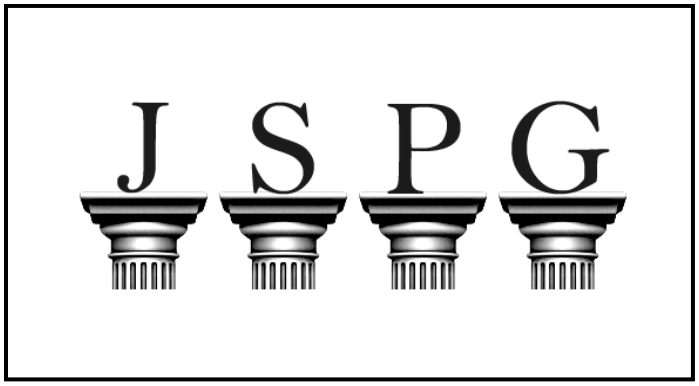
The Journal of Science Policy & Governance



POLICY MEMO:

INCREASING SUSTAINABLE BIOMASS THROUGH PRODUCTION TAX CREDITS

BY

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Executive Summary

As various tax credits and subsidies for the biomass industry expire and with US Environmental Protection Agency (EPA) waivers for Renewable Fuel Standards (RFS) looming for the next several years, there is a need to better promote sustainable biofuels. A maximum production tax credit (PTC) of $0.11 per gallon of renewable fuel and $11 per dry ton of feedstock should be made available to farmer-refinery partnerships that reduce greenhouse gas (GHG) emissions in the production of renewable fuels. This credit should be made available equivalent to the percentage reduction in GHGs from biofuels relative to gasoline. For example a 100% reduction in CO_2 emissions over gasoline would result in a 100% issue of the PTC and so forth.

This production tax credit will increase the availability of sustainable feedstock, guarantee farmers an economic advantage in producing biomass for fuel, and help reach RFS mandates. This PTC will replace the Volumetric Ethanol Excise Tax Credit (VEETC), which costs $6 billion annually. The new PTC could help keep $76.9 billion dollars in the American economy each day as the biomass program reaches its full potential and replaces substantial amounts of petroleum (Greene, 2011). This production tax credit ensures sustainably produced biomass, reduces GHGs, and should be included in the Biomass Crop Assistance Program (BCAP) in the future reauthorizations of the Farm Bill.

Introduction and Analysis of Existing Data and Policies

Currently the US imports 8.43 million barrels of crude oil every day (EIA, 2013). Various programs and policies have been implemented that attempt to reduce US dependence on foreign oil for a variety of reasons. These policies include mandates such as Corporate Average Fuel Economy standards (CAFE), which seek to reduce overall fuel consumption from light duty vehicles and others, such as the RFS, which seek to increase domestic production of renewable fuels. Increasing the domestic production of fuel helps to bolster the economy, reduce fuel price shocks, and increase gross domestic product (GDP). Using advanced biomass for fuel has the potential to greatly reduce the amount of GHGs released into the atmosphere and thus reduce the contribution of the transportation sector to climate change.

While the potential for biomass to replace petroleum maxes out around 30% due to

sustainability factors, biomass is the only alternative fuel source that is readily converted to a liquid transportation fuel which matches current US infrastructure and on road vehicle fleets (DOE, 2011). Other alternative fuel sources, like hydrogen and natural gas, require major engine modifications. Current RFS mandates from the EPA require a minimum of 36 billion gallons of renewable fuels in use by 2022, with 16 billion gallons coming from cellulosic biofuels (EERE, 2011; Schnepf, Yacobucci, & Service, 2013). Currently, advanced biofuels made from biomass, which reduce GHGs by at least 50% over petroleum, are not being produced commercially.

