

## Low Carbon Fuels: How Clean Fuels Can Power the West Coast and Beyond

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UCS-commissioned research released today is the latest to find that, with stable policies, we can achieve ambitious clean fuels goals. Recent publications from UC Davis, the International Council on Clean Transportation and E4Tech have drawn similar conclusions. As California prepares to readopt their 2010 Low Carbon Fuel Standard, we are seeing clear evidence that diverse types of clean fuel can make a significant contribution to cutting oil use and transportation carbon pollution.

A year ago more than one hundred leading [California scientists and economists sent an open letter on climate change](#) to Governor Jerry Brown and the California Legislature urging them to maintain California's leadership on climate change. These experts said that a clear price on carbon is "key, but not sufficient to adequately reduce emissions. Policies that promote renewable energy, low carbon fuels, and cleaner transportation are also critical." Policymakers should look beyond the current policies, and prepare now to reach emissions targets between 2020 and 2030.

*"Every sector involved in addressing climate change, from energy to transportation, will need sufficient time to prepare to meet new targets. The longer we wait the harder and more costly it will be. Please begin now to set a science-based, heat-trapping emissions target for 2030."*

California is taking up this challenge. In addition to policies that put a price on carbon, [California has a comprehensive suite of policies](#) that will clean up transportation including a low carbon fuel standard (LCFS) that shifts the market steadily towards cleaner fuels. And the state is starting to look beyond 2020. Governor Brown recently set a 2030 goal of cutting oil use in half, making it clear that 2020 is just the first step. The steady growth of clean fuels is key to meeting this goal.

Three recent studies look into the potential for clean fuels in the US, the West Coast and California, and together illustrate why the future for clean fuels is bright, provided the policies are in place to support them.

California kicked off a transition to clean fuels with its LCFS in 2010, and later this month the California Air Resources Board will consider the readoption of the LCFS, making technical updates,

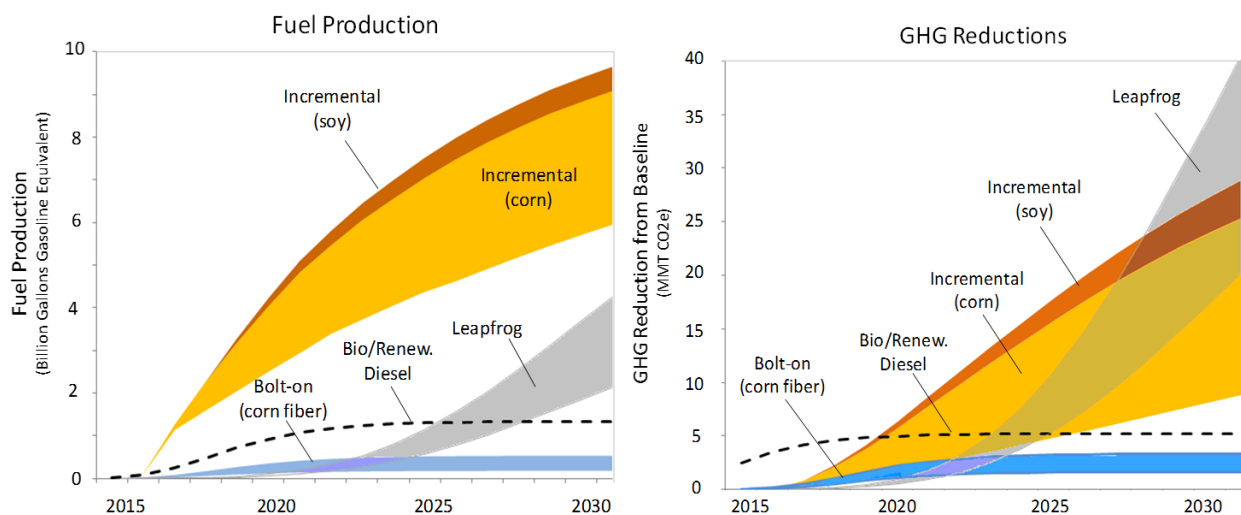
resolving legal issues and getting the policy back on track to cut carbon pollution from transportation fuels by 10% per unit of energy by 2020. As they do so, they need to start planning for the next phase, from 2020 to 2030.

