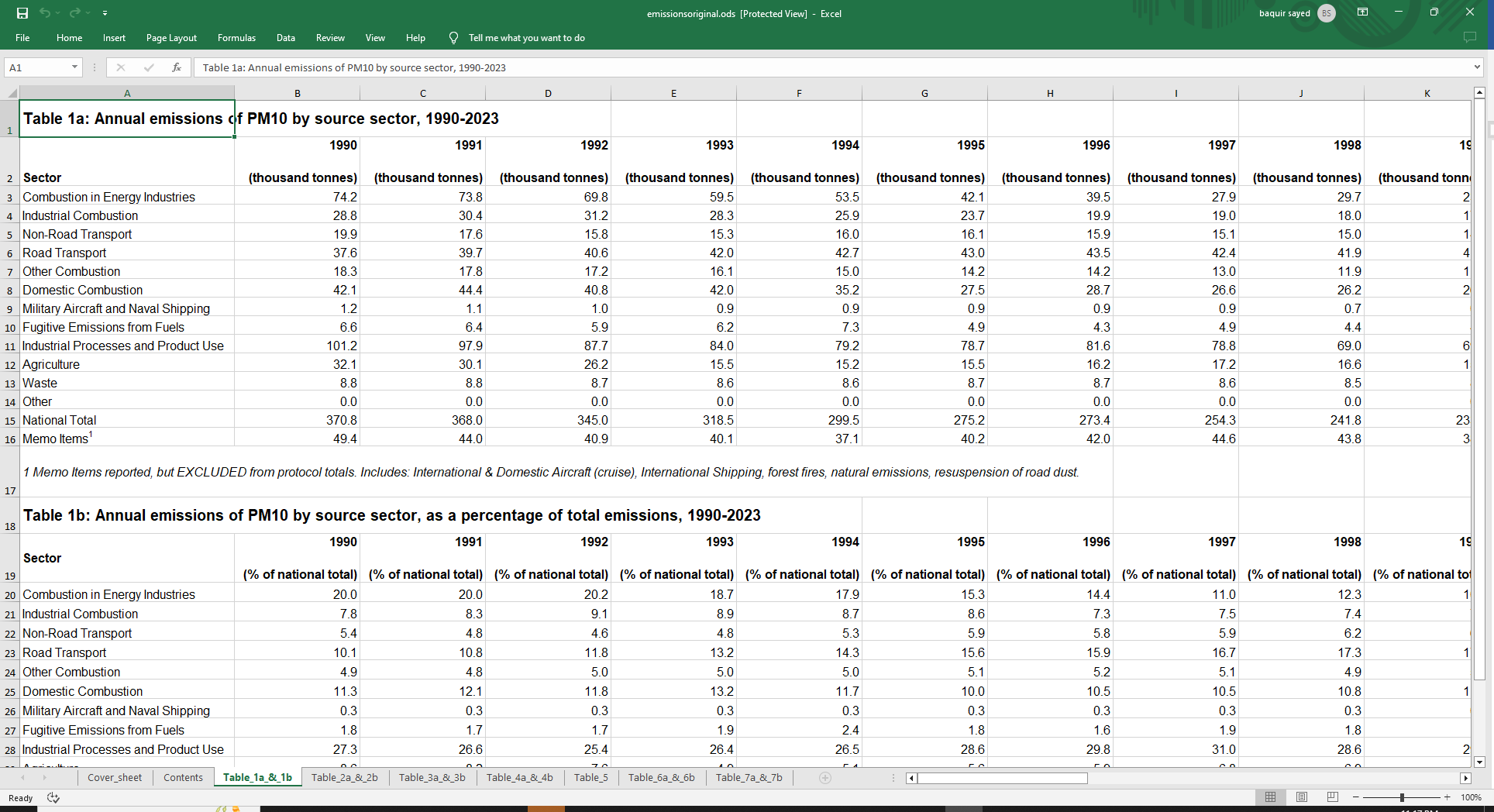
Pollution report documentation

Personal project that I took up to practice and learn how to work with Power BI better, this document folder serves as a step-by-step overview of what I did while working on the project with the data provided. This project is about government pollution in the UK, with the data being sourced directly from gov.uk, making cleaning the data essentially unnecessary in this case. This is more of a reference as to how I got my report working and functioning. For this project, I focused mainly on particulate matter, nitrogen oxides and ammonia released into the atmosphere, though there is more data present for other emissions such as methane on their website.

