Analysis of the Implications of Climate Change and Energy Legislation to the Agricultural Sector

Executive Summary

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25x'25
AMERICA'S ENERGY FUTURE

BEAG

BACKGROUND

Congress is currently considering energy and climate change legislation and numerous questions have arisen as to what impact various policy proposals may have on the agricultural and forestry sectors. To better assess these impacts, the 25x'25 Alliance asked the University of Tennessee's Bio-based Energy Analysis Group (BEAG) to analyze how several proposed energy/climate change policy scenarios might impact land use change, feedstock production, feedstock prices, and farm income, as well as carbon costs and payments for producers.

Results from the University of Tennessee study will be presented in four parts. This first report focuses on a detailed agricultural sector analysis evaluating the impacts on agriculture as a result of providing carbon offsets and supplying energy feedstocks from agricultural based products and by-products from crops and livestock while incorporating projected wind and solar impacts from renewable energy farms. Subsequent reports will address impacts on the forest sector and will incorporate economic analysis of the nation's economy conducted at the state and national levels.

ABOUT BEAG

The Bio-based Energy Analysis Group (BEAG), located at the University of Tennessee, is an inter-disciplinary research and outreach group which strives to provide decision makers in government and industry with the most up to date economic and environmental analysis of the bio-based energy industry at the state, regional, and national levels. In 2006, BEAG assessed the ability of the agriculture and forestry sectors to produce 25 percent of the energy consumed by the nation by 2025 while continuing to produce safe, abundant and affordable food, feed and fiber. Among the key findings, the study found that America's farms, forests and ranches can play a significant role in meeting the country's renewable energy needs, that the 25x'25 goal is achievable and that it can be met without compromising the ability of the agricultural sector to reliably produce food, feed and fiber at reasonable prices. The report can be viewed at http://www.25x25.org/storage/25x25/documents/RANDandUT/ut_ea_report.pdf

ABOUT 25x'25

25x'25 is a renewable energy initiative backed by organizations and individuals united by a common interest in making America's energy future more secure, affordable and environmentally sustainable. Through its diverse alliance of agricultural, forestry, environmental, conservation and other organizations and businesses, 25x'25 partners have been working collaboratively since 2005 to advance the goal of securing 25 percent of the nation's energy needs from renewable sources by the year 2025. 25x'25 is led by a national steering committee composed of volunteer leaders from the agricultural, forestry and renewable energy communities. The initiative is supported by the Energy Future Coalition. More on 25x'25 can be found at www.25x25.org

The study has been funded by The Energy Foundation. An electronic copy of the report can be viewed and downloaded at www.25x25.org

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This study projects how meeting several proposed energy/climate change policy scenarios might impact the U.S. agricultural sector. For the purposes of each scenario studied, it is assumed that the Renewable Fuels Standard (RFS) established by the Energy Independence and Security Act of 2007 is in play. Along with the RFS, policy scenarios that have been analyzed include a cap-and-trade regulatory system and varying treatments of agricultural offsets.

KEY FINDINGS

Under a properly constructed cap-and-trade program:

- Net returns to agriculture are projected to be positive – including up to $13 billion annually in additional revenues for agriculture and forestry – and exceed baseline projections for eight of nine crops analyzed;
- Income from offsets and from market revenues is higher than any potential increase in input cost including energy and fertilizer;
- At projected carbon prices of up to $27 per $MtCO_2e$, afforestation of cropland will not occur;
- Major shifts in commodity cropland use does not occur;
- Demand for bioenergy feedstocks will cause significant shifts to hay and dedicated energy crop acreage from pasture conversion;
- Crop and beef prices are not disrupted; and
- Biomass feedstock production creates significant direct and indirect reduction in greenhouse gases (GHG). This includes a direct reduction of an accumulated 460 million metric tons CO_2 equivalent.

If emissions are regulated by EPA without the benefit of multiple offsets:

- Net farm income is projected to fall below baseline projections;
- Agriculture is subjected to higher input costs with no opportunity to be compensated for the GHG reduction services the sector provides;
- Impacts to beef production are uncertain; and
- If afforestation and grassland sequestration are the only offsets allowed, and carbon prices are as high as $160 per $MtCO_2e$, sixty million acres of cropland could be converted to forests and grasslands.

The study looks at a "baseline" policy scenario, which is an extension of the USDA agricultural baseline through 2030. Four other scenarios are then compared with the *Baseline Scenario*.

Among the other four scenarios is one in which emissions, including those from the agricultural sector, are regulated by the EPA in accordance with a 2007 Supreme Court ruling holding the agency responsible for regulating greenhouse gas

emissions under the Clean Air Act (*EPA Led Scenario*). No legislative guidance is presumed for this scenario.

Another scenario limits the offsets available to agriculture to methane capture, afforestation, and conservation tillage (*Limited Offsets Scenario*). Crop residue removals under this limited offset scenario must be carbon neutral.

A third scenario allows for many agricultural offsets, including those for bioenergy crop production and grassland sequestration, but there is no requirement that the removal of crop residues at harvest be carbon neutral (*Multiple Offsets Scenario*). However, crop residue removal must be held at acceptable levels for erosion.

The final scenario also allows many offsets, but the removal of crop residues at harvest must be carbon neutral (*Multiple Offsets/RCN Scenario*). For this final scenario, the effects of pasture conversion and forage replacement on the cattle industry were estimated.

The study used POLYSYS, an agricultural policy simulation model of the U.S. agricultural sector, to project the impacts to the agricultural sector from these potential policy scenarios. The results show impacts on economic returns, climate benefits, feedstock prices, and land use impacts.

The *Multiple Offsets/RCN Scenario* is projected to produce the highest net returns to agriculture and the greatest climate benefits, but ranks third in terms of biomass price. Because this scenario performs well in meeting three important objectives (net returns, environmental performance, and biomass prices), the study devotes further analysis to it, using the *Baseline* and *EPA Led Scenarios* as reference points. The *Multiple Offsets/RCN Scenario* provides nearly $209 billion more in net returns than the *Baseline Scenario* and $364 billion more than the *EPA Led Scenario***.** The *Multiple Offsets/RCN Scenario* also provides an additional 463 million metric tons of reduced CO_2 equivalent, and 31 million metric tons more in reductions when measured against projections made for the *EPA Led Scenario*.