduction

Analysys Mason has been commissioned by Chorus to provide modelling and consulting services related to the New Zealand Commerce Commission's Unbundled Copper Local Loop (UCLL) Final Pricing Principle (FPP) and Unbundled Bitstream Access (UBA) FPP review.

This report is the model user guide for the UCLL model, which is a hybrid bottom-up model using Chorus' actual asset counts (as a proxy for the forward looking asset count) in order to calculate the element based TSLRIC of UCLL.

The remainder of this document is laid out as follows:

- Section 2 summarises the results of the cost model
- Section 3 presents an overview of the model
- Section 4 explains how to install and run the model

The report includes a number of annexes containing supplementary material:

- Annex A provides a description of the content of each model file
- Annex B provides a glossary of terms used in this document and in the model workbooks.

2 Results

The model calculates the following results.

2.1 Five-year constant nominal unit cost

The Commission has indicated that it intends to set a constant price in nominal terms for a period of five years. Accordingly, we have set up the model to calculate the 5-year flat nominal unit cost on a similar basis, recovering the same NPV as the calculated unit cost over this period. The result is as follows:

Service	Unit cost (NZD/month)
Non Cabinetised (NC) UCLL	74.10
SLU	81.43
UCLFS	84.87

Figure 2.1: Five year constant nominal results for model [Source: Analysys Mason, 2014]

2.2 Network valuation

The Gross-Replacement Cost of the modelled access network is NZD 13 780 M in 2013 real terms.

Figure 2.2: Network Gross Replacement Cost in the model [Source: Analysys Mason, 2014]
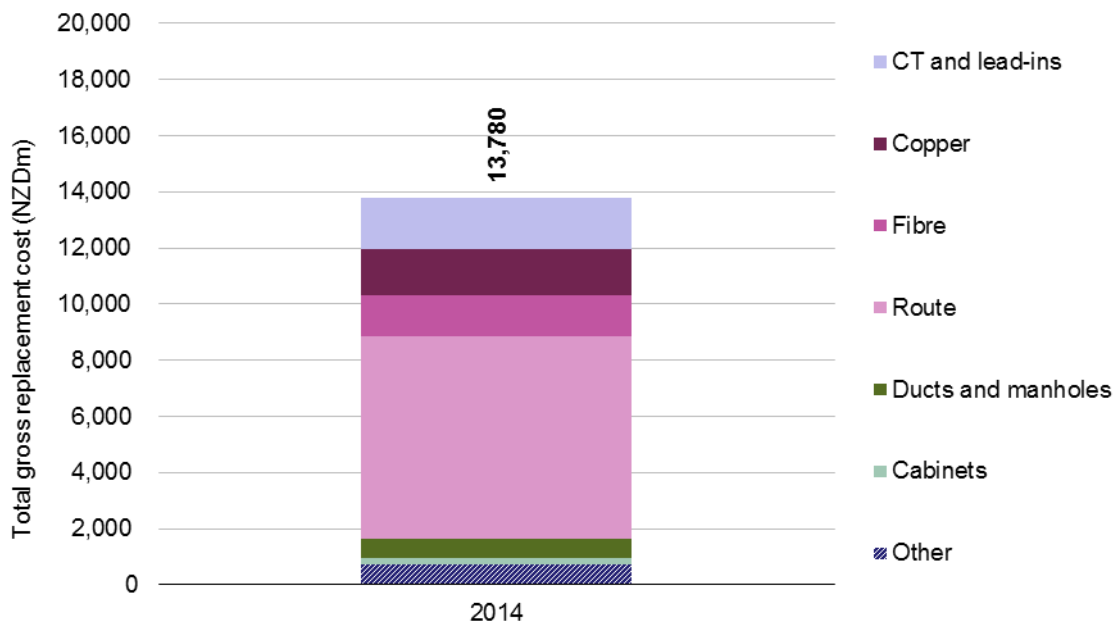
3 Model overview

This section describes the basic structure and operation of the UCLL model in the following order:

- Section 3.1 provides an overview of the flow of the calculations
- Section 3.2 describes each of the interlinked calculations in turn, including calculation of key assets and costing methods applied.

In addition, Annex A provides a detailed description of the contents of the calculations.

3.1 Overview of the flow of the calculation

The model consists of a single Excel workbook that uses various inputs.

Figure 3.1: Structure of the model [Source: Analysys Mason, 2014]
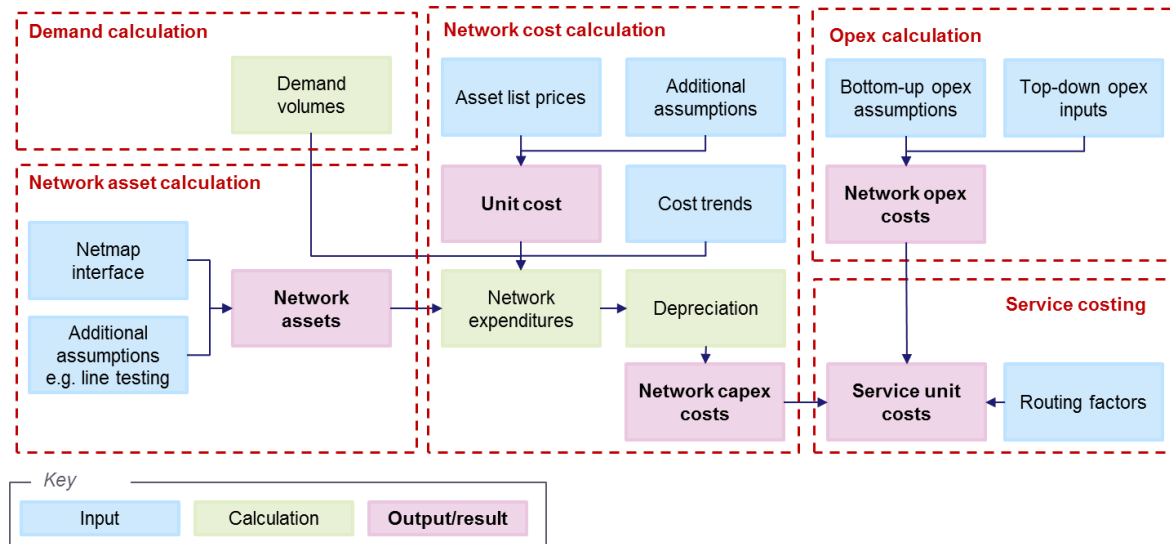
3.2 How the cost model works

The model calculates the unit cost of access network products provided by Chorus. The model calculations are made at a national level.

The model is designed to calculate the full costs of SLU, non-cabinetised (NC) UCLL and copper feeder only. However, it also partially represents the costs of some other services (for instance where they share assets or costs with these services). These other services are included in the calculations but their full asset base is not represented and therefore the full costs are not captured.

The inputs are described below. Section 3.2.5 describes the main model calculations.

3.2.1 Demand

For cost modelling purposes we assume that demand remains flat for all access products from 2013.