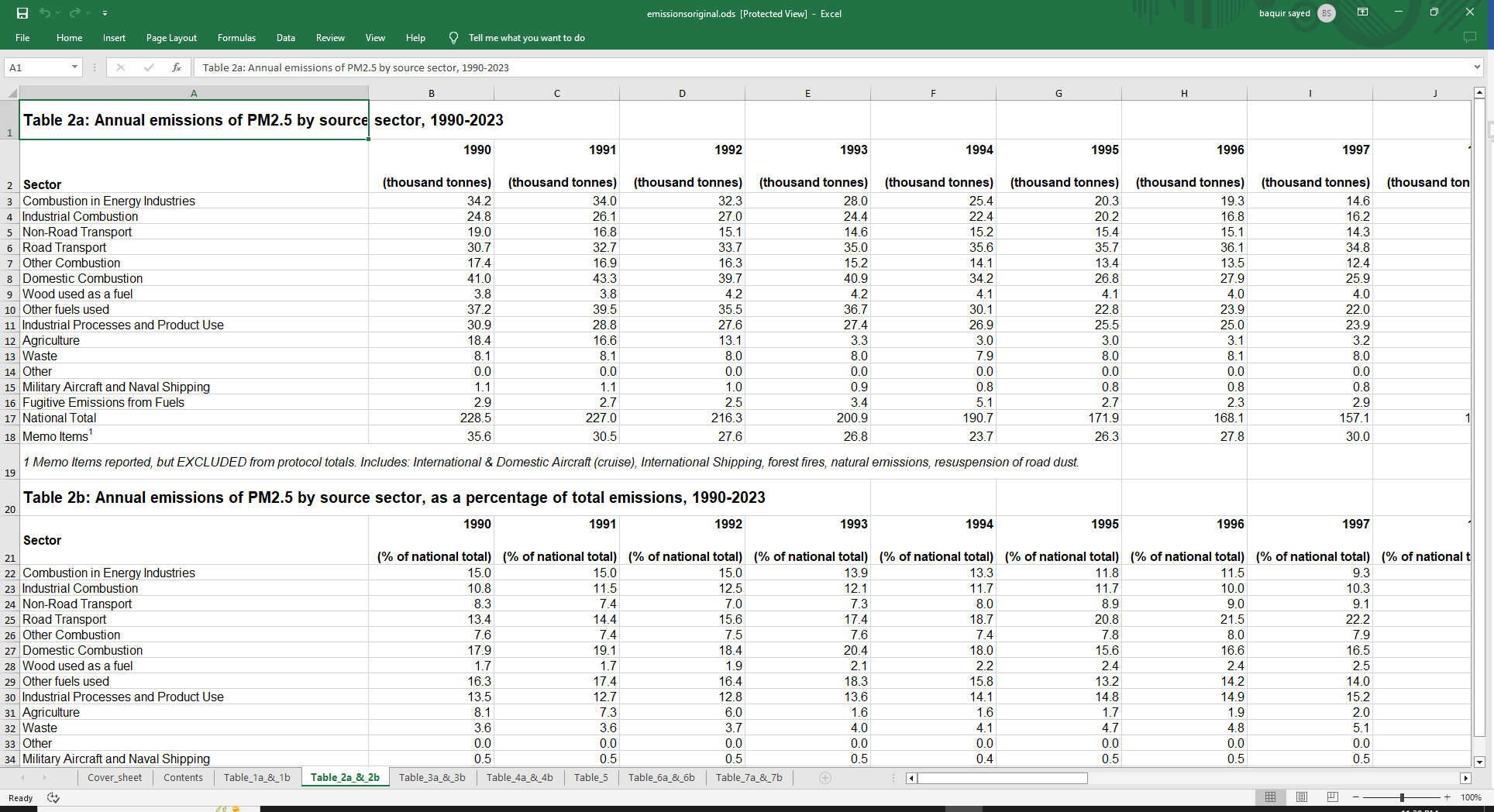
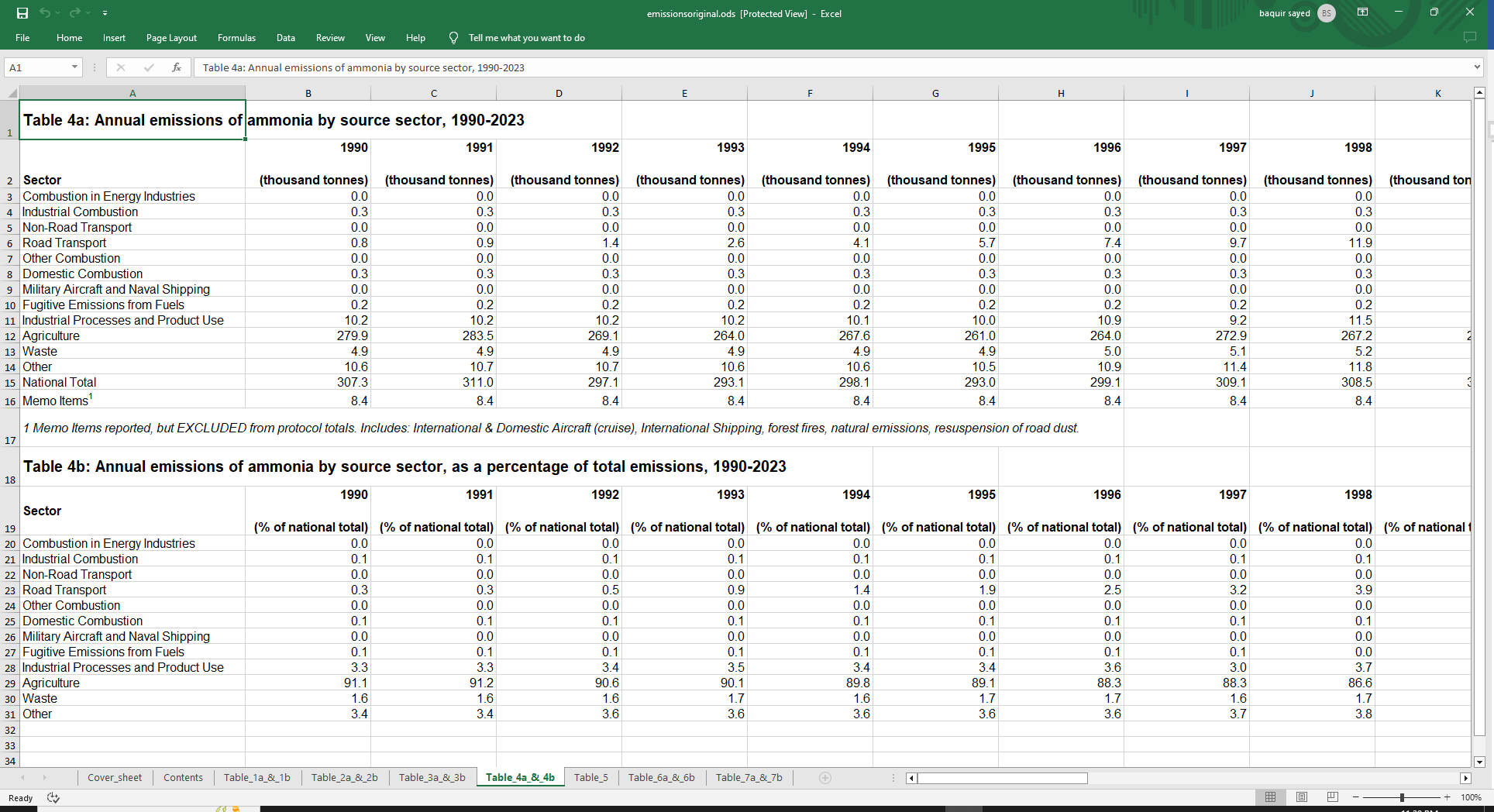
