

# 2022-23 Tariff Compliance Statement

## Appendix C

### Regulatory Model User Guide

31 May 2022

Port of Melbourne



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## Abbreviations and acronyms

Term	Description
ABBM	Accrual Building Block Methodology
ABS	Australian Bureau of Statistics
ARR	Aggregate Revenue Requirement
Capex	Capital Expenditure
CPI	Consumer Price Index
ESC	Essential Services Commission
GST	Goods and Services Tax
GT	Gross Tonne
ICB	Initial Capital Base
Opex	Operating Expenditure
PCP	Port Capacity Project
PMA	Port Management Act
Required Revenue	ARR based on the ABBM
SL depn	Straight Line Depreciation
Tariffs	Tariffs for Prescribed Services
TEU	Twenty-Foot Equivalent Unit
TAL	Tariffs Adjustment Limit
TCS	Tariff Compliance Statement
WACC	Weighted Average Cost of Capital
WATI	Weighted Average Tariff Increase

# 1 Introduction

## 1.1 Model purpose

The regulatory model (the **Model**) has three major components, a revenue component, a cost allocation component, and an efficient cost bounds component. The purpose of the Model is to ensure Port of Melbourne's calculation and allocation of tariffs for Prescribed Services and required revenue is done in accordance with the requirements of the Pricing Order.<sup>1</sup>

### Revenue Component

The model calculates two revenue streams for the upcoming regulatory period:

- Forecast Revenue – prescribed service revenue (subject to the TAL) and revenue from legacy contracts with Port Users for prescribed services, and
- Aggregate Revenue Requirement (ARR) based on the accrual building block methodology (ABBM) – referred to as the Required Revenue.

The Model calculates the above in accordance with the requirements of the Pricing Order. The Model also calculates tariffs for Prescribed Services (tariffs) for the upcoming regulatory period, also in accordance with the Pricing Order.

### Cost Allocation Component

This component of the Model is used to attribute, or allocate, actual and forecast capital expenditure (capex) and operating expenditure (opex) to individual Prescribed Services in accordance with the cost allocation principles in the Pricing Order.

The Model also tests and demonstrates that the attributed or allocated capex or opex or tariffs for the relevant regulatory period comply with key requirements of the Pricing Order.

Attachment 1 sets out the key Pricing Order requirements for calculating revenue and tariffs.

### Efficient Cost Bound Component

This component of the Model is used to estimate the indicative standalone and avoidable costs of supplying each Prescribed Services Bundle. This Model helps demonstrate that forecast revenue for each Prescribed Services Bundle falls within efficient pricing bounds in accordance with the pricing principles in the Pricing Order.

## 1.2 Version and review

The Model was first developed in early 2019 and forms part of Port of Melbourne's (PoM) 2022-23 tariff compliance statement (TCS) to the Essential Services Commission of Victoria (ESC) for the period 1 July 2022 to 30 June 2023.

The Model incorporates what was previously three separate models, the Regulatory Model, the Cost Allocation Model, and the Efficient Cost Bounds Model.

The Model will be updated each year to support PoM's future annual TCS submissions to the ESC.

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<sup>1</sup> Pricing Order made under the Port Management Act 1995 by the Victorian Government and gazetted on Friday 24 June 2016.

### 1.3 Tariffs

Actual tariffs are input to the **Data** sheet along with those proposed for the upcoming regulatory period. The Model can be populated with forecast tariffs out to the end of the (50 year) port lease period.

### 1.4 Port lease period

Although the port lease ends on 31 October 2066, the Model is set up with a 50 year horizon from 1 July 2016 out to 30 June 2066 to align with the regulatory years used to set tariffs (which run on an Australian financial year basis) and to simplify the depreciation and other calculations in the Model.

### 1.5 Structure of the user guide

This user guide is structured into three further chapters:

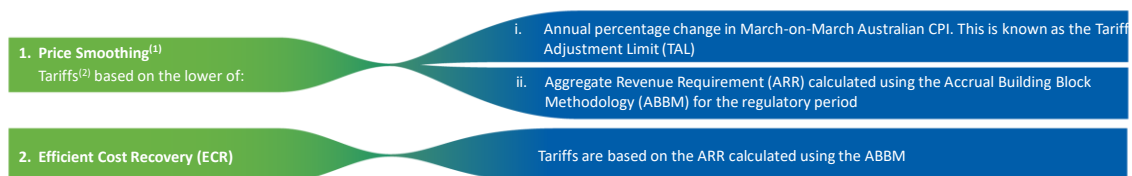
- Chapter Key pricing principles<sup>2</sup> **Error! Reference source not found.** provides background on the Model requirements
- Chapter 3 steps through each sheet of the Model, its purpose, and its structure
- Chapter 4 explains how to operate the Model, including to update key inputs.

## 2 Background

### 2.1 Key pricing principles

There are two key pricing principles under the Pricing Order with which PoM's tariffs must comply, as summarised in Figure 1.

*Figure 1: Key pricing principles*



- 1 Applies until at least 30 June 2032 and at the latest 30 June 2037 (TAL Period).
- 2 Except full out outbound container wharfage service tariffs – these will decrease by 2.5% p.a. until 30 June 2020.

PoM currently expects that tariffs will be subject to price smoothing through the application of the TAL and will therefore change in line with the annual increase in CPI during the TAL period. This is because tariffs implied by the ABBM are expected to be higher than tariffs subject to the TAL over this period (TAL period).

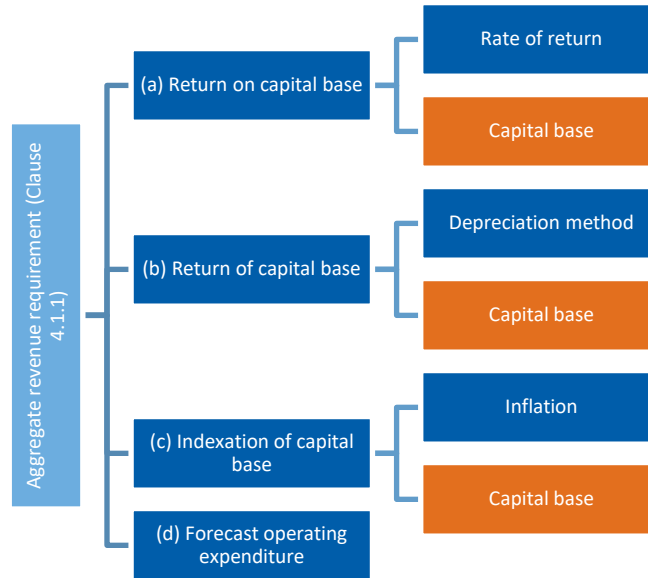
The Pricing Principles provide that tariffs must be set to allow PoM a reasonable opportunity to recover the efficient costs, as determined by the ABBM, of providing Prescribed Services.

**Attachment 1** sets out further details on the key Pricing Order requirements for calculating revenue and tariffs.

### 2.2 Accrual Building Block Methodology

Figure 2 shows the ABBM components used to calculate the ARR. As highlighted in orange, three of the four building blocks that make up the ARR are derived from the capital base.

**Figure 2: Diagrammatical representation of the aggregate revenue requirement**



## 2.3 Cost Allocation Principles

Port of Melbourne incurs opex and capex each year to provide prescribed and non-prescribed services. Some of those costs can be directly attributed to either prescribed or non-prescribed services, others are shared across both types of services.