We have also constructed an estimate of historic demand, but this does not affect the result.

3.2.2 Network assets

Asset counts

The model calculates the investment in and operating costs for the assets that make up the network and then allocates the costs between services.

The model is intended to reflect a hypothetical new entrant. The model is based on actual asset counts, where available, as Chorus' actual investment decisions are taken as a proxy for an efficient operator given the real-world constraints encountered in New Zealand. The model applies additional optimisations to asset counts to reflect additional levels of efficiency.

The network assets use data from NetMap[1] and other sources, resulting in a count of assets for the year used for the NetMap extract. The model uses an extract of the NetMap system from July 2013, except where superseded by more recent data provided to the Commerce Commission.

Route lengths are based on information supplied to the Commerce Commission and duct lengths are based on duct data supplied by Chorus (in turn based on NetMap). We use alternative sources or estimates to generate counts for assets not currently owned by Chorus (e.g. line testing equipment which is owned and operated by Spark) or not recorded by NetMap.

Asset sharing / route allocation matrix

The model uses a specific methodology to share costs of routes, ducts and underground utility boxes (UUB) between services. This methodology is based on the number of end users of each service. We note that the calculation is performed using information regarding routes and is reused for ducts and UUB (i.e. the distribution between services/users in routes is assumed to be a good proxy for the distribution for ducts and UUB). The methodology considers all combinations of *technical services[2]* that may be served using assets within an individual route segment.

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[1]   NetMap is an operational system designed to record information relating to outside plant.

[2] We use technical services as it is easier to break down products into non-overlapping services provided by the network.

The technical service is in turn made up of certain assets which do not appear in other technical services. This may include for example route, cabling, joints, duct, manholes and poles that are in a particular part of the network. One or more technical services can be built up to be an actual product. For example:

- Distribution from active (DSLAM-containing) cabinets = SLU

- Distribution from passive (no-DSLAM) cabinets + Copper feeder to passive (no-DSLAM) cabinets + Direct feed distribution from exchange = NC-UCLL

This may be a combination of any of the following technical services:

- Copper Active Distribution
- Copper Active Feeder
- Copper Direct Feed
- Copper Passive Feeder
- Copper Passive Distribution
- Fibre Feeder
- UFB direct feed
- Core and RBI

In practice, partly due to limitations in the NetMap extract, there are assets within some route segments where a unique technical service is not identifiable. For example, this may be because a single cable sheath may be utilised for multiple services. For instance, there are assets that are flagged within NetMap as:

- Distribution Copper (without indicating whether Copper Passive Distribution or Copper Active Distribution)
- Mixed Copper (without indicating whether Copper Active Distribution, Copper Active Feeder, Copper Direct Feed, Copper Passive Feeder or Copper Passive Distribution)
- Mixed Fibre (without indicating whether Fibre Feeder, UFB, RBI or Core).

The Mixed Copper category is present in approximately 12% of total route by length. The Distribution Copper and Mixed Fibre categories account for less than 2% of total route by length in aggregate. The mixed copper category therefore has the largest scope for altering the distribution of cost between technical services. These costs are distributed as follows:

- In the extract of NetMap we found 217 combinations of the technical services. We calculated the total length of route by ESA for each of the 217 combinations.
- For each ESA we also calculated the number of subscribers consuming each technical service. This is based on the number of copper connections recorded in ICMS (in March 2014) and on the distribution of subscribers by loop type from previous Chorus modelling work.
- The final calculation distributes the total length of route for each combination of technical services to the technical services according to the number of subscribers consuming each technical service. This allows us to distribute the length of route amongst *unique* technical services instead of amongst *combinations* of technical services.

We think that allocation of asset costs based on the number of users of the service supported by that asset is a sensible approach to cost allocation especially where the different services are substitutes. The methodology is explained in more detail below.

► *Route allocation matrix process*

Each segment of route recorded in NetMap can contain multiple cables. Each cable is assigned a flag describing which technical service it supports. For example a section of feeder (only) route

may contain copper providing direct distribution pairs (part of NC-UCLL) and fibre feeder to an active (DSLAM-containing) cabinet.

Figure A.2: Schematic diagram of a route segment [Source: Analysys Mason, 2014]
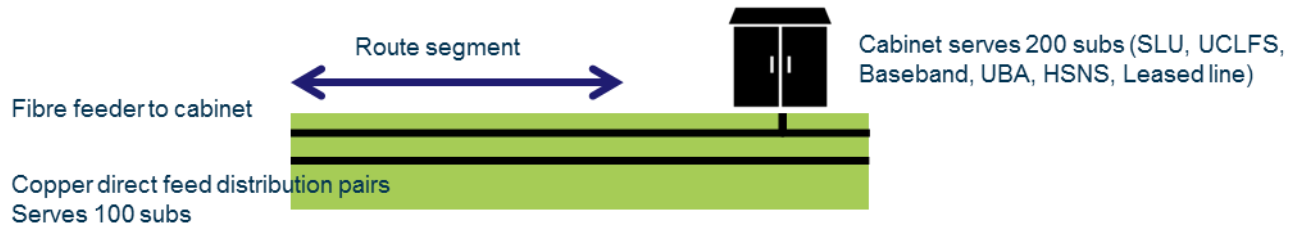
The route allocation matrix process calculates the number of subscribers making use of that route segment and apportions the cost of that route segment in proportion to the number of subscribers for each technical service.

In the above example two thirds of the cost is allocated to the fibre feeder (and therefore all services that use it) and one third to copper direct feed (ultimately to NC-UCLL). In practice however the calculation works on an aggregate level across each exchange area rather than by individual segment as there can be many route segments with the same combination of technical services. Aggregating also avoids having to attribute specific numbers of subscribers to particular segments.

We perform this calculation for route, but then apply the same proportions (for each ESA) to manholes and ducts. The route allocation matrix allocates the route counts to each technical service on the basis of the proportions calculated

3.2.3 Calculating costs inputs

Capex unit costs

An overview of the capex unit cost calculation is shown below in Figure 3.3.