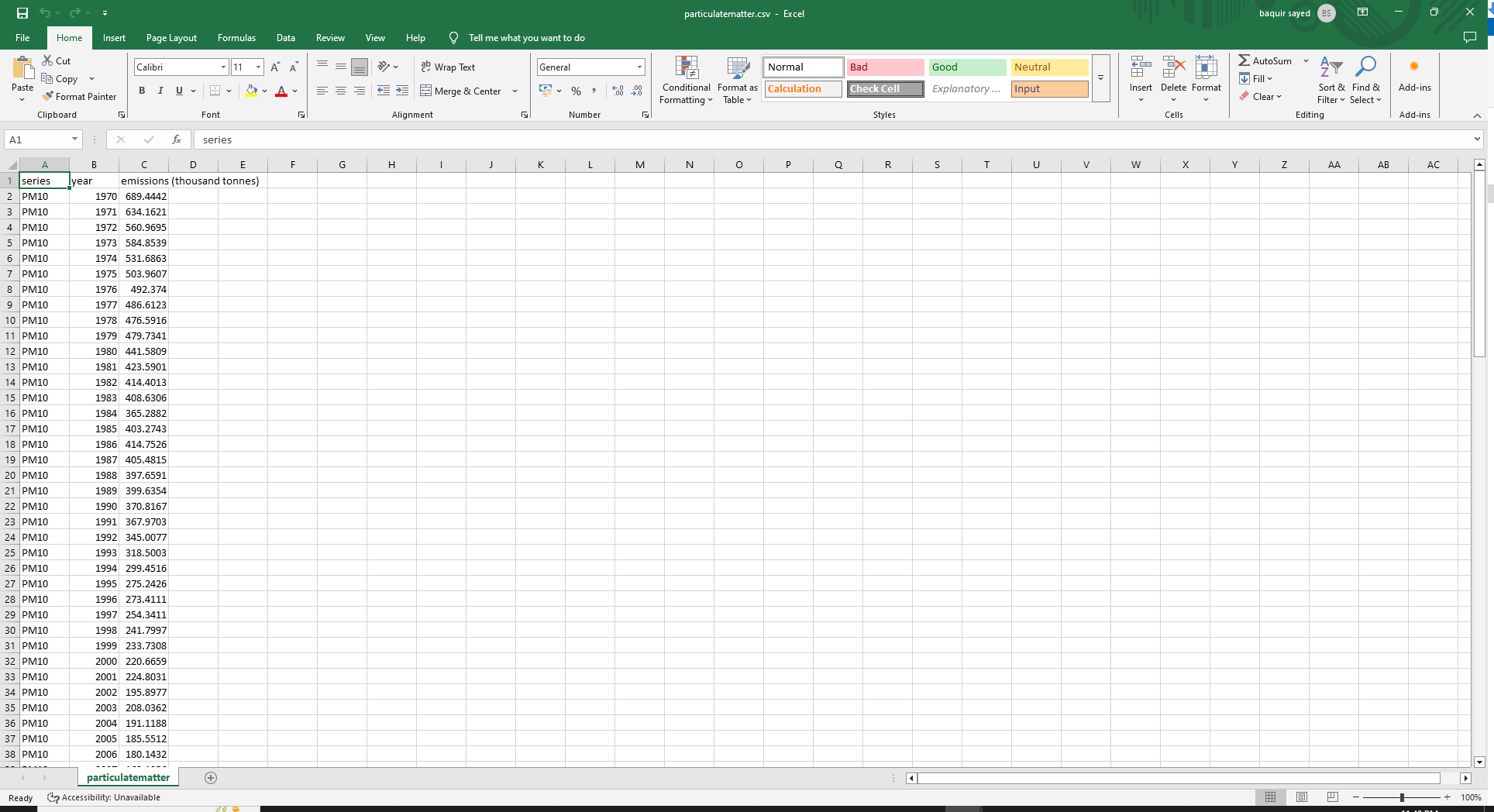