There are several pathways for cultivating and harvesting biomass. Some pathways energy intensive and result in fewer efficiency benefits. Others are potentially less beneficial in carbon reductions because they release stored carbon, such as that stored in trees, or otherwise degrade land resulting in more CO_2 emissions. While policies are in place to mandate production of advanced biomass, there are not many incentives available to farmers to increase their interest in producing biomass for feedstock. In addition, the market price per ton of feedstock has not been economical for farmers and other producers. Because of this, the US has failed to meet RFS mandates and the EPA has had to issue waivers to fuel refineries in the absence of feedstock supply. Further, there are no regulations or guidelines in place encouraging farmers to cultivate and harvest biomass sustainably. Sustainably harvested biomass is desirable because it reduces the trade-off between food and fuel and takes land use change into account when measuring emissions. Changes in land use include clearing forests to grow energy crops, which can release more carbon into the air making biofuels derived from those crops more GHG intensive. In order to incentivize production of advanced biofuel on a commercial scale without further increasing costs for refineries, a graded subsidy is recommended for farmers based on the sustainability of the feedstock they produce. This subsidy would be made available proportional to the total amount of GHGs reduced relative to a gallon of gasoline equivalent.

Policy Analysis

The current version of the BCAP provides matching payments of up to $45 per ton of biomass feedstock (National Sustainable Agriculture Coalition, n.d.). Last year while the bill to reauthorize the program was under consideration in the Senate Committee of Nutrition, Agriculture, and Forestry, Members of Congress made amendments to decrease the matching

payments to only $35 per ton and to decrease the length of time a farm is eligible to receive the payments. When Congress failed to pass a 2012 Farm Bill a 9 month extension was passed which expires in 2013. Due to concerns over the budget, Congress may make cuts to the BCAP program. PTCs can relieve pressure on the budget as they are directly related to the amount of production and would not result in a loss of revenue.

Currently when a project submits to this program, the applicant is granted priority based on the following criteria: 1) volume of eligible crops, 2) volume of other renewable biomass, 3) anticipated economic impact, 4) opportunity for producers and local investors, 5) beginning or socially disadvantaged farmer or rancher participation, impact on natural resource conservation, 6) variety of production approaches, and 7) range of eligible crops (National Sustainable Agriculture Coalition, n.d.). These parameters do not presently include lifecycle analysis (LCA) of GHG emissions, where the reduction of GHGs is one of the goals of using biomass to produce fuel.

In order to promote the most sustainable development of feedstock, a PTC should be granted by evaluating the total reduction in LCA GHGs, where GHG emissions are recorded from the farm all the way to the end product (i.e. from seed to station). Because of this, the full subsidy should only be granted to refinery-farmer relationships achieving 100% reduction in GHG emissions over gasoline across the entire life-cycle of the fuel. Refinery-farmer relationships that achieve partial reduction in GHG emissions over gasoline will receive partial payment of the subsidy. Therefore, refineries that invest in sustainable practices like carbon capture and storage (CCS) or lignin powered facilities will receive higher subsidies. Should the refinery-farmer relationship achieve greater than 100% reduction in GHG emissions over gasoline, the credit will also increase by that percentage. There are several biofuels pathways that have been shown to reduce GHG emissions by 100% or more over gasoline (Baddeley, Ballinger, & Ltd, 2010).

Economic Analysis

The market price per dry ton of feedstock is on average about $22 less than farmers need in order to make production economical, assuming the break-even point for the farmer is around $60 per dry ton. Using an average conversion rate of 100 gallons per ton and an average amount of subsidy necessary of $22 per ton, this equates to a subsidized amount of about $0.22 per gallon

(Haque & Epplin, 2010). In order to achieve sustainability across the refinery, cultivation, and harvesting processes, the PTC would be split evenly, thereby directly reducing both farmer costs and refinery costs. This would allow the price per dry ton to come to about $60 with full subsidy. This even split between the refinery and farmer also incentivizes each party to use the most sustainable methods available, as more sustainable farmers will be able to offer more competitive prices per ton of feedstock and more sustainable refineries will be able to offer higher prices per ton.