Figure 3.3: Unit cost calculation [Source: Analysys Mason, 2014]
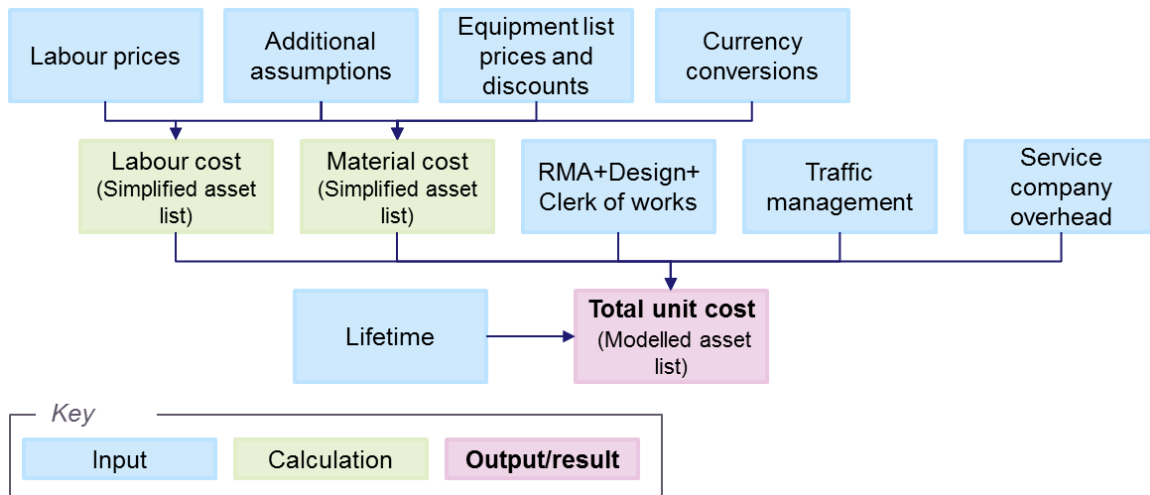
The labour and material cost for all assets is calculated using Chorus data such as vendor price lists and service company coded rates. Underground trenching unit costs have been based on a detailed statistical analysis extrapolating actual recent trenching project cost data on the basis of clutter type, road type and rock type in exchange service areas across New Zealand.

Additional assumptions have been made to estimate the unit cost for assets missing unit cost data. Where relevant we have accounted for additional costs such as traffic management, costs related to the Resource Management Act, network design, service company overheads and Chorus project management costs.

Allowance for spares inventory

We carried out an analysis of Chorus' inventory of spare assets. By comparing the gross replacement cost of the total asset base by category to the gross replacement cost of the spares held in that category we were able to calculate a mark-up to the unit cost of deployed assets. This mark-up is applied to the unit costs used in the model (rather than the asset counts) to account for the spares required to be held in inventory to meet Chorus' network reliability requirements.

Many asset unit costs are at least in part composed of service company coded rates which vary between eleven contract areas. The capex unit costs used in the model reflect this variation where possible. Therefore the inputs to the model are by Service Company Area (CSA) so that the costing calculation can take account of the way costs vary across New Zealand.

Opex costs

The opex analysis combines top-down and bottom-up data.

The operating costs of Chorus can conceptually be separated into four main categories:

- *Network opex* which is the costs of operating the network e.g. the non-capitalised cost of cost centres such as Field Services or Network Engineering and can be further divided into
  - Network labour costs
  - Customer services costs (including network provisioning)
  - Network maintenance
  - Network IT
  - Network accommodation
  - Network electricity
  - Network other
- *Marketing and sales opex* which is the costs associated with the management of Chorus wholesale products e.g. the non-capitalised cost of cost centres such as Market and Product Development or Product Management and Capability
- *Business support opex* which is the costs associated with business overhead and non-network common costs e.g. the non-capitalised cost of cost centres such as Corporate Property or Human Resources
- *Regulatory levies* which are the costs associated with payments to the Government for the TDL and the Commerce Commission's fees.

We used information from several sources[3] to calculate the total annual opex for each of the above opex categories. Those totals for each category are then allocated to each service type (e.g. copper, UBA etc.)

The following key inputs are used within the model:

- Direct opex inputs (in 2013 terms), *AssetIn* sheet, column AG
  — Route assets have a direct input cost per metre per annum representing the annual cost of non-exchange rent, rates and similar costs
  — Chorus annual business overhead. This is allocated to services in the model on the basis of an equi-proportional markup
  — Product and customer IT relevant to copper services. This is allocated to services in the model on the basis of an equi-proportional markup
  — UCLL customer services costs per line per annum
  — UCLL marketing and sales costs per line per annum
  — SLU Network operations per line and SLU Network operations per line per annum
- Accommodation cost in terms of floorspace is inserted in column AM. In the UCLL model this relates only to the cost of accommodating the MDF. The cost, expressed in terms of NZD per sqm per year, accounts for common space and the level of utilisation.
- Power consumption costs are input in columns AR:AV. This includes the annual consumption and the cost of electricity.

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[3]   Primarily the Chorus General Ledger

— The cost of electricity is based on Chorus actual 2013 consumption and expenditure. The cost per kWh accounts for the cost of accommodating power plant. We apply an uplift of 23% (based on 1/(90%*90%)) to account for a 10% reduction in the usable energy supplied due to DC power plant losses and a further 10% reduction in usable energy due to other site operational requirements such as lighting, cable losses etc.

— Total electricity consumption is based on bottom-up estimates

— We assume that assets that consume electricity require cooling. We apply a 40% uplift to electricity consumption requirements to account for the power required for cooling.

• Regulatory levies are represented as an asset in the model with a direct opex charge. This is based on the amount of levy charged to Chorus in FY2013 and is recovered as an equi-proportional mark-up (EPMU) across all services.

3.2.4 Cost trends, asset lives and planning periods

Other cost inputs are taken from the following sources:

• Cost trends in real terms for unit direct capex are taken from publicly available network cost models

• Cost trends for unit indirect capex are assumed to be in line with the price trend for New Zealand technicians and trade workers[4]

• Cost trends for unit direct opex are assumed to be flat in real terms. A real terms cost trend of 1% is assumed to apply to the cost of accommodation and power

• Asset lives are where possible taken from the Chorus fixed asset register

• Planning periods are taken from the average of multiple benchmarks from previous regulatory models.

3.2.5 Service unit costing

This calculates the cost of Chorus' access network products using the demand, asset count, capex and opex inputs. The calculation is in real terms before making a conversion to nominal terms once the results are calculated.

Annex A contains additional explanation of these calculations.

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[4] An average real labour cost trend of -0.6% was calculated based on the average year-on-year change in New Zealand's labour cost index for technicians and trade workers (LCIQ.SH43C9) in the period 2009 to 2014 expressed in real terms by using the average year-on-year change in the price index for the same period. Data were sourced from Statics New Zealand and the EIU in 2014.

Total network investment

The model first estimates the number of each network asset in all modelled years by applying deployment drivers[5] to the known asset counts for the year for which asset counts have been collected (NetMap data is from 2013). Using estimated asset lifetimes it is possible to calculate the number of assets of each type in the modelled asset list that are deployed in each year using an asset deployment calculation with a retirement algorithm[6] (*NwDeploy* sheet). The drivers for this algorithm are defined in this worksheet.