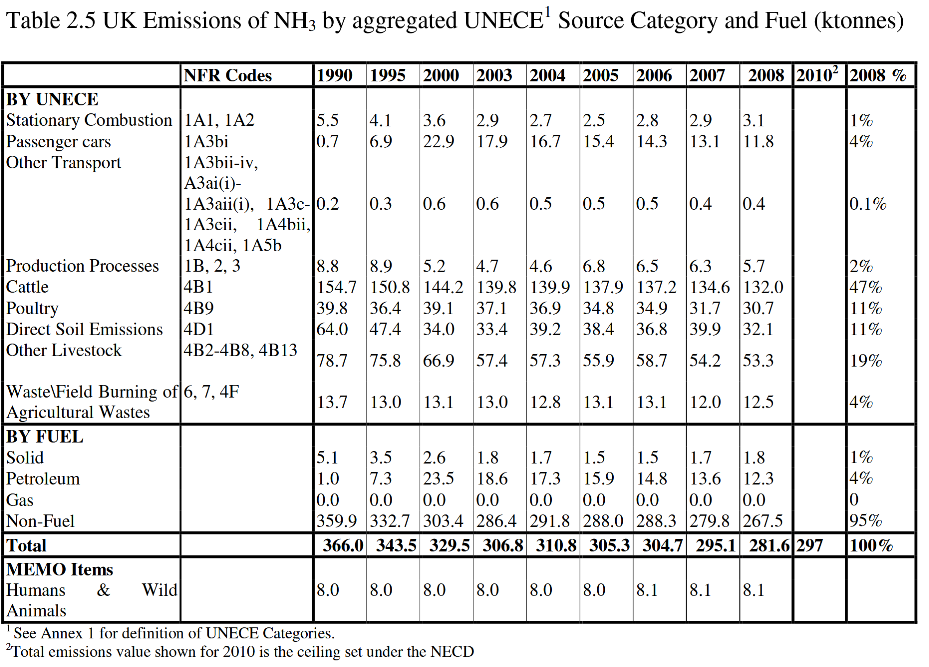
# Data sourcing, cleaning and transformation