Clause 5.2.1 of the Pricing Order sets out the principles for allocating costs when setting prescribed services' tariffs:

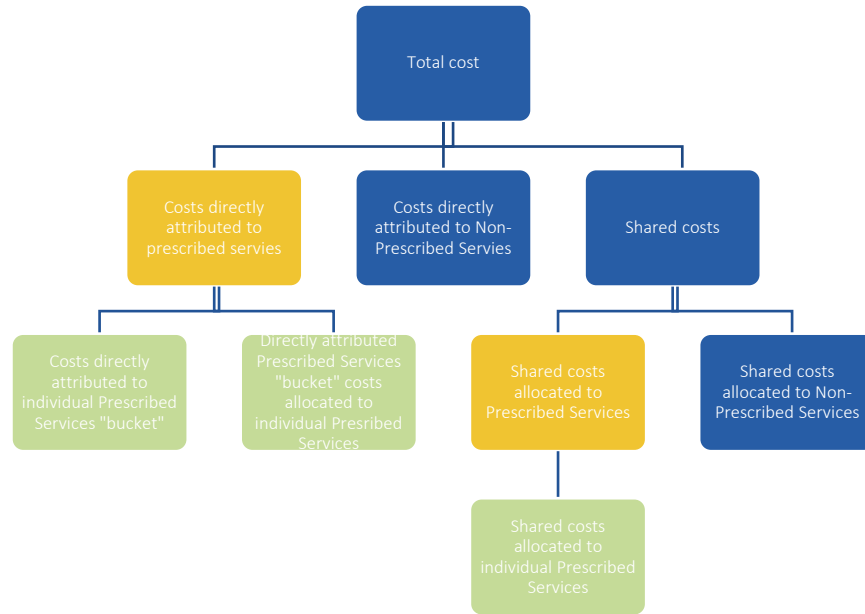
*Costs of the Port Licence Holder must be allocated between Prescribed Services and all other services provided by the Port Licence Holder in a manner consistent with the following cost allocation principles:*

- (a) Costs that are directly attributable to the provision of the Prescribed Service must be attributed to that Prescribed Service; and*
- (b) Costs that are not directly attributable to the provision of the Prescribed Service but which are incurred in the course of providing both one or more Prescribed Services and other services must be allocated to the Prescribed Service on the basis of its share of total revenue from all services provided by the Port Licence Holder.*

Figure 3 shows: how costs can be first identified as those directly attributed to either prescribed services or non-prescribed services, or as shared costs; how shared costs can be allocated between prescribed and non-prescribed services; how costs attributed to prescribed services can be either directly attributed to individual services or allocated among them; and how shared costs allocated to prescribed services can be further allocated across individual services.



**Figure 3: Diagrammatical representation of cost allocation principles**



## 2.4 Efficient Cost Bounds

Standalone and avoidable costs – often called the ‘efficient pricing bounds’ – are theoretical concepts that are used to determine whether prices are too high or too low.

- If a price for – or revenue from – a service is below avoidable cost, then it is more efficient for the service provider to stop providing that service as the cost saving would exceed the revenue foregone
- If the price or revenue is above the standalone cost, then it is more efficient for users or another service provider to deliver an equivalent service at cost rather than use the existing service.

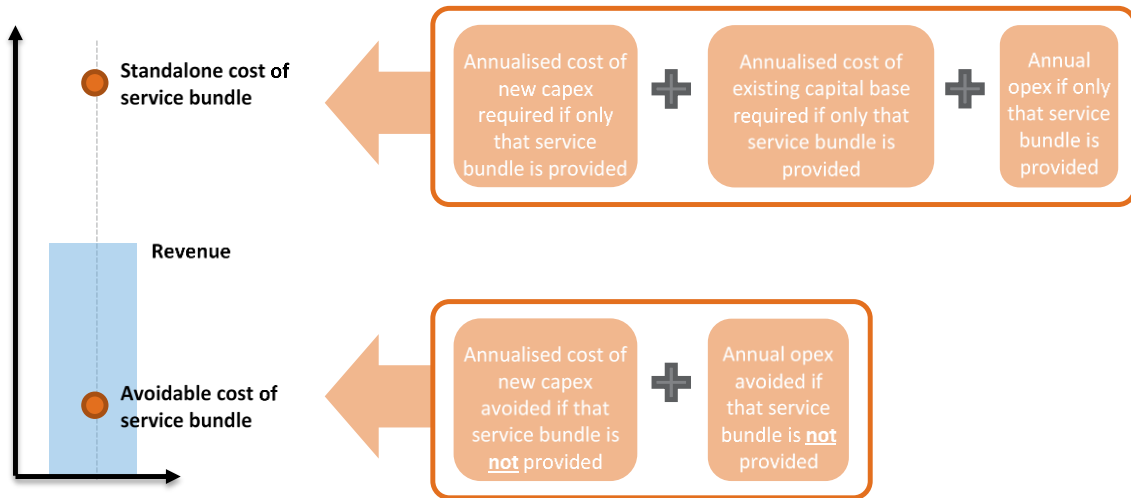
If revenue from a given Prescribed Services Bundle falls outside these bounds, then it suggests there are inefficient cross-subsidies between services.

However, estimating the efficient cost bounds is difficult as it requires assumptions and data – with experts often disagreeing on how to do it. Clause 2.1.1(b) of the Pricing Order requires tariffs to be set so that revenue from Prescribed Services Bundles falls within efficient cost bounds, but it does not specify how to estimate them.

Figure 4 shows one conceptual approach that can be used to estimate the efficient cost bounds – this is the one used in the Model. The blue bar represents the revenue from a given Prescribed Services Bundle, while the two orange circles represent the standalone and avoidable costs for that bundle. The two boxes to the right illustrate what components are used to make up the two cost measures respectively.

Sheets related to the efficient cost bounds are not included in the public version of the model as they rely on confidential forecast data.

Figure 4: Diagrammatical representation of the efficient cost bounds



## 3 The Model

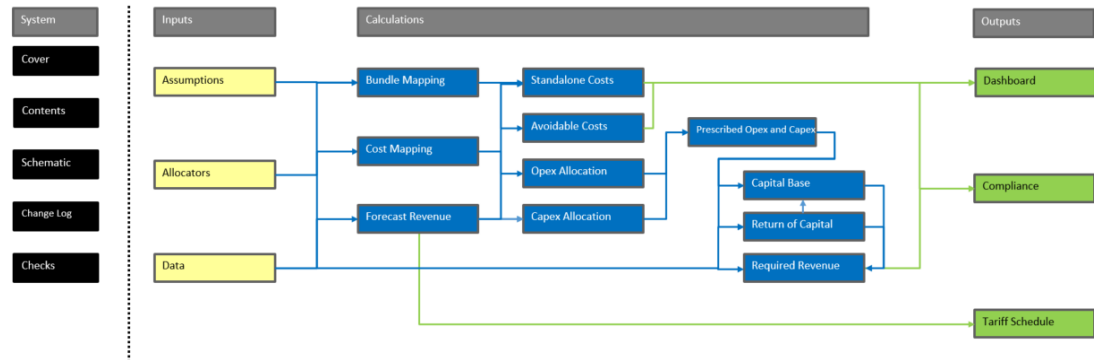
### 3.1 Overview

The Model is structured to separate system controls, inputs, calculations, outputs and appendices:

- System control sheets include the **Cover, Contents, Change Log, Schematic** and **Checks** sheets – which are used to help navigate and structure the Model
- Input sheets include **Assumptions, Data** and **Allocators** – which are used to input all the data and user choices needed for the Model to work
- Calculation sheets include the **Cost Mapping, Bundle Mapping, Forecast Revenue, Opex Allocation, Capex Allocation, prescribed Opex and Capex, Capital Base, Return of Capital, Required Revenue, Standalone Costs, and Avoidable Costs** sheets – which are used to allocate the opex and capex from the data sheet across services to calculate the ARR (i.e. required revenue) and forecast revenue (i.e. prescribed service revenue (subject to the TAL) and revenue from legacy prescribed services contracts) that are used to demonstrate compliance with key Pricing Order requirements within the **Compliance** sheet
- Output sheets include the **Dashboard, Compliance, and Tariff Schedule** sheets – which provide the key outputs from the Model

The Model structure is summarised in Figure 5. The remainder of this chapter explains the purpose and operation of each of the system control, input, calculation and output sheets.