Combining the calculations and inputs above enables capex in each modelled year to be calculated (assets deployed in each year and unit cost information for each year, in the *Capex* sheet) and opex in each year to be calculated (number of active assets in each year and unit operating expenditures by asset calculated in a bottom-up way in the *UnitOpex* sheet).
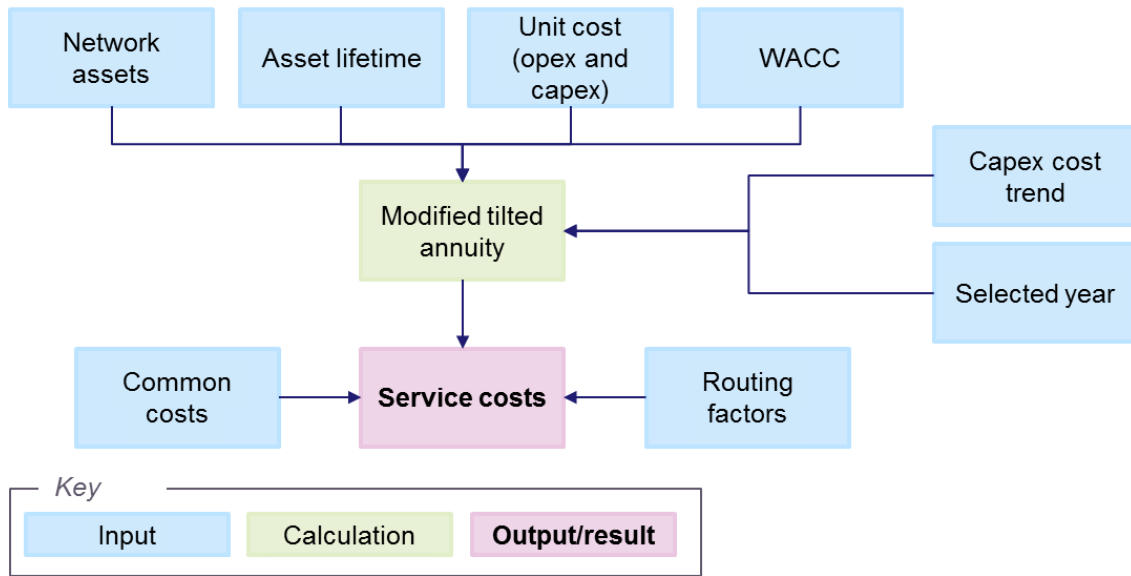
Depreciation

The cost model recovers cost using a modified tilted annuity depreciation calculation. Given the constant demand assumption, the result is the same as a tilted annuity.

Modified tilted annuity tilts the annualised cost recovery based on demand trends and input cost trends. The calculations can be found in the *MTAD* sheet and are outlined below in Figure 3.4 and in section A.2.

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[5] These are based on estimates of the deployment of assets over time. For example, we have used fibre cable and copper cable purchase history data as a proxy for the majority of fibre and copper assets. Other assets are driven by the number of households in New Zealand, or households served by the access network.

[6] The model calculates the number of assets that are required in any one year. It then calculates the number that would need to be purchased in the network to provide the number required whilst taking into account the growth of the network and the number of assets reaching the end of their lifetime and requiring replacement. The planning period modifies the number of assets purchased to account for buying assets in advance of deploying them in the network. It also accounts for assets not being purchased at a single point in the year. The retirement delay accounts for decommissioning and disposal costs by retaining the cost (only) of the asset in the network beyond its removal of the network.

Figure 3.4: Service unit cost calculation using straight line depreciation and modified tilted annuity [Source: Analysis Mason, 2014]

Service costing

The output of the selected depreciation calculation is a total economic cost by asset. The service costing calculation (in the *TSLRIC* sheet) uses routeing factors to assign the total costs for each modelled asset to each technical service[7]. The TSLRIC for each product is then built up from the TSLRIC by technical service.

The model has a facility for additional business overhead (a common cost) to be added on to the TSLRIC cost per product in the *Output* sheet as an equi-proportional mark-up (i.e. in proportion to the incremental costs). However, this is not currently used. Such overheads have instead been included as operating expenses.

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[7]   We break down *products* into building blocks which we call *technical services.* Those technical services are then mapped to *group of assets*. Each technical service uses a determinate list of assets. This simplifies the process of assigning asset costs to products.

4 Installing and running the model

4.1 Running the model

The model is a single workbook. It can be run using the following steps:

- Microsoft Excel should be used in 'manual' calculation mode (Formulas->Calculation Options->Manual)
- To run the model, type Ctrl+Alt+F9 to instruct Microsoft Excel to perform a full recalculation of the workbooks incorporating any changed parameters
- The full numerical results can be viewed in the *Output* sheet of the UCLL full model.xlsb workbook

Annex A   Description of the structure of the model

A.1   File structure

Figure A.5: Key inputs, calculation and outputs of the model [Source: Analysys Mason, 2014]

Sheet title	Contents
C	The contents sheet
V	A history of the versions of the workbook
S	A guide to the styles used in the workbook
T	Template to be used for adding new sheets
Output	Sets up the control parameters for the model
	Inputs macroeconomic indicators – historical and forecast inputs
	Calculates discount rates based on WACC and inflation rate
	Shows main model outputs
Lists	Lists used in the model
LinkedIn	Inputs service demand - historical and forecast inputs
	Inputs material and labour unit costs
	Inputs asset counts in the network
AssetIn	Defines the list of modelled assets
	Inputs key asset parameters such as cost trends, lifetimes, planning periods and retirement periods of assets
	Inputs unit opex parameters such as floorspace needed, power needed, supplier annual support
DmdSubCalc	Inputs demand data
	Transforms demand for Chorus products into demand for technical services
	Transforms demand for technical services into demand for asset groups
FullNw	Inputs deployment drivers for historic build-up of network
	Calculates full network asset counts for full time series
NwDeploy	Inputs asset units required in full network
	Inputs lifetimes, planning periods and retirement periods of assets
	Calculates total number of items deployed and incremental deployment in each year (including replacement)
NwEleOut	Inputs service demand - historical and forecast inputs
	Inputs service routeing factors
	Inputs asset cost recovery years
	Calculates the recovery profile and traffic loading on each type of network element
CostTrend	Inputs inflation rate - historical and forecast inputs
	Inputs capital and operational expenditure trends - historical and forecast inputs
	Determines the capex and opex cost trends for each network element over time
Capex	Inputs direct equipment purchases – historical and forecast inputs
	Calculates unit capex based on inflation, unit prices and capex trends
	Calculates total capex based on cost per network element and direct equipment

| Sheet title	Contents
	purchases
UnitOpex	Calculates unit opex based on parameters in the AssetIn sheet
Opex	Inputs working capital allowance – historical and forecast inputs
	Inputs deployed assets – historical and forecast inputs
	Calculates total opex based on inflation, unit prices and opex trends
	Calculates total opex based on cost per network element and deployed assets
MTAD	Inputs capex cost trend – historical and forecast inputs
	Inputs asset unit cost – in year 2013
	Inputs total annual capex – historical and forecast inputs
	Inputs total annual opex – historical and forecast inputs
	Inputs asset lifetimes and additional tilt percentage
	Calculates gross replacement costs based on total annual capex, capex cost trend and capex unit cost
	Calculates total variable costs based on capex cost trend, gross replacement cost, asset lifetime and additional tilt
	Calculates total costs recovered based on total variable costs and total annual opex
	Calculates total costs per unit output
	Calculates total costs per unit output based on total cost recovered and network element output
TSLRIC	Inputs total economic cost by asset
	Inputs common costs proportions
	Calculates total common costs based on total economic cost by asset and common cost proportions
	Calculates total incremental costs based on total economic cost by asset and common cost proportions
	Calculates incremental cost per unit output based on common cost proportions
	Calculates TSLRIC per service unit based on routeing factors and incremental cost per unit output
	Calculates total TSLRIC by multiplying TSLRIC per service unit and service demand

A.2 Key calculations

Some key calculations within the service unit cost file are described below.