Being directly sourced from the government, the data is very clean, so I didn’t have to do any cleaning on my end (although there is some discrepancy as mentioned later in this segment). As for transformation, I did a few transformations to make it easier to work on the data. Starting off, the data looked like this from the Excel and ODS files (links are found in reference and also uploaded to the repository). Here is an example.

**Emissions of PM10 in tonnes and as a %**

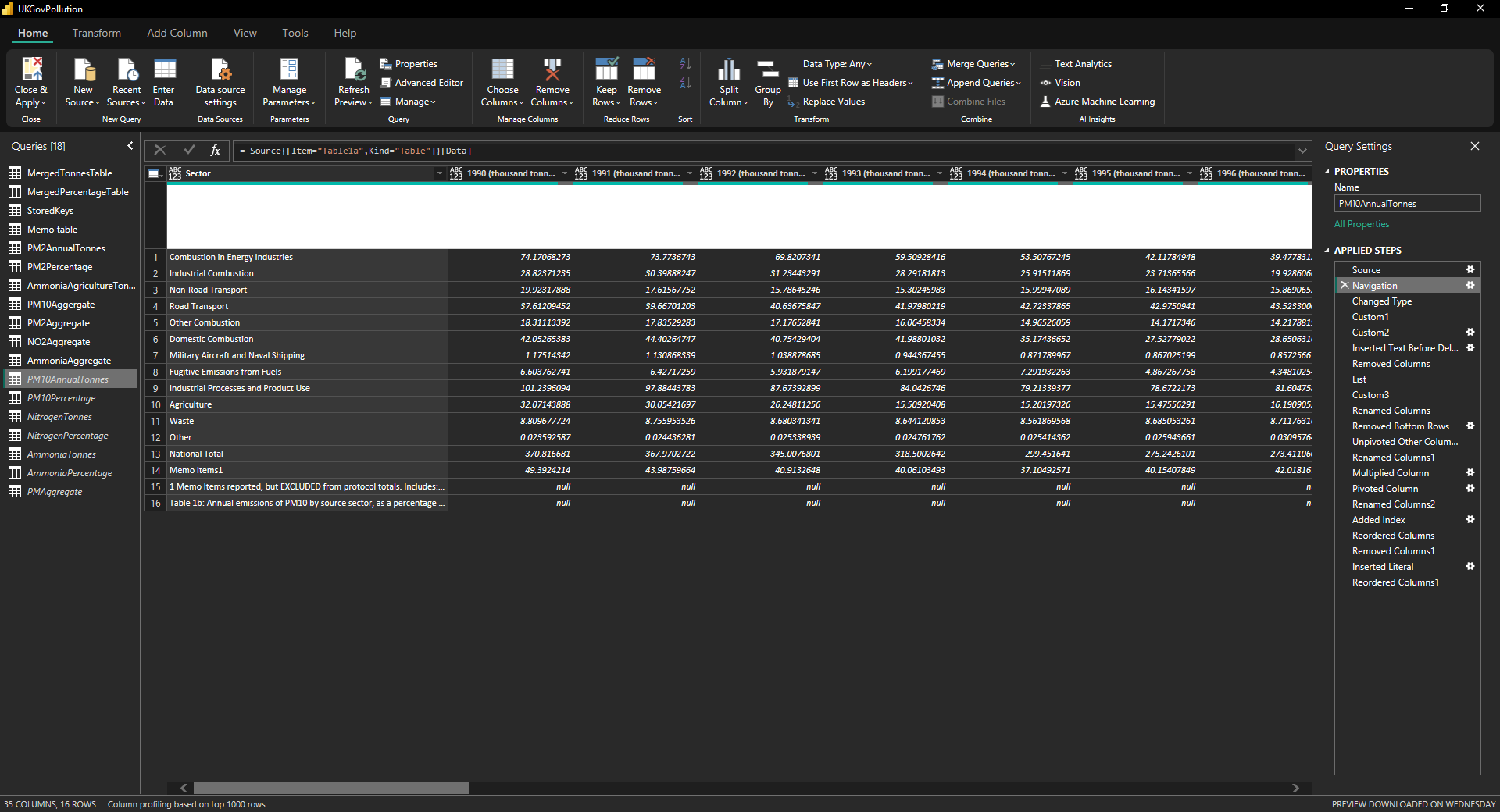


The data was split between different industries/sectors where the emissions were coming from, and were summed up yearly with one of the columns being a “National Total” for that year. There was also a list of “Memo items”, which were recorded but not included in the total, as it included data from emissions such as forest fires, international aircraft/shipping and natural emissions. From the three emissions I decided to visualize, there were a few key points that I learned while looking over the dataset.

* PM10, NO2 and Ammonia had the same sectors between the three of them, while PM2.5 and Ammonia from agriculture had different sectors. PM 2.5 had *most* of the same columns, but had a few differences, such as the inclusion of “Wood used as a fuel” and “Other fuels used”. 
* Ammonia was heavily skewed in its distribution, as most of its emissions come from agriculture. More specifically, animals and use of inorganic fertilizer produces an immense level of emissions. Between 1990 and 2023, the lowest amount of ammonia produced by agriculture was 84.3% of the national total, and thus it needed its own separate second table based only around agriculture and ammonia produced there. 
* Nitrogen Oxide was by far, the highest emission produced from the three I selected, and showed the steepest decline compared to the rest.
* The UK government had published a set of aggregate data as well, these were just the national totals in their own .csv files. The problem here is that these records stretch back all the way to 1970 (or 1980 for Ammonia). We do not have the data spread between sectors from that time period, just its aggregate. I still decided to import this data, mainly for static visuals if necessary because applying a filter context to it would be useless.   
  
