

TUBA FAQs

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Data input

Q: Can I run TUBA for just one modelled year?

Yes, but your first appraisal year and horizon year must then be the same as your single modelled year.

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Q: I am using charges in my model. What price base should these be in?

All charge matrices must be deflated to the economic base year (currently 2002). This can be done by entering an appropriate value in the factor column of the INPUT_MATRICES table. For example suppose the matrix has charges in 2004 prices. The RPI for 2004 is 186.7 and for 2002 it is 176.2 so the 2004 charges need to be multiplied by $\frac{176.2}{186.7} = 0.944$ to convert them to 2002 prices.

Remember also that charges should be input in perceived costs, i.e. for business trips any element of VAT should be removed first. Again this can be done using the factor column. If the charge matrix includes VAT at 17.5% then it needs to be multiplied by $\frac{1}{1.175} = 0.851$ to remove VAT.

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Q: Is it possible to have the scheme open after the first modelled year?

This is most likely to happen when there are delays in starting construction of the scheme, compared with when the modelling work was first undertaken. TUBA will not allow you to enter a modelled year that is before the first year for which benefits should be calculated (defined by the 'first year' parameter in the scheme file).

If scheme opening is only 1 or 2 years after the first modelled year then the modelled year data can be used to represent the scheme opening year. Suppose the first modelled year is 2006 and the scheme opening year is 2008. You can specify the first modelled year in TUBA as being 2008, but use your model data from 2006.

If scheme opening is between 3 and 7 years after the first modelled year then a more complicated workaround is required. Suppose the first modelled year is 2006 and the scheme opening year is 2010. The TUBA scheme file parameters should be set up as follows:

- horizon year should be 2069 (i.e. 60 year appraisal period from scheme opening)
- first year should be 2006 (i.e. the first modelled year, even though this is before actual scheme opening)

TUBA will calculate benefits and revenues for the period 2006 to 2069 (inclusive). It is then necessary to remove the benefits for the years 2006 to 2009 from the results presented in the TEE, Public Accounts and AMCB tables. Total revenues and benefits for these years can be found in the MODE table in the output file. These should then be subtracted from the relevant cells in the TEE and Public Accounts table. Summary statistics (e.g. PVB and PVC) in these tables will need to be recalculated and the results carried through to the AMCB table, where NPV and BCR will also need to be recalculated.

If a more detailed breakdown of benefits and revenues is required (such as those provided in the SUBMODE, PURPOSE etc. tables) then it will be necessary to extract the data using the detailed results analysis facility (Analysis->Export option).

If scheme opening is more than 7 years after the first modelled year then you must update your model.

In all cases it will be necessary to give proper consideration to how any delays may affect scheme construction costs.

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Error messages

Q: I'm getting a warning message that there isn't enough memory. What should I do?

Two things to try (either separately or together) are:

- In the Run Settings template select the 'Run one user class at a time' check box
- Use sectoring. The fewer sectors the better. If you are not interested in analysing the spatial distribution of benefits you can put all zones into one sector. This can be achieved by setting the scheme parameter 'user zones as sectors' to 'No'; there is no need to define a sector file explicitly.

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Interpretation of results

Q: I have summed the TUBA output undiscounted costs (e.g. in DS_SCHEME_COSTS table) but the total is different from the costs I have input

A: Although these costs have not been discounted TUBA has adjusted them to base year prices. It does this using the RPI values that were input with the scheme costs as follows:

$$base_year_scheme_cost = input_scheme_cost \times \frac{RPI_base_yr}{RPI_scheme}$$

If the input costs were in factor costs it will also adjust them to market prices by applying the $(1+t)$ adjustment (i.e. multiply by 1.209).

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Q: My scheme includes a developer contribution but the PVC looks a bit low

The definition of PVC in TUBA (consistent with WebTAG, i.e. official DfT guidance) includes only *public* sector costs and revenues. Costs to the *private* sector, such as developer contributions, appear in the PVB calculation and will reduce the PVB.

Developer contributions appear as a negative cost in the PVC as they are actually a receipt for the public sector, not an expenditure.

You have to be careful that you have defined the input scheme costs correctly. The cost to the public sector entered into TUBA should be the full scheme cost. TUBA will then take into account the transfer of funds from the developer to the public sector. For example, assume the total scheme cost is £100k of which £70k is paid by developer contribution. Then you should enter the cost to the public sector as being £100k and the amount of developer contribution as being £70k. In calculating the PVC TUBA will subtract the £70k from the £100k to show the net cost to the public sector is £30k.