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Network demand by asset calculation

This calculation is contained within the *DmdSubCalc* worksheet. The demand by asset group is later converted into demand by asset in *NwEleOut*. Figure A.6 below summarises the key calculation steps.

Figure A.6: Network demand by asset calculation [Source: Analysys Mason, 2014]
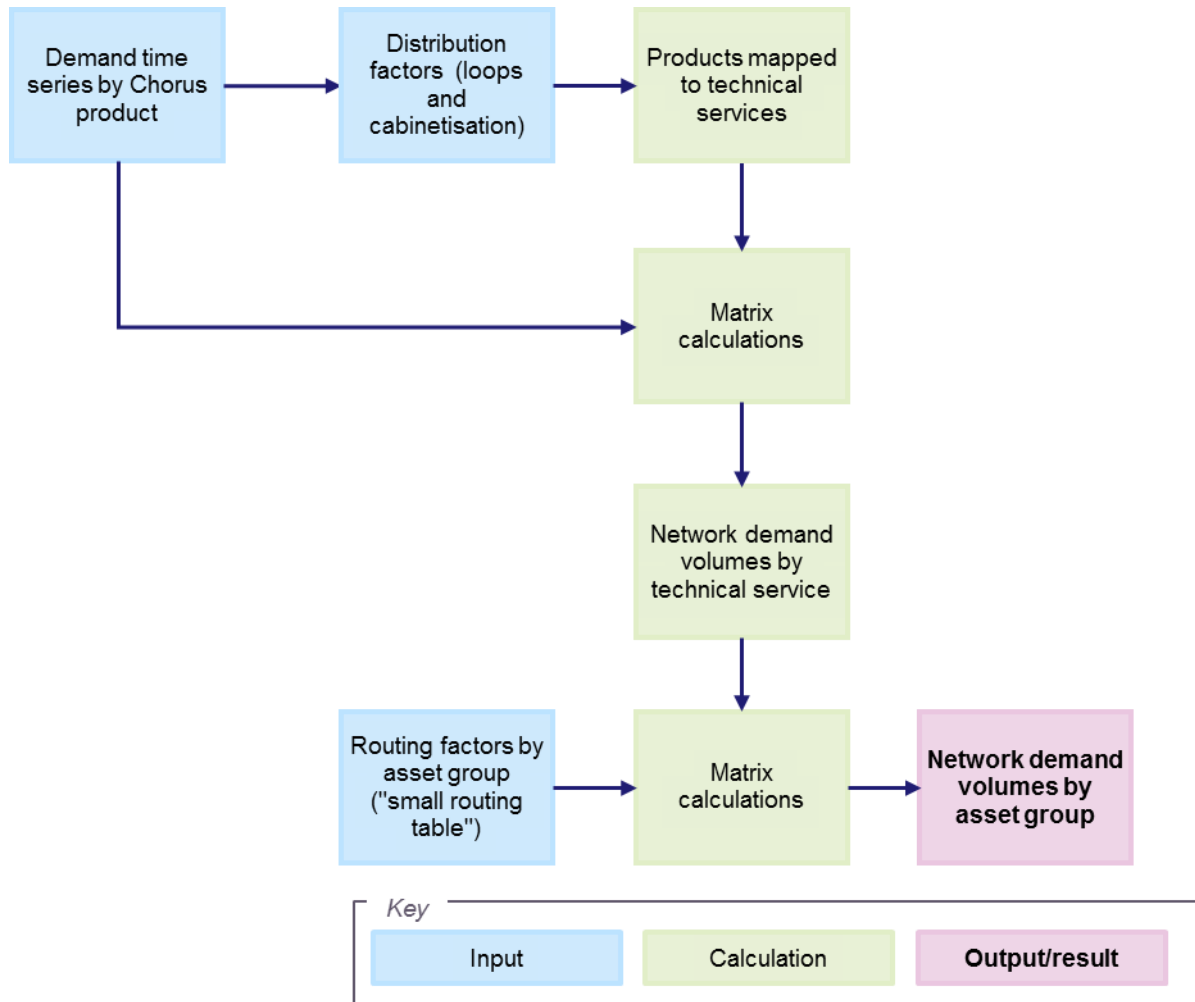
FullNw worksheet and asset counts used in the service costing

The number of assets in the network in 2013 is the key input to this calculation. For the majority of the asset base this is based on NetMap records. The remainder of assets are based on alternative Chorus records and Analysys Mason assumptions. For example, we make assumptions related to the choice of modern equivalent asset instead of actual deployed assets which reflect historic technologies to some extent. Also, Chorus currently purchase line testing services from Spark whereas a modern efficient new entrant would operate its own line testing equipment.

Figure A.7: Calculation of asset volumes [Source: Analysys Mason, 2014]
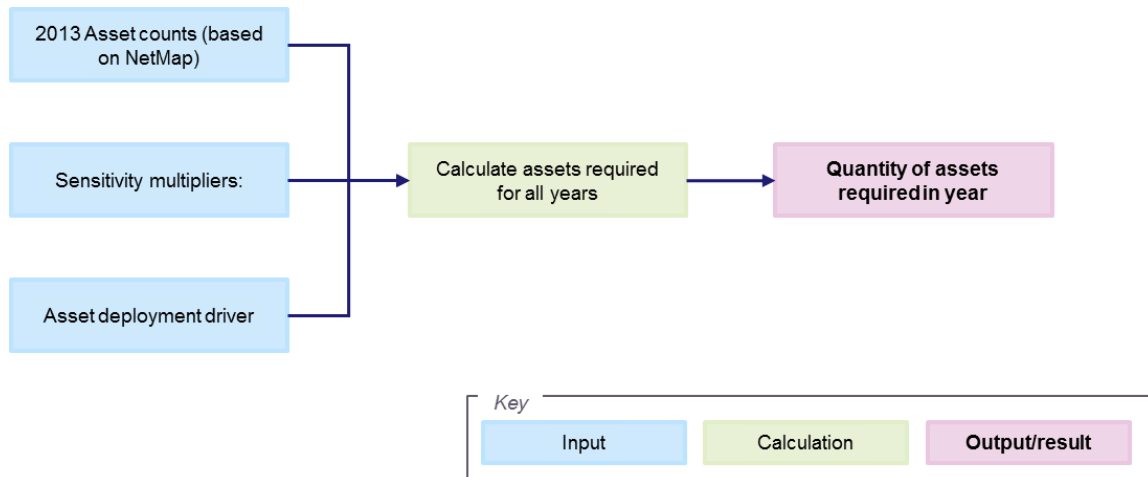
Asset deployment drivers are used to estimate past requirements as the network was deployed. As noted above, the model assumes flat demand from 2013. Deployment drivers were based on trends such as the following:

- Number of households
- Total fixed lines
- Total fixed lines including fibre
- Fibre access lines
- Copper lines
- Total UFC fibre connections
- Chorus fibre connections
- Copper sheath purchase history
- Fibre sheath purchase history

The above calculation forecasts the assets *required* to be deployed in the network in any one year. The depreciation calculation used in the model requires the number of assets *purchased* in a given year.