Figure 5: Model structure



### 3.2 Cover, contents, change log, and schematic and checks sheets

The **Cover** sheet provides the base information about the Model. The **Contents** sheet lists and describes each sheet in the Model. The **Change Log** sheet includes a change log for any changes from one version of the model to the next. The **Schematic** sheet includes Figure 5 above and relevant keys. The **Checks** sheet contains a summary of error checks and alert.

### 3.3 Assumptions sheet

The **Assumptions** sheet inputs key assumptions that drive the presentation of the Model. As shown in Figure 6, key assumptions include the:

- Model start date – the first year of the horizon shown in the Model
- Display years – identifying the relevant TCS year, ESC review period and regulatory period, which are then displayed at the top of all relevant input, calculation and output sheets
- Port lease period – identifying the years that apply to the port lease
- TAL period – identifying the years that apply to the TAL period
- Annualisation of costs – which sets the horizon (in years) of forecast costs that is used to estimate the prevailing annualised cost.

The **Assumptions** sheet also includes key defined values used within the Model, such as 'Half', 'Million' and 'Subsection' (which is used to number subsection headings).

Figure 6: Assumptions sheet

Port of Melbourne Regulatory Model (Commercial in Confidence)			
4 Assumptions			
No errors identified			
[To Contents]			
4.01 Year Assumptions			
This table inputs key dates and defined values used to structure the model. All references to 'years' are July to June years unless otherwise stated.			
<b>Model Start</b>			
First year	Year ending		2015
Period start	Date		01-Jul-14
Period end	Date		30-Jun-15
<b>Display Years</b>			
Tariff Compliance Statement Year	Year ending		2023
ESC Review Period			
First Year	Year ending		2022
Last Year	Year ending		2026
Regulatory Period			
First Year	Year ending		2023
Last Year	Year ending		2023
<b>Port Lease</b>			
First year	Year ending		2017
Term	Years		50
<b>Tariff Adjustment Limit (TAL) Period</b>			
First year	Year ending		2017
Last year	Year ending		2037
<b>Annualisation of Costs (for efficient cost bounds)</b>			
Number of years to look forward	#		15
<b>Defined Values</b>			
Half	Value		0.5
Million	Value		1,000,000
Subsection	Value		0.01
#			
END			

### 3.4 Data sheet

The **Data** sheet enables inputs for inflation, rate of return, capital base, capital expenditure, capital contribution, operating expenditure, tariffs, volumes and other revenue – all in separate tables.

The inflation, rate of return, capital base, capital expenditure and operating expenditure data is used to calculate the ARR in the **Required Revenue** sheet, including via interim calculations in the **Capital Base** and **Return of Capital** sheets. The tariff, volume, and other revenue data is used to forecast total prescribed services revenue in the **Forecast Revenue** sheet.

The inflation (5.02) and rate of return (5.03) tables cover:

- actual and forecast inflation inputs for each year used to escalate the port licence fee, tariffs and the capital base, including the consumer price index (CPI) for both the weighted average of the eight capital cities and for Melbourne, and

- the pre-tax nominal rate of return required by Clause 4.3 of the Pricing Order that is used to calculate the return on capital component of the ARR, as well as a pre-tax *real* rate of return that is used to apply the tilted annuity depreciation method.

Cells F37:G37 can be used by the Model User to nominate what data is used to determine inflation calculated from the weighted average of eight capital cities CPI, including the quarter and whether a lagged series is used or not.

If actual CPI inputs are not available for a given year, then the forecast inflation inputs are used instead to determine the inflation for that year used throughout the model.

The capital base table (5.04) includes:

- the initial capital base (**ICB**) by asset class as at 1 July 2016, which matches that reported in Clause 4.7 of the Pricing Order and including the value of the PCP capital expenditure referred to in Clauses 4.2.3 and 4.7.2 of the Pricing Order
- the remaining life of the ICB, again by asset class that is used to depreciate the ICB in the **Return of Capital**
- the standard economic lives for each asset class, which are used to depreciate new capex in the **Return of Capital** sheet
- the initial unrecovered depreciation by asset class, which is set to zero and used as the opening balance for the unrecovered depreciation balance calculated in the **Return of Capital** sheet,
- the assumptions used to apply the tilted annuity depreciation method, including the years when that method is to apply and the tilt factors that are used.

The capital expenditure (5.05 and 5.06) and operating expenditure (5.07) tables cover:

- actual and forecast gross capital expenditure (**capex**) for prescribed services by asset class
- actual and forecast capital contributions and asset disposals (based on sale proceeds) for prescribed services by asset class; and
- actual and forecast operating expenditure (**opex**) for prescribed services by category.

Capex and opex include expenditure for prescribed services, including those covered under legacy contracts rather than by prescribed service tariffs.

The tariff setting parameters table (5.08) includes for each tariff:

- the initial tariff included in the schedule to the Pricing Order
- a unique tariff index that is used to reference the tariff and volume data in calculations throughout the model
- the rounding applied
- a flag for whether the tariff is subject to export price decision or not, as referred to in Clauses 2.3.1, 3.2.1 and 14 of the Pricing Order, and
- a flag for whether the tariff is calculated as a ratio of another tariff and, if so, the ratio and the index for the tariff used to calculate the tariff.

The prescribed service tariffs (5.09) and prescribed service volumes (5.10) tables include:

- actual and proposed tariffs, which can be input either as hard coded values or as calculations using the inputs in the tariff setting parameters table (5.08), and
- actual and forecast volumes by tariff.

The other prescribed services revenue table (5.11) includes:

- Actual and forecast revenue from legacy contracts with Port Users for prescribed services that have costs included in either the initial capital base or actual and forecast expenditure and which is not covered by the prescribed services tariffs included in table 5.09.
- Historical forecast prescribed opex and revenue (5.12) provides forecasts from prior TCSs for the purpose of presenting historical required revenue using forecast values.

All financial data should be entered in nominal dollars (i.e. dollars of the day incurred), unless otherwise stated. Inputs should be included for all years up to and including the TCS year nominated at Cell F17 of the **Assumptions** sheet. Inputs can be included – but are not required – for all years of the port lease period.

Throughout the sheet, inputs can be marked as either ‘Actuals’, ‘Forecasts’ or ‘Update’ – which are used to identify the status of the data. ‘Actuals’ are data sourced from historical records, such as internal financial systems or external data providers such as the Australian Bureau of Statistics (**ABS**). ‘Forecasts’ are estimated data either determined by the Port of Melbourne or provided by an external party. ‘Update’ is data that is a placeholder that needs validating or updating with an actual or forecast and is used when populating the model before it is submitted to the ESC.

