

**ANALYSIS OF RISKS AND CORPORATE DISCLOSURES
REGARDING
ENVIRONMENTAL AND CLIMATE CONSIDERATIONS
IN THE BIOMASS POWER SECTOR**

PARTNERSHIP FOR POLICY INTEGRITY

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SYNOPSIS

The Partnership for Policy Integrity (PFPI) is a Massachusetts-based environmental organization with expertise on biomass energy and its environmental and health impacts. We produce reports and provide scientific and legal expertise to citizens and policymakers on biomass energy facilities and on national, state and local biomass energy policies.

In early 2013, PFPI reviewed corporate disclosures by three energy companies with substantial biomass energy¹ holdings – Covanta Holding Corporation (“Covanta”), Dominion Resources Inc./Virginia Electric and Power Company (“Dominion”) and Southern Company. All three are publicly traded companies that own and operate wood-fueled biomass power plants in the United States. We analyzed how company disclosures described the environmental risks associated with biopower, and their compliance with related Securities and Exchange Commission (SEC) disclosure requirements, including guidelines provided by the 2010 SEC Climate Guidance.

PFPI found that discussion of environmental risks of biopower was incomplete and misleading without inclusion of additional information.

Biomass energy generation is on the rise in the United States, in part driven by the availability of subsidies and tax credits for renewable energy. However, renewable energy technologies are not all equally effective at reducing greenhouse gas and pollutant emissions. Wind, solar, and hydropower are often characterized as “clean” and “carbon neutral” due to their lack of emissions of carbon dioxide (CO₂) and conventional air pollutants like particulate matter, nitrogen oxides and carbon monoxide. The terms “clean” and “carbon neutral” are also sometimes used to describe bioenergy, but in light of the actual emissions from biomass power plants, the terms are misleading. Biomass energy is much more akin to traditional fossil-fueled energy than no-emissions technologies like wind and solar energy.

On a day to day basis, wood-fueled power plants emit about 150% the CO₂ of a coal plant and 300 – 400% the CO₂ of a gas plant per megawatt-hour of electricity generated.

Biomass power plants emit more CO₂ than fossil-fueled plants, producing about 150% the CO₂ of a coal plant and 300 – 400% the CO₂ of a gas plant per megawatt-hour (MWh) of electricity generated. Biopower facilities also emit similar or greater amounts of key air pollutants per MWh as fossil fueled facilities, including particulate matter, nitrogen oxides, and carbon monoxide. The pollution emitted by any particular facility depends on the fuels burned and the emission controls employed, but in general, permitted emissions of key air pollutants are similar to or greater than those from modern coal plants, and are significantly greater than those from gas plants, even at bioenergy facilities that have employed “best available control technology.”

¹ “Biomass energy” or “bioenergy” as used in this letter refers to the generation of heat and electricity by burning wood and other biological materials as fuel in industrial, commercial, and utility boilers. Biomass power or “biopower” refers solely to the generation of electricity. As used here, the term “bioenergy” does not include the separate but related industry of producing refined liquid fuel products from biological sources. It is important to note at the outset that the vast majority of biomass energy facilities are wood-fueled, and much smaller portions are fueled with agricultural wastes or other biological materials. The present analysis focuses on the wood-fueled portion of these operations.

A renewable energy technology that emits more CO₂ on a day to day basis than the fossil fuels it is supposed to replace is not immediately effective in mitigating climate warming, but it is in theory possible for bioenergy CO₂ emissions to be offset and thus mitigated with the passage of time. There are two main ways this may occur. Either fuels are derived from waste wood that would decompose and emit CO₂ anyway, so that net emissions over time are equivalent whether the material is burned for energy or left to decompose; or, it is assumed that trees and other plants harvested for fuel will grow back and re-sequester an equivalent amount of CO₂ as was released by burning, thus drawing down net CO₂ emissions. However, both these processes take time, particularly when wood is burned as fuel. In fact, when whole trees are used as fuel, modeling studies show that it takes 30 – 90 years or even longer for the extra emissions emitted by a biopower facility to be offset so that net emissions are reduced to the *same level* as would have been emitted from a fossil-fueled power plant. Only after this point can a biopower facility be said to produce a net reduction in atmospheric CO₂ loading relative to a fossil fueled facility.

The regulatory and policy environment for bioenergy has changed significantly in recent years, and there are several developments that may impact the viability of bioenergy, or are already doing so. However, we found sparse discussion of material business risks that could arise due to changing regulation of biomass energy and biogenic carbon emissions. Instead, the companies we examined tended to represent biopower as a key component of corporate clean energy strategies intended to reduce CO₂ emissions – without acknowledging that climate benefits will only occur in the future, if they occur at all.

New regulations and policies are aimed at greenhouse gas emissions from biomass power plants

Federal regulation of biogenic CO₂ appears to be a significant possibility. When EPA initially began regulating CO₂ under the federal Clean Air Act's Prevention of Significant Deterioration (PSD) permitting program in early 2011, biomass power plants were regulated alongside fossil fueled power plants. In July 2011, EPA suspended regulation of bioenergy facilities under the program for a period of three years, and convened a Panel of its Science Advisory Board (SAB) to advise the agency on how to regulate biogenic CO₂ emissions. The permitting deferral ends in July 2014, and EPA seems poised to adopt the recommendations of the SAB that bioenergy can not be considered *a priori* carbon neutral, with net CO₂ emissions from bioenergy depending on a variety of factors. This suggests that EPA will come up with a regulatory scheme to account for bioenergy emissions that could, if the agency follows the SAB's recommendations, discriminate among fuels and power plant technologies when accounting for net CO₂ emissions.

In the meantime, a 2013 federal court ruling vacated EPA's regulatory deferral for biogenic CO₂ emissions (*Center for Biological Diversity v. EPA*, D.C. Cir. No. 11-1101, July 12, 2013). The court identified nothing in the Clean Air Act that would allow EPA to exempt biogenic CO₂ from being counted when determining whether a facility meets the emissions thresholds that trigger PSD permitting. If PSD permitting is resumed for bioenergy facilities, the great majority of biomass power plants now proposed would be "major" sources of CO₂ under the Clean Air Act (emitting over 100,000 tons of CO₂ per year) and thus would be required to go through PSD permitting, which is a more involved process than receiving a state-issued emissions permit. In other developments at EPA, the proposed federal New Source Performance Standard for fossil-fueled power plants does count CO₂ emitted by biomass co-firing in new coal plants when

determining a facility's emission rate, indicating there are circumstances when EPA does not distinguish between fossil-fuel and biogenic CO₂ emissions.

Although the companies examined in this letter offered comments to EPA on what regulation of biogenic CO₂ emissions could mean for their businesses, there was very little disclosure of these matters to the SEC. Based on the bioenergy industry's own comments, the avoidance of Clean Air Act regulation of CO₂ seems to have been a pivotally important legal matter. Yet the important federal court decision and other developments which could portend materially significant regulation of biogenic CO₂ emissions have not been disclosed in SEC filings.

Companies have not disclosed important information to investors

Meanwhile, at the state level, there has been increasing recognition of the greenhouse gas and forest impacts of biomass energy. In Massachusetts, state regulations eliminated subsidies for low-efficiency, high emissions bioenergy facilities like the ones owned and operated by the three companies named in this letter, a development that directly affects two of Covanta's bioenergy facilities in Maine. Legislation proposed in Maryland and Washington, DC would also eliminate renewable energy subsidies for low-efficiency biopower facilities, and would directly affect Dominion's biopower investments. However, none of the companies disclosed these policy developments to investors, even though they had in some cases submitted letters on proposed legislation stating that elimination of subsidies would reduce the financial viability of their biopower facilities.

The three companies we reviewed all have significant bioenergy holdings, specifically, wood-burning power plants, and all have promoted bioenergy as providing environmental benefits.

Dominion

Dominion operates one of the largest biomass power stations in the United States, the 83 MW Pittsylvania station in Virginia. In addition to Pittsylvania, Dominion began operation of the 585 MW Virginia City Hybrid Energy Center in July 2012, which will co-fire up to 60 MW biomass by 2020. Dominion is also converting three coal-fired power plants to burn biomass, and announced the completion of the Altavista plant conversion on July 15, 2013. Dominion's projected renewables mix for 2020 is more than 75% wood fueled biomass, 3% solar, and 0% wind energy.

Dominion refers to bioenergy as "clean" and "carbon neutral" in promotional materials, including on its website where those claims may be viewed by investors. However, emissions of CO₂ from Dominion's facilities are significant. Once Dominion's bioenergy capacity is all online (Pittsylvania plus the new facilities) these facilities at fulltime operation will represent about a 4.1% increase in electricity generation in Virginia, but will cause an 11.7% increase in day to day power sector CO₂ emissions over the 2011 baseline. Emissions of conventional pollutants will also be significant. For instance, construction permits for the Altavista, Southampton and Hopewell plants (combined capacity 153 MW) reveal that their permitted emissions will be 253.2 tpy of PM_{2.5}, 114.6 tpy sulfur dioxide, 1,237 tpy nitrogen oxides, 2,748 tpy carbon monoxide, and 129.4 tpy volatile organic compounds. Wood use at each plant will be

about 785,000 tons per year.

The company admitted in testimony to the State Corporation Commission (but not in SEC disclosures) that their coal-to-biomass conversions will emit more CO₂ on a day to day basis than facilities that simply burn coal. They also stated that the value of their investments in converting the coal plants to burn biomass depends on regulatory treatment of biomass energy as carbon neutral.

Concern about climate change and greenhouse gas emissions led to legislation being offered in Maryland in 2013 that would eliminate renewable energy subsidies for low-efficiency biopower plants like those owned by Dominion. Testifying against the bill, Dominion stated that subsidies are a “key revenue stream” that is critical to the economic viability of the projects. In a letter to the EPA, Dominion also stated that the value of biomass power facilities depends on bioenergy being treated as carbon neutral. Yet Dominion’s disclosures to investors do not reflect these vulnerabilities, or other developments relevant to regulation of biogenic carbon.

Dominion, Southern, and Covanta have all represented bioenergy as “clean” and “carbon neutral”

Southern Company

Southern Company directly owns one biomass facility, the Nacogdoches plant near Sacul, Texas. Using about 1 million tons of wood per year and with 116 MW capacity, the Nacogdoches facility is one of the largest biomass power stations in the United States (although the facility was idled a few months after it went online, due to the high cost of its power relative to other available sources, including wind and natural gas). Southern Company subsidiaries (Alabama Power, Mississippi Power, and Georgia Power) are co-firing biomass in coal plants, have contracted with other smaller companies for biomass power, or are planning and investigating future bioenergy projects.

Southern Company’s promotional materials claim that bioenergy is clean and carbon neutral, but in a letter to the EPA on regulation of biogenic CO₂, the company states that such regulation would impact future bioenergy projects. While Southern’s SEC filings discuss the risks that regulation of coal plant CO₂ may pose, potential regulation of biogenic CO₂ is not discussed.

Covanta

Covanta Holding Corporation owns eight wood-fueled biomass power plants – six in California and two in Maine. The company’s website makes several statements on the environmental benefits of bioenergy, asserting bioenergy produces “significant reductions in greenhouse gas emissions.” Of the companies we reviewed, Covanta was the only one to state (in its sustainability report) that bioenergy is not always carbon neutral.

