Exercise 3: Filling in data for – Combustion Activities in Energy Industries and Manufacturing Industries and Construction

1.   Open workbook, save as **'Malé Inv workbook Version 2.3_test data *your initials*.xls'**

2.   Go to **Main menu** and fill in inventory year as **"Exercise 1 data**"

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

4.   Using the data presented in the Excel file **'Test fuel data.xls', enter fuel consumed (in ktoe)** in the **'*Public Electricity and Heat Production'*** column for all relevant fuels. (As this is listed under the IEA **Transformation Sector**, fuel consumption appears as a *negative* value so remember to remove the minus sign after copying numbers to your workbook!)

5.   In the Malé workbook, fuel consumed within **'*Public Electricity and Heat Production'*** also includes *'Own use'* which the IEA account for separately under **'Own Use in Electricity, CHP and Heat Plants**' within the Energy sector. You should be able to find one fuel used for this purpose and the amount given should be added to the total for that fuel already entered in your worksheet under '*Public Electricity and Heat Production'*.

6.   Moving to the next column in your workbook, **enter fuel consumed (in ktoe)** for *'Petroleum refining',* and *'Coke ovens'* both listed under the IEA **Energy Sector** (blue section), **not Transformation** (turquoise section).

7.   **Enter fuel consumed (in ktoe)** for *'Charcoal production'* (**Note:** This **does** come under the **Transformation Sector** as the 'primary solid biomass' (i.e. wood) is burnt as well as being transformed into charcoal.

8.   **Enter fuel consumed (in ktoe)** for *'Other own use'.* This includes fuel use within the IEA **Energy Sector** (blue section) given in the **Non-specified Energy Sector** row **but added to** any remaining fuel use (shown as red numbers) in the Energy sector not already accounted for in step 5. [For example: for **gas/diesel oil** the total will be calculated as **0** (given for 'Non-specified energy sector') + **24** (for own use in 'coal mines') + **212** (for own use in 'oil and gas extraction') = **236 ktoe** in total)]

9.   Moving on to *'Combustion in Manufacturing Industries and Construction'* **enter fuel consumed** for *'Iron and steel'* as given in the IEA category **Final consumption** (pale yellow section). [**Note**: **Do not enter any values for coal and coke** because these are used primarily as reducing agents in the blast furnaces, not as fuels).

10. Repeat step 8 for the other categories (from *'Non-ferrous metals'* through to *'Construction'*. [**Remember** that for '*Chemical and petrochemicals'* you must **subtract feedstock use** from the total to give the amount of fuel actually combusted. Naptha is not listed separately in the workbook and so its use must be included within '*Other Petroleum Products*'.]

11. **Enter fuel consumed (in ktoe)** for *'Autoproduction of electricity/heat'* which is given within the IEA's **Transformation Sector.**

12. **Enter fuel consumed (in ktoe)** for *'Remainder non-specified'.* Within the IEA's **'Final consumption'** category (pale yellow), the values given in the **'non-specified industry'** row must be added to any fuel use not already entered into the workbook (shown as red numbers).

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

14. In **Sheet 1.1.2**, for all 'Combustion in energy' and 'Combustion in manufacturing and construction' sectors, **enter NCVs** of 0.645 toe/t for *'Other bituminous Coal and Anthracite'*, 0.663 toe/t for *'Coke oven coke'* and 0.968 for *'Crude oil'*.

15. Go to **Sheet 1.1.3 Error check sheet for net calorific values for fuel (toe/t)** to see if all energy 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. If so, locate and correct error.)

16. Go back to **Menu 1** then to **Sheet: 1.3.1 Nitrogen oxides (NOx) - emission factors (kg/TJ)** and enter default EFs for '*Other Bituminous Coal & Anthracite'*, '*Natural gas'*, '*Gas/diesel oil'* and *'Wood'* (But stop when you get to Transport!).

17. Check totals are carried forward to final **Summary Sheet 9**.

18. **Did you get the correct values for NOx emissions?** See table below

| Sector | Sub-sector | Total emissions (kilotonnes pollutant per year (kt/yr)) | | | | | | |
		SO_2	NO_x	CO	NMVOC	NH_3	PM_{10}	$PM_{2.5}$
1. Combustion in the Energy Industries	Public Electricity and Heat	0.00	779.61	0.00	0.00	0.00	0.00	0.00
	Petroleum Refining	0.00	1.27	0.00	0.00	0.00	0.00	0.00
	Manufacture of Solid Fuels and Other Energy	0.00	44.14	0.00	0.00	0.00	0.00	0.00
2. Combustion in Manufacturing Industries and construction	Iron and Steel	0.00	0.68	0.00	0.00	0.00	0.00	0.00
	Non-ferrous metals	0.00	0.34	0.00	0.00	0.00	0.00	0.00
	Non-metallic minerals	0.00	11.74	0.00	0.00	0.00	0.00	0.00
	Chemicals	0.00	10.37	0.00	0.00	0.00	0.00	0.00
	Pulp, Paper and print	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mining and Quarrying	0.00	7.21	0.00	0.00	0.00	0.00	0.00
	Construction	0.00	5.31	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	0.00	0.00
	Autoproduction of electricity/heat	0.00	40.77	0.00	0.00	0.00	0.00	0.00
	Remainder (Non-specified)	0.00	91.43	0.00	0.00	0.00	0.00	0.00