Biofuels - outline for two-pager
With an emphasis on “renewable diesel” vs “petro-diesel” (aka diesel).

Dear Portland,
Please don’t hang your hat on Renewable Diesel just yet

While we are very much in the midst of a climate emergency, it’s times like these when elected officials and policymakers must keep a cool head. Leaders everywhere want to be able to say they are “doing something” to reduce harm to our climate – even if the “something” is not proven to be effective.

The claim: Using biofuels will decrease global green-house gasses and local air pollution.
The reality: There are many factors that contribute to uncertainty about the benefits of renewable diesel.

1. First, what is renewable diesel and how is this different from biodiesel, which was so popular in Portland circa 2005? Renewable diesel is similar to petro-diesel, but not chemically identical. When burned it produces about 25% less black carbon and PM 2.5 (particulates 2.5 microns or less that lodge in lungs), but only slightly (3-10%) less NOx and CO. All of these things are very damaging to human health, especially for children, elders, and those who are immunocompromised.[1] Biodiesel is different chemically, and can only be blended up to 20% in most vehicles; it may also increase NOx.[2]
2. Why is it difficult to determine whether renewable diesel is “better” than petro-diesel? Doesn’t the word, “renewable” always make something good?
    a. Renewable diesel manufacturing depends on feedstocks (the basic carbon-based stuff that is turned into fuel). When demand for various feedstock grows, farmers & land managers respond, sometimes making new and different choices. Their land use changes may actually increase global emissions, even though they are not part of the stuff that gets turned into fuel.
    b. While not complicated in terms of lifecycle analysis, it’s important to keep in mind that fossil fuels are often used to produce renewable diesel feedstocks.
    c. When measuring global warming potential of burning specific fuels, all emissions are converted into CO2-equivalents. When it comes to diesel, the time frame when the CO2-equivalency effect is measured matters. It matters most for particulates, esp. black carbon, which has high, but uncertain global warming potential. The fact that it’s generally excluded from the life-cycle analyses undergirding fuel policies demonstrates the uncertainty & fallibility of modeling.
    d. Sometimes people like to imagine that if we produce more of a good thing, less of a bad thing will be used. In reality, the total amount of diesel is not capped, so there is uncertainty about how much fossil-diesel will be displaced by renewable diesel through time. Everything depends upon fluctuating market conditions. For example, increasing overall availability could lead to lower prices and therefore increased use. Ultimately, the prices at pumps inside Portland city limits and in neighboring municipalities will determine where diesel vehicle owners fuel their rigs.
    e. One of the well-known cautionary tales about renewable diesel: shunting grain toward fuel production carries the potential to increase food prices.
3. At the heart of discerning whether renewable diesel is beneficial for the climate or not is an essential term: Carbon Intensity (CI). CI is a measure that attempts to account for the greenhouse gasses

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[1] Particulate matter and black carbon cause both cardiovascular and pulmonary effects and developmental disorders: impaired pulmonary development in adolescents; increased cardiopulmonary mortality and all-cause mortality; measurable pulmonary inflammation; increased severity and frequency of asthma attacks, ER visits, and hospital admissions in children; increased rates of myocardial infarction (heart attack) in adults; increased risk of cancer; neurodevelopmental disorders.
[2] cite?

emitted during the following stages of biofuel production: feedstock production, transportation, and fuel conversion. The best models also include land-use changes.

   a. The carbon intensity of various renewable fuels is not a fixed number, it is an approximation based on subjective modeling, and it is usually accompanied by a great deal of uncertainty.
   b. The magnitude of the CI depends on:
      i. Modeling assumptions used. This gets deep in the weeds fast because there are multiple schools of thought on what should be included. There are two forms of Life Cycle Analysis (LCA) used to calculate CI; one (attributional, ALCA) analyzes the supply chain (as though it's in a vacuum) and the other (consequential, CLCA) also includes changes that result from an action or policy. Neither necessarily includes land use changes, although the latter is designed to capture effects and externalities outside the supply chain. The modeler chooses which specific effects to include in the LCA based on the purpose of the analysis (and who the client is). Another method, attempts to create a more inclusive reflection of economic forces (ex: if U.S. corn is used for fuel, will that increase forest removal for agricultural production elsewhere?)
      ii. The feedstock used to make the fuel and how it is produced. Is it waste oil, canola from Oregon, or corn?

4. All of these factors lead to great uncertainty about the benefit of Portland adopting a renewable fuels standard.
   a. From 2015-2025, the Oregon Clean Fuels program will have a 10% reduction in (deemed) CI, but it's uncertain how this translates to net, global GHG reductions because modeling assumptions exclude land use changes. (At this late stage in the climate crisis, the value of such a large policy and infrastructure effort is questionable for so small and uncertain a GHG reduction).
   b. Low carbon fuel standards (LCFS) are not the best way to incent electrification of transportation, and may, if anything, delay the transition toward clean electrification.
   c. Spills, fires, local effects on fenceline communities are still a concern.
   d. Air pollution in communities along transportation corridors from burning renewable diesel will remain a significant threat.
   e. Uncertainty of climate benefit models is so great that increased use of renewable diesel could even be increasing GHG emissions at the global level.
   f. Facilities might say they plan to use one thing (waste of some kind), but then switch to a less favorable feedstock (trees or planted crops).
   g. Other short-term policies may be better for cleaning up air pollution (e.g. tighten standards/phase out old diesel engines).
   h. Increased dependence on biofuels may force a fall-back to fossil fuels if war and climate change-induced extreme weather lead to a food crisis.
   i. Investing in the renewable diesel industry creates a new vested interest that will oppose fleet electrification, a solution that will become less carbon-intensive as the grid shifts toward renewable sources.

5. Why does renewable diesel seem so popular in Oregon these days?
   a. The subjectivity and uncertainty of CI ratings is poorly understood by some regulators and biofuel proponents.
   b. Oregon's Clean Fuels Program was put in place before the intricacies of biofuel modeling were understood and before the U.S. EPA established federal guidelines - Oregon simply followed California's lead.[3]

[3] Oregon's program is actually weaker than California's because, presumably due to industry pressure, Oregon DEQ adopted a lower CI rating from a different modeling system for corn ethanol.

c. State and local jurisdictions like to be able to say they are “doing something” even if the something is not proven to be effective.
d. Fossil fuel companies (especially large ones) prefer renewable diesel, for it perpetuates reliance on liquid fuels.
e. Prices in California are high - facilities in Oregon could sell to California. (Currently Renewable Diesel is produced in only 4 states: LA, CA, WA, ND).
f. There may be some legitimate roles for renewable diesel (maybe long-haul transportation, marine transportation?) at least in the short run, so arguments can get complicated.

6. Our position regarding policies that encourage biofuels/renewable diesel:
    a. Given uncertainty about their benefit, use the precautionary principle and arguments above to raise a skeptical voice.
    b. Guardrails: be sure policies and individual projects:
        i. Prohibit use of dedicated crops
        ii. Prohibit use of facilities for fossil fuels
        iii. Use a healthy dose of skepticism with CI numbers, recognizing that most models can be configured to produce high or low numbers. Insist upon robust models that include land use transformation and as many negative externalities as possible, use the high end of CI ranges
        iv. Take into consideration the method of hydrogenation when making renewable diesel.

    c. Proposed facilities: choice of location matters (seismic risk, noise, pollution, trains, vulnerable populations)

This document summarizes a presentation by Dr. Rich Plevin, Pacific Northwest National Laboratory. U.S. Department of Energy