**Nzip\_industry\_patch – nzip.py code changes + patch code operations**

**Small/minor changes to nzip.py**

* Low-carbon CAPEXs were incorrect “df.loc[df['Year of Implementation'] < y, f'capex low carbon {y}'] = 0” where the < sign needed to be flipped.
* REEE measures were still incorrect. Patch code addressed these later.
* AMAC was made the same as NUAC. However, it was still unclear what is the right calculation for AMAC and NUACs.
* How scenarios are labelled at start of code were changed.

**Patch code**

* Combines AAP and BP tabs.
* We had “Iron and **s**teel” and “Iron and **S**teel” subsectors
* In mapping file **non** ferrous metals needed to be changed to **non-**ferrous metals.
* “Other manufacturing and industry” subsectors needed to be grouped to “other industry”
* For REEE measures the following columns are cleared as not applicable ["Category3: Dispersed or Cluster Site", "Category4: Process", "Measure ID"]
* For REEE measures and variables, TWh units are corrected for MtCO2e for ['Abatement emissions CO2', 'Abatement total direct'] measure variables.
* For REEE measures, only United Kingdom is retained as country, devolved authorities were not needed
* For REEE measures, 'Category5: Selected Option' is changed to represent Resource Efficiency or Energy Efficiency
* Unique Measure IDs are created based on combinations of ['Subsector', 'Category4: Process', 'Category5: Selected Option']
* Baseline data is cleaned up by removal of values in ['Category5: Selected Option'] then aggregations are performed for where duplicates are made.
* Measures names are updated where 'Other' values are present to BECCS (Calcium looping), Resource Efficiency (Strong LDAR), and Electrification (Process Change, EAF)
* Corrections are made in bp/aap measure level data where measure variable is 'Abatement emissions N20' (from NZIP) and corrected to 'Abatement emissions N2O'
* replace\_values(bp\_measure\_level\_data, 'Measure Variable', 'Abatement emissions N20', 'Abatement emissions N2O'
* Using the measure IDs a measure attributes tab is generated.
* New REEE abatements were then recalculated using some outputs and had to be re-entered manually in the sector databook.

**Lists of manual edits that were needed**

* Scenario labelling of "AAP" or "BP" needs to be changed to "Additional Action Pathway" or "Balanced Pathway" this is in the "Aggregate data" tab
* In the BP/AAP Measure level tabs "cum cost differential" and "cum total emissions" measure variable rows need to be removed
* In the "Aggregate data" tab the "Additional demand gas abated" values in "Aggregate Variable" column need be removed/fixed for UK only and all values for the years should be changed to zero.
* From the original NZIP files (you can collect a streamlined excel file in the first part of the code which are "REEE\_fix\_scenario.xlsx" which should've been downloaded), the remaining emissions (all and traded) for 2021-2050 need to be collected indepedently and replace the "Direct emissions total" and "Direct traded emissions total" values for 2021-2050 in the "Aggregate data" tab. This is because current ones are incorrect as there seems to be an issue with accounting for REEE emissions/abatement.
* Measure IDs tab needs to be deleted.
* In the measure attributes tab, a 66% optimism bias value should be added for everything non-REEE.
* Deployment+behavioural metrics tab needs to be created and calculated manually. Previous versions of sd-industry-tests available in shared folders has useful formulas. Boilers replacements will need to be calculated from the REEE\_fix\_scenario.xlsx files manually using the COUNTIF excel functions for "Boiler - Steam" and "Boiler - Steam (Non BECCS allowed)" and the year of implementions.
* The REEE measure abatements will need to be manually correct, there is a code and guidance that helps with this after the block below