The modified tilted annuity depreciation calculation takes into account the planning period. Retirement delay and the calculation of the assets purchased to replace assets coming to the end of their lives in a specific year are not required for the modified tilted annuity calculation.
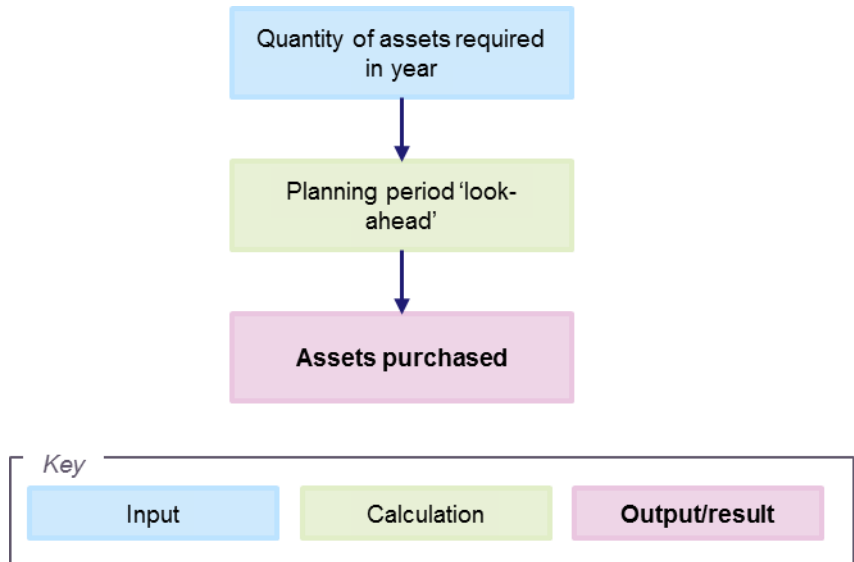
Figure A.8: Asset count calculations for Modified Tilted Annuity Depreciation Calculation [Source: Analysys Mason, 2014]

The opex calculations take account of the number of assets actually deployed in the network taking into account the planning period. This takes account of both the 'pure planning' period when the requirement for the asset is identified and it may be ordered, and the 'operational but not needed yet' phase when the asset has been commissioned, uses floorspace and energy, and needs maintenance to make sure it is working when it is actually required.

Modified Tilted Annuity Calculation

The MTAD calculation can be summarised in the following terms:

$$\text{Gross Replacement Cost} \times (1 + \text{WACC})^{\frac{Planning\ period - 6}{12}} \times \frac{WACC - (Capex\ cost\ trend + additional\ tilt)}{1 - ((\ (1 + (Capex\ cost\ trend + additional\ tilt))/(1 + WACC))^{asset\ lifetime})}$$

A tilted annuity formula calculates the annualised cost of recovering the investment and the return on capital with a tilt of the forecast price of the asset.

The modified tilted annuity approach adjusts the tilt used in line with the trend in demand over the lifetime of the asset. The additional tilt therefore prevents under-recovery of costs over the life of the asset when demand is falling and over-recovery where demand is growing.