Covanta also had the most complete set of disclosures regarding developments in regulation of bioenergy CO₂ emissions at the EPA. However, the company does not disclose in SEC filings that its two wood-burning power plants in Maine will no longer

qualify for the financially generous Class I renewable energy credits in Massachusetts as of 2016, as the facilities are not efficient enough to comply with the state's new requirements. Covanta commented on the Massachusetts rules when they were proposed, arguing that its facilities should be exempted from the regulations, but has not disclosed the loss of subsidies to investors.

The three registrants whose filings we reviewed represent biomass power as “clean” and “carbon neutral” and largely do not disclose to investors the threats posed by potential regulation of bioenergy and biogenic CO₂ emissions. Our analysis suggests the companies are omitting adequate discussion of regulatory, reputational and litigation risks. The companies' continued failure to adequately disclose the material risks related to biomass investment is potentially harmful to investors.

Along with the investors who have signed the letter that accompanies this report, we are asking that the Securities and Exchange Commission evaluate, consistent with the SEC Climate Guidance, evidence that these companies named in this document are failing to live up to the requirements of the securities laws when it comes to disclosure of the financial and operational risks and impacts on each company due to its investments in biopower. We are further requesting that the Commission clarify the disclosure obligations of these companies by directing corrective disclosures and issuing an additional Staff guidance on the duty of companies to accurately disclose material risks from biopower.

I. BIOENERGY: THE DILEMMA OF DISCLOSURE

The question of how to reduce use of fossil fuels for electricity generation is a growing preoccupation of policy-makers. The generation of “renewable” energy is thus frequently incentivized at the state level with ratepayer-funded subsidies, known as renewable energy credits (RECs), as well as with taxpayer-funded federal and state tax credits. To meet the growing demand for renewable energy, and to benefit from these incentives, a number of companies are proposing to increase the use of bioenergy, the combustion of wood and other biological materials of recent origin to produce heat and power.

The vast majority of new utility operations generating electricity from biomass are wood-fueled. Thus as used in this document, “bioenergy” refers to energy produced by wood combustion in industrial, commercial, and utility boilers, including thermal energy used for heat or electricity generation; “biopower” is used in this document to refer solely to the generation of electricity by burning wood as fuel. Neither term as used here includes other forms of bioenergy, such as that derived from landfill gas or liquid biofuels. Also, this document exclusively analyzes wood-fueled bioenergy, because currently biopower facilities burning other materials such as agricultural wastes or crops like switchgrass reflect a very small portion of existing or proposed biomass electricity generation.

Certain renewable energy technologies, like wind and solar power, are characterized as “carbon neutral” because they do not rely on fossil fuels and thus eliminate emissions of greenhouse gases produced by fuel combustion. These technologies also do not emit conventional air

pollutants like nitrogen oxides (NO_x) and particulate matter (PM). Such zero-emissions energy technologies are often referred to as “clean.”

In contrast, bioenergy facilities, which burn biomass in power plants using technology nearly identical to that of a coal plant, emit more of the greenhouse gas carbon dioxide (CO₂), and as much or more of key “conventional” air pollutants² as power plants fueled by coal and gas. Despite the fact that bioenergy CO₂ and air pollutant emissions equal or exceed those from fossil-fueled facilities, companies frequently refer to bioenergy as “clean,” “low emissions,” and “carbon neutral.” Such representations can be seen as misleading not only to consumers, who may pay extra on their utility bill to support renewable energy, but also to investors in publically traded companies with bioenergy holdings.

In addition to actively representing bioenergy as clean and carbon neutral, companies with bioenergy holdings often *omit* information from company literature and filings to the Securities and Exchange Commission that would assist investors in accurately assessing the risks and opportunities associated with bioenergy. Companies are making significant investments in bioenergy in order to generate more renewable power and to benefit from renewable energy subsidies and tax credits, but some of those of subsidies are at risk due to changing scientific understanding of the viability of bioenergy as a climate strategy. Furthermore, the companies face undisclosed regulatory risks associated with their greenhouse gas and air pollutant emissions and the potential for emerging regulation of these emissions.

Claiming that bioenergy is clean and carbon neutral is misleading to consumers and investors

To inform the Securities and Exchange Commission (SEC) about this trend, we reviewed publically available information and corporate disclosures by three large companies with bioenergy holdings – Covanta Holding Corporation (“Covanta”), Dominion Resources Inc./Virginia Electric and Power Company (“Dominion”) and Southern Company (together, “the Companies”). All three are publicly traded companies that own and operate biomass power plants in the United States. We found that all three companies advertised their bioenergy investments to varying degrees as clean and carbon neutral, and all three failed to disclose key judicial, regulatory, and legislative developments that indicate a strong potential for bioenergy to face regulation that could significantly reduce the value of bioenergy investments.

In the following sections, we describe common claims made about bioenergy emissions, and analyze whether they are accurate. We describe policy and regulatory developments, and how these may jeopardize investments in bioenergy generally. We then assess the disclosures of the three companies in light of these issues.

II. ANALYSIS OF COMMON BIOENERGY INDUSTRY REPRESENTATIONS

In this section we address claims that bioenergy is clean and carbon neutral.

² Depending on the emission control technologies employed.

A. Representations of Biopower as “Clean” Are Misleading

Biomass power producers often market biopower as “clean” power, which might reasonably be understood to imply that emissions are less than from fossil fuel combustion, and that biopower has a net positive effect on air pollution, greenhouse gas emissions, and public health.

Disclosure-related comments representing biomass as “clean” could in some cases cause readers to assume the term means the same as for other renewable energy technologies such as wind, solar and hydropower.

However, on a day-to-day basis, biopower facilities emit as much or more particulate matter, carbon monoxide, and nitrogen oxides³ as modern coal and gas plants per unit energy generated. Replacing coal with biomass can lead to a reduction in sulfur dioxide emissions, but biomass plants have higher sulfur dioxide emissions relative to modern natural gas plants, which are the most common type of new power plants being built in the U.S. today.

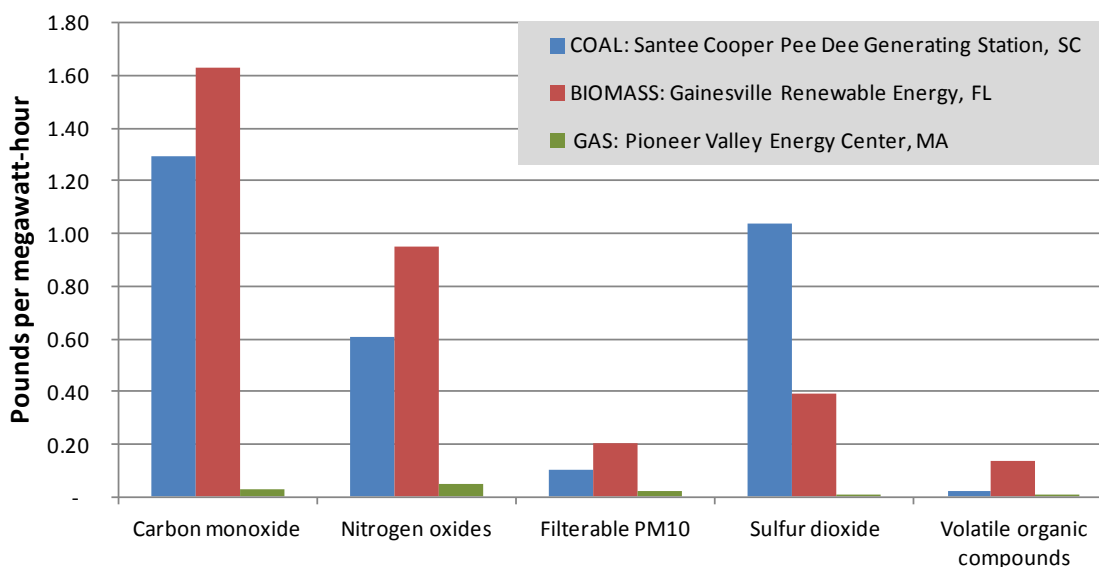


Figure 1. Permitted emission rates (in pounds per megawatt-hour of electricity generated) from three recently permitted facilities. Emissions from the biomass facility are higher than from the coal or gas-burning facilities in all cases except for sulfur dioxide, where emissions exceed those from natural gas but not from coal.⁴

³ The amount of pollution emitted by a particular facility and how it compares to any other facility depends on the fuels burned and the pollution control technologies employed. Data on permitted emissions from different facilities are available at EPA’s BACT clearinghouse, <http://cfpub.epa.gov/RBLC/>. The best-performing (lowest-emitting) biomass power plants included in the database have emissions rates that are no lower than the best-performing coal plants, except for sulfur dioxide. However, emission rates of bioenergy for sulfur dioxide exceed those from natural gas considerably.

⁴ South Carolina Bureau of Air Quality. December 16, 2008. PSD, NSPS (40CFR60), NESHAP (40CFR63) Construction Permit for Santee Cooper Pee Dee Generating Station (1,320 MW). Florida Department of Environmental Protection. December 28, 2010. Final air construction permit for Gainesville Renewable Energy Center (100 MW). Massachusetts Department of Environmental Protection. June, 2010. Conditional permit to construct issued to Pioneer Valley Energy Center. Emissions rates from the three permits were converted from

A comparison of three recently permitted facilities (Figure 1) shows that for day-to-day operations, permitted emissions rates for the biopower facility (pounds per megawatt-hour) compared to the natural gas facility are 56 times higher for carbon monoxide, 20 times higher for nitrogen oxides, 9 times higher for filterable particulate matter, 35 times higher for sulfur dioxide, and 15 times higher for volatile organic compounds. All three facilities went through a “Best Available Control Technology” analysis and can therefore be assumed to have relatively low permitted emissions compared to other facilities of their type.

Biomass power plants emit as much or more of certain harmful air pollutants as coal- and gas-fired facilities

There are real health consequences associated with emissions from biopower, which is why the American Lung Association opposes biomass energy in general and especially its classification as “renewable” energy that is eligible for subsidies and tax breaks.⁵ Pollutant emissions from biomass combustion, similar to pollutant emissions from fossil fuel technologies, worsen air quality and are linked to respiratory and cardiac disease, as well as cancer. To the extent that states meet their renewable energy goals by building biomass power plants rather than wind or solar facilities, they are increasing air pollution. To the extent that biopower displaces natural gas, this also increases direct stack emissions of air pollution from power plants. Therefore, the unqualified use of the word “clean” in SEC disclosures appears to be misleading.

B. Claims That Wood-fueled Biopower is “Carbon Neutral” Can Be Misleading

Burning one ton of “green” woodchips in a biomass power plant emits about one ton of CO₂. Thus, compared to the negligible lifecycle carbon emissions from wind and solar power, claims of carbon “neutrality” by bioenergy merit a great deal of qualification to avoid creating a misleading perception that these “renewables” are environmentally comparable. Most fundamentally, on a day-to-day basis biomass power plants emit more CO₂ per MWh of electricity than traditional fossil-fueled power plants. Typical emission rates for power plants are as follows:

Gas combined cycle	883 lb CO ₂ /MWh
Gas steam turbine	1,218 lb CO ₂ /MWh
Coal steam turbine	2,086 lb CO ₂ /MWh
Biomass steam turbine	3,029 lb CO ₂ /MWh

Table 1. Stack emissions of CO₂ from fossil-fueled and biomass-fueled power plants.⁶

units of lb/MMBtu to units of lb/MWh.