Accelerating the transition to clean fuels now will support innovation, cutting oil use and reducing transportation emissions and ensuring that investments in the clean fuels of the future replace dead end investments in ever dirtier sources of oil.

### ***National: UC Davis NextSTEP's study***

Experts at UC Davis' Institute for Transportation Studies examined three distinct ways cleaner biofuels of different types are emerging across the United States (recently published in [Energy Strategy Reviews](#)).

- First, *incremental* progress is being made at existing biofuel facilities, as they adopt cleaner and more efficient production processes.
- Second, *transitional* progress is being made as existing corn ethanol biorefineries start making cellulosic ethanol from corn fiber together with corn ethanol at existing corn ethanol facilities.
- Finally, *leapfrog* progress is being made as firms build new facilities specifically to make cellulosic biofuel.

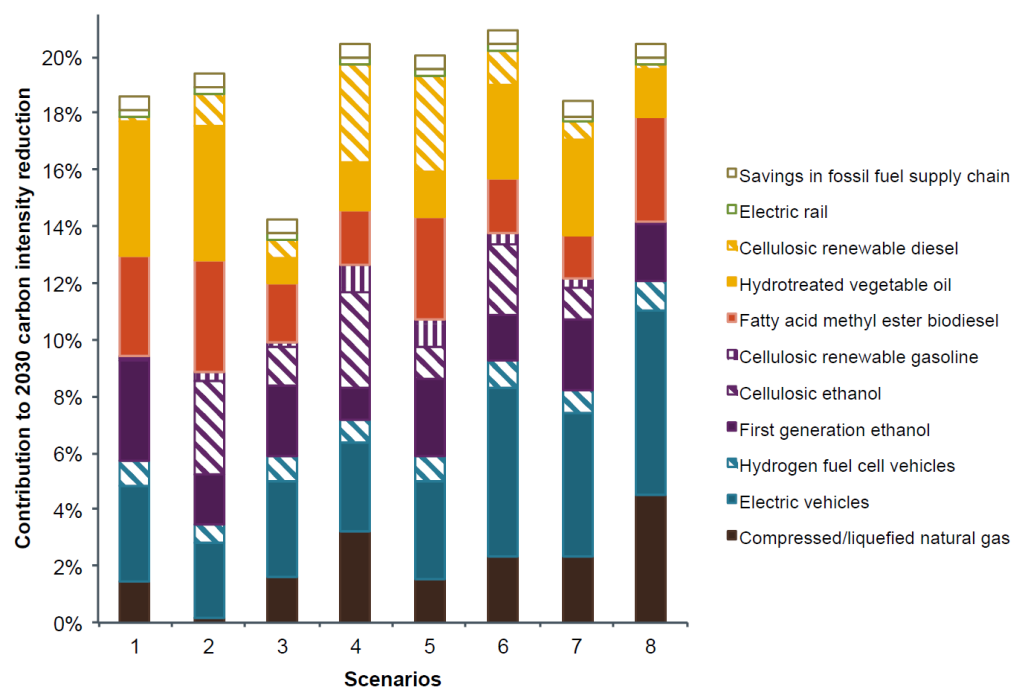


Notice that the incremental approaches are likely to come on more quickly between now and 2020. But the leapfrog approach is the one with the potential to deliver the largest oil savings and emissions reductions by 2030. The transitional route also plays an important role in building early experience with cellulosic biofuel technology in a context that is less risky and capital intensive. This lower risk learning is especially important today, with [policy uncertainty delaying investment](#) in the most ambitious projects.

The bright future described in this study is by no means guaranteed. Strong policy support is needed to scale up low carbon fuels. These [policies lead to steadily increasing production, which accelerates learning and brings down the costs of cellulosic biofuel over time](#). And the broader the market for the fuels, the faster this learning will accumulate. While US policy is stalled, the west coast is working on creating a large and steadily growing clean fuels marketplace.