The network gross replacement cost is calculated taking into account assets required in the network and a planning period. This accounts for the investment in assets ahead of the demand that requires them to be in place. The cashflow impact of the timing of this investment is taken into account in the formula above.
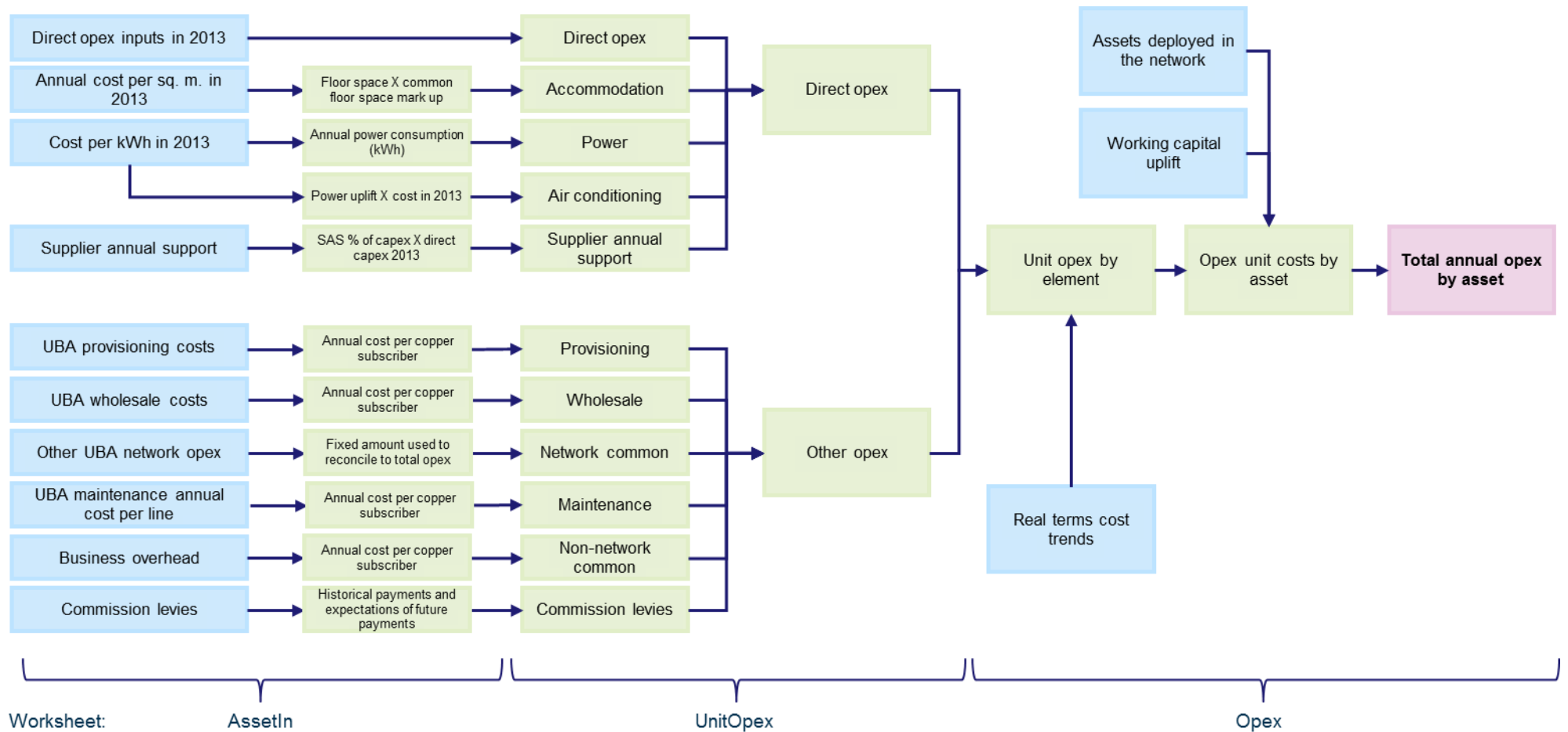
Figure A.9: Modified Tilted Annuity Calculation [Source: Analysys Mason, 2014]
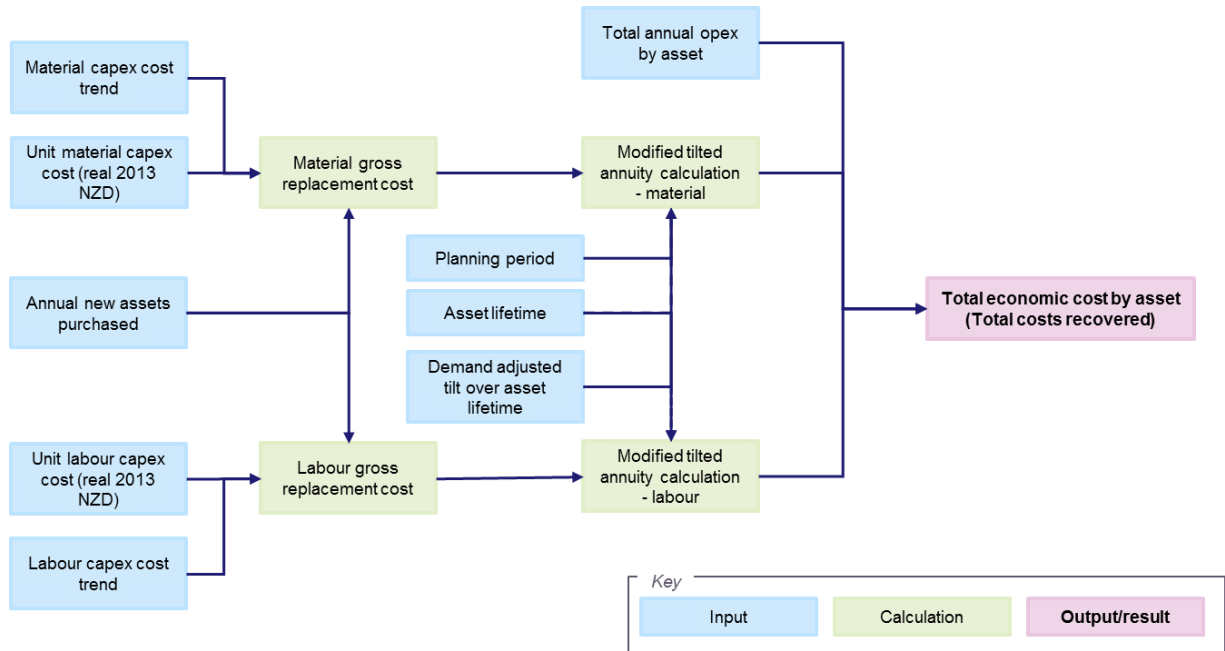
Total opex calculations

The opex calculation for the Modified Tilted Annuity Calculation takes the form described below.

Figure A.10: Total annual opex by asset calculation [Source: Analysys Mason, 2014]

Service costing calculation

The total economic costs included can be divided into common and incremental costs:

- Incremental costs can be attributed to a specific asset, and
- Common costs are not attributable to a particular asset

The incremental costs are attributed to the relevant assets and can then be mapped to the services which they support using the routing factors in *DmdSubCalc*. Common costs are then allocated to services on the basis of an equi-proportional mark up.

Figure A.11: Service costing calculation [Source: Analysys Mason, 2014]
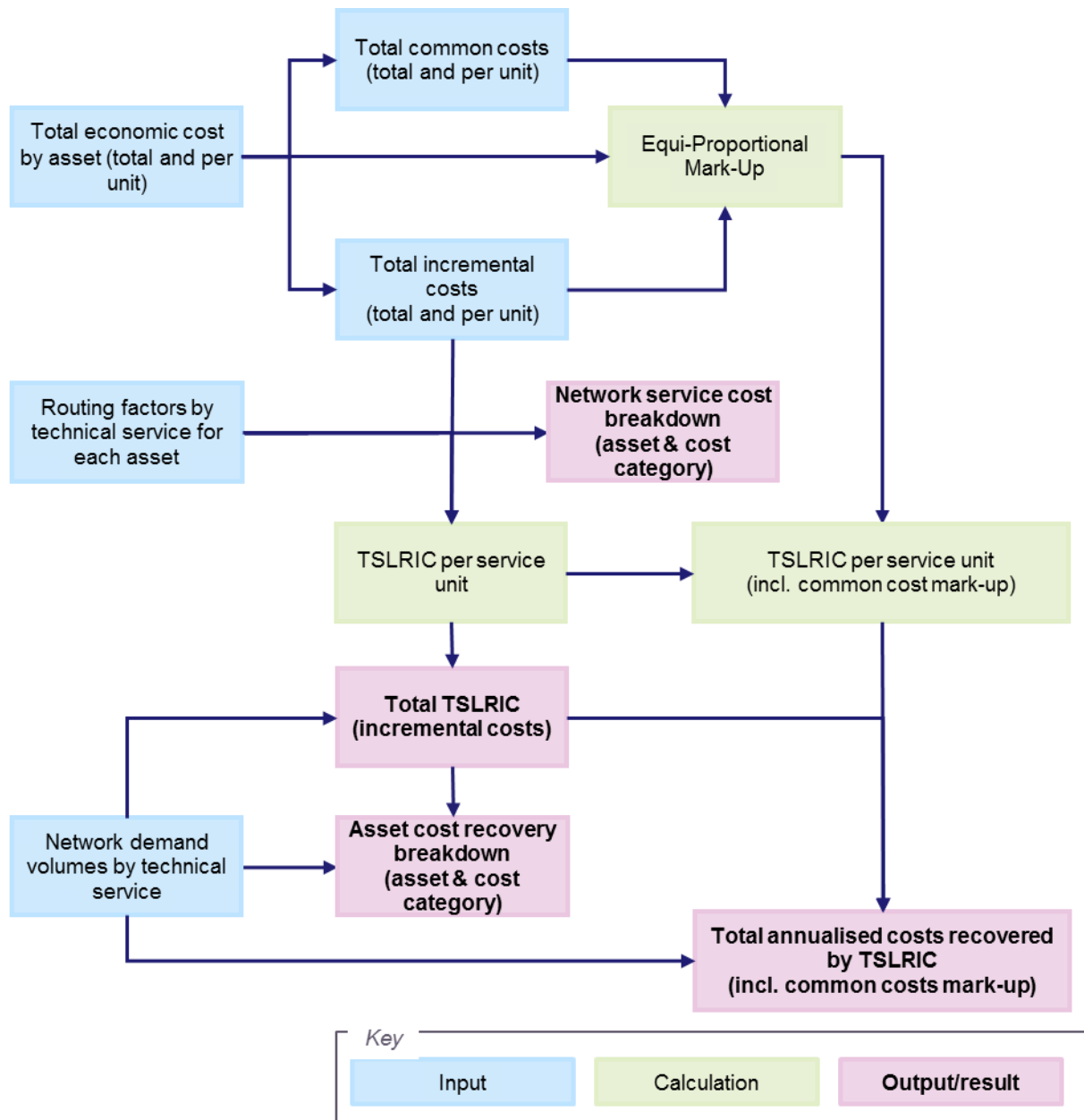
Annex B   Glossary