⁵ From ALA’s Letter to Representatives Waxman and Markey on the American Clean Energy and Security Act, June 24, 2009: “The legislation should promote clean renewable electricity, including wind, solar and geothermal. The Lung Association urges that the legislation not promote the combustion of biomass. Burning biomass could lead to significant increases in emissions of nitrogen oxides, particulate matter and sulfur dioxide and have severe impacts on the health of children, older adults, and people with lung diseases.”

⁶ Fuel CO₂ per heat content data are from EIA, Electric Power Annual, 2009: Carbon Dioxide Uncontrolled Emission Factors. Efficiency for fossil fuel facilities calculated using EIA heat rate data (<http://www.eia.gov/cneaf/electricity/epa/epat5p4.html>); biomass efficiency value is common value for utility-scale facilities.

Biomass power plants have higher emissions than coal-fired or natural gas-fired plants, partly because they are less efficient and also because biomass has significantly lower energy content per unit carbon than natural gas. Converting a power plant from coal to biomass generally *decreases* the amount of power the facility can produce, and *increases* the amount of CO₂ emitted per megawatt-hour of electricity generated. If society uses more wood-fired biopower facilities to meet next year's energy needs, next year's atmospheric CO₂ will go up, not down.

The assumption of bioenergy carbon neutrality can lead to deeply flawed policies, exemplified by the American Clean Energy and Security Act (the “Waxman Markey” climate bill) of 2009. Energy Information Administration modeling projected a decline in power sector CO₂ emissions from new renewable energy capacity under that bill. However, close examination of the assumptions revealed that most of the “decline” in CO₂ emissions consisted of replacing coal with biomass, and *then simply not counting the biopower CO₂ emissions on the presumption they were carbon neutral*. When the biomass emissions are added back in, however, it is apparent that nearly the entire greenhouse gas reduction strategy of this flagship piece of climate legislation was based on an accounting trick (the legislation also assumed carbon capture and sequestration – CCS – would be playing a significant role by 2016). Power sector emissions would only show a marginal decline when biogenic CO₂ is counted.

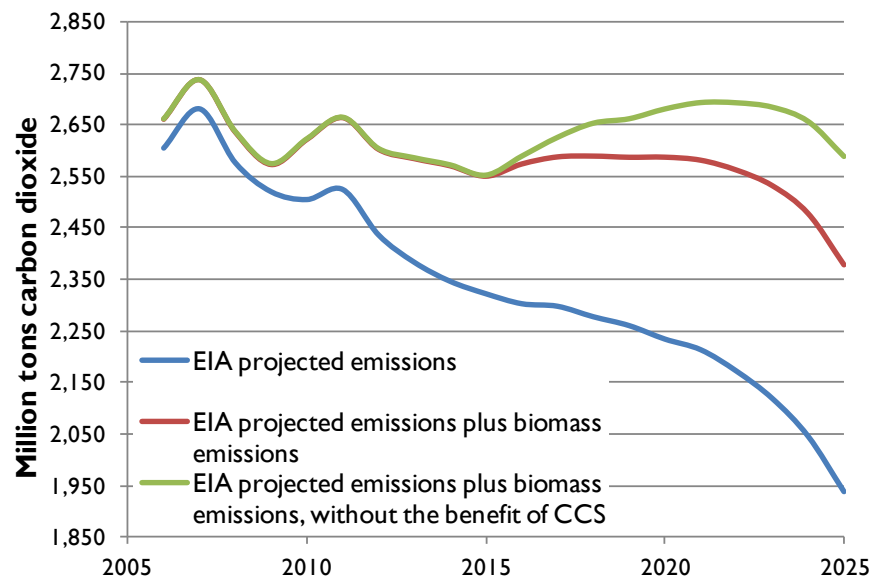


Figure 2. Projections for GHG emissions under the American Clean Energy and Security Act, 2009.⁷

1. Biomass combustion occurs quickly, but offsetting CO₂ emissions takes time

When a company claims that their biopower facilities are carbon neutral, they are typically implicitly or explicitly relying on two key principles:

⁷ Mary Booth and Richard Wiles, 2010, “Clearcut Disaster,” Environmental Working Group, Washington, DC.

1. Forest regrowth offsets. This argument is based on the idea that net carbon emissions from burning wood will be offset as trees regrow and take up an equivalent amount of CO₂ as was released by burning. (From the outset, this argument is significantly complicated by the reality that in the *absence* of burning trees for fuel, ongoing forest growth would already offset CO₂ emissions from fossil-fuel burning. Thus to be accurate, calculations of the time required for net CO₂ resequstration must take account of lost sequestration following biomass harvesting, as well as regrowth.)
2. Waste wood decomposition offsets. Where waste wood or wood-derived materials are used as fuel (such as lumber mill shavings, pulping liquors, and forestry residues – the tops and limbs left over after saw-timber harvesting), it is argued that burning these materials emits no more CO₂ than letting them decompose naturally. It is also sometimes argued that burning wood waste instead of allowing it to decompose prevents the production of methane, a greenhouse gas with greater potency than CO₂.

Importantly, as Figure 3 illustrates, neither of these justifications for biopower carbon neutrality acknowledges the amount of time it takes to offset the immediate emission of CO₂ from burning wood as fuel. This time-lag is critical for determining the effect of biopower emissions on net atmospheric CO₂ loading.

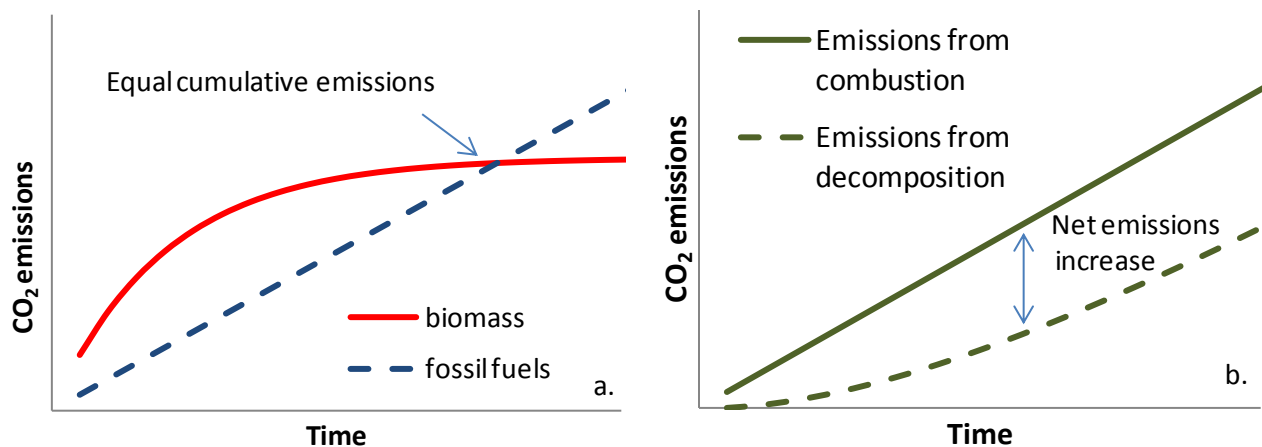


Figure 3. Offsetting bioenergy CO₂ emissions takes time. Panel (a) illustrates that time is required for forests cut for biomass fuel to regrow and draw down net biogenic CO₂ emissions to the point where cumulative emissions match those from fossil fuels; only after this point will net emissions from bioenergy be less than from fossil fuels.⁸ Achieving full carbon neutrality takes significantly longer. Panel (b) illustrates that cumulative emissions from burning waste wood exceed those from letting that wood decompose; the net emissions increase from burning such materials for fuel is equal to the difference between the curves. Cumulative emissions from decomposition always lag emissions from burning.

⁸ Figure after Walker, T., et al. 2012. Carbon accounting for woody biomass from Massachusetts (USA) managed forests: a framework for determining the temporal impacts of wood biomass energy on atmospheric greenhouse gas levels. *Journal of Sustainable Forestry*, 32:1-2, 130 – 158.

It is also important for calculating net CO₂ emissions from bioenergy to account for the pulse of CO₂ from decomposing root material that is emitted when trees are cut for fuel. While emissions from the aboveground portion of the tree are accompanied by energy generation, the decomposition of belowground biomass simply emits additional CO₂ with no energy gain.

2. Offsetting biopower CO₂ emissions with forest regrowth takes decades

The framework for determining net emissions from bioenergy was most clearly articulated by a study conducted in Massachusetts, where three large biomass power plants were proposed in the mid-2000's. Policymakers were concerned that the significant CO₂ emissions from biopower facilities were incompatible with the state's mandate to reduce CO₂ emissions under the Global Warming Solutions Act, and thus commissioned a study to determine the net CO₂ emissions impact of biopower.

In assessing net CO₂ emissions from bioenergy, the "Manomet study," as it came to be known, took into account the critical role that forests currently play in sequestering CO₂ from the power sector, whether it arises from fossil fuel or biomass combustion. Concluding that there were not enough forestry residues from sawtimber harvesting in the region to meet potential fuel needs, the study evaluated how increasing forest harvesting would affect net CO₂ emissions.⁹ It considered whether and when increased forest regrowth following harvesting of biomass today would result in a breakeven point, when the CO₂ sequestered by re-growing forests would not only offset the CO₂ emitted from harvesting and burning forest wood for fuel, but also compensate for the CO₂ that *would* have been sequestered by those forests had they continued to be managed without additional harvesting for biomass fuel (the "business-as-usual" scenario employed by the Manomet study assumed that fossil fuels continue to be burned for energy).

The main and most newsworthy conclusion of the Manomet study was that a biomass power plant could operate for more than 40 years, all the while allowing forests cut for fuel to regrow and re-sequester CO₂ undisturbed, and cumulative CO₂ emissions would still exceed emissions from a same-sized coal facility operating over the same period (during which forests

Manomet found that net CO₂ emissions from a biomass power plant would exceed those from coal for more than 40 years

had been harvested for sawtimber only). It would take more than 90 years for forest regrowth to draw CO₂ emissions from a biopower facility down to the level of a similarly sized gas facility. Whether this offset would ever *actually* be achieved depends on whether forests are left alone to regrow without additional harvests, and whether ecological conditions, including the effect of climate warming, favor regrowth.

Cutting and burning trees that would otherwise have a future of carbon sequestration ahead of them degrades the forest carbon sink that is *currently* preventing atmospheric CO₂ levels from being even higher than they already are. The potential effects on forest cover are significant – for instance, a single 50 MW biomass power plant can consume about 650,000 tons of wood a

⁹ Walker, T., et al. Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy. Manomet Center for Conservation Sciences. 2010.

year, or the equivalent wood that would be yielded by clear-cutting 6,500 acres of medium-aged Northeastern forests annually. Figure 4 shows a real-life example of how slowly forests regrow, compared to the speed with which they can be cut and burned. The clearcut shown in this satellite imagery taken from Google Earth had barely begun to grow back after almost ten years.



Figure 4. Repeat satellite imagery of a 25-acre clearcut in Maine, showing little regrowth after almost ten years. Assuming standard values for forest biomass in Maine,¹⁰ the amount of wood generated by this harvest would be about 950 tons, sufficient to fuel a 50-MW biomass power plant for about 21 hours.

