# 2021 - 2022 TARIFF COMPLIANCE STATEMENT

# Efficient cost bounds model user guide

## 31 May 2021

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# Contents

## Abbreviations and acronyms

| Abbreviation / acronym | Description |
| --- | --- |
| Capex | Capital Expenditure |
| ESC | Essential Services Commission |
| Opex | Operating Expenditure |
| PMA | Port Management Act |
| The Model | The Efficient Cost Bounds Model |
| TCS | Tariff Compliance Statement |

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# 1.    Introduction

## 1.1    Model purpose

The efficient cost bounds model (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 those efficient pricing bounds in accordance with the pricing principles in the Pricing Order. [1]

## 1.2    Version and review

The Model was first developed in early 2019 and is intended to support the 2021-22 Tariff Compliance Statement (**TCS**) to be submitted by Port of Melbourne to the Essential Services Commission (**ESC**) in May 2021.

The Model is expected to be updated each year to support future TCSs and any tariff rebalancing applications submitted to the ESC.

## 1.3    Structure of the user guide

This user guide is structured into three further chapters:

- Chapter 2 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.

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[1]     Pricing Order made under the Port Management Act 1995 by the Victorian Government and gazetted on Friday 24 June 2016.

## 2.    Background

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. As described in Section 2.1, although the Pricing Order requires tariffs to be set so that revenue from Prescribed Services Bundles falls within efficient cost bounds, it does not specify how to estimate them.

The conceptual approach to estimating the efficient cost bounds applied in the Model is summarised in Section 2.2.

## 2.1    Requirements

Clause 2.1.1(b) of the Pricing Order requires that revenue from Prescribed Services Bundles falls within the efficient cost bounds:

> 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.

Clause 2.1.4 of the Pricing Order says that the standalone cost bound requirement in clause 2.1.1(b) does not apply in certain circumstances:

> The principle in clause 2.1.1(b) does not apply to the extent that the Port Licence Holder expects to derive revenue from:
>
> (a)   any applicable Initial Prescribed Service Tariff; or
>
> (b)   during the period in which clause 3.1.1 applies [(i.e. if the tariff adjustment limit applies)], any subsequent increase to any Initial Prescribed Service Tariff (as may be varied from time to time due to the acceptance of a Final Rebalancing Application under clause 3.2.18) that does not exceed the Tariffs Adjustment Limit; or
>
> (c)   in any period in which clause 3.1.1 no longer applies, any subsequent increase to any Initial Prescribed Service Tariff that does not exceed the rate of change in the Aggregate Revenue Requirement over a corresponding period, that would exceed the stand alone cost of providing the Prescribed Service Bundle.

'Prescribed Services Bundle' is defined in clause 14 of the Pricing Order:

> **Prescribed Service Bundle** means each of the following:
>
> (a)   wharfage services for containerised cargo;
>
> (b)   wharfage services for non-containerised/general cargo;
>
> (c)   wharfage services for motor vehicle cargo;
>
> (d)   wharfage services for liquid bulk cargo;

(e)   *wharfage services for dry bulk cargo;*

(f)   *Shared Channel Services;*

(g)   *Dedicated Channel Services; and*

(h)   *any other Prescribed Services, or component or combination thereof, in respect of which the Port Licence Holder introduces new Prescribed Service Tariffs after the Commencement Date and which the Commission determines to be a Prescribed Service Bundle by notice in writing to the Port Licence Holder.*

*For the avoidance of doubt, each of items (a)-(g) above is a Prescribed Service Bundle. By way of example, 'wharfage services for containerised cargo' is a Prescribed Service Bundle and 'Shared Channel Services' is another Prescribed Services Bundle.*

## 2.2   Efficient cost bounds diagram

Figure 1 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.