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Q: I am appraising a public transport scheme and am looking at PT passengers only. PT fares are not subject to VAT yet the scheme seems to have an impact on government indirect tax revenues. What is going on?

The formula for the calculation of the change in government indirect tax revenue assumes that, for consumer trips, an increase (or decrease) in expenditure on transport is offset by a decrease (or increase) in expenditure elsewhere in the economy.

Assume the scheme increases PT patronage and there is an increase in expenditure on fares. These fares are not subject to indirect taxes. However, there is assumed to be a corresponding decrease in expenditure elsewhere in the economy which, on average, has an indirect tax rate of 20.9%. The government therefore loses tax revenue as a result. For more details of indirect tax revenue calculations please see Section 5 of [WebTAG 3.5.3](#).

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Q: How come I'm getting a negative BCR or PVC?

A negative BCR is the result of either a negative PVC or a negative PVB, but not both.

Some schemes will generate significant revenues to the public sector, e.g. through road tolling or an increase in indirect tax revenues. In certain cases this might be sufficient to more than offset the public sector costs of implementing the scheme and the PVC will be negative. If the PVB is positive then the scheme represents good value for money; the BCR will be negative but is essentially meaningless.

A negative PVB indicates that there is a net disbenefit to transport users and private sector providers, for example high private sector investment costs which are not offset by user benefits.

Note that if the PVB and PVC are both negative then the BCR will be positive but meaningless.

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Q: Why is the change in indirect tax revenues bigger than the user fuel operating cost benefits?

Given that fuel taxes are around 75-80% of the market price of fuel some users expect tax revenues to be around 75-80% of the user fuel cost benefits. There are two reasons why the change in indirect tax revenues may be greater than the user fuel cost benefits.

Firstly, changes in indirect tax revenues depend on changes in all transport expenditure (e.g. non-fuel operating costs, PT fare, road tolls and parking charges), not just expenditure on fuel. However, it is true that in a highway-only TUBA run with no user charges then the change in indirect tax revenues is primarily determined by fuel expenditure.

The second reason is that indirect tax revenues and user benefits are calculated using different formulae.

The user fuel (dis)benefit is calculated using the rule of a half:

$$\frac{1}{2}(T^0 + T^1)(F^0 - F^1)$$

where

- T^0 is the number of trips in the DM
- T^1 is the number of trips in the DS
- F^0 is the fuel cost per trip in the DM
- F^1 is the fuel cost per trip in the DS

On the other hand the change in fuel tax revenue depends on the change in expenditure on fuel:

$$T^1 \times F^1 - T^0 \times F^0$$

(The formulae have been simplified slightly so they do not include the adjustment to market prices)

If there is a small change in the cost per trip between the DM and DS but a large change in the number of trips then it is possible for the change in tax revenues to be larger than the user fuel cost benefits. The two quantities can have the same sign (e.g. both positive), or they may have different signs, depending on the relative size and direction of the changes in T and F .

For more details of indirect tax revenue calculations please see Section 5 of [WebTAG 3.5.3](#).

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Q: I am appraising a road tolling scheme. The user (dis)benefit and the increase in toll revenue are very different. Why?

The two results are calculated in different ways.

The user (dis)benefit is calculated using the rule of a half:

$$\frac{1}{2}(T^0 + T^1)(C^0 - C^1)$$

where

T^0 is the number of trips in the DM

T^1 is the number of trips in the DS

C^0 is the charge in the DM

C^1 is the charge in the DS

On the other hand the increase in revenue is calculated using:

$$T^1 \times C^1 - T^0 \times C^0$$

(The formulae have been simplified slightly so they do not include the adjustment to market prices)

The two measures can give results of different magnitudes and the same, or opposite, sign. The simplified formulae are only the same in the case of a fixed trip matrix (i.e. $T^0 = T^1$) but even then user benefits and revenues reported by TUBA may be of different magnitudes because of the different way they are converted to market prices.

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Q: Although I am modelling a significant change in passenger numbers there is no user benefit for PT users.

If there is no change in travel time or fare per trip for PT then there will be no user benefit. This may be the case if the change in passenger numbers is a result of changes in highway costs. However, there will still be an impact on operator revenues (see above question on tolling).

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