The Manomet study is only one of several scientific studies in recent years that have come to similar conclusions regarding how long it takes for the extra CO₂ emitted by biopower facilities to be offset by forest regrowth.

- A 2009 paper published in the journal *Nature* demonstrated the theoretical impossibility for biopower emissions to be carbon neutral where forests are cut for fuel.¹¹
- A study conducted in the Southeast¹² examined how long it would take for fast-growing pine plantations to offset biopower emissions. The study concluded that even under these seemingly favorable conditions, it would take 30 – 50 years for biopower emissions to be drawn down to a level comparable to net emissions from fossil fuels.
- A 2012 modeling study determined that under a wide variety of land use histories and harvesting regimes in the United States, forests store more carbon than using them for energy “saves.”¹³
- Another study assessing biopower fueled with forest wood found that for all scenarios

¹⁰ Smith, W.B., et al. 2007. Forest Resources of the United States, 2007. United States Forest Service, Gen.Tech Report WO-78. December, 2008.

¹¹ Searchinger, T., et al. 2009. Fixing a critical climate accounting error. *Science* 326: 527-528.

¹² Colnes, A., et al. 2012. Biomass supply and carbon accounting for Southeastern Forests. Biomass Energy Resource Center, Montpelier, VT.

¹³ Mitchell, S., et al. 2012. Carbon debt and carbon sequestration parity in forest bioenergy production. *GCB Bioenergy* (2012) doi:10.1111/j.1757-1707.2012.01173.x.

compared, biopower reduced forest carbon and increased atmospheric CO₂ emissions.¹⁴

In the face of this science, policymaking bodies are coming to important conclusions that undermine the prospects for bioenergy to continue to be treated as a climate-friendly renewable energy technology. Internationally, the current Intergovernmental Panel on Climate Change Guidelines do not consider biomass used for energy to be automatically carbon neutral even where the biomass is thought to be produced sustainably.¹⁵ Here in the United States, the Environmental Protection Agency (EPA) convened a panel of the Science Advisory Board (SAB) to advise the agency on how to regulate biogenic CO₂ emissions, which concluded that “biomass energy cannot be considered *a priori* carbon neutral.”¹⁶ EPA’s official position on the net carbon impact of bioenergy is still evolving, but a recent rulemaking cited the SAB position.¹⁷ We discuss these developments in greater detail below.

C. Burning “Waste” Wood Does Not Mitigate Climate Warming

Bioenergy industry statements regarding climate benefits of burning of waste wood for energy are also not supported by current science.

1. Combustion emits CO₂ faster than decomposition

The bioenergy industry often argues that burning forestry residues and other waste wood emits no more CO₂ than allowing these materials to decompose. While this may be true eventually, as shown in Figure 3(b), burning emits CO₂ immediately while decomposition takes years to decades, while building soil carbon in the process. In fact, assuming a decomposition rate typical for New England forests, after 20 years of facility operation, cumulative net emissions from combustion are still *double* the amount that has been emitted by decomposition. This means that a 50 MW biopower plant where emissions are not counted because it burns forestry residues actually emits about 4.6 million more tons of CO₂ than what would be emitted if residues were left in the forest to decompose.¹⁸

Even when biopower is fueled by “waste” wood, cumulative CO₂ still exceeds emissions from coal and gas

The Manomet Study, which assumed that forestry residues break down fairly quickly in nature,

¹⁴ McKechnie, J. et al. 2011. Forest bioenergy or forest carbon? Assessing trade-offs in greenhouse gas mitigation with wood-based fuels. *Environmental Science and Technology*, 45: 789-795

¹⁵ Intergovernmental Panel on Climate Change (IPCC), Task Force on National Greenhouse Gas Inventories, Frequently Asked Questions. (<http://www.ipcc-nggip.iges.or.jp/faq/faq.html>).

¹⁶ United States Environmental Protection Agency. SAB review of EPA’s Accounting Framework for Biogenic CO₂ Emissions From Stationary Sources. EPA-SAB-12-011. September 28, 2012. Washington, DC. ([http://yosemite.epa.gov/sab/SABPRODUCT.NSF/57B7A4F1987D7F7385257A87007977F6/\\$File/EPA-SAB-12-011-unsigned.pdf](http://yosemite.epa.gov/sab/SABPRODUCT.NSF/57B7A4F1987D7F7385257A87007977F6/$File/EPA-SAB-12-011-unsigned.pdf)).

¹⁷ Standards of performance for greenhouse gas emissions from new stationary sources: electric generating units. 40 CFR Part 60, [EPA-HQ-OAR-2013-0495; FRL-9839-4] RIN 2060-AQ91. September 20, 2013.

¹⁸ This calculation employs the decomposition rate assumed for the net CO₂ emissions calculator provided by the State of Massachusetts in the carbon accounting spreadsheet that accompanies the new bioenergy rules. (<http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/biomass/renewable-portfolio-standard-biomass-policy.html>)

nonetheless determined that net emissions from a biopower facility would exceed those from a coal plant for more than ten years, and would exceed those from a gas plant for more than 30 years – even if the facility was fueled with forestry residues from sawtimber harvesting that would decompose anyway and there was no increase in whole-tree harvesting to provide fuel.¹⁹

2. The definition of “waste” wood is in the eye of the beholder

Claims that biopower facilities only burn forestry residues that are generated by sawtimber harvesting are used to justify the argument that net emissions are no more than leaving those materials in the woods to decompose. Beyond the flawed logic as shown above, such claims have a high probability of being false because large bioenergy facilities require more fuel, and higher quality fuel, than forestry residues are likely to provide. For instance, in testimony before the North Carolina Utilities Commission, a representative for Duke Energy stated that the company required whole tree chips for co-firing at their Buck and Lee coal plants, as forestry residues are mostly “left at the harvest site because they are considered uneconomic to transport and have low quality for utilization due to size, dirt, and bark content.” The Duke witness also stated that forestry residues were quite limited in quantity.²⁰ Such blunt admissions are never found in companies’ public pronouncements about what they burn for fuel, however.

Additionally, it is not uncommon for bioenergy companies to treat whole trees as “waste.” Two of the companies we examine in this letter provide examples. A letter from Dominion to EPA’s Science Advisory Board on biogenic carbon states that waste wood “to us means forest materials including residues (tree tops, non-merchantable sections of stem, branches, and bark), small trees and other low value materials.”²¹ Covanta Energy distinguishes residues from whole tree chips but nonetheless treats whole tree chips as waste wood, stating that their Burney Mountain Power facility burns “waste” comprised of “forest residue, mill residue and whole tree chips.”²² Their website additionally states that they use “logs from forest thinning” for fuel.²³

Bioenergy companies cut and burn whole trees for fuel

Such broad definitions of waste wood that include whole trees create economic incentives for additional tree harvesting for fuel, significantly increasing net greenhouse gas emissions as trees are cut. It is likely that but for a bioenergy fuel market, trees cut for fuel would continue to grow and sequester atmospheric CO₂. Further, when biomass harvesting displaces other economic uses of wood (such as for the pulp and paper industry) these older industries may expand harvesting

¹⁹ Walker, T., et al. Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy. Manomet Center for Conservation Sciences. 2010.

²⁰ Testimony of Peter Stewart before the North Carolina Utilities Commission, Docket No. E-7, Sub 939 and Sub 940. In the matter of the registration statements of Buck and Lee Steam Stations as Renewable Energy Facilities pursuant to Commission Rule R8-66.

²¹ Pamela F. Faggert, Dominion Resources Services, Inc. Comments to the Science Advisory Board biogenic carbon emissions panel on its draft advisory report regarding EPA’s accounting framework for biogenic CO₂ emissions from stationary sources. March 16, 2012.

²² Other Renewable Energy Projects, Covanta website, (<http://www.covantaenergy.com/what-we-do/our-services/other-renewable-energy.aspx>).

²³ <http://www.covantaenergy.com/what-we-do/our-services/other-renewable-energy.aspx>

elsewhere. Such “leakage” is a recognized source of increased greenhouse gas emissions at the national and international scale.

3. Combustion does not reduce greenhouse gas emissions from waste wood

Methane (CH₄) can be generated in extremely low oxygen conditions during waste decomposition, such as in a landfill. As it is a more powerful greenhouse gas than CO₂, companies sometimes claim that by burning waste wood as fuel, and thus emitting biomass carbon as CO₂ rather than CH₄, methane emissions from decomposition are avoided, and that such avoidance reduces net greenhouse gas emissions.

However, this argument is misleading. Methane can be emitted in nature, but only in environments where oxygen is extremely low or non-existent, like saturated wetland soils. In upland areas where well-aerated logging residues are decomposing, forest soils contain bacteria that consume methane, so that these forested systems are net consumers, not producers, of methane.²⁴ In fact, a recent review by the Environmental Protection Agency reports that the Intergovernmental Panel on Climate Change concluded that “dry upland soils serve as one of the primary global methane sinks,” removing about 30 million metric tons of methane from the atmosphere each year.²⁵ Harvesting biomass may actually reduce this sink, as some studies show that logging activities can reduce forest soil uptake of methane.²⁶

As for methane production from decomposing wood in landfills, EPA data and modeling show the rates are relatively low, and where landfill gas is captured, net emissions are negligible.²⁷ Because most forestry materials used as biomass fuel would never be disposed of in a landfill to begin with, the question of “avoiding” these emissions is mostly irrelevant. In any case, the resistance of wood and wood products to anaerobic decomposition in landfills is significant. A review of several studies on methane production from landfilled wood found wide agreement that methane emission rates were relatively low, estimating that at maximum only 30% of the carbon from paper and 0 – 3% of the carbon from landfilled wood are ever emitted as landfill gas. The study concluded that “US landfills serve as a tremendous carbon sink, effectively preventing major quantities of carbon from being released back into the atmosphere.”²⁸

²⁴ EPA’s page at <http://epa.gov/climatechange/ghgemissions/gases/ch4.html> points out that while wetlands can be a source of methane, natural systems actually take it up: “Methane is emitted by natural sources such as wetlands, as well as human activities such as leakage from natural gas systems and the raising of livestock. Natural processes in soil and chemical reactions in the atmosphere help remove CH₄ from the atmosphere.”

²⁵ U.S. EPA, Office of Atmospheric Programs. 2010. Methane and nitrous oxide emissions from natural sources. EPA 430-R-10-001. April, 2010.

²⁶ Wu, X. et al. 2011. Long-term effects of clear-cutting and selective cutting on soil methane fluxes in a temperate spruce forest in southern Germany. *Environmental Pollution*, 159:2467-2475; Bradford, M.A. et al. 2000. Soil CH₄ oxidation: response to forest clearcutting and thinning. *Soil Biology and Biogeochemistry*, 32:1035-1038.

²⁷ EPA’s Waste Reduction Model (WARM) shows that landfilled wood generally represents a carbon sink, and not a source of greenhouse gases, for years to decades. Net methane emissions are relatively low from this recalcitrant material.

²⁸ Micales, J.A. and Skog, K.E. 1997. The decomposition of forest products in landfills. *International Biodeterioration and Biodegradation* 39:145-15.