*Figure 1: Diagrammatical representation of the efficient cost bounds*
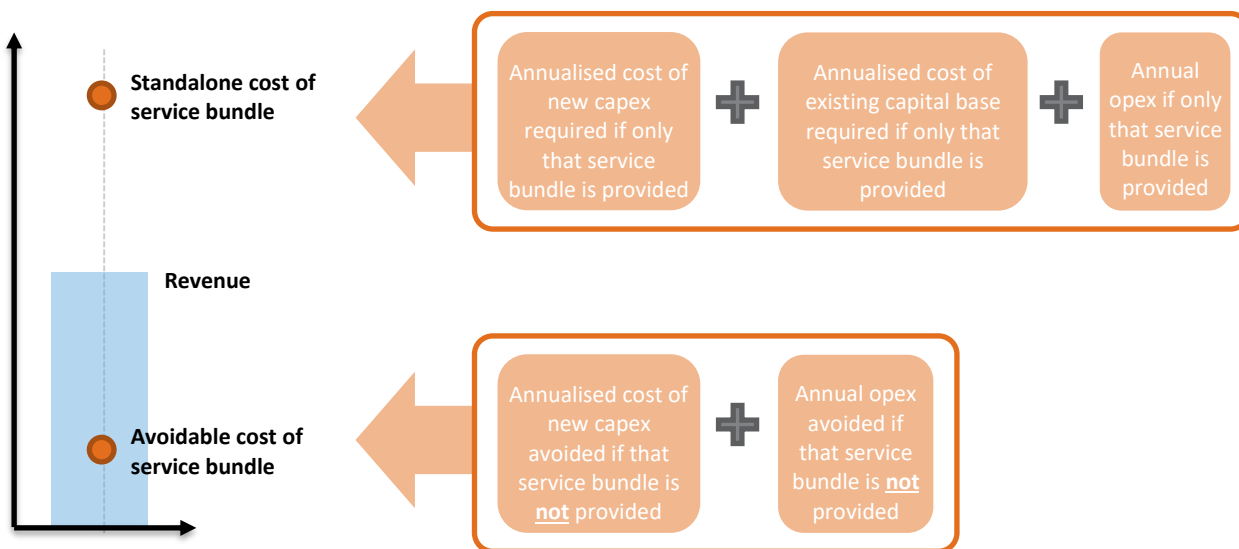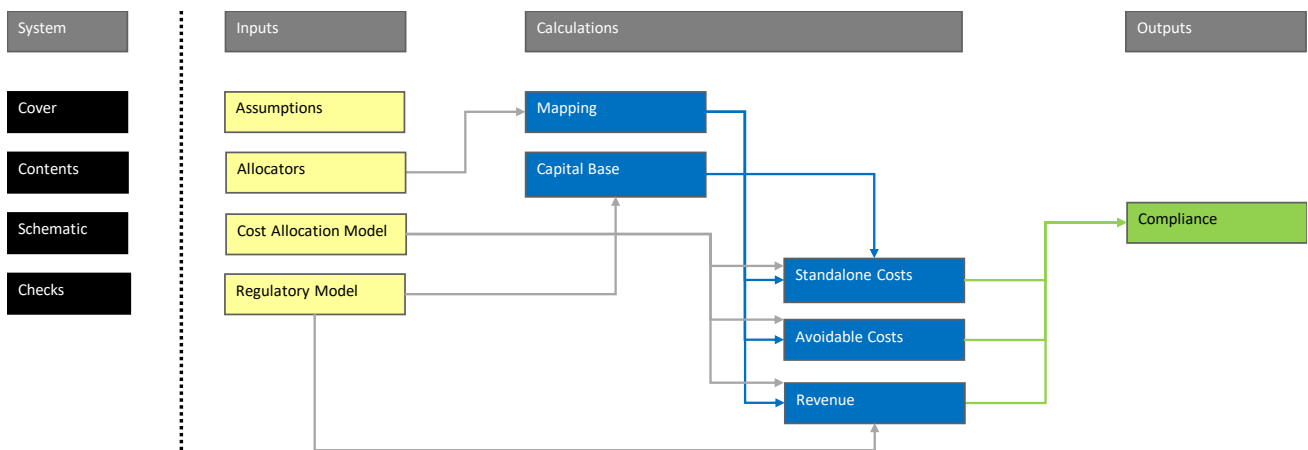
## 3.    The Model

### 3.1    Overview

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

- System control sheets include the **Cover**, **Contents**, **Schematic** and Model **Checks** sheets – which are used to help navigate and structure the Model

- Input sheets include **Assumptions**, **Allocators**, **Cost Allocation Model** and **Regulatory Model** sheets – which are used to input all the data and user choices needed for the Model to work

- Calculation sheets include the **Mapping**, **Capital Base**, **Standalone Costs**, **Avoidable Costs**, and **Revenue** sheets – which are used to estimate the efficient cost bounds and forecast revenue for Prescribed Services Bundles

- The only output sheet is the **Compliance** sheet – which compares the forecast revenue for each Prescribed Services Bundle to the estimated efficient cost bounds.

