Life Cycle Assessment of Transportation Fuel Technologies

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Sasol Chevron's position

Substitution/Displacement should be strongly considered instead of or at least along side of Allocation methodology for evaluating the environmental impacts of alternative diesel fuels.

WHY?

- Substitution/Displacement is a more comprehensive analysis. Given the critical issues of GHG, emissions and future energy requirements, a comprehensive view is necessary.

- The future energy requirements will depend on a diversity of alternative fuels and fair methodologies are imperative to ensure they all receive equitable treatment going forward.

Substitution VS Allocation Method

- **Substitution** seeks to ask the question: “What are the environmental implications of supplying markets 1,2,3 with products from technologies A, B and C?
  - To answer this question, it is necessary to consider the whole technology system. Specifically for the GTL technology, a system comparison for a complex refinery system would include refining, the main products and markets.
  - The 3 LCA studies in the Five Winds report intentionally studied the whole technology system and not individual products. The system comparisons are more comprehensive compared to well to wheel (allocation) studies since they take the whole suite of products into account. They consider the direct market consequences of applying a new technology.

System Expansion VS Allocation Method cont.

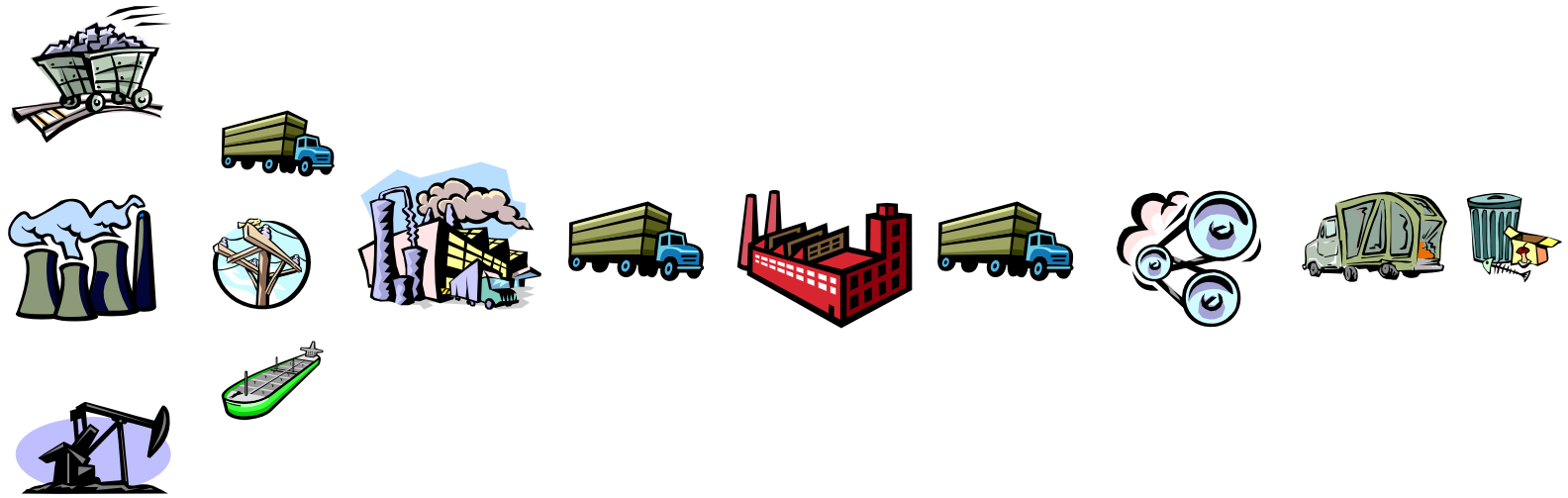
- **Allocation:** creating a "virtual" product assessment, by eliminating all co and by products.
  - uses physical or financial properties of co-products to isolate individual product flows out of a more comprehensive system.

- Allocation method concentrates solely on transportation fuels. Where a system produces other products in addition to transport fuels, these other products are not considered

- The choice of the allocation method is often independent of the business reality or the rationale behind an assessment. For example, the market does not equally value conventional refinery products. Allocating associated environmental burdens according to mass or energy ratios ignores such important considerations.

System Expansion: From cradle to grave

Raw materials and energy consumption



Raw material ⟹ Production / manufacturing ⟹ Use ⟹ End-of-life

Releases to air, water and soil

From Nov 16th/07 working group meeting:

- Significant, credible support for the substitution method was highlighted however the allocation method is being recommended for several key fuel groups.

Co-Product Methods from Other Studies

- ISO 14040
  - For LCA recommends "substitution' method
- U. S. EPA, CONCAWE, U. K. RTFO, and the Cramer Commission
  - Recommend the substitution/displacement approach
- GREET, AB 1007
  - Used hybrid methodologies in certain cases
- Staff Recommendation
  - Substitution/displacement but allocation necessary for certain pathways

Conclusion

- **We believe the system expansion method should be used or at least be considered along side the allocation method**
- **Our industry can assist in providing any information / data to assist the process**

THANK YOU

For more info, including a copy of the Five Winds LCA Industry report that evaluates the findings of several reports or Sasol Chevron LCA report (by PWC) please contact:

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