D. Wood-fueled Biopower Is Incompatible With the Need to Reduce CO₂ Emissions Immediately

Far from “reducing” greenhouse gas emissions from power generation as companies sometimes claim, burning wood clearly increases emissions compared to fossil fuels. This occurs not only because smokestack CO₂ emissions from biopower facilities are higher than emissions from fossil-fueled plants, but also because any emission offsets that occur take several years to several decades to be realized. These simple physical facts, and resulting vulnerabilities of this renewable energy strategy, are seldom if ever acknowledged in investor disclosures by the bioenergy industry, even as bioenergy is promoted as a technology that can reduce greenhouse gas emissions.

In light of what we know about climate warming, misrepresentations by the bioenergy industry should be taken very seriously. Scientists warn us that we may be at the tipping point now, so that there is a critical need to reduce CO₂ emissions, not 30 or 90 years from now, but *immediately*, to slow a cascading series of catastrophic climate events that are already being observed. These include rising temperatures connected with drought, fire, and intense storms; sea level rise, connected with flooding of the coastal areas where a majority of the world’s population lives; melting of the ice caps and mountain glaciers, connected with accelerating feedbacks on warming and disruption of regional water cycles; and ocean acidification, connected to dissolution of the carbonate-forming organisms that form the base of the oceanic foodchain.

The findings of the latest Intergovernmental Panel on Climate Change (IPCC) are sobering. Concentrations of the greenhouse gases carbon dioxide, methane, and nitrous oxide (N₂O) now substantially exceed the highest concentrations recorded in ice cores during the past 800,000 years. The average rates of increase in atmospheric concentrations over the past century are, with very high confidence, unprecedented in the last 22,000 years. Increasing atmospheric CO₂ concentrations do not just drive climate warming, but also ocean acidification, which is quantified by decreases in pH. The pH of ocean surface water has decreased by 0.1 since the beginning of the industrial era, which corresponds to a 26% increase in hydrogen ion concentration.²⁹ Increasing acidification is a threat to the base of the oceanic foodchain and the productivity of the world’s oceans.

Atmospheric CO₂ concentrations are now the highest they have been in 800,000 years

In three out of four IPCC modeled greenhouse gas emissions scenarios, global temperatures continue to increase beyond 2100. Only IPCC’s “mitigation” scenario, where CO₂ emissions are constrained *immediately*, projects that temperature increases level off around 2100. Burning woody biomass increases CO₂ emissions immediately and over a period of decades, meaning that promises of carbon neutrality of wood-fueled biopower, even if eventually fulfilled in future decades, come at the cost of increased risk to the climate and ocean acidification in the near

²⁹ Intergovernmental Panel on Climate Change, Fifth Assessment Report. Summary for policymakers, September 27, 2013. www.ipcc.ch

term, especially when biomass harvesting reduces forest cover, our most important terrestrial carbon sink. It makes a critical difference from the standpoint of reducing the total amount of carbon in the atmosphere this year, next year, and for the critical years ahead, to not add additional CO₂ to the atmosphere. Discussions about CO₂ that might be withdrawn from the atmosphere 90 years from now are not germane to meeting immediate carbon reduction goals.

III. POLICY DEVELOPMENTS THAT MAY JEOPARDIZE BIOENERGY INVESTMENTS

In this section we discuss developments concerning regulation of bioenergy emissions, and how these developments may present material risks to companies with bioenergy holdings.

A. EPA Is Likely To Resume Regulating Biogenic CO₂ After July 2014

EPA regulates CO₂ from large stationary sources like power plants under the Clean Air Act. Biogenic CO₂ has been temporarily exempted from regulation, but this exemption is expected to end in July 2014 or before, by one means or another, as we explain below. Any companies that are materially affected should be disclosing this change in regulatory status, but none of the companies whose disclosures that we reviewed have done so. It is unclear to us whether this is because these companies believe their facilities and plans are not materially affected by this court decision, or whether this is an omission of disclosure of material information.

The history of biogenic CO₂ regulation is as follows. Under the Clean Air Act, if EPA determines that an “air pollutant . . . may reasonably be anticipated to endanger public health or welfare,”³⁰ it must regulate that air pollutant under the Prevention of Significant Deterioration of Air Quality (PSD) and Title V permitting programs, which are part of the Clean Air Act. The PSD program requires certain specified “major emitting facilit[ies],” such as iron and steel mills, to obtain state-issued construction permits if they have the potential to emit over 100 tons per year (tpy) of “any air pollutant,” and other covered sources (including biomass power plants) to obtain such permits if they have the potential to emit over 250 tpy.³¹ Under the PSD program, sources need permits before starting construction or modification of a facility.³² To obtain a PSD permit, covered sources must undergo a “best available control technology” (BACT) analysis for all regulated air pollutants.³³

In response to the Supreme Court decision in *Massachusetts v. EPA*, 549 U.S. 497 (2007), the EPA published an Endangerment Finding for greenhouse gases—a “well-mixed” and “aggregate” group of six gases that includes CO₂. As a result, the EPA issued rules phasing in stationary source greenhouse gas regulation under the Clean Air Act, starting with the largest greenhouse gas emitters. Major stationary emitters of greenhouse gases became subject to the

³⁰ 42 U.S.C. § 7521(a)(1).

³¹ *Id.* §§ 7475, 7479(1)

³² 42 U.S.C §§ 7411(a)(4), 7475, 7479(2)(C).

³³ This requirement extends to air pollutants that emit over a certain significance level but where emissions are insufficient to trigger the PSD permitting requirement on their own. In other words, if a source emits two regulated air pollutants—for instance, sulfur dioxide and particulate matter—but triggers the PSD permitting requirement only because it emits 500 tpy of sulfur dioxide, it must install BACT for both. *Id.* § 7475(a)(4).

PSD and Title V permitting requirements on January 2, 2011. To restrict regulation to the largest emitters, EPA had developed the “Tailoring Rule,” which initially defined a major source for CO₂ as one that emitted at least 75,000 tons of CO₂ equivalent³⁴ per year as well as being a major source for conventional pollutants. During this first phase, EPA initially regulated sources of biogenic CO₂³⁵ under the rule, alongside sources of fossil fuel CO₂. However, in July of 2011, when EPA expanded the rule to cover facilities that emit at least 100,000 tons of CO₂ equivalent per year, whether or not the source is “major” for conventional pollutants, the agency announced that biogenic CO₂ would no longer be counted.³⁶

EPA’s “Deferral Rule” exempted biogenic CO₂ from regulation under the Clean Air Act for a period of three years, to end in July 2014. Justifying this action, the agency stated that most biomass fuels were comprised of residues (such as sawdust from milling operations) and as such, would otherwise decompose within 10 – 15 years, rendering only a trivial gain from regulating such emissions.³⁷ Environmental groups submitted comments during this rulemaking presenting evidence that this is not the case, and that many existing and planned biopower facilities use forest materials, including whole trees, as fuel.³⁸ The comments observed that whatever the source of biomass, the exemption of biogenic CO₂ from regulation would cause harm by increasing greenhouse gas emissions from the power sector.

When EPA enacted the deferral as proposed, environmental groups sued the agency. The U.S. Court of Appeals for the D.C. Circuit heard the case as *Center for Biological Diversity, et al. v. U.S. EPA*, (decided July 12, 2013). The environmental groups argued that nothing in the Clean Air Act allows EPA to exempt a class of sources from regulation. The court agreed and vacated the Deferral Rule, but there has been a delay in the Court issuing the mandate to EPA that would compel the Agency to begin regulating biogenic CO₂ immediately, as we discuss below.

Once EPA begins regulating biogenic CO₂, this will mean that any new or reconstructed biomass energy facility with the potential to emit 100,000 tons of CO₂ per year³⁹ will be considered a “major” source for CO₂. As any facility of about 8 MW and above has the potential to emit 100,000 tons of CO₂, the majority of biomass power facilities now being proposed and built would be major sources. As a result of the court ruling, some facilities permitted during the deferral could become subject to PSD regulation, which could impose material costs and

³⁴ The common currency for expressing greenhouse gases is in terms of CO₂ equivalency, with all greenhouse gases converted to CO₂ equivalents based on their global warming potential.

³⁵ EPA defines biogenic CO₂ as emissions “directly resulting from the combustion or decomposition of biologically-based materials other than fossil fuels and mineral sources of carbon.”

³⁶ Deferral for CO₂ Emissions from Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs (“Deferral Rule”), 76 Fed. Reg. 43,490, 43,493 (July 20, 2011).

³⁷ United States Environmental Protection Agency. Deferral for CO₂ emission from bioenergy and other biogenic sources under the prevention of significant deterioration (PSD) and Title V Programs: Proposed rule. Federal Register Vol. 76, No. 54, p. 15261.

³⁸ Comments of Center for Biological Diversity et al on “Deferral for CO₂ Emissions from Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs,” 76 Fed. Reg. 15,249 (March 21, 2011). Docket no. EPA-HQ-OAR-2011-0083

³⁹ Facilities making modifications trigger the requirement to implement BACT if they have the potential to increase GHG emissions by at least 75,000 tpy CO₂e and also exceed 100/250 tpy of GHGs on a mass basis.

operational impacts on certain operations if the Court issues the mandate to compel EPA to reverse the deferral.

As major sources for CO₂, biopower facilities will have to undergo several processes that are intended to reduce their environmental and health impacts:

- Major source facilities undergo a Best Available Control Technology (BACT) analysis for both CO₂ and criteria air pollutants, which identifies the technologies, fuels, and processes that will best reduce emissions.
- Facilities are required to undergo air quality modeling, which uses a computer model to simulate the facility's emissions in the context of existing air quality, and assesses whether the facility will increase ambient air pollution to unhealthy levels.
- Permits issued under the federal PSD program contain rigorous and enforceable emission limits, whereas most permits for biomass power plants issued by the states simply contain yearly caps (in tons per year) of allowable emissions, with few limits on how much pollution can be emitted in a given time period.
- The PSD process also provides formal opportunities for public comment and involvement during the permitting process, and review of the air permit by the EPA, instead of just the state issuing authority.
- The cost of obtaining a PSD permit is reported by the EPA to be around \$85,000,⁴⁰ and the process can take over two years.

Many bioenergy facilities seek to avoid Clean Air Act permitting and emission restrictions

Given the additional trouble, time, and expense associated with federal permitting, many biopower companies already seek to avoid PSD permitting for criteria pollutants. In our review of 87 air permits for biomass power plants issued since 2009, we found that 35 (40%) had avoided PSD by taking “synthetic minor” status, where a facility promises that it will not exceed the triggering threshold 250 tons of emissions for each criteria pollutant, and thus obtains a permit from the state, instead of going through the federal PSD program. Permitted emissions of particulate matter, nitrogen oxides, and carbon monoxide tend to be about two times higher at facilities that just get a state-level emissions permit compared to facilities that go through the PSD process.

Once biogenic CO₂ is fully regulated under the Clean Air Act, some “synthetic minor” facilities (including those that received permits during the deferral, but have not yet started construction) will likely be pulled into the PSD program on the basis of their CO₂ emissions alone. This impending regulation of CO₂ from biopower facilities will increase the difficulty and expense of

⁴⁰ Carrie Wheeler. Information collection request for Prevention of Significant Deterioration and Nonattainment New Source Review (40 CFR Part 51 and 52). United States Environmental Protection Agency, 2010. This estimate is taken from Table 6-1 and does not include preconstruction air quality monitoring. There are few available estimates of the cost of obtaining a state-only construction permit, making comparison difficult.

building or modifying a biomass energy facility, which given the marginal nature of the bioenergy industry, could further compromise these facilities' financial viability.

