

## Ethanol blend hike to jump start cellulosic investment

A move announced on October 13 by the US Environmental Protection Agency (EPA) to raise the permitted ethanol blend in gasoline for motor vehicles has been widely welcomed by ethanol manufacturers and biofuel advocate groups. The increase of ethanol in gasoline, from 10% to 15%, revises a mandate that has stood for 35 years and is thought to be a critical step toward bringing cellulosic ethanol to consumers.

The EPA's decision applies only to light motor vehicles made since 2007—a second decision on vehicles made from 2001 to 2006 is expected by the year end—but it's still enough to give hope to biotechs working on cellulosic ethanol (and other non-corn feedstock 'second-generation' biofuels). The problem for cellulosic ethanol producers was that the so-called E10 blend limit—10% ethanol—left the market saturated with corn ethanol, says Jim Sturdevant, director of Project Liberty, the cellulosic operation of Poet, of Sioux Falls, South Dakota. Raising that limit should open the door to companies like his—critical, Sturdevant says, because “without a demand, it's not worth investing in cellulosic ethanol.”

The E15 decision could indeed revive investor interest in non-grain-based ethanol companies. Investor interest—in both biofuels and bio-based materials—grew during the first few years of this decade, reaching a peak in 2007 (Fig. 1). That meant companies were able to quickly acquire seed money and take their technologies to the pilot plant level, but as financing became harder to acquire and interest petered out, progress stalled. That was all part of “a natural dropoff” in the cycle of early technology development, says David Berry, a principal at Flagship Ventures in Cambridge, Massachusetts, but the blend wall decision could start money flowing again.

Berry says the biggest impact would be on the later-stage companies in need of financing to “cross the chasm” from pilot-scale facilities to large manufacturing plants. An example is Mascoma, of Lebanon, New Hampshire, which is in the process of securing funding for its first industrial-scale cellulosic plant, in Kinross, Michigan. After the EPA's decision, it will be “considerably easier to raise equity for this sort of facility,” says Justin van Rooyen, Mascoma's director of business development.

But corn ethanol—for all the roads it has paved—can still be an impediment to



Car drivers in the US can now fill their tanks with a higher blend of ethanol. But cellulosic biofuel producers want to see the limit rise further.

second-generation biofuels. It's part of the reason 54 ethanol manufacturers and Growth Energy, an ethanol supporters' group based in Washington, DC, submitted the E15 Green Jobs Waiver to the EPA in the spring of 2009, petitioning the organization to amend the ethanol blend limit to 15%. The lobby group realized the 10% ethanol opportunity in gasoline was becoming saturated by existing corn ethanol manufacturers.

Cynthia Bryant, marketing manager, global fuels at Novozymes North America, with headquarters in Bagsvaerd, Denmark calls the EPA's decision “a validation of what we've been saying all along—that higher blends of ethanol can be used in our cars today.” A 15% blend puts ethanol into 43 million cars; if the EPA allows the blend into cars built in and after 2001, it would add another 83 million cars. That could, in effect, reach 54% of the cars in the US.

That's a huge step, though the government is also assisting the growth of biofuels in other ways. In October the US Department of Agriculture said its Biomass Crop Assistance Program will supply \$525 million in subsidies to farmers growing second-generation biomass crops over a 15-year period. But the future of cellulosic ethanol in the US will eventually come down to the hypothetical consumer, and he or she is already being discussed. The EPA E15 decision came with a suggested label to identify pumps dispensing the new blend: bright orange, with the word 'caution' printed in bold at the top. It is not final, but has raised eyebrows anyway, as those in the biofuels industry say the label could scare away customers. “It's a little ominous looking,” says Dreyer, particularly because “all of our testing has shown that E15 is perfectly safe.”

Growth Energy is seeking federal legislation that will require country-of-origin

## IN brief

### Singapore injects \$12.5 billion

The Singaporean government will spend S\$16.1 (\$12.5) billion on research innovation over the next 4 years—a 20% increase over the previous budget. A quarter of the funding—S\$3.7 (\$2.9) billion—is allotted to biomedical science, according to the September announcement. The funding boost “reflects our steady commitment to transforming our economy,” says Beh Kian Teik, director of biomedical sciences of Singapore's Economic Development Board. Since 2000, when the Singaporean government outlined its long-term plan to transform this tiny nation-state into a knowledge-based economy, the government ploughed roughly S\$25 (\$19.3) billion to shore up research infrastructure and create a talent pool to attract private investment. The figures suggest Singapore has succeeded. The country's biomedical manufacturing output alone more than tripled from S\$6.3 billion (\$4.9 billion) in 2000 to S\$21 billion (\$16.2 billion) in 2009. The biomedical sector now represents 10% of the country's manufacturing output, up from 4% in 2000. Most major pharma companies have a presence in Singapore, although in October, Eli Lilly of Indianapolis announced the closure of its Singapore Centre for Drug Discovery. The new funding budget will make “more money available for everyone,” says Beh, with an emphasis on initiatives that favor “economic outcomes.” In fact, some are questioning whether the shift in emphasis toward translational outcomes and away from blue sky research is too myopic. Some of the funding has been earmarked to support the Biomedical Science Industry Partnership Office (IPO), a fledgling agency that supports public-private research projects and helps companies pool expertise across Singaporean research institutes and medical centers. The IPO office has succeeded in setting up collaborations for Basel-based Roche and London-based GlaxoSmithKline with Singaporean researchers. Roche plans to spend S\$130 (\$100.6) million to support a center for translational medicine to develop drugs for the Asian market; whereas GlaxoSmithKline will participate in four public-private research collaborations focused on early-stage research in ophthalmology, regenerative medicine and neurodegeneration. “This should be good news for the biotech sector,” says Jan-Anders Karlsson, CEO of S\*BIO, a drug discovery company set up as a joint venture between the Singapore Economic Development Board Investments and Chiron Corporation in 2000. Government estimates that the nation's economy will have grown by 13–15% by year's end—higher than estimated growth for China and India. In October, Basel-based agribusiness Syngenta opened an R&D facility in Singapore to support technology development in the Asia Pacific region.

Gunjan Sinha