

How to use the CCOptions workbook (v5.5)

The workbook contains a number of separate, named, linked spreadsheets.

On opening the spreadsheet, an information and copyright sheet is displayed. Please read this.

It is recommended that for initial use, the 'Control' sheet is displayed, which contains all the user-adjustable parameters as well as the key numerical results and a chart of the historical+allocated emissions for a small number of major countries and groupings. The 'Concentrations' sheet displays a graph of the scenario atmospheric CO2 concentrations and global mean temperatures. The 'Pc.chart' sheet displays a graph of the scenario per-capita emissions.

For normal use, all that a user needs to do is to type a chosen set of values into the block of user-adjustable parameters, which in v5.5 is B8:B25 on the Control sheet. This block is the only unbold data displayed. Do not type into other cells on the control sheet.

The values used are displayed in bold immediately to the right, in column C. The reason for this will become apparent when scenarios are used – see below.

Changing anything else in the workbook is not recommended unless you are confident you understand its workings in detail. But it should be safe to add extra computations or data if wanted. If you do, please also retain the original copy as received.

On a fast PC, simply retyping a desired different set of parameter values results in the rapid recomputation of the results and chart(s). On a slower PC, it is better to use the Excel option to switch calculation to manual to avoid lengthy computation of unwanted intermediate results when changing several parameters.

The following parameters can be entered.

A set of plausible values, which the workbook is shipped with, are shown in the second column.

Parameters:

Optional named preset scenario of parameter values. CCOptions is shipped with it blank. If included, the other typed-in options are ignored. **Preset value** (left blank)

Convergence year (can be up to 2100) **Preset value** 2030

Population cutoff year (can be up to 2050). If later than the convergence year, has no effect.

Preset value 2030

Convergence mode selector (1 for linear, 2 for exponential) **Preset value 1**

Speed of convergence parameter (linear convergence)

Preset value (not used for linear convergence)

Optional name of secondary scenario of contraction profile. If included, the other typed in options in the contraction section are ignored.

Preset value (left blank)

Initial year global industrial CO2 emissions growth rate

Preset value 1.5%

Contraction year (can be up to 2100)

Preset value 2100

Rate of decline of emissions in contraction year

Preset value 1%

Contraction level of industrial CO2 emissions (as % of 1995).). This is the percentage that emission are planned to be reduced to.

Preset value 40%

Planned total 110-year industrial CO2 emissions (GTC)

Preset value 590

Phase2 start year. Set to 2100 if no phase 2 is required. The next four items are only relevant if a year earlier than 2100 is entered.

Preset value 2100

Phase2 contraction year

Preset value

Phase 2 decline rate in contraction year

Preset value

Phase2 contraction level

Preset value

Phase2 planned total 110-year emissions

Preset value 450

22nd Century: target concentration in ppm

Preset value 0.05

It is also possible, using the push-button on the control sheet, to draw additional graphs of countries' historical+allocated emissions. Just follow the dialogue. Note that country names must be spelled exactly as in CCOptions; instead of typing in the name you can click on it in the list which is displayed adjacent to the pop-up box with the name request.

Copious use has been made of the Excel Note facility—cells with explanatory notes have a small red dot in the upper right corner. In Excel v7 and later the note is displayed when the mouse hovers over that cell; in v5 you have to select "Insert/Note" or double-click on the cell to see it.

Various intermediate stages of the calculation are 'hidden' using the standard Excel facilities. Access to these is not necessary for understanding the results, but can be freely done if desired and will not affect any results. You may need to watch out for the Excel feature, in v7 the default, to only graph unhidden data.

CCOptions is available in 6-region and 200-country versions. The 6-region version is much faster and it is recommended that new users familiarise themselves by using this version initially. It may also sometimes be available in a later version than the 200-country version.