### 3.5 Allocators Sheet

The **Allocators** sheet enables inputs for two key mapping tables:

- Prescribed services mapped to Prescribed Services Bundle (6.02)
- Opex categories mapped to services (6.03), and
- Asset classes mapped to services (6.04).

These tables are used first in the **Cost Mapping** and **Bundle Mapping** sheets and then in the **Opex Allocation** and **Capex Allocation** sheets to map the expenditure data in the **Data** sheet to services. The Opex Allocation and Capex Allocation data is then fed into **Standalone Cost** and **Avoidable Cost** sheets to calculate Prescribed Services Bundle.

The first table (6.02) shows what services fall within each Prescribed Services Bundle. In most cases, a service falls within only one bundle. However, some services fall across more than one bundle. For instance, transshipment services fall within wharfage services for containerised, non-containerised/general, motor vehicle, liquid bulk and dry bulk cargo bundles.

The second table (6.03) shows what opex categories are used to provide each service. In most cases an opex category is used to provide more than one service (e.g. the Port Licence Fee).

The third table (6.04) shows what asset classes are used to provide each service. Similar to the first table, in most cases an asset class is used to provide more than one service (e.g. the wharves asset class is used to provide the various wharfage services).

These mapping tables are not expected to change significantly from one year to the next. Data limitations mean that it is likely not possible to identify cost categories nor asset classes that are mapped to only one Prescribed Services Bundle.

### 3.6 Cost Mapping Sheet

The **Cost Mapping** sheet takes the last two tables (6.03 and 6.04) from the **Allocators** sheet and transposes the rows and columns. Both the original tables and the transposed tables are used to allocate the opex and capex data to services.

The opex table (7.01) identifies whether a given opex category is dedicated to prescribed services, dedicated to non-prescribed services, or shared across both prescribed and non-prescribed services. The

table identifies whether a given asset category is dedicated to prescribed services, dedicated to non-prescribed services, or shared across both prescribed and non-prescribed services.

### 3.7 Bundle Mapping Sheet

The **Bundle Mapping** sheet uses the three tables from the **Allocators** sheet to create tables that map opex categories and asset classes to Prescribed Services Bundles. There are two tables for each of opex and capex – one to identify standalone costs and the other to identify avoidable costs.

The opex *standalone* table (8.02) shows what categories would be required to provide a given Prescribed Services Bundle on a standalone basis (i.e. if no other bundles are provided); while the opex *avoidable* table (8.03) shows what categories could be avoided if a Prescribed Services Bundle were not provided. Given that the largest cost categories (i.e. the port licence fee and the cost contribution amount) are shared across all prescribed services and the difficulty of identifying cost categories that apply only to one Prescribed Services Bundle, the avoidable costs are likely to be small (if any) for a given bundle.

Similarly, the capex standalone table (8.04) shows what asset classes would be required to provide a given Prescribed Services Bundle on a standalone basis. The capex avoidable table (8.05) shows the share of each asset classes that could be avoided if a Prescribed Services Bundle was not provided. The share is estimated by weighting an asset class across the Prescribed Service Bundles that it serves using relative revenue for a given year sourced from the **Forecast Revenue** sheet, with the year nominated by the Model User at cell F160.

### 3.8 Forecast Revenue sheet

The **Forecast Revenue** sheet forecasts total prescribed services revenue by adding:

- prescribed services revenue (subject to the TAL), and
- revenue from legacy contracts with Port Users for prescribed services.

Table 9.03 combines both prescribed services revenue (subject to the TAL) and legacy contract revenue (for prescribed services) for each year to calculate total prescribed services revenue, by tariff type. Legacy contract revenue is included as required by clause 6.2.2(b) of the Pricing Order.

Table 9.04 calculates actual and forecast total revenue from prescribed services and non-prescribed services for cost allocation purposes. Prescribed services revenue used for cost allocation purposes is inclusive of both legacy and new prescribed service contract revenue.

Table 9.05 calculates revenue by Prescribed Services Bundle and year. This revenue is used to both determine the weights for the avoidable capex mapping table (8.04) in the **Bundle Mapping** sheet and test that it falls within the cost efficiency bounds in the **Compliance** sheet.

Table 9.06 calculates the weighted average tariff increase (WATI) from prescribed services tariffs including and excluding tariffs subject to the export pricing decision. The two WATI values for a given year will differ if the tariffs subject to the export pricing decision change from the prior year by a different percentage to the other prescribed services tariffs.

Table 9.06 also calculates the estimated tariff adjustment needed to match the ARR each year and, for a given year, the standard deviation of those adjustments from that year until the end of the Port Lease Period. During the TAL period, tariff adjustments cannot increase faster than inflation so the calculation is best suited to compare different tariff adjustments scenarios in the post-TAL period. This information can be used to inform how a change in depreciation method may affect the variance of expected tariff changes.

Table 9.07 picks up the actual and forecast unrounded prescribed services tariffs from the **Data** sheet; while table 9.08 picks up the actual and forecast rounded prescribed services tariffs from the Data sheet. Table 9.09 picks up the actual and forecast prescribed service volumes from the **Data** sheet. Table 9.10 multiplies

the rounded tariffs and volumes from tables 9.08 and 9.09 to calculate the actual and estimated revenue from each prescribed services tariff for each year.

The revenue and WATI calculated values in this sheet are used in the **Compliance** sheet to test compliance with key requirements in the Pricing Order.

### 3.9 Opex Allocation sheet

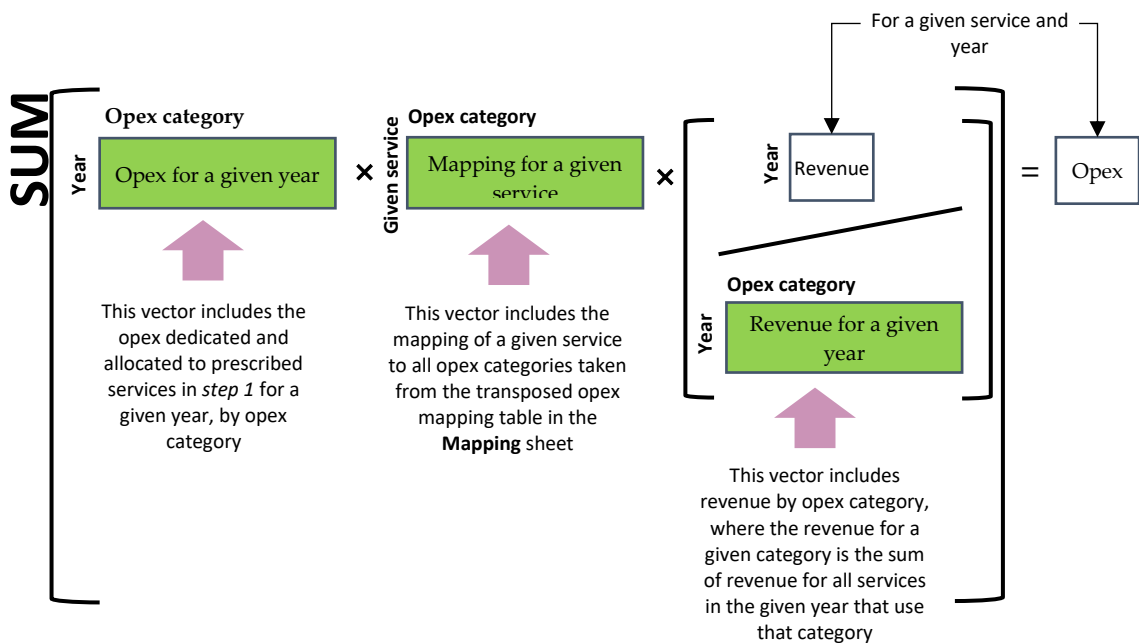
The **Opex Allocation** sheet allocates the opex data from the **Data** sheet across services.