It is important to note that as is the case for CO₂, per megawatt-hour emissions of the conventional pollutants – particulate matter, carbon monoxide, and nitrogen oxides –tend to be significantly higher from biomass facilities than coal- or gas-fired facilities. As biomass facilities become subject to the PSD program because of their emissions of CO₂, the imposition of BACT for conventional pollutants could trigger requirements to switch to cleaner fuels and technologies, possibly including natural gas.⁴¹

B. EPA's Science Advisory Board Has Concluded that Bioenergy Is Not A *Priori* Carbon Neutral

When EPA does enact regulations for how biogenic CO₂ should be counted under the Clean Air Act, it is very likely that the Agency will follow recommendations of its advisory board and will not treat all bioenergy as carbon neutral.

The background is as follows. When the EPA decided to defer regulating biogenic CO₂ in 2011, it convened a panel of the Science Advisory Board (SAB) to advise the agency on how to regulate biogenic CO₂ emissions in the future. That panel issued a final report in September 2012. The SAB's report unequivocally concluded that biomass energy cannot be considered a *priori* carbon neutral. The SAB recommended:

“To accurately capture the carbon outcome, an anticipated baseline approach and landscape level perspective are needed. An anticipated baseline requires selecting a time period and determining what would have happened anyway without the harvesting and comparing that impact with the carbon trajectory associated with harvesting of biomass for bioenergy.

For logging residues and other feedstocks that decay over longer periods, decomposition cannot be assumed to be instantaneous... For residues, consider alternate fates (e.g., some forest residues may be burned if not used for bioenergy) and information about decay. An appropriate analysis using decay functions would yield information on the storage of ecosystem carbon in forest residues.”⁴²

EPA's Science Advisory Board found that biomass, including logging residues, can not be assumed carbon neutral

The SAB's recommended approach, which compares net CO₂ emissions under the bioenergy scenario with an alternative, “business as usual” scenario, is the same analytical framework as

⁴¹ United States Environmental Protection Agency. PSD and Title V Permitting Guidance for Greenhouse Gases. EPA-457/B-11-001. March, 2011. Washington, DC.

⁴² United States Environmental Protection Agency. SAB review of EPA's Accounting Framework for Biogenic CO₂ Emissions From Stationary Sources. EPA-SAB-12-011. September 28, 2012. Washington, DC. ([http://yosemite.epa.gov/sab/SABPRODUCT.NSF/57B7A4F1987D7F7385257A87007977F6/\\$File/EPA-SAB-12-011-unsigned.pdf](http://yosemite.epa.gov/sab/SABPRODUCT.NSF/57B7A4F1987D7F7385257A87007977F6/$File/EPA-SAB-12-011-unsigned.pdf)).

employed by the Manomet study in Massachusetts. The Manomet study included the recommended modeling and concluded that if forest harvesting is increased to provide biomass fuel, net emissions from biopower exceed those from coal-fired power for more than 40 years. (It should be noted that when comparing possible futures and the type of energy to be displaced by bioenergy, the alternative scenario need not assume that fossil fuels continue to be burned; the comparison could be made between bioenergy and wind energy, for instance, in which case the increase in emissions from the bioenergy scenario would be even more significant).

Subsequently, the EPA appears to have adopted its SAB's reasoning, stating in the recently issued rulemaking on New Source Performance Standards (NSPS) for fossil fueled power plants that "In general, the overall net atmospheric loading of CO₂ resulting from the use of a biogenic feedstock by a stationary source will ultimately depend on the stationary source process and the type of feedstock used, as well as the conditions under which that feedstock is grown and harvested."⁴³ It seems likely that EPA's final framework for biogenic CO₂ accounting will formalize the SAB's recommended approach.

A further relevant development at EPA is that the NSPS for new fossil fueled power plants, which sets an emissions limit of around 1,000 lb CO₂ per megawatt-hour for new facilities, *does* count CO₂ from biomass that is co-fired at fossil-fueled plants when calculating total emissions.⁴⁴ This development demonstrates that EPA is capable of regulating biogenic CO₂ stack emissions directly.

As a result of EPA's likely impending regulation of biogenic CO₂, and in light of the SAB's recommendations that bioenergy not be assumed to be carbon neutral, it seems likely that the bioenergy industry's strategy has become much more complicated. Now, controversy about how biogenic CO₂ emissions can be offset is inevitable – encompassing source materials, commitments related to regrowth of trees, and assurances that regrown trees will not be reharvested in a manner that forgoes their calculated (offsetting) role in carbon sequestration. Investors in bioenergy would surely find it relevant to understand how much more complicated the "carbon offset" part of their regulatory environment has become.

Despite the notoriety of the EPA's initial deferral of biogenic CO₂ accounting and the SAB's proceedings subsequently, none of the companies we reviewed mentioned the SAB's recommendation to EPA that bioenergy not be considered *a priori* carbon neutral.

C. Federal Court Opinion Has Stated Biogenic CO₂ Emissions Should be Regulated

An important federal court case, *Center for Biological Diversity, et al. v. U.S. EPA*, (decided July 12, 2013), is central to the regulatory treatment of greenhouse gas emissions from biomass power plants, because the Court determined that EPA does not have the authority to exempt biopower CO₂ emissions from regulation. However, this case was not mentioned in any of the materials from Covanta, Dominion, and Southern Company published as of September 18, 2013.

⁴³ Standards of performance for greenhouse gas emissions from new stationary sources: electric generating units. 40 CFR Part 60, [EPA-HQ-OAR-2013-0495; FRL-9839-4] RIN 2060-AQ91. September 20, 2013.

⁴⁴ *Id.*

After EPA announced in 2011 that it would hold off from regulating biogenic CO₂ emissions for three years, a coalition of environmental groups sued the Agency. The Court decided in the groups' favor and against EPA in July 2012, finding that the EPA's justifications for the Rule were not legally sufficient and did not meet "fundamental" obligations "that EPA set forth the reasons for its actions."⁴⁵ The court's decision noted that the atmosphere makes no distinction between carbon dioxide emitted by biogenic and fossil-fuel sources.⁴⁶

Much of the court's reasoning for ruling against EPA's deferral of biogenic CO₂ regulation turned on the plain meaning of the word "emit," and the fact that the Clean Air Act regulates pollutants emitted by power plants and other stationary sources. A concurrent opinion explained that the Clean Air Act forecloses any "offsetting" approach – i.e., taking off-site carbon sequestration into account as a compensating factor that can mitigate a power plant's emissions – because "The statute does not allow EPA to exempt those sources' emissions of a covered air pollutant just because the effects of those sources' emissions on the atmosphere might be offset in some other way."⁴⁷

The Federal Court noted that the atmosphere makes no distinction between carbon dioxide emitted by biogenic and fossil-fuel sources

This is, however, exactly the argument that companies use to justify claims that stack emissions of bioenergy CO₂ should be ignored, and that bioenergy should be treated as carbon neutral – that emissions are offset by forest regrowth, or are offset because emissions would "occur anyway" from decomposition. The "waste decomposition" argument was how EPA justified the deferral when it was initially proposed, but the Court's decision rejects this logic.

As of November 2013, the enactment of the Court's decision leading to the full reversal of EPA's deferral rule has been postponed, pending a Supreme Court decision in a separate case concerning the overall authority of EPA to regulate CO₂ emissions from stationary sources.⁴⁸ However, in the event that no decision is reached, EPA's three-year deferral of PSD regulation will lapse in June 2014, and CO₂ emissions from biopower facilities will again become subject to PSD regulation in the absence of further action by the EPA or the courts.

D. Biomass Power is Beginning to Lose Eligibility For Subsidies at the State Level

At the state and local level, there is growing opposition to subsidizing biopower as renewable energy alongside technologies like wind and solar energy that generate no local air emissions. Proposals to build biomass power plants are often greeted with intense opposition and legal action including appeals of air permits and water withdrawal permits. The negative public response to burning wood for power was illustrated in 2009, when over 75,000 people signed a

⁴⁵ Opinion p. 18, citing *Northeast Maryland Waste Disposal Authority v. EPA*, 358 F.3d 936, 949 (D.C. Cir. 2004) (*per curiam*).

⁴⁶ Opinion page 7.

⁴⁷ Concurrence page 3.

⁴⁸ *Utility Air Regulatory Group v. EPA*, S. Ct. No 12-1146, and consolidated cases.

petition in Massachusetts that would have taken state renewable energy subsidies away from any technology that emitted more than minimal amounts of CO₂.⁴⁹

Environmental groups are also increasingly opposing large-scale bioenergy. Demonstrating that opposition to wood-burning power plants has become a mainstream environmental issue, the website of the Natural Resources Defense Council, one of the largest environmental groups in the country, features a page entitled “Our Forests Aren’t Fuel,”⁵⁰ which characterizes biopower as “an emerging environmental disaster.”

The problems presented by large-scale bioenergy are beginning to be addressed by state-level policy. In Massachusetts, following the publication of the Manomet study and its finding that net biopower CO₂ emissions exceed those from coal for more than 40 years, the state eliminated renewable energy subsidies for electric-only biopower plants,⁵¹ finding their low efficiency and high net CO₂ emissions are incompatible with state mandates to reduce greenhouse gas emissions from the power sector.⁵² In Maryland and Washington DC, legislation is being considered that would also make low-efficiency biomass power plants ineligible for renewable energy subsidies, like Massachusetts restricting them to high-efficiency combined heat and power facilities (in Maryland, the Governor himself spoke in support of the bill. While it narrowly did not pass, partly due to lobbying by Dominion Resources, it will be reconsidered next year). Other states, including Vermont, are studying the question of what role bioenergy should play in the state’s renewable energy portfolio. For states that have not yet taken on this question, the growing recognition and imminent regulation of biogenic CO₂ at the federal level could prompt greater scrutiny of whether bioenergy deserves to be subsidized alongside no-emissions renewable energy.

Massachusetts has eliminated subsidies for low-efficiency biopower, and other states are following suit

Although the Massachusetts regulations were well known, and companies named in this letter submitted comments and lobbied against the passage of the Massachusetts and Maryland legislation, none of the companies have disclosed to investors that state-level legislation has already and may further erode the subsidies available to biopower.

E. These Regulatory Developments Are A Known Trend That Is Material to This Industry

As documented above, a significant body of scientific literature demonstrates that wood-burning biomass power plants are net sources of greenhouse gases even after decades of forest regrowth. This scientific information is already having an impact on the regulatory and subsidy/tax policy environment within which the biopower industry operates.

⁴⁹ Press release from the Stop Spewing Carbon campaign, December 1, 2009.

⁵⁰ <http://www.nrdc.org/energy/forestsnotfuel/>.

⁵¹ The new regulations pertain to 225 CMR §14.00, and are available at <http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/biomass/renewable-portfolio-standard-biomass-policy.html>.

⁵² Massachusetts’ Global Warming Solutions Act mandates significant reductions in greenhouse gas emissions by 2020 and 2050.

