

New CBE research proves higher refinery emissions from lower quality oil

[Fact sheet]



Is this new science?

CBE's research, "Combustion emissions from refining lower quality oil: What is the global warming potential?," was published by the American Chemical Society in the journal *Environmental Science & Technology* on November 30, 2010 (<http://pubs.acs.org/doi/abs/10.1021/es1019965>). This is the first peer reviewed research to verify the emissions from refining "dirtier" crude oil using data from actual operations at refineries.

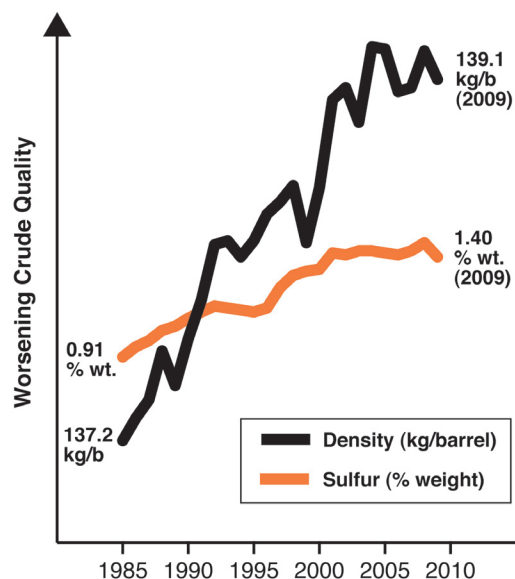
Why did CBE do this research?

Oil companies are switching to very different, lower quality crude oil. We need to know what this could do to our environment, our health, and our climate.

What did CBE find?

- The heavier and more contaminated the crude refined, the more fuel refineries burn per barrel processed: Crude quality predicts the amount of combustion emissions from large groups of refineries with crude inputs from diverse sources.
- Crude quality drove a 39% increase in CO₂ emissions across U.S. refining regions and years (1999–2008). West Coast refineries ran the lowest quality crude and emitted the most CO₂ per barrel refined in this period.
- A switch to heavy oil and tar sands—much heavier, dirtier oils—could double or triple refinery emissions. Worldwide, this could increase annual refinery CO₂ emissions by 1.6–3.7 billion tons. That by itself would increase total well-to-wheel petroleum emissions by 14–33%. The total emissions increase from extracting *and* refining heavy and tar sands oils could be even greater.

Continued next page...



Quality of crude inputs to U.S. refineries reported by USEIA, 1985–2009. Increases in the density ("heaviness") and sulfur content of crude refined over time show that a shift to lower quality oil has already begun. A full-blown switch to the average heavy oil and tar sands bitumen would worsen the quality of crude refined by 8–14 times what is shown in this chart.

A CBE fact sheet: Emissions from refining lower quality oil—continued

How does this pollution increase?

- Making motor fuels from lower quality crude requires more intensive processing.
- This more intensive processing requires more energy to refine each barrel of crude.
- Burning more fuel for that energy emits more pollutants from refineries.
- CBE measured *how much* these effects of “dirtier” crude increase refinery process intensity, energy intensity, and CO₂ emissions intensity using data from 97% of the U.S. refining industry over ten years.
- We also showed that other factors could not explain these effects from refining dirtier crude.

Why is this important?

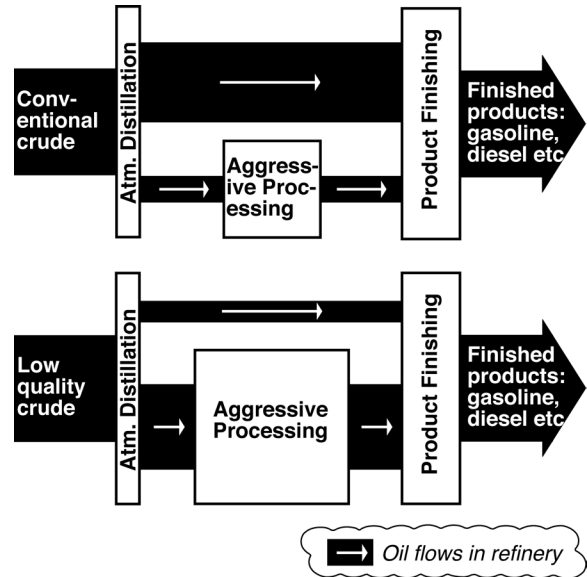
- Refinery fuel combustion emissions already cause “toxic hot spots” in nearby communities that disparately threaten the health of low income people of color. A switch to dirtier oil could make these toxic fuel combustion emissions even worse.
- Increasing CO₂ emissions from a switch to dirtier oil could make it virtually impossible to avoid worst-case climate impacts. Our best climate science says total emissions from all sources must be cut by 50-80% (see www.ipcc.ch), but oil already accounts for about 40% of these emissions (see www.eia.doe.gov/oiaf/1605/ggrpt).
- Allowing the hugely expensive equipment for dirtier oil to be built could commit us to this additional pollution for decades. See Davis et al., 2010. *Science* (329): 1330–1333.

What is the alternative? Can I help?

We can switch to solar and wind powered electricity to light our homes and run our cars. This would create more jobs than oil (see CBE’s *Big Oil, little jobs* fact sheet summarizing U.S. Economic Census data). Stopping the switch to dirtier oil could free up the huge societal investment needed for this “green energy” alternative. We can do it, but it’s hard. Replacing limited conventional crude with dirtier oil could make it much, much harder.

Communities such as Richmond, California are making the most progress to stop dirtier oil in order to create this healthier, more prosperous future. CBE works for and with our communities. **We know that we need to work together. We need your help. Join us!**

Support CBE. Donate today: www.cbecal.org/donate/index.html



Aggressive processing (vacuum distillation, cracking, and aggressive hydroprocessing) acts on a larger portion of the total crude refined to make motor fuels from lower quality crude, requiring more fuel to be burned for energy and increasing refinery emissions.