This is done using a three-step process:

- *Step 1* – takes the opex data from the **Data** sheet and allocates this into:
  - (A) costs directly allocated to prescribed services only
  - (B) costs directly allocated to non-prescribed services only, and
  - (C) costs shared between prescribed services and non-prescribed services
- *Step 2* – uses the ratio of prescribed services revenue to total revenue from the **Data** sheet to determine the share of shared costs (from C) that is allocated to prescribed services (D), as per Clause 5.2.1 of the Pricing Order
- *Step 3* – takes the costs directly allocated to prescribed services only (from A) and the share of shared costs allocated to prescribed services (from D) and allocates these costs across those prescribed services to which they relate based on their relative revenue shares.

The overall approach used is summarised diagrammatically in Figure 7, which shows how the opex for a given service is determined. The green boxes represent vectors of data.

**Figure 7: Opex allocation approach**



The steps are applied through a series of tables (or sections) in the **Opex** sheet.



The first table (10.03) inputs the revenue and opex from **forecast revenue** sheet and **data** sheet. The second table (10.04) applies step 1 to split opex between prescribed, non-prescribed and shared services. The third table (10.05) applies step 2 to allocate shared opex between prescribed and non-prescribed services.

The fourth table (10.06) contains two interim calculations needed to apply step 3.

- The *first* calculation aggregates, by category, opex either directly attributed to prescribed services (in step 1) or allocated to prescribed services (in step 2).
- The *second* calculation determines the revenue divisor (i.e. denominator) needed to weight a given cost to the prescribed services that use it. In effect, the revenue divisor for a given cost category and year is the sum of revenue in that year from all prescribed services that benefit from that cost being incurred.

The fifth and final table (10.07) uses the interim calculations and the original opex mapping table from the **Cost Mapping** sheet to allocate opex attributed and allocated to prescribed services to each prescribed service.

### 3.10 Capex Allocation sheet

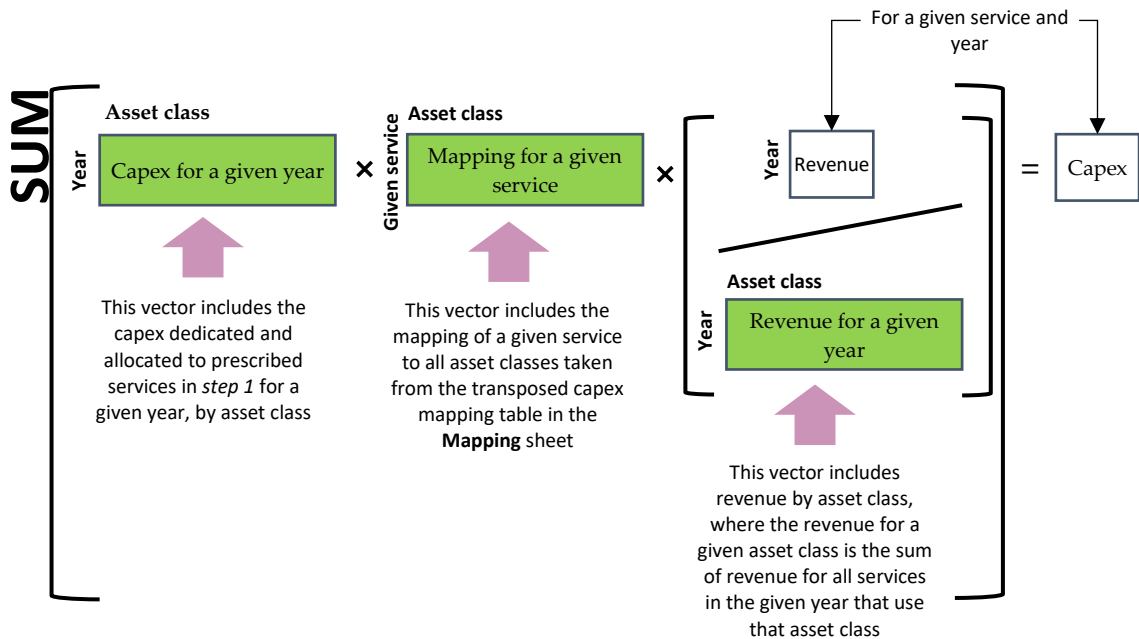
The **Capex Allocation** sheet allocates the capex data from the **Data** sheet across services.

This is done using a three-step process (which is effectively the same as that used in the **Opex Allocation** sheet):

- *Step 1* – takes the capex data from the **Data** sheet and allocates this into:
  - (A) costs directly allocated to prescribed services only
  - (B) costs directly allocated to non-prescribed services only, and
  - (C) costs shared between prescribed services and non-prescribed services
- *Step 2* – uses the ratio of prescribed services revenue to total revenue from the **Data** sheet to determine the share of shared costs (from C) that is allocated to prescribed services (D), as per Clause 5.2.1 of the Pricing Order
- *Step 3* – takes the costs directly allocated to prescribed services only (from A) and the share of shared costs allocated to prescribed services (from D) and allocates these costs across those prescribed services to which they relate based on their relative revenue shares.

The overall approach used is summarised diagrammatically in Figure 8, which shows how the capex for a given service is determined. The green boxes represent vectors of data.

Figure 8: Capex allocation approach



The steps are applied through a series of tables (or sections) in the **Capex Allocation** sheet.

The first table (11.03) inputs the revenue and capex data from **forecast revenue** and **data** sheets. The second table (11.04) applies step 1 to split capex between prescribed, non-prescribed and shared services. The third table (11.05) applies step 2 to allocate shared capex between prescribed and non-prescribed services.

The fourth table (11.06) contains two interim calculations needed to apply step 3.

- The *first* calculation aggregates, by asset class, capex either directly attributed to prescribed services (in step 1) or allocated to prescribed services (in step 2).
- The *second* calculation determines the revenue divisor needed to weight a given cost to the prescribed services that use it. In effect, the revenue divisor for a given asset class and year is the sum of revenue in that year from all prescribed services that benefit from that asset class.

The fifth and final table (11.07) uses the interim calculations and the original capex mapping table from the **Cost Mapping** sheet to allocate capex attributed and allocated to prescribed services to each prescribed service. This is done for each year and each prescribed service.

### 3.11 Prescribed Opex and Capex sheet

The **Prescribed Opex and Capex** sheet outputs the opex by category and capex by asset class data for prescribed services that are input to the **Capital Base**, **Return of Capital** and **Required Revenue** sheets.

### 3.12 Capital Base sheet

The **Capital Base** sheet rolls forward the capital base as required by Clause 4.2 of the Pricing Order. The capital base for a given year includes any unrecovered straight-line depreciation from prior years.