We believe this is a “known trend” within the meaning of Regulation S-K that obligates a company to assess and disclose regulatory implications. The fact that this trend is known to these companies is demonstrated by their participation in state and federal rulemaking processes regarding the regulation of CO₂ from biomass power plants, where they have submitted comment letters that argue for biopower to be considered carbon neutral. For example, both Dominion and Southern Company submitted comments to the federal docket in response to EPA’s calls for information and rulemaking on emissions regulation of biogenic CO₂.⁵³ The Companies’ comments clearly state that regulation of biogenic CO₂ would impact their operations. Southern Company notes in particular, “Future biomass projects will be impacted if biogenic CO₂ emissions are not provided a permanent applicability exemption from the PSD and Title V Programs.”⁵⁴ (We discuss company-specific evidence in more detail below).

Given that companies have acknowledged that new emission regulations of biogenic CO₂ could affect their businesses, the trend is known to the companies.

F. SEC’s Climate Guidance Requires Companies to Disclose These Developments

The Securities Exchange Act requires publicly traded companies registered with the SEC to disclose certain information to assist investors in making informed investment decisions (see the Appendix for a discussion of these requirements). The SEC formally recognized the materiality of climate change-related information in its 2010 Climate Guidance,⁵⁵ which advises companies on existing disclosure requirements as they apply to climate change. The Guidance explains that the physical effects of global climate change, and the legislation, regulations and policies developed to address it, could all have a material effect on companies. Therefore, all publicly traded companies must assess the materiality of climate change matters to the company’s business, determine what disclosures should be included in SEC filings with respect to climate change matters, and include required disclosures. Companies must also monitor legislative and regulatory developments on greenhouse gas and climate change matters at the international, Federal, state, and regional levels on an ongoing basis and assess the potential impact of developments on the company’s business.⁵⁶

The SEC reiterated the long-standing disclosure principles for dealing with uncertainty when it issued its guidance on climate change disclosures:

“In the case of a known uncertainty, such as pending legislation or regulation, the

⁵³ Environmental Protection Agency. Call for Information: Information on Greenhouse Gas Emissions Associated with Bioenergy and Other Biogenic Sources (75 Fed. Reg. 41173 (July 15, 2010) and Proposed Rule: Deferral for CO₂ Emissions from Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs (76 Fed. Reg. 15249 (March 21, 2011)).

⁵⁴ Southern Company’s Response to EPA’s Call for Information: Information on Greenhouse Gas Emissions Associated with Bioenergy and Other Biogenic Sources (75 Fed. Reg. 41173 (July 15, 2010)), Docket ID No. EPA-HQ-OAR-2010-0560, page 3.

⁵⁵ Commission Guidance Regarding Disclosure Related to Climate Change (Release Nos. 33-9106; 34-61469; FR-82) February 2010.

⁵⁶ “SEC Issues Interpretive Guidance On Climate Change Disclosures”, Gibson, Dunn & Crutcher, LLP, February 4, 2010. Available online at <http://www.gibsondunn.com/publications>.

analysis of whether disclosure is required in MD&A consists of two steps. First, management must evaluate whether the pending legislation or regulation is reasonably likely to be enacted. Unless management determines that it is not reasonably likely to be enacted, it must proceed on the assumption that the legislation or regulation will be enacted. Second, management must determine whether the legislation or regulation, if enacted, is reasonably likely to have a material effect on the registrant, its financial condition or results of operations. Unless management determines that a material effect is not reasonably likely, MD&A disclosure is required. In addition to disclosing the potential effect of pending legislation or regulation, the registrant would also have to consider disclosure, if material, of the difficulties involved in assessing the timing and effect of the pending legislation or regulation.” (Emphasis added)

The Climate Guidance also states (footnote 71):

“Management should ensure that it has sufficient information regarding the registrant’s greenhouse gas emissions and other operational matters to evaluate the likelihood of a material effect arising from the subject legislation or regulation.”

With regard to bioenergy, the Climate Guidance would require companies to disclose:

- 1) Specific risks arising from existing or pending climate change-related legislation or regulation, such as the potential for climate change legislation or regulation of emissions from bioenergy facilities to materially increase the company’s costs to operate its biomass power facilities.
- 2) The potential reduction in value of various renewable and “green” energy subsidies and tax credits from which the companies currently benefit.
- 3) The risk of decreased consumer demand for energy that produces significant greenhouse gas emissions or services, compared to solar and wind energy.
- 4) Risks arising from reputational damage related to climate change, such as possible negative public reaction as the public comes to understand the speculative and potentially misleading presentation of the environmental and greenhouse gas benefits of the company’s bioenergy investments.

The SEC’s Climate Guidance requires companies to disclose material risk from potential future regulations concerned with climate change

IV. ANALYSIS OF DISCLOSURES BY DOMINION, SOUTHERN COMPANY, AND COVANTA

In this section we describe the statements and formal disclosures of material risk that Dominion, Southern Company and Covanta have made concerning their biopower investments. These fall into two main categories:

- First, companies assert that bioenergy facilities “reduce” CO₂ emissions, or that emissions are “clean,” in some instances without clarifying that the day-to-day CO₂ emissions of these facilities exceed those of competing combustion technologies, and that conventional air pollutant emissions are similar or greater.
- Second, companies make statements about bioenergy as a climate warming mitigation measure, and as carbon neutral, without qualification or disclosure of emerging science that refutes these claims, and the resulting prospects for adverse policy developments, legislation, and legal action that could materially impact operations or finances.

A. Dominion - Virginia Electric and Power Company

Dominion is a large U.S. energy company with diverse holdings across the Eastern United States. Dominion operates one of the largest biomass power stations in the United States, the 83 MW Pittsylvania station in Virginia.⁵⁷ In addition to Pittsylvania, Dominion began operation of the 585 MW Virginia City Hybrid Energy Center in July 2012, which will co-fire up to 60 MW biomass by 2020.⁵⁸ Dominion is also converting three coal-fired power plants to burn biomass (Altavista, Southampton, and Hopewell), and announced the completion of the Altavista plant conversion on July 15, 2013.⁵⁹ Dominion also plans to purchase another 20 MW of bioenergy from a non-utility generator.⁶⁰ Dominion’s projections for energy generation from renewables in 2020 includes over 75% bioenergy, 3% solar, and 0% wind.

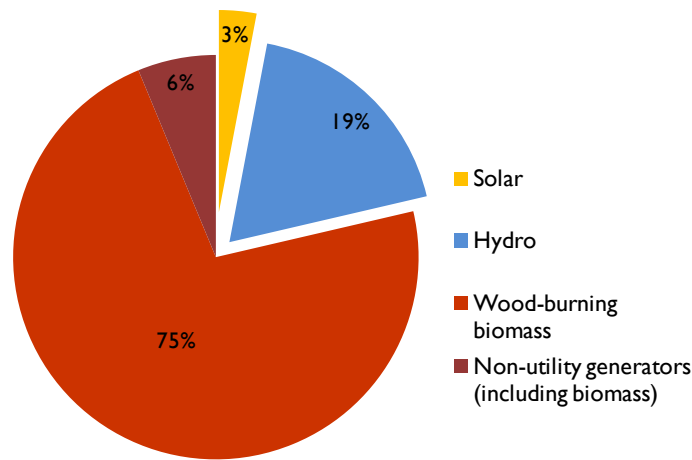


Figure 5. Dominion’s anticipated mix of renewable energy generation in 2020.⁶¹

⁵⁷ Dominion 2011-2012 Citizenship & Sustainability Report, page 85 (<http://www.dominioncsr.com/assets/pdf/2011-12-DominionCSR.pdf>).

⁵⁸ Dominion Virginia Power’s and Dominion North Carolina Power’s Report of Its Integrated Resource Plan. Before the Virginia State Corporation Commission and North Carolina Utilities Commission. Case No. PUE-2013-00088, Docket No. E-100, Sub 137. Filed August 30, 2013.

⁵⁹ Announcement of Altavista conversion completion, (<http://dom.mediaroom.com/2013-07-15-Dominion-Virginia-Power-Completes-Biomass-Conversion-At-Altavista-Power-Station>).

⁶⁰ See *supra* footnote 60

⁶¹ Virginia Electric and Power Company d/b/a Dominion Virginia Power. Annual report to the State Corporation

In its Integrated Resource Plan for 2013, Dominion describes its use of bioenergy as “extensive,” and states that the Company “considers biomass to be carbon neutral from an emissions standpoint.”⁶² Once Dominion’s new bioenergy capacity comes online, the Company’s total wood demand will likely be about 3.6 million tons per year.

Dominion meets renewable energy goals both by generating renewable energy and purchasing renewable energy credits from non-Dominion owned generating facilities. Dominion has a Green Power Program that offers Dominion customers the chance to voluntarily pay extra on their monthly electric bills to support alternative energy, including biopower. All the RECs that Dominion purchases with these funds are from non-Dominion owned facilities and are separate from the RECs that Dominion uses to meet state-level renewable portfolio standard goals.

Biopower is an important component of Dominion’s Green Power program. In 2011, 9% of the RECs that Dominion purchased for the program came from biomass energy facilities, but this increased to 25% in 2012, an increase of 277 percent from the previous year.⁶³ We do not know what proportion of the RECs purchased by Dominion for this program come from combustion biopower facilities burning wood (and wood-derived products like pulping liquors from the paper industry), and what proportion comes from facilities that generate power by burning methane from animal waste or sewage facilities.

1. Claims about biopower made on Dominion’s website and in its marketing materials

Dominion’s website materials assert that biopower is “clean,” that it “reduces” greenhouse gas emissions, and that it is “carbon neutral,” but the website provides no background to explain the controversy underlying the question of bioenergy carbon neutrality.

- The Company’s web materials assert, “Although biomass burned as a fuel emits carbon dioxide, scientists consider the process to be ‘carbon neutral’ because an equal amount of carbon is released into the atmosphere that would have been returned to it when the trees decayed as part of their natural life cycle.”⁶⁴

Dominion asserts its bioenergy holdings are clean and carbon neutral

This statement omits the fact that burning biomass dramatically increases day to day emissions over fossil fuels. According to the Energy information Administration, Virginia’s fossil-fueled electricity sector⁶⁵ generated 61.5 million megawatt-hours of electricity in

Commission on renewable energy. November 1, 2012.

⁶² Dominion Virginia Power’s and Dominion North Carolina Power’s Report of Its Integrated Resource Plan. Before the Virginia State Corporation Commission and North Carolina Utilities Commission. Case No. PUE-2013-00088, Docket No. E-100, Sub 137. Filed August 30, 2013.

⁶³ “The Facts about Dominion Green Power Renewable Energy Certificates (RECs),” Dominion Green Power, (<https://www.dom.com/dominion-virginia-power/customer-service/energy-conservation/pdf/gp-facts-about-recs.pdf>), pages 1-2.

⁶⁴ Dominion website, (<https://www.dom.com/about/stations/renewable/biomass-stations.jsp>).

⁶⁵ Virginia’s fossil-fueled electricity sector includes electric utilities and independent power producers.

2011,⁶⁶ and emitted 31.4 million tons of CO₂.⁶⁷ Once Dominion's bioenergy capacity is all online (Pittsylvania plus the new facilities) these facilities at fulltime operation will represent a 4.1% bump in electricity generation, but will cause an 11.7% increase in day to day power sector CO₂ emissions over the 2011 baseline.

- A promotional video for the Pittsylvania Power Station states,⁶⁸ “In addition to being renewable, biomass is also a source of low carbon energy... As Dominion works to further increase its renewable energy portfolio, Pittsylvania Power Station will remain the foundation on which the company's efforts are based. Clean, reliable, and renewable.” (Emphasis added).