The Model structure is summarised in Figure 2. The remainder of this chapter explains the purpose and operation of each of the system control, input, calculation and output sheets.

*Figure 2: Model structure*



### 3.2    Cover, contents and schematic sheets

The **Cover** sheet provides the base information about the Model and includes a change log for any changes from one version of the model to the next. The **Contents** sheet lists and describes each sheet in the Model. The **Schematic** sheet includes Figure 2 above and relevant keys.

### 3.3    Assumptions sheet

The **Assumptions** sheet inputs key assumptions that drive the presentation of the Model. As shown in Figure 3, key assumptions include the:

- Model start date – the first year of the horizon shown in the Model

- Display years – identifying what years are shown in each of the sheets that include data or calculations over time

- Actual years – identifying the years for which actual data is available

- Depreciation profile – which is used to determine what depreciation profile is used to roll-forward the capital base, namely real-straight line depreciation or deferred depreciation

- Annualisation of costs – which sets the horizon (in years) of forecast costs that is used to estimate the prevailing annualised cost.

All display years that are not actual years are identified as forecast years. This split treatment helps the Model User identifying whether displayed values are based on actual or forecast data.

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

*Figure 3: Assumptions sheet*

| Efficient Cost Bounds Model (Commercial in Confidence) | | | Port of Melbourne |
|---|---|---|---|
| 3 **Assumptions** | | | |
| • *No errors identified* | | | |
| [To Contents] | | | |

**3.01 Year Assumptions**

This table inputs key dates needed to structure the model. It also inputs the depreciation method application in the cost calculation.

| | | |
|---|---|---|
| **Model Start** | | |
| First year | *Year* | 2015 |
| Period start | *Date* | 01-Jul-14 |
| Period end | *Date* | 30-Jun-15 |
| | | |
| **Display years** | | |
| From | *Year* | 2018 |
| To | *Year* | 2066 |
| | | |
| **Actual years** | | |
| From | *Year* | 2016 |
| To | *Year* | 2020 |
| | | |
| **Depreciation Profile Selection** | | |
| Selection | *Selection* | Straight Line Depreciation   *2* |
| Method 1 | *Option* | Deferred Depreciation |
| Method 2 | *Option* | Straight Line Depreciation |
| | | |
| **Annualisation of Costs** | | |
| Number of years to look forward | *#* | 15 |
| | | |
| **Defined Values** | | |
| Million | *Value* | 1,000,000 |
| Subsection | *Value* | 0.01 |

**END**

## 3.4 Allocators sheet

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

- prescribed services mapped to Prescribed Services Bundles (4.02)

- operating expenditure (**opex**) categories mapped to services (4.03), and

- capital expenditure (**capex**) asset classes mapped to services (4.04).

These tables are used first in the **Mapping** sheet and then in the **Standalone Cost** and **Avoidable Cost** sheets to map the cost data from the **Cost Allocation Model**, **Regulatory Model** and **Capital Base** sheets to Prescribed Services Bundles.

The first table (4.02) 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, transhipment services fall within wharfage services for containerised, non-containerised/general, motor vehicle, liquid bulk and dry bulk cargo bundles.

The second table (4.03) 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 (4.04) shows what asset classes are used to provide each service. In most cases, an asset class is used to provide more than one service (e.g. wharves).

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.

## 3.5 Cost Allocation Model sheet

The **Cost Allocation Model** sheet inputs the actual and forecast opex by cost category from the cost allocation model that is used to estimate the efficient cost bounds. The intent is for this data to be sourced from the Port of Melbourne's cost allocation model.

The opex table (5.02) has the same structure as the opex mapping table (4.03) in the **Allocators** sheet, where opex is split by:

- dedicated to prescribed services only
- dedicated to non-prescribed services only, or
- shared across both prescribed and non-prescribed services.

All data should be entered in nominal dollars (i.e. dollars of the day incurred).

## 3.6 Regulatory Model sheet

The **Regulatory Model** sheet inputs inflation and rate of return by year, opening capital base, net capital expenditure (**capex**) and return of capital by asset class, opex, and revenue by service – in separate tables. All data in the sheet is shown for the display years entered in the **Assumptions** sheet and may include both actual and forecast data. The intent is for this data to be sourced directly from the Port of Melbourne's regulatory model.