The roll-forward is summarised in table 13.03 in aggregate and detailed in table 13.04 by asset class. Each year, the capital base is rolled forward by adding indexation and new net efficient capex to the opening value and removing any return of capital, as required by Clause 4.2:

- The opening capital base in the first year matches that initial capital base set out in Clause 4.7 of the Pricing Order. For subsequent years the opening balance simply matches the closing balance from the immediately preceding year.
- Indexation is calculated on the opening capital base and any new net capital expenditure for a given year and asset class. As per Clause 4.6.1, this includes a half year of inflation on new net capital expenditure.
- New net efficient capital expenditure for a given year and asset class is sourced from the **Prescribed Opex and Capex** sheet. As per Clause 4.2.1(c) of the Pricing Order, that expenditure is deemed to be incurred at the mid-point of the year.
- The return of capital is calculated on the Return of Capital sheet, which is calculated as per Clause 4.4 of the Pricing Order.
- The closing balance of the capital base is then calculated by adding indexation and new net capital expenditure to the opening balance and removing any return of capital, as per Clause 4.2.1 of the Pricing Order.

The capital base is used in the **Required Revenue** sheet to calculate the ARR.

### 3.13 Return of Capital sheet

The **Return of Capital** sheet calculates the return of capital that is a deduction to the capital base (in the **Capital Base** sheet) and a component of the ARR (in the **Required Revenue** sheet).

The return of capital calculation recognises that in some years during the TAL period, some or all of the depreciation calculated using the straight-line method, described in Clause 4.4.1 of the Pricing Order, may not be recovered in the year to which it relates. This is because the application of the TAL prevents PoM increasing its tariffs to the level whereby PoM could recover its ARR with the application of straight-line depreciation. In such cases, clause 4.4.2(a) of the Pricing Order provides that an alternative to the straight-line method may be used. The alternative depreciation methodology only applies depreciation to the extent that forecast revenue from prescribed services (including legacy contract revenue) exceeds the ARR excluding the depreciation allowance.

The calculation also recognises that an alternative depreciation method can be used where it is expected to reduce the volatility of annual tariff changes, which is allowed for under clause 4.4.2(b) of the Pricing Order. This done in the Model by allowing the Model User to apply the tilted annuity depreciation method.

To give effect to this, the Model uses a five-step process:

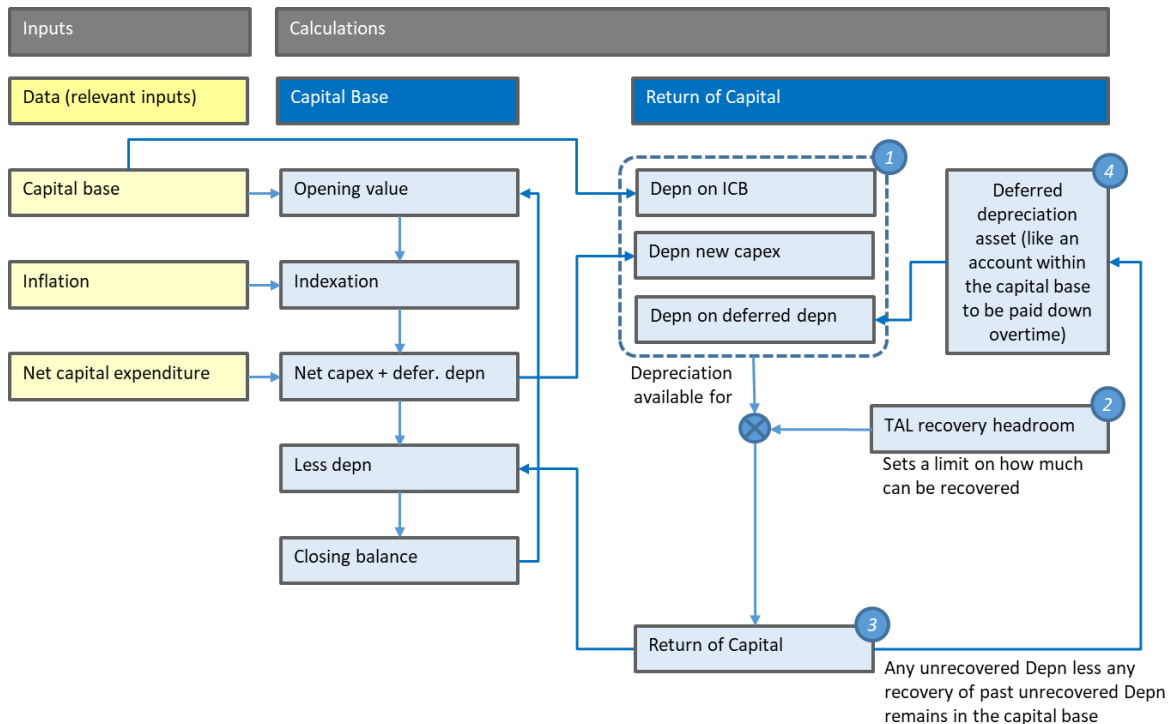
- *Step 1* – depreciation on the ICB, new capex, and any deferred depreciation asset is calculated for a given year, independent of what has been returned (via the return of capital component of the ARR)
- *Step 2* – the headroom between the forecast revenue (during the TAL period) and the other components of the ARR (i.e. the return *on* capital, indexation and forecast opex) is calculated
- *Step 3* – the return of capital is calculated as the minimum of the depreciation available for recovery calculated in step 1 and the headroom calculated in step 2
- *Step 4* – any unrecovered depreciation from a given year is added to the closing balance of the Deferred Depreciation Asset for that year.

The Model also allows for past headroom values to be input by the Model User at row 72. This can be used to fix the amount of headroom calculated under step 1 for a forecast year when it comes to the roll-forward of the capital base using actual expenditure and inflation. This is discussed further in Chapter 4.

The four-step process – along with the interactions with the **Data** and **Capital Base** sheets – is summarised in Figure 9. The relevant inputs from the **Data** sheet are shown in the yellow boxes on the left. The interactions with the calculations in the **Capital Base** sheet are shown next to those with the **Data** sheet.

The return on capital calculations are summarised on the right, marked with the numbers (in blue circles) corresponding to the four steps noted above.

**Figure 9: Return of capital calculation**



The calculations are split up across tables as follows:

- Table 14.03 calculates the return of capital covered by step 3, the TAL recovery headroom covered by step 2, and allocates the return of capital across the sources of depreciation covered by step 1.
- Table 14.04 calculates the return of capital by asset class, which is needed to roll-forward the capital base by asset class in the **Capital Base** sheet.
- Table 14.05 calculates the depreciation on the ICB, new capex, and any deferred depreciation for each year of the port lease period in two separate calculation blocks: for the ICB at rows 134:158 and for new capex and deferred depreciation at rows 163:187, which references the more detailed calculations in Table 14.07. As a check in columns F, G and H, the total depreciation (**Depn**) by asset class for both blocks is compared to the ICB or the sum of capex in real dollar terms.
- Table 14.06 calculates the life to apply to new capex and any deferred depreciation in the calculations included in Table 14.05. For a given year and asset class the life is calculated as the minimum of the standard economic life input to the **Data** sheet and the remaining term of the port lease period, consistent with what is required by Clauses 4.4.1(a) and 4.4.1(b) of the Pricing Order.
- Table 14.07 also calculates the depreciation on new capex and any deferred depreciation. There is a separate row for each year and asset class of new capex or deferred depreciation. For a given year and asset class, depreciation is calculated using either the straight-line method or the tilted annuity method depending on what method has been assigned for that year in Table 5.04 of the **Data** sheet. Both methods use the lives determined in Table 14.06. The tilted annuity method also uses the tilt factor pre-tax real rate of return for each year included in Table 14.02, which are both sourced from the **Data** sheet.

Importantly, the Deferred Depreciation Assets sits within the capital base calculated in the **Capital Base** sheet. That is, any unrecovered depreciation remains within the capital base until it is recovered through the return of capital component of the ARR.