* While trying to find pre-1990 sector data, I came across a report from DEFRA (Department for environment, food and rural affairs) and these reports came up with significantly higher ammonia levels and significantly lower NO2 levels from agriculture compared to the one on gov.uk. I’ve still decided to go with the data on gov.uk, mainly because it is a more complete dataset, but I’ve linked the entire report in references and a list of NFR codes aswell. The report has completely different numbers compared to everything.
* Nitrogen Oxide is measured as an aggregate in (million tonnes) instead of the standard (thousand tonnes) that is done by all other emissions, while the statistical report uses thousand tonnes.

These were the first important bits of information I gleamed over while performing some basic EDA on my data and trying to find additional data sources. I tried finding data based on the sector pre-1990, but didn’t find anything thorough enough to use in a report.

Importing data from the dataset, it conveniently split up between different tables inside the sheet itself. For example, Table 1a and 1b contain data about PM10 emissions, 1a is PM10 emissions in kilo tonnes, split based on their source sector, while 1b is percentage of the emissions split based on source sector. This allowed for me to split up the percentages and the of emissions in kilo tonnes for easier visualization and reporting. First import into power query looked like:



Theres a few problems here that are obvious from the data import, mainly:

* The imported data contains two lines that aren’t data points. These are swiftly removed by removing the bottom two rows of the table.
* Memo tables are also present here, while these are good to have, they present a bit of a problem because they’re not calculated in the national totals.
* National totals are present here as well, even though we already have aggregate tables in our model. This is duplication of data and is making the size of our

References:

<https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-nitrogen-oxides-nox>

<https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-particulate-matter-pm10-and-pm25>

<https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-ammonia-nh3>

<https://www.gov.uk/government/statistical-data-sets/env01-emissions-of-air-pollutants>

DEFRA report: <https://uk-air.defra.gov.uk/reports/cat07/1009030925_2008_Report_final270805.pdf>  
NFR codes: <https://naei.energysecurity.gov.uk/sites/default/files/cat07/0910130851_DA_AQ_Inventory_Report_2007_Appendices_Issue_1.pdf>