The inflation and rate of return table (6.02) covers, for each year, the actual and forecast inflation and pre-tax nominal rates of return.

The opening capital base table (6.03) splits the opening capital base as at 1 July 2016 by asset class. The total value of the capital base matches that in clause 4.7 of the Pricing Order.

The net capex table (6.04) identifies the actual and forecast capex net of capital contributions and asset disposals for prescribed services, for each year, split by asset class.

The return of capital tables (6.05 and 6.06) cover the return of capital by asset class for the two depreciation methods identified in the **Assumptions** sheet, namely:

- deferred depreciation (6.05) – which reflects the alternative depreciation modelled in the Port of Melbourne's regulatory model where recovery of straight-line depreciation is deferred due to the impact of the tariff adjustment limit

- straight-line depreciation (6.06) – which reflects the straight-line depreciation modelled in the regulatory model and used as an input to the alternative depreciation.

Further detail on the two depreciation profiles is available in the user guide to the Port of Melbourne's regulatory model.

The opex table (6.07) identifies the actual and forecast opex for prescribed services. This opex may differ from that input to the **Cost Allocation Model** sheet and is used to scale the values from that sheet so the standalone and avoidable costs align to the aggregate revenue requirement from the Port of Melbourne's regulatory model.

The revenue table (6.08) covers revenue for each prescribed service. Contract revenue is included within the 'Other' category. The revenue for a given service and year is calculated within the regulatory model as the product of the volume for that service and year and the corresponding tariff. The revenue is used to allocate some cost data across Prescribed Service Bundles.

All data should be entered in nominal dollars (i.e. dollars of the day incurred).

## 3.7    Mapping sheet

The **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 (7.02) 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 (7.03) 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 (7.04) shows what asset classes would be required to provide a given Prescribed Services Bundle on a standalone basis. The capex avoidable table (7.05) 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 **Revenue** sheet, with the year nominated by the Model User at cell E151.

## 3.8    Capital Base sheet

The **Capital Base** sheet rolls forward the capital base over the port lease period. The values are used to calculate the standalone capital costs in the **Standalone Cost** sheet.

The first table (8.02) shows the inflation and pre-tax nominal rate of return values over the period, input to the **Regulatory Model** sheet.

The second table (8.03) shows the opening values of the capital base by asset class for each year. The values for the first year are taken from the **Regulatory Model** sheet. The values for the remaining years are set equal to the closing values for the immediately preceding years.

The third table (8.04) calculates the indexation on the capital base by asset class for each year. Indexation for a given year and asset class is calculated as a full year of inflation on the opening value for that asset class and year and a half year of inflation on the net capex for that asset class and year.

The fourth table (8.05) shows the net capex while the fifth table (8.06) shows the return of capital, both by asset class and year and both taken from the **Regulatory Model** sheet. The return of capital depends on the depreciation method selected in the **Assumptions** sheet.

The sixth and final table (8.07) calculates the closing balance for each asset class and year by adding the opening balance, indexation and net capex and deducting the return of capital.

## 3.9 Standalone Cost sheet

The **Standalone Cost** sheet calculates the standalone costs for each Prescribed Services Bundle and year.

The first table (9.02) shows the inflation and pre-tax nominal rate of return values over the period, input to the **Regulatory Model** sheet. It also calculates a cumulative discount rate index at row 20, which is used in the annualisation calculations.

The second table (9.03) calculates standalone capex by Prescribed Services Bundle and year by multiplying the capex mapping table (7.03) from the **Mapping** sheet by the net capex table (6.04) from the **Regulatory Model** sheet.

The third table (9.04) calculates the opening capital base year by Prescribed Services Bundle and year, by again multiplying the capex mapping table (7.03) from the **Mapping** sheet by the opening asset base table (8.03) from the **Capital Base** sheet.

The fourth table (9.05) calculates the annualised cost of new capex by Prescribed Services Bundle and year using the net capex shown in the second table (9.03). 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 54, and then

- converting that present value into an annuity payment that grows by inflation over the same nominated period.

The nominated period at row 54 is determined as the minimum of the period nominated at cell E30 of the **Assumptions** sheet and the remaining term of the port lease period.