### 3.14 Required Revenue sheet

The **Required Revenue** sheet calculates the ARR for each year as per Clause 4.1.1 of the Pricing Order, which combines four components:

- a return on capital allowance calculated by summing:
  - a return on the opening balance – calculated by multiplying the opening balance of the capital base calculated in the **Capital Base** sheet by the pre-tax nominal rate of return input from the **Data** sheet, and
  - a return on new net efficient capex – calculated by multiplying new net efficient capex from the **Data** sheet by half the rate of return<sup>2</sup>
- a return of capital allowance calculated in the **Return of Capital** sheet
- a forecast opex allowance sourced from the **Data** sheet, and
- an indexation allowance calculated in the **Capital Base** sheet.

Unlike other equivalent calculations that use a 'post-tax' framework to apply the accrued building block methodology, the calculation specified in Clause 4.1.1 does not separately include a tax allowance component (or building block). Instead, estimated tax costs are included within the return on capital allowance by using a nominal *pre-tax* rate of return.

Table 15.03 calculates required revenue. At rows 41:43 it removes forecast revenue from the **Forecast Revenue** sheet to determine the share of the ARR that is under-recovered.

Table 15.04 provides an alternative presentation of the ARR that excludes unrecovered depreciation. The unrecovered depreciation balance is summarised in table 15.05 and sourced from the **Return of Capital** sheet. The check at cell G74 confirms that the balance of unrecovered depreciation by the end of the port lease period is zero.

Table 15.06 summarises the capital base calculated in the **Capital Base** sheet. The check at cell G88 confirms that the capital base is zero by the end of the port lease period. If this were positive, then it would show that the Port of Melbourne is not expected to recover – or has indeed not recovered – its capital base.

### 3.15 Standalone Cost sheet

The **Standalone Cost** sheet calculates the standalone costs for each Prescribed Services Bundle and year. (This sheet relies on confidential data and is not included in the public model.)

The first table (16.02) shows the inflation and pre-tax nominal rate of return values over the period, using input from the **Data** sheet. It also calculates a cumulative discount rate index at row 24, which is used in the annualisation calculations.

The second table (16.03) calculates standalone capex by Prescribed Services Bundle and year by multiplying the capex mapping table (8.03) from the **Bundle Mapping** sheet by the net capex table (12.03) from the **Prescribed Opex and Capex** sheet.

The third table (16.04) calculates the opening capital base year by Prescribed Services Bundle and year, by again multiplying the capex mapping table (8.03) from the **Bundle Mapping** sheet by the opening asset base table (13.04) from the **Capital Base** sheet.

The fourth table (16.05) calculates the annualised cost of new capex by Prescribed Services Bundle and year using the net capex shown in the second table (16.03). The annualised cost for a given bundle and year is calculated by:

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<sup>2</sup> In this case, a 'half' rate of return is applied as a multiplicative half, which is equivalent to  $((1 + [\text{annual rate of return}])^{(1/2)}) - 1$ .

- first calculating the present value (as at the start of the year) for forecast net capex running from the year out over the annualisation period shown at row 56, and then
- converting that present value into an annuity payment that grows by inflation over the same nominated period.

The nominated period at row 56 is determined as the minimum of the period nominated at cell F34 of the **Assumptions** sheet and the remaining term of the port lease period.

The fifth table (16.06) calculates the annualised cost of the opening capital base by Prescribed Services Bundle and year using the opening capital base shown in the third table (16.04). Similar to the fourth table (16.05), the annualised cost for a given year and bundle is calculated by taking the opening balance for that year and bundle then converting it into an annuity payment that grows by inflation over the same nominated period.

The sixth table (16.07) calculates standalone opex by Prescribed Services Bundle and year by multiplying the opex mapping table (8.02) from the **Bundle Mapping** sheet by the opex by service allocation table (5.07) in the **Data** sheet.

The seventh and final table (16.08) calculates total standalone costs by Prescribed Services Bundle and year by summing the annualised costs from the third and fourth tables (16.05 and 16.06) and the standalone opex by Bundle from the sixth table (16.07).

### 3.16 Avoidable Costs sheet

The **Avoidable Costs** sheet calculates the avoidable costs for each Prescribed Services Bundle and year. (This sheet relies on confidential data and is not included in the public model.)

The first table (17.02) shows the inflation and pre-tax nominal rate of return values over the period, using input from the **Data** sheet. Like the **Standalone Cost** sheet it also calculates a cumulative discount rate index at row 24, which is used in the annualisation calculations.

The second table (17.03) calculates avoidable capex by Prescribed Services Bundle and year by multiplying the capex mapping table (8.04) from the **Bundle Mapping** sheet by the net capex table (12.03) from the **Prescribed Opex and Capex** sheet.

The third table (17.04) calculates the annualised cost of new capex by Prescribed Services Bundle and year using the net capex shown in the second table (17.03). The annualised cost for a given bundle and year is calculated by:

- first calculating the present value (as at the start of the year) for forecast net capex running from the year out over the annualisation period shown at row 43, and then
- converting that present value into an annuity payment that grows by inflation over the same nominated period.

The nominated period at row 43 is determined as the minimum of the period nominated at cell F34 of the **Assumptions** sheet and the remaining term of the port lease period.

The fourth table (17.05) calculates avoidable opex by Prescribed Services Bundle and year by multiplying the opex mapping table (8.03) from the **Bundle Mapping** sheet by the opex table (5.07) from the **Data** sheet.

The fifth and final table (17.06) calculates total avoidable costs by Prescribed Services Bundle and year by summing the annualised costs from the third table (17.04) and the avoidable opex from the fourth table (17.05).

### 3.17 Dashboard sheet

The **Dashboard** sheet provides a visual summary of PoM's aggregate revenue requirement and capital base (18.01), cost allocation (18.02), prescribed opex (18.03), prescribed capex (18.04), prescribed revenue (18.05) and efficient cost bounds (18.06 – confidential model only).

### 3.18 Compliance sheet

The **Compliance** sheet shows whether key requirements in the Pricing Order are satisfied for the selected TCS year. If a requirement (or check) is not satisfied, then this triggers the error flag in the **Checks** sheet.

Table 19 checks that:

- forecast revenue from prescribed services (including from legacy contracts) does not exceed the ARR for the TCS year, consistent with Clause 2.1.1(a) of the Pricing Order
- the WATI does not exceed the TAL for the TCS, as required by Clause 3.1.1 of the Pricing Order
- the return of capital over the port lease period does not exceed the undepreciated value of the ICB and new net efficient capex, as required by Clause 4.4.1(c).
- the revenue for each Prescribed Services Bundle does not exceed the corresponding estimated standalone or fall below the avoidable cost of not providing the Prescribed Service Bundle (confidential model only).

### 3.19 Tariff Schedule sheet

The **Tariff Schedule** sheet outputs the tariffs for the selected TCS year in the format presented in the schedule to the Pricing Order, including by adding goods and services tax (**GST**).

The tariffs are sourced from the **Data** sheet. The Model user can nominate the GST adjustment at cell G8, with the default set to 10%.

### 3.20 Checks sheet

The **Checks** sheet includes a check from each of the Model input, calculation and output sheets – and based on the results of those checks provides an overall model check. If any of the sheet checks fails, then the overall model check fails and the message "*The model contains one or more errors*" is noted at the top of each sheet.

The check for a given sheet combines the results of the individual checks on that sheet, which vary by number and purpose depending on what is included in that sheet. Most checks seek to identify input or calculation errors. However, the checks on the **Compliance** sheet seek to identify any concerns against key requirements in the Pricing Order.