This type of incentive is more effective and easier to apply than the current BCAP. BCAP payments are presently subject to the availability of funding whereas production tax credits are not. PTCs are different than direct subsidies like BCAP payments in that they do not directly increase government expenditure. A production tax credit will only reduce revenue as production increases, ensuring that the decrease in revenue is in line with increases in production. Also, it is not clear exactly who will be selected for BCAP funding. A PTC on the other hand will go to all farmers engaged in biomass production, regardless of their ability to apply, and be selected, for BCAP grants. A PTC is a direct way of ensuring a given price per ton of feedstock for both farmers and refineries. Further, BCAP only offers matching payments which do not encourage efficiency in production and cultivation. In a direct production credit, farmers are still encouraged to reduce their costs in order to earn higher profits. Also, PTCs are based on production and are thus proportional to the amount of biomass produced.

The EPA has already developed LCA GHG emission thresholds for renewable fuels that vary based on the type of renewable fuel produced. Renewable fuels must meet these standards in order to be in compliance with the RFS program. These thresholds are considered as reductions in GHG emissions over gasoline and are: 1) 20% reduction for ethanol from corn starches, 2) 50% for advanced biofuel and biomass based diesel, and 3) 60% reduction for cellulosic biofuel (EPA, 2010). These emissions thresholds, however, only set a floor and not a ceiling. Therefore they do nothing to directly encourage greater reduction in GHG emissions over the lifecycle of the fuel. Given that greater reductions are possible, policy should guide the market in a fully sustainable direction.

Recommendations

Developing energy independence in America is paramount. Each day Americans spend more than a billion dollars on foreign fuel. For every barrel of crude oil that is imported into the US, $75 leave the economy and go to the country from which the oil was purchased (EERE, 2011). Producing fuel domestically could keep that money in the American economy. For instance, biomass has the potential to meet about one third of the of domestic transportation fuel demand (DOE, 2011). Today's import consumption rate is equivalent to 8.43 million barrels of crude daily with one barrel of crude oil producing about 42 gallons of gasoline (EIA, 2013). This means the US imports 129 billion gallons each year while 43 billion of those could be produced from biomass. If each barrel is equivalent to a loss of $75 to the US economy, then the US sends $632 million out of our economy daily, with each gallon costing us approximately $1.78. If the US produced the equivalent of one third of those gallons domestically, approximately $210 million would stay in the US economy each day — the equivalent of $76.9 billion per year. To reach this goal, biomass production needs to equate to about 43 billion gallons annually. At an average conversion rate of 100 gallons of fuel per dry ton of feedstock, 43 billion gallons equates to approximately 430 million dry tons of feedstock per year (DOE, 2009). This conversion rate is subject to change in the coming decade and the US Department of Energy (DOE) predicts increases of up to 6% in efficiency conversion, which would mean even higher yields per acre. Subsidies are needed in order to make that feedstock available. A carbon tax would be difficult to apply because it would be very difficult to tell where fuel comes from once it gets into the tank. This means the tax would need to apply upstream. This will have little effect on the producer of the feedstock and will not incentivize farmers to grow their feedstock for biomass as the proposed policy is intended to do.

This program is intended to bring feedstock growth up to its potential by creating a higher market price for feedstock and steering feedstock production towards sources with low GHG emissions in order to achieve climate and energy security goals. In this program, half of the subsidy is made available to farmers and half is made available to refiners. For farmers this is equivalent to about $11 per ton and for refiners it is equivalent to approximately $0.11 per gallon. It is expected that this will create a market where the most sustainable refinery-farmer partnerships will be the most profitable, thus creating competition in the marketplace to find the partners with the lowest emissions.

By growing crops and utilizing domestic workers to produce the feedstock, biomass subsidies keep money in America and strengthen the economy through stable domestic job production. Bringing feedstock prices up to $60 per ton will incentivize farmers to grow and produce feedstock. In some cases this will cost as much as $25 per ton or as little as $17 per ton depending on the feedstock. If the average credit is $22 per ton, the cost of the program amounts to $9.46 billion dollars annually. This number is an eighth of the money kept in the economy by enacting this proposal. For every dollar kept in the economy about $0.12 cents goes towards funding this program. The costs will be offset by the reduction in imported oil because the costs will only be incurred if the entire potential for biomass is realized and its penetration reaches a full 30% of the petroleum supply. When the higher percentage of total biomass potential is realized, supply curves indicate that the market price for the feedstock should stabilize on its own and subsidy will no longer be necessary in a mature market.

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