### West Coast: ICCT and E4tech

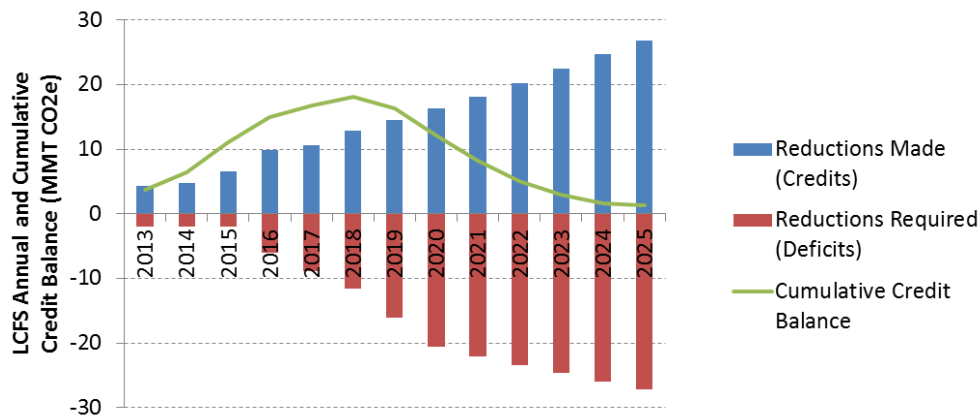
Last month the [International Council on Clean Transportation](#) and [E4tech](#) released a study on the [potential low-carbon fuel supply to the Pacific Coast region of North America](#). They find that California, Oregon, Washington and British Columbia, acting in concert to create coordinated clean fuels policies, can triple the use of low carbon fuels and replace a quarter of the region's gasoline and diesel use by 2030. That's a massive reduction in carbon pollution and oil use. The report also highlights the diversity of potential fuels and pathways, with eight distinct scenarios and different amounts of low carbon fuels emerging as electricity, renewable natural gas, ethanol, biodiesel, and other low-carbon fuels ramp up at different rates.



Their study reinforces that there are many routes to a low carbon future, and with a flexible policy framework like a low carbon or clean fuel standard, policy makers are committing to the outcome, rather than picking specific fuels or technologies needed to get there. I've written in the past about the [importance of flexibility in clean fuels policies](#), and my colleague Josh just posted [a blog on how Oregon's clean fuels program](#) is making it work for them.

## California: NRDC/UCS/EDF Promotum Study

Today UCS, the Natural Resources Defense Council and the Environmental Defense Fund released a [study of compliance options for the California Low Carbon Fuels Standard](#) over the next ten years. The study was conducted by Promotum and addresses endless oil industry claims that moving to cleaner fuels is infeasible. Our study examines where clean fuels can come from to meet both a 10% reduction in carbon intensity (carbon pollution per unit of energy) by 2020 that California adopted back in 2010, and looks beyond 2020, to a 15% standard in 2025.



The oil industry likes to focus on whether biofuels or Electric Vehicles (EVs) are ready to scale up quickly enough to meet ambitious targets. This study indicates that they are, and also that the oil industry can meet 15% of its clean fuel obligations in 2020 by improving efficiency and integrating renewable energy inputs into the production of oil and the refining of gasoline and diesel. Promotum evaluated the impact of credit prices of \$100 a ton (LCFS credits are measured by ton of avoided emissions), and found that the available options would exceed the requirements of the policy in 2020, and allow compliance with steadily increasing targets that hit 15% in 2025.

## 2020 is just the beginning

It took more than a century to build today's oil industry, and it will take longer than five or ten years to scale up the clean fuels industry that will succeed it. The three studies provide a roadmap for successfully achieving low carbon goals the states are setting today, which will create a steadily growing regional marketplace for clean fuels. When you consider that the combined economies of California, Oregon, Washington and British Columbia would rank fifth in the world, behind Germany and ahead of France, it is clear this marketplace can provide major step forward towards a clean transportation future.

*About the author: Jeremy Martin is a scientist with expertise in the technology, lifecycle accounting, and water use of biofuels. He is working on policies to help commercialize the next generation of clean biofuels (made from waste and biomass rather than food) that can cut U.S. oil dependence and curb global warming. He holds a Ph.D. in chemistry with a minor in chemical engineering.*