This section lists the terms and their definitions as used in this document, as well as a number of others. The terms and their definitions are in agreement with the Glossary of Terms provided to the Commission.

Figure B.1: Glossary of terms used in this work [Source: Analysis Mason, 2014; Chorus, 2014]

Term	Definition
Access Network	• Chorus's local loop network, as defined in clause 1 of Part 1 of Schedule 1 of the Act (including any relevant line in Chorus's local telephone exchange or distribution cabinet); and • Chorus's local telephone exchange, as defined in clause 1 of Part 1 of Schedule 1 of the Act, and Chorus's distribution cabinet (or equivalent facility); and • Chorus's backhaul network (whether copper, fibre, or anything else) between the local loop network handover point in Chorus's distribution cabinet (or equivalent facility) or Chorus's local telephone exchange and the first data switch (including the first data switch); and • Chorus's digital subscriber line access multiplexer (or equivalent facility)
Baseband	The baseband product is a technology neutral voice input service that is either bundled with a broadband product or provided on a standalone basis should a customer not require a broadband connection
BDF	Building Distribution Frame
Cabinet	A Chorus owned, leased or licensed structure that is not an Exchange and at which Chorus copper local loops connect to a distribution frame
Capex	Capital Expenditure
CAR	Corridor Access Request
ComCom	The Commerce Commission (the national telecommunications regulatory authority of New Zealand)
Cost Centre	A cost centre is a 4 digit code that represents a unit in the Chorus management reporting structure.
CSA	Customer Service Area: New Zealand is divided into 11 CSA areas. Service Companies are assigned one or more CSA areas in which they provide engineering services to Chorus. Service Company pricing for tasks varies geographically between CSA.
CT	Cable terminal
DSLAM	Digital Subscriber Line Access Multiplexer – a device that connects many digital subscriber lines to a network by multiplexing the DSL traffic onto one or more network trunk lines
End User	In relation to a telecommunications service, means a person who is the ultimate recipient of that service or of another service whose provision is dependent on that service
EPMU	Equi-proportional markup
ESA	Exchange Service Area

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Term	Definition
ETP	External Termination Point at an End User's premises or, where there is no termination point external to the premises, the first jack on the premises wiring or, the building distribution frame
Exchange	A Chorus owned or leased building, or leased or licensed area within a building, with a floor area of at least 15 square metres and a main distribution frame terminating copper local loop of at least 200 pairs connected to End-User premises, the primary function of which is to provide fixed wire line telecommunications services, and includes all of the Chorus owned, leased or licensed property on which the building is situated
GRC	Gross Replacement Cost
FPP	Final Pricing Principle
FY	Financial Year
HFC	Hybrid-fibre coaxial
HSNS	High Speed Network Service - a service for RSPs to use in delivering data and voice services to Medium to Large Enterprises
ICMS	An internal Chorus billing system
kWh	kilowatt-hours
LFC	Local Fibre Company, LFC means a local fibre company, being an entity in which CFH, the Government and a partner holds shares, and through which the investment of CFH and the partner in relation to the UFB Initiative is effected
MDF	Main Distribution Frame
MDU	Multi-dwelling unit, otherwise known as a Multi-Unit Complex (MUC)
NC-UCLL	Non-Cabinetised UCLL. This describes UCLL subscriber lines that do not pass through an active cabinet (i.e. one containing a DSLAM). Instead NC-UCLL lines are fed directly from the exchange or via a passive cross-connect cabinet
NetMap	Chorus' internal database of outside plant
NZD	New Zealand Dollar
ONT	Optical Network Terminal
Opex	Operating Expenditure
OSP-facing	Outside plant facing
PEFUT	Polyethylene grease filled unit Twin (denotes a type of insulated cable)
RBI	Rural Broadband Initiative
RMA	Resource Management Act 1991
RSP	Retail Service Provider
S98	Section 98 of the Commerce Act (1986)
SDU	Single Dwelling Unit
SerCo	Service Company: Subcontractors who carryout network deployment and maintenance tasks on behalf of Chorus
SLU	Sub Loop UCLL Service: This is the metallic path facility (MPF or copper pair) that goes from the subscriber's home or business to the distribution frame (DF) in the roadside cabinet.
SME	Subject matter expert
Spark	Spark New Zealand (previously Telecom New Zealand)

Term	Definition
Sub-loop UCLL Service	The sub-loop unbundled (SLU) copper local loop service supplied by Chorus pursuant to the standard terms determination dated 18 June 2009 (Commission Decision No. 672)
sqm	Square metres
TDL	Telecommunications Development Levy
TSLRIC	Total Service Long Run Incremental Cost
UBA Service	The Unbundled Bitstream Access Service supplied by Chorus pursuant to the standard terms determination dated 13 December 2007 (Commission Decision 611)
UCLF Service	The Unbundled Copper Low Frequency Service supplied by Chorus pursuant to the standard terms determination dated 24 November 2011 (Commission Decision 738)
UCLL and UCLF Backhaul Service	The unbundled copper local loop and unbundled copper low frequency network backhaul service supplied by Chorus pursuant to the standard terms determination dated 7 June 2008 (Commission Decision 626)
UCLL and UCLF Co-location Service	The unbundled copper local loop and unbundled copper low frequency network co-location service supplied by Chorus pursuant to the standard terms determination dated 7 November 2007 (Commission Decision 610)
UCLL Service	Chorus' Unbundled Copper Local Loop Network Service supplied by Chorus pursuant to the standard terms determination dated 7 November 2007 (Commission Decision 609)
UFB	Ultra Fast Broadband
UFB Initiative	The Government led initiative to aim to enable 75% of New Zealanders to be able to access Ultra-Fast Broadband by 31 December 2019
UUB	Underground Utility Box
WACC	Weighted Average Cost of Capital