The Scenarios

There are two separate sets of 'scenarios' in CCOptions. There is nothing very special about them, they are just stored sets of parameters to the model. You can try out the different preset scenarios to get a feel for the range of possible futures that CCOptions can encompass.

a) Overall Scenarios

These consist of a stored set of values for the parameter list described above. The scenarios are stored in the 'Scenarios' worksheet in CCOptions, in columns A onward. Each is named in row 3, labelled "Reference". The one described above is "S450basic" and can be found in Column F.

To use an overall scenario, just type or copy-and-paste its name into cell B8 on the control sheet, at the top of the parameter block. The values in the parameter block below, from B9 to B25 are then ignored and it would be better for them not to be displayed, as they may confuse. We recommend deleting them manually before or after entering the scenario name. The values used by CCOptions are always those displayed in column C.

To edit an overall scenario, a little care is required. Editing the scenario data in the scenario worksheet is not recommended, instead use the following procedure:

1. "Use" the scenario as described above.
2. Select cells C9:C25 using the mouse.
3. Copy this block (most easily done by using the right mouse button and the pull-down menu.)
4. Use Excel's Edit-paste-special-values_only feature (also available from the right-button-click pull-down menu) to copy the values into cells B9:B25. If you do an ordinary copy and paste errors are generated and the chart will display nonsense.
5. Delete the scenario name from cell B8. (It's easy to forget this – if you omit it, subsequent changes made as per step 6 below will be ignored!)
6. Change parameter values in cells B9:25 to edit the scenario as you wish.

To create a new scenario, which you have created either by editing an old one or by any other method, proceed as follows:

1. Go to the scenarios sheet and find the cell containing the text "Insert extra scenarios to the left of this column". Insert a column to the left of it (most easily by right-clicking on the screen area containing Excel's letter for the column – at the time of shipping this is column T)
2. Use Excel to copy the parameter block B9:B25 from the control sheet to rows 3:20 of the new column you have just created.
3. Make up a unique name for the scenario and type it into row 2 of that column. Names can I believe contain most printable characters, but avoid using ones that look like a cell reference to Excel (such as BB3) and don't include spaces.
4. Type it's name into B8 in the control sheet to check that you did it right.

To delete a scenario, just delete the column from the scenarios sheet.

Contraction Scenarios

These were added to enable CCOptions to explore CO2 emissions profiles generated by other models or suggested independently by anyone. Overall scenarios may use a contraction scenario. When you use a contraction scenario, either via an overall scenario or otherwise, the contraction profile part of CCOptions is replaced by directly using the values from the scenario. These values need to give global industrial CO2 emissions for every even-numbered year from 2000 to 2100. If you have estimates from another model for fewer years, possibly 2025, 2050, 2075 and 2100 only, you will have to set up interpolation formulae; this is straightforward in Excel – we did it to create the preset contraction scenarios. The formulae we used were straightforward linear interpolations, and have been removed to speed up spreadsheet computations.

To add a new scenario, you need to insert a block of data above the row headed "Insert extra contraction scenarios above this row", taking care to use Excel features to insert only a block (as shipped this is cells W11:BU11) and not a whole row – which would mess up the contraction scenarios; and add a name into the "name" column, currently V. Deletion is the reverse.

You may notice that much of the contractions-scenario data is 'hidden', this is just for display convenience.

To use a contraction scenario, just type its name into cell B13 of the control sheet. The rest of the "Contraction" block, B14:B18 is then ignored and might as well be deleted. You will see that this has been done in those preset overall scenarios that use contraction scenarios.

Results

The majority of the results are displayed on the control sheet. The detailed allocations on which the chart displayed is based can be read in the allocated_CO2 sheet. There are also percapita CO2 emissions tables and a chart in separate sheets, computed straightforwardly. Finally, there are atmospheric CO2 concentrations and global mean

temperatures displayed together on a separate chart sheet. These are derived from a simple regression model model calculated to reflect the results presented at various places in the three IPCC WG1 reports (for references see