The fifth table (9.06) 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 (9.04). Similar to the fourth table (9.05), 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 (9.07) calculates standalone opex by Prescribed Services Bundle and year by multiplying the opex mapping table (7.03) from the **Mapping** sheet by the opex table (5.02) from the **Cost Allocation Model** sheet.

The seventh and final table (9.08) calculates total standalone costs by Prescribed Services Bundle and year by summing the annualised costs from the third and fourth tables (9.04 and 9.05) and the standalone opex from the sixth table (9.07).

## 3.10 Avoidable Costs sheet

The **Avoidable Costs** sheet calculates the avoidable costs for each Prescribed Services Bundle and year.

The first table (10.02) shows the inflation and pre-tax nominal rate of return values over the period, input to the **Regulatory Model** sheet. Like the **Standalone Cost** sheet it also calculates a cumulative discount rate index at row 20, which is used in the annualisation calculations.

The second table (10.03) calculates avoidable capex by Prescribed Services Bundle and year by multiplying the capex mapping table (7.04) from the **Mapping** sheet by the net capex table (6.04) from the **Regulatory Model** sheet.

The third table (10.04) calculates the annualised cost of new capex by Prescribed Services Bundle and year using the net capex shown in the second table (10.03). 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 40, and then

- converting that present value into an annuity payment that grows by inflation over the same nominated period.

The nominated period at row 40 is determined as the minimum of the period nominated at cell E30 of the **Assumptions** sheet and the remaining term of the port lease period.

The fourth table (10.05) calculates avoidable opex by Prescribed Services Bundle and year by multiplying the opex mapping table (7.05) from the **Mapping** sheet by the opex table (5.02) from the **Cost Allocation Model** sheet.

The fifth and final table (10.06) calculates total avoidable costs by Prescribed Services Bundle and year by summing the annualised costs from the third table (10.04) and the avoidable opex from the fourth table (10.05).

## 3.11    Revenue sheet

The **Revenue** sheet calculates revenue by Prescribed Services Bundle and year. This revenue is used to both determine the weights for the avoidable capex mapping table (7.04) in the **Mapping** sheet and test that it falls within the cost efficiency bounds in the **Compliance** sheet.

The revenue table (11.02) is calculated by multiplying the service to bundle table (7.05) from the **Mapping** sheet by the revenue by service table (6.08) from the **Regulatory Model** sheet.

## 3.12    Compliance sheet

The **Compliance** sheet compares – for a user selected year (at cell E11) – revenue for each Prescribed Services Bundle to the corresponding estimated standalone and avoidable cost.

The figure (12.02) shows this comparison graphically using the data shown below it (12.03). The data is sourced from the **Standalone Cost**, **Avoidable Cost**, and **Revenue** sheets.

## 3.13    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.

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, allocators and data

All inputs to the Model are contained within the **Assumptions**, **Allocators**, **Cost Allocation Model** and **Regulatory Model** sheets. The only exception is the compliance year input in the **Compliance** sheet, which the Model uses to adjust what data is presented.

To update the Model from one year to the next:

1. Update the display years and the actual data years in the **Assumptions** sheet to reflect the intended horizon – for instance, if the model is being used to show costs out to 2025 with actual costs only out to 2020, then update cell E18 to 2025 and cell E22 to 2022

2. 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

3. Update actual and forecast data in the **Cost Allocation Model** and **Regulatory Model** sheets with updated data where required.

Applying these steps will update the calculated values in the **Standalone Costs**, **Avoidable Cost** and **Revenue** sheets and allow the user to update the analysis shown in the **Compliance** sheet (by changing cell E11 of that sheet).

## 4.2     Using Model outputs

The graphs and numerical data in the **Compliance** sheet can be used to show whether revenue from a given Prescribed Services Bundle and year falls within the efficient cost bounds for that bundle.

## 4.3     Adding new tariffs

The Model is set up to allow for new prescribed services to be added. For instance, the mapping tables in the **Allocators** sheet and allow for up to five further prescribed services to be included, as does the revenue data inputs in the **Regulatory Model** sheet. Using these spare service inputs does not require any changes to the model structure.

If more than five new prescribed services need to be inserted, or the structure of existing prescribed services changed, then this may require changes to the structure of the model. This will involve tracing through the dependencies of the inputs to ensure that calculations that depend on them continue to work.

Changes to the Model structure should be issued as a new version of the model, with any changes captured in the change log included in the **Cover** sheet.