

Carbon Intensity TF – Downstream

Preparatory questionnaire - To be sent to the OGCI Secretariat before Monday, January 9th

Introduction

1. How many operated refineries does your company have in its portfolio?

7 (Antwerp, Rotterdam, Slagen, Fawley, Gravenchon, Fos, Trecate)

Note: also 2 non-operated refineries: Miro (25%) and Samref (50%)

3 (Strathcona, Sarnia, Nanticoke)

1 (Singapore 592,000kbd)

If your company doesn't operate any refinery, no further question is required.

Definition of the downstream intensity

2. How many of your operated refineries already calculate / would be able to easily calculate the following indicators?

CWT (Solomon Complexity Weighted Tons – mass based)	7
CWB (Solomon Complexity Weighted Barrels – volume based)	3
Both	
Neither of these two indicators	1

Additional comments:

EU refineries have had to calculate annual CWT for 2014-2018 and will need to continue doing so as of ETS phase 4 (in 2021 for 2019 and 2020 and every year from then on), driven by ETS legislation. They also need to report yearly GHG emissions.

As of 2019, there is now a federal CWB requirement that back stops any province without equivalent requirements. This will apply to the ON refineries (Sarnia and Nanticoke). AB (Scona) has had requirements based on CWB in place since 2018 (prior to that was a simplified version of CWB).

Singapore's carbon tax is a flat tax on full emissions for emitters >25,000tCO₂e. It has no regulations requiring CWT, CWB or Solomon EEI or EII. However, Singapore Refinery subscribes to Solomon EEI benchmarking and therefore, can use EEI basis for CWT or CWB if needed. This move will need to be socialised with the Refinery B.U.

3. Would your company be interested as well in considering other options?

☐ Throughput

☐ Other (specify):

☒ No other option

Additional comments:

Canadian and provincial governments now accept CWB. Significant effort has been undertaken to QA/QC historical data for the purpose of establishing the facility and/or sector benchmarks.

Should use existing/commonly accepted metrics rather than developing new ones. CWT methodology has been actively used by EU regulators and EU refining industry for many years, and has been mutually accepted as an adequate denominator for benchmarking emission intensity.

Solomon already has an emissions intensity metric (CEI) for refining – but that uses a different methodology which is not being used by the EU regulator in the EU ETS context so would be additional.

4. Any additional comment to consider?

CWT by itself is not an intensity... it is only the denominator. The numerator should be sufficiently "smart" to not just look at total GHG emissions but also reflect "deemed emission impacts" from transfers of heat/steam, waste gas, electricity production/import/export etc. EU ETS legislation includes methodologies on how to do this. These numerator calcs (when done on that "smart" basis) are significantly more complex than the CWT calc... and they are only required by the EU regulator once every five years. So we can't say that the intensity calculation is "available" anyway for EU refineries. This would require additional analysis per site every year. Need to balance this versus the alternative of selecting Solomon CEI as intensity metric and reporting that on a bi-yearly basis... which would not require any additional analysis/computation work for participating sites.

Target setting

5. Could the baseline be 2017 to replicate the work that has been performed on the methane intensity and the upstream carbon intensity?

- ☐ Yes
☐ No (no further question required)

Additional comments:

If using CO₂/CWT approach: From an EU circuit perspective, ideally we'd use 2016-2017 average as the baseline, given that that's the same timeframe used by the EU regulator for preparing the benchmarks for ETS Phase 4. From a site by site perspective, also better to use a multi-year average versus a single year baseline, to filter impacts of Turnarounds etc.

If using CEI metric: would need to use an even year as baseline (and probably even better: the average of 2 or more historical Solomon studies, e.g 2014 and 2016).

It takes significant effort to QA/QC the data. We continue to believe that a three year average is preferable for baseline purposes to better account for variability and planned maintenance. The benchmark years for both Canada and AB are 2013-2015. I would recommend continuing to use these baseline years and if desirable use the Solomon data to estimate how much improvement has occurred to 2017 to normalize the data. For refining the rate of change is pretty steady (at ~0.5%/year).

6. What could be the targeted year?

- ☐ 2025 (same as for Methane intensity & carbon intensity upstream)
☒ Other (specify):

Additional comments:

Depends on ambition level / what we want to target... small/incremental improvements may be possible on a year-on-year basis, however refineries will typically need a major turnaround opportunity to implement step change projects... Turnaround cycles can range between 3 and 8 years, are typically 5-6 years, with ~3-4 years lead time needed to develop significant size projects. So I don't think 2025 provides sufficient time to realistically target significant intensity improvements. Agreed!

7. To be able to release a carbon intensity in the annual report, data will need to be consolidated by the 3rd party between March and May. When will your company be able to provide all the data?

If using CO₂/CWT approach: May should be ok for EU sites (ETS emission account for Y is settled by April Y+1... so by then all data should be available).

Assuming we would want to leverage existing Solomon data (CEI), that would be quite tight (typically site data gathering for submission to Solomon happens in Q1 of each uneven year)... so would only be able to submit

own raw input numbers, not the ones vetted/verified by Solomon associates. Solomon results are typically not available until well in 3Q. And in this case there would only be a data point every two years.

Data are verified in April / May (for submission in June). Consolidated data are available just in time for the verification. I would not want to share data before verification as it is not uncommon for errors to be identified and corrected during the process. Solomon is less of a concern, in that the whole process will run in parallel (and independent of) the Solomon process.

Appendix A: Minutes of the June 2019 F2F meeting – Comparison between CWT/CWB/Throughput by Solomon

- This session was presented by Tracy J. Ellerington, Bruce L. Pretty (remote) and Mark A. Heersema (remote) from Solomon Associates.
- Discussion focused on the definition of the potential downstream intensity as there is no consensus about the denominator among the member companies (UEDC, CWT, CWB or throughput)
- Solomon strongly recommended not to use throughput as denominator. With an increasing complexity of refineries, carbon intensity might increase for equal amount of oil consumed. Member companies were already convinced that throughput is not an adequate parameter.
- Solomon also recommended not to use UEDC, as it is a cost based weighting index (costs might have changed significantly on a regional basis since its definition in 2004). In addition, UEDC does not reveal the real carbon emission from some operating units. Publication of UEDC figures or intensities based on UEDC is not allowed without permission from Solomon.
- Both CWB and CWT are Carbon based metrics:
 - i. CWT was developed in 2008 based on a benchmark of EU refineries, with simplifications that were used in this specific region, and high correlation with full methodology. Extrapolation in other regions may lead to a biased denominator as some specific geographic impacts are not captured.
 - ii. CWT is a better denominator than throughput or UEDC but would still be an approximate as the characteristics of the refineries change with the population.
 - iii. Refineries in other regions require CWT/CWB methodologies tailored to the characteristics of the regional population.
 - iv. Combining CWT in Europe with CWB in other regions would lead to inconsistencies (different units + different crude quality from one region to another)
 - v. Solomon has not updated the emissions factors since the definition (as it has not been asked to do so).