These checks are one tool to assist the Model user to review and validate the inputs, calculations and outputs in the Model. However, not all errors will be picked up by these checks. A model user should undertake care and diligence when operating the Model to ensure that its outputs remain accurate.

## 4 Operating the Model

### 4.1 Inputting assumptions and data

All inputs to the Model are contained within the **Assumptions**, **Data**, and **Allocators** sheets. The only exceptions are specific model user inputs in the following sheets:

- **Return of Capital** – any nominated deferral of depreciation
- **Tariff Schedule** sheet – the GST adjustment to apply to tariffs

To update the Model from one TCS year to the next:

1. Update the TCS year in the **Assumptions** sheet and the ESC review and regulatory periods if relevant – for instance, if the model is being used to apply to the 2022-23 TCS and there is only a one-year regulatory period, then cells F17, F22 and F23 should be set to 2023
2. Update the inputs in the **Data** sheet to ensure that all data is included for the TCS year, including the proposed tariffs, replace forecast data with actual data where this is available, and input any relevant historical forecast data
3. Check that the allocation tables in the **Allocators** sheet remain accurate – in most cases these tables should not change significantly (if at all) from one year to the next
4. Check that the compliance checks in the **Compliance** sheet are passed – if not, then consider revising the inputs in the **Data** sheet, and most likely the proposed tariffs.

Applying these steps will update the outputs in the **Dashboard**, **Compliance**, and **Tariff Schedule** sheets.

### 4.2 Using Model outputs

The compliance checks are output in the **Compliance** sheet and can be used to check whether the proposed tariffs satisfy key requirements of the Pricing Order. In this way, the Model can be used to help demonstrate compliance with the Pricing Order.

The Model also provides outputs that can be used in the TCS itself. For instance, the charts in the **Dashboard** sheet can be used to illustrate the actual and forecast revenue, the capital base, how total costs are allocated across prescribed and non-prescribed services, and whether revenue from a given Prescribed Services Bundle and year falls within the efficient cost bounds for that bundle. The tariffs in the **Tariff Schedule** sheet can be used to present the proposed tariffs in a way consistent with how the initial tariffs are shown in the Pricing Order.

### 4.3 Fixing the return of capital

The Model is set up to allow for past TAL recovery headroom to be fixed based on the forecasts used for those years; by inputting values at row 72 of the **Return of Capital** sheet for years prior to the TCS year.

The TAL recovery headroom for a prior year could be fixed at the value previously forecast for that year (e.g. when determining tariffs for that year). Whether this is done will depend on the approach used to roll-forward the capital base from time to time.

### 4.4 Extending the regulatory period

The **Compliance** sheet currently compares revenue and tariffs for a single (TCS) year.



If the regulatory period is set longer than a year, then an additional calculation may be needed to compare forecast revenue from prescribed services against the ARR. This could be done by comparing the net present value of both forecasts over the regulatory period.

# Attachment 1 - Pricing Order Requirements for calculating revenue and tariffs

The key Pricing Order requirements for calculating tariffs are set out below.

Clause 2.1.1 sets out key pricing principles for setting prescribed service tariffs:

*Prescribed Service Tariffs must be set so as:*

- (a) *to allow the Port Licence Holder a reasonable opportunity to recover the efficient cost of providing all Prescribed Services determined by application of an accrual building block methodology of the type described in clause 4 (**Aggregate Revenue Requirement**); and*
- (b) *subject to clauses 2.1.1(a), 2.2, 2.3.1 and 3, to allow the Port Licence Holder a reasonable opportunity to recover, for each Prescribed Service Bundle, revenue that:*
  - (i) *does not exceed an upper bound representing the stand alone cost of providing the Prescribed Service Bundle; and*
  - (ii) *does not fall below a lower bound representing the avoidable cost of not providing the Prescribed Service Bundle.*

The 'Aggregate Revenue Requirement' is set out in clause 4.1.1 as:

*For the purposes of determining its Aggregate Revenue Requirement, the Port Licence Holder must apply an accrual building block methodology over the Regulatory Period comprising:*

- (a) *an allowance to recover a return on its capital base, commensurate with that which would be required by a benchmark efficient entity providing services with a similar degree of risk as that which applies to the Port Licence Holder in respect of the provision of the Prescribed Services (see clauses 4.2 and 4.3);*
- (b) *an allowance to recover the return of its capital base (see clause 4.4); and*
- (c) *an allowance to recover its forecast operating expenses, commensurate with that which would be required by a prudent service provider acting efficiently (see clauses 4.5); less*
- (d) *an indexation allowance (see clause 4.6).*

The default depreciation method used to calculate the return of the capital base is set out in clause 4.4.1 as:

*Subject to clauses 4.4.2 and 4.4.3, for the purposes of clauses 4.1.1(b), depreciation must be determined so that each asset or group of assets used to provide the Prescribed Services is depreciated using a straight-line methodology over a period that is:*

- (a) *no shorter than the reasonable economic life of the relevant asset or the remaining term of the Port Lease (whichever is shorter); and*
- (b) *no longer than the remaining term of the Port Lease,*  
**(Depreciation Period); and**
- (c) *only once, meaning that the amount by which the asset or group of assets is depreciated over the Depreciation Period does not exceed the value of the asset or group of assets at the time of its or their inclusion in the capital base.*

An alternative to the straight-line depreciation method may be used in certain circumstances, as set out in Clause 4.4.2:

*The Port Licence Holder may only use an alternative to the straight-line methodology to be applied under clause 4.4.1 if:*

- (a) *the application of clauses 3.1.1 means that the return of capital derived using a straight-line depreciation methodology is not capable of being recovered in the applicable Financial Year; or*
- (b) *the alternative depreciation methodology is reasonably likely to reduce the variance in the expected annual percentage changes of Prescribed Services Tariffs through to the end of the Port Lease.*

Clause 3.1.1 describes the tariffs adjustment limit requirement:

*In addition to complying with clause 2, the Weighted Average Tariff Increase implied by the Prescribed Service Tariffs set by the Port Licence Holder in respect of any Financial Year commencing on or after 1 July 2017 must not exceed the Tariffs Adjustment Limit.*

Clause 3.2.1 describes the limits on tariff revisions where there is no rebalancing:

*Subject to the Commission's acceptance of a Final Rebalancing Application under clause 3.2.18 (or pursuant to an appeal under Part 7 of the Essential Services Commission Act 2001 (Vic)), the Port Licence Holder may only revise each Prescribed Service Tariff (other than, in the period prior to the start of the 2020 Financial Year, Prescribed Service Tariffs that are subject to the Export Pricing Decision) in respect of a Financial Year by the same percentage adjustment.*

The 'Weighted Average Tariff Increase' (**WATI**) is defined in clause 14 as:

**Weighted Average Tariff Increase** means, in respect of a Financial Year, the expected weighted average rate of increase in the Prescribed Service Tariffs using weightings based on historical revenues derived from the Prescribed Service Tariffs in the most recent Financial Year for which audited data are available or, if there is no historic audited data upon to calculate the expected weighted average rate of increase on this basis, an alternative estimate of revenue for the purpose of calculating weightings on a basis determined by the Commission.

The 'Tariffs Adjustment Limit' (**TAL**) is defined in clause 14 as:

**Tariffs Adjustment Limit** means the percentage change in CPI between the March quarter immediately preceding the relevant Financial Year and the March quarter in the Financial Year two years preceding the relevant Financial Year.