Exercise 4: Filling in dummy data for – *Manufacturing Industry and Construction* (Optional/Homework)

1. Continue working with the workbook **'Malé Inv workbook Version 3_test data.xls'** you saved at the end of Exercise 3.

2. Go to **Menu 1** and then go to **Sheet: 1.1.1b 'Fuel consumption in thousands of tonnes oil equivalent per year (ktoe/year)'**

3. In the white cells, within the subsector **Combustion in Manufacturing Industries and Construction,** enter **50** for fuel consumed (in ktoe) in the 2 subsectors *non-ferrous metals* and *non-metallic minerals* for '**Other Bituminous Coal & Anthracite')** and **'Natural gas'**.

4. Click **'Back to menu'** and go to **Sheet: 1.1.2 Default net calorific values for fuel (toe/t).**

5. In **Sheet 1.1.2**, enter **NCVs of 0.650 toe/t** for *'Other bituminous Coal and Anthracite'* used in the 2 subsectors.

6. Go to **Sheet 1.1.3 Error check sheet for net calorific values for fuel (toe/t)** to see if all sectors by fuel type are 'OK'. (If any cells say "NCV needed" this indicates that a value for fuel consumption *has* been entered in sheets 1.1.1b but a net calorific value (NCV) *has not yet* been entered into Sheet 1.1.2.)

7. Go back to menu and then to **Sheet 1.2.2 Sulphur dioxide (SO_2) - Calculation of emission factors and emissions, Manufacturing Industries and Construction**. Column A should show 2093.4 TJ for the 2 fuels used in these sectors (and 0 for those fuels not used).

8. Where fuel consumption appears in the green cells in column A, enter default '**Sulphur content of fuels**' values in the next column: for coal assume 0.84 % sulphur as before. (**Do not** enter a value for Sulphur content if there is no fuel consumption as this will just waste your time!)

Tip: It saves time to copy and paste S-contents by fuel type through all the sub-sectors

9. Enter default '**Retention in ash'** values in column C.

10. Go to row 124 and enter **100** TJ for *Other Bituminous Coal & Anthracite* used in **cement manufacture,** 0.84% for S-content and 5% for S-retention. Notice that the fuel consumption for *Other Bituminous Coal & Anthracite* in the non-metallic minerals section above will be adjusted accordingly. (This step is needed because

about 80% of the fuel sulphur is absorbed during cement manufacture and this is accounted for in Column D: 'Emission control efficiency'. Zero SO_2 control efficiency is assumed for all other activities in this sector.)

Congratulations! You have now calculated the **total SO_2 emissions** from the **Combustion in Manufacturing Industries and Construction** – check that the totals now appear in the worksheet (**Sheet 9 Summary sheet - Annual emissions of each pollutant by source sector**) at the end of the workbook. (**Did you get the correct values?** See table below.)

11. Go back to **Menu 1** then to **Sheet: 1.3.1 Nitrogen oxides (NOx) - emission factors (kg/TJ)** and enter default EFs for the same 2 subsectors (*Non-ferrous metals, Non-metallic minerals*) of Combustion in Manufacturing Industries and Construction only, again just for the same 2 fuels ('**Other Bituminous Coal & Anthracite'** and **'Natural gas')**

12. Use tabs to go to **Sheet 1.3.3** where you will see the **Total NOx emissions** have been automatically calculated. Again, check that the **NOx emission totals** for Combustion in Manufacturing Industries and Construction now appear in the **Summary sheet** at the end of the workbook. (**Did you get the right values?** See table below.)

13. If you have time, repeat step 11 for CO, NMVOC and NH_3.

14. **Save** your workbook.

From Summary sheet – Annual emissions of each pollutant by source sector in kt/yr.

Sector	Sub-sector	Total emissions (kilotonnes pollutant per year (kt/yr))				
		SO_2	NO_X	CO	NMVOC	NH_3
2. Combustion in Manufacturing Industries and construction	Iron and Steel	0.00	0.00	0.00	0.00	0.00
	Non-ferrous metals	1.23	0.74	0.38	0.05	0.00
	Non-metallic minerals	1.18	0.74	0.38	0.05	0.00
	Chemicals	0.00	0.00	0.00	0.00	0.00
	Pulp, Paper and print	0.00	0.00	0.00	0.00	0.00
	Mining and Quarrying	0.00	0.00	0.00	0.00	0.00
	Construction	0.00	0.00	0.00	0.00	0.00
	Other (Please specify in sheet 1.1.1a, 1.1.1b or 1.1.1c)	0.00	0.00	0.00	0.00	0.00
	Autoproduction of electricity/heat	0.00	0.00	0.00	0.00	0.00
	Remainder (Non-specified)	0.00	0.00	0.00	0.00	0.00

Note: For NH_3 you will have 0.00 kt/yr for all subsectors because numbers less than 0.005 become 0.00 when rounded up to two decimal places.