FAQs – Answers to four most frequently asked questions

1. Why do some observations have net *positive* environmental impact? How is that possible?

   As we mention in the "Data Guidance" tab of our data file, there are rare cases of positive numbers listed as an observation's "Total Environmental Cost." Almost all cases of the *positive* environmental impact are caused by two distinct scenarios: 1) The firm led a significant *Carbon Offset* effort in that particular year, resulting in a net positive environmental impact, or 2) the observation's NOx or SOx emissions were very large in volume. As explained by the EPS methodology (Steen, 2019) that was incorporated into our own methodology, this is a reflection that damage costs imposed by global warming are very high relative to all other costs given the current urgent climate situation. As such, the harmful effects of NOx and SOx are currently significantly outweighed by their extent of a negative greenhouse gas effect. This perspective is also supported by the 5th IPCC GWP.

2. Why do some observations have atypically large environmental impact?

   Although GHG emissions are the most material component of the majority of the companies' total environmental impact, there are some observations with noticeably large environmental impacts that are not driven solely by their GHG emissions volume. Instead, most of the observations with atypically large environmental impacts have a high level of SOx and NOx emissions or water usage. Please refer to the question above for explanations regarding SOx and NOx emissions' contribution to a company's total environmental impact. As for the companies with large environmental costs associated with water usage, two biggest drivers are 1) the large volume of water withdrawal compared to the volume of water discharged, and 2) the high AWARE factor of the organization's domicile country (from which all of its water withdrawal is assumed to take place), indicating the country's potential of water deprivation.

3. Are there any other significant contributors to total environmental impact besides the five emission variables covered by the paper? How do you account for the missing emissions variables?

   The five emission variables we currently employ as inputs to our environmental impact calculation methodology are GHG, NOx, SOx, VOC, and water usage. Through our preliminary analysis of how *material* each emissions variable component is within an organization's total environmental impact, we have reached a conclusion that on average, we are able to capture majority of the environmental cost from firm operations scoped within our study with these five major variables.

   Moreover, our methodology incorporates other emissions variables such as PM 2.5 through imputations using the Exiobase's industry-level data. Simply put, Exiobase allows us to estimate corporate-level data for unreported emissions variables by allocating the total emissions from an entire industry in a particular country attributable to the company by

taking the percentage of the firm's revenue in that year relative to total industry revenue. We incorporate imputations as an attempt to estimate the missing organization-level emissions data, and while we recognize that this approximation is imperfect, it is necessary to provide comparability across organizations and industries. In particular, this imputation methodology is useful in order not to "punish" the companies with a higher level of disclosure and "reward" those that disclose less environmental information, which renders the two incomparable at a corporate level. Furthermore, in order to ensure robustness and reliability of our results, we qualify our sample of analysis to only the observations that have less than 20% of imputed contribution to their total environmental impact.

4. Which data points do you use to calculate the companies' annual *total water consumption*?

   In our paper, we calculate an organization's water consumption volume by subtracting its total amount of water discharged from total amount of water withdrawn. For your reference, the total water withdrawn variable is denoted by "ES269" in Bloomberg database and "ENRRDP054" in Asset4 (Thomson Reuters) database; the total water discharged variable is denoted by "ES081" in Bloomberg and "ENERDP057" in Asset4 (Thomson Reuters).