However, permitted emissions from the 83 MW Pittsylvania plant, according to its Title V emissions permit,⁶⁹ are 96.4 tons per year (tpy) particulate matter, 77.1 tpy sulfur dioxide, 482.1 tpy nitrogen oxides, 1,687.3 tpy carbon monoxide, and 337.5 tpy volatile organic compounds. (See Figure 1 above for a comparison of how much lower emissions from a modern gas plant would be. Pittsylvania's CO₂ emission rate is not set in the permit but the plant's emissions at nearly full-time operation are around 1 million tons per year, based on standard assumptions about facility efficiency. A gas plant would emit about one-third as much).

- Literature on Dominion's “Green Power” program assures ratepayers that new energy investments, including biopower, “reduce greenhouse gas emissions.”⁷⁰ Referring to the company's conversion of three Virginia coal plants to burn wood, the brochure states “These renewable generation facilities are expected to begin burning clean biomass in 2013.”⁷¹

Combined capacity of the Altavista, Southampton and Hopewell plants will be 153 MW. Construction permits⁷² for the facilities reveal that their combined permitted emissions will be 253.2 tpy of PM_{2.5}, 114.6 tpy sulfur dioxide, 1,237 tpy nitrogen oxides, 2,748 tpy carbon monoxide, and 129.4 tpy volatile organic compounds. Wood use at each plant will be about 785,000 tons per year. Whereas EPA data show that combined CO₂ emissions from the three plants

Dominion's coal-to-biomass conversions will emit almost two million tons of CO₂ per year, and thousands of tons of particulate matter, nitrogen oxides, and carbon monoxide

⁶⁶ Energy Information Administration. Annual generation, State historical tables for 2011, released November 2012. Washington, DC.

⁶⁷ Energy Information Administration. Annual emissions, State historical tables for 2011, released November 2012. Washington, DC.

⁶⁸ Available at http://www.youtube.com/watch?feature=player_embedded&v=UdVbknG7WNk#!.

⁶⁹ Available at <http://www.deq.state.va.us/Portals/0/DEQ/Air/Permitting/TitleVPermits/30871tvada.pdf>

⁷⁰ Dominion's “Green Power” brochure (<https://www.dom.com/dominion-virginia-power/customer-service/energy-conservation/pdf/gp-brochure.pdf>) states, “*Your participation in Dominion Green Power supports renewable energy and creates environmental benefits*”. One benefit listed is “*reduce greenhouse gas emissions*”.

⁷¹ “Biomass Power,” Dominion Website (<https://www.dom.com/about/stations/renewable/biomass-stations.jsp>).

⁷² Available at

<http://www.deq.state.va.us/Programs/Air/PermittingCompliance/Permitting/PowerPlants/BiomassPermits.aspx>

burning coal were 0.69 million tons in 2010, once converted to wood, CO₂ emissions from the three plants will be around 1.8 million tons per year.

2. *Claims about biopower made to the Virginia State Corporation Commission*

In its application and testimony to the Virginia State Corporation Commission (SCC) supporting the Biomass Conversions at Hopewell, Altavista and Southampton Power Stations,⁷³ Dominion made numerous claims regarding biopower. A notable exchange that highlights the incredulity with which certain claims are sometimes met occurred between a Dominion witness and a Commissioner:

COMMISSIONER CHRISTIE: Before you leave that. This has always fascinated me.

Walk me through again -

THE WITNESS: Yes.

COMMISSIONER CHRISTIE: -- why a commodity that when you burn it produces twice as much carbon as coal is considered carbon neutral. Just walk me through that again.

The witness then went on to describe that residues would decompose in 10 to 15 years, or 25 years for large logs, and that burning these residues should therefore be considered carbon neutral.⁷⁴ However, this argument is invalid. It might be valid if Dominion's converted coal plants operated for a single year and then shut down, but for facilities in continuous operation for a period of 20 years, based on the methodology used in the Manomet study, the net cumulative atmospheric CO₂ loading over this period would be about 14 million tons *more* than if the residues had simply decomposed. Further, this would be the case only if Dominion were solely burning forestry residues generated in the course of sawtimber harvesting. However, as Dominion has stated in testimony to EPA and highlighted above, the Company includes whole trees in its definition of "waste" wood.⁷⁵ Such whole trees may or may not include trees which would not have been cut down but for the market created by Dominion's biomass facilities.

3. *Dominion's disclosures to the SEC*

a) Disclosures concerning federal regulation of bioenergy

While Dominion has significant bioenergy investments, we were only able to locate a few, vague statements disclosing risks to the Company's bioenergy holdings in the company's SEC filings. They are:

⁷³ 2011 Testimony Before the State Corporation Commission of Virginia Regarding Dominion's Applications for Approval of Major Unit Modification and Approval of Rate Adjustment for the Biomass Conversions (Switching from Coal to Biomass at Hopewell, Altavista, and Southampton Power Stations).

⁷⁴ Commonwealth of Virginia, State Corporation Commission. Transcript of hearings held January 12, 2011. Case No. PUE-2011-00073, Vol. III 01-12-2012. Page 693.

⁷⁵ Pamela F. Faggert, Dominion Resources Services, Inc. Comments to the Science Advisory Board biogenic carbon emissions panel on its draft advisory report regarding EPA's accounting framework for biogenic CO₂ emissions from stationary sources. March 16, 2012.

- “Below are some of the Companies’ efforts that have or are expected to reduce the Companies’ overall carbon emissions or intensity: . . . Virginia Power added 83 MW of renewable biomass and is converting three coal-fired power stations to biomass, which is anticipated to be considered carbon neutral by regulatory agencies.”⁷⁶ (emphasis added)
- “While Virginia Power’s new Virginia City Hybrid Energy Center, which started commercial operations in July 2012, is a new source of GHG emissions, Virginia Power has taken steps to minimize the impact on the environment. The new plant is expected to use at least 10% biomass for fuel. . . .”⁷⁷

The company also made a general disclosure about potential effects of climate policy:

“There are other legislative proposals that may be considered that would have an indirect impact on GHG emissions. There is the potential for the U.S. Congress to consider a mandatory Clean Energy Standard. In addition to possible federal action, some regions and states in which Dominion and Virginia Power operate have already adopted or may adopt GHG emission reduction programs. Any of these new or contemplated regulations may affect capital costs, or create significant permitting delays, for new or modified facilities that emit GHGs.”⁷⁸

However, this general disclosure was notably lacking in specifics regarding the known emerging risks associated with the company’s substantial biopower investments.

b) Other disclosures

Despite the lack of disclosure in SEC filings, testimony by Dominion on state-level legislation and in state-level regulatory proceedings shows that the company is well aware that should biogenic CO₂ be increasingly regulated, this could undercut their biopower investments.

Dominion admits that losing renewable energy subsidies would hurt their bioenergy business, but has not disclosed this to investors

Dominion wants to collect renewable energy subsidies in Maryland for the three coal plants that it is converting to biomass in Virginia. Testifying against the bill in Maryland that would eliminate subsidies for low-efficiency biopower, Dominion wrote:

“When Dominion made the decision to convert these coal units to biomass, Maryland law classified biomass as a Tier I renewable resource. The classification was a significant factor in making a business case to invest over \$165 million to convert these facilities. Now, with these plants approved and

⁷⁶ Dominion Resources, 2012 10-K, page 30.

⁷⁷ *Id.* at page 32.

⁷⁸ *Id.* at page 48.

currently under construction, this bill would eliminate a key revenue stream that is considered critical to their economic viability.⁷⁹ (Emphasis added)

However, there is no mention of the Maryland legislation in any of Dominion's SEC filings.

In its letter to the Maryland Legislature, Dominion also reveals how marginal bioenergy investments are in light of natural gas prices, an observation that is likely of interest to investors. The Company states,

“In an era of very low natural gas prices, new biomass units, although they play an important role in renewable energy policy, are simply not cost competitive. However, biomass conversions of coal units are cost competitive, when the value of both the energy produced, the air quality benefits compared to coal, and the value of the renewable energy credits produced are considered.”⁸⁰

In testimony to the State Corporation Commission, Dominion representatives stated that the three coal plant conversions will save customers approximately \$388 million over the next 25 years compared to continued operation of the units on coal.⁸¹ However, the testimony also states that this assessment depends on continuing tax credits and state subsidies for biopower and continued non-regulation of biogenic CO₂. Dominion representatives testified⁸² that at an expected annual capacity factor of 92% for all three converted facilities, the value of federal renewable energy Production Tax Credits (PTC) earned by the plants is expected to produce a Net Present Value (NPV) to customers of approximately \$120 million.⁸³ Dominion stated that the converted power stations would remain economical after the PTC expired⁸⁴ due to lower emissions costs and the value of the RECs produced by the facilities.⁸⁵ However, Dominion's written testimony to the SCC acknowledges that under a scenario where biomass is not considered carbon neutral, the value of converting the

The viability of Dominion's coal plant conversions depends on treating bioenergy as if it has zero CO₂ emissions

⁷⁹ Letter from Carolyn Moss, Dominion Resources, to Thomas Middleton, Chair of the Senate Finance Committee of the Maryland Legislature. March 5, 2013.

⁸⁰ *Id.*

⁸¹ Dominion states that the conversions will save customers approximately \$388 million net present value ("NPV") over the entire 25-year lives of the converted power stations when compared to continued operation of the units on coal. Application of Virginia Electric and Power Company for approval and certification of the proposed Major Unit Modification of the Altavista Power Station under sec. 56-580D and 56-46.1 of the Code of Virginia and for approval of rate adjustment under sec. 56-585.1 A 6 of the Code of Virginia, Case No. PUE-2011-00073, June 27, 2011, page 5.

⁸² *Id.* at page 11.

⁸³ Dominion states that the fuel used will meet the definition of eligible biomass set in Section 45 of the United States Internal Revenue Code, which governs the PTC. In making these calculations, Dominion assumed that 95% of the electricity generated from the converted facilities would be eligible for the federal PTC, because at least 95% of the fuel used at each of the power stations would qualify as eligible biomass.

⁸⁴ The PTC is granted for a period of ten years.

⁸⁵ Direct Testimony of Diane Leopold on behalf of Virginia Electric and Power Company Before the State Corporation Commission, Case No. PUE-2011-00073, -74, -75, page 14.

power plants to biomass would be significantly less than the Net Present Value of continued operation on coal.⁸⁶

However, this admission may only be discovered by reading hundreds of pages of company testimony in this case, and is therefore not available to ordinary investors. It does not appear in the company's shareholder disclosures.

Dominion also admits that regulation of biogenic CO₂ would threaten its investments in its comment letters to EPA. Dominion wrote to EPA's Science Advisory Board during deliberations about Clean Air Act regulation of biogenic CO₂, referencing Dominion's several biopower facilities, including the three coal plants it is converting to burn biomass. The letter acknowledges that regulating biopower emissions would present a financial risk to the company:

“Given the current economic assumptions for the stations to be converted to biomass mentioned above, they are expected to provide significant customer value under a broad range of future market conditions. The value of future biomass power facilities could be diminished while not actually reducing overall carbon emissions if EPA implements a policy which relies on an accounting framework which devalues the “carbon neutrality” of biogenic CO₂ emissions; particularly that of waste wood.”⁸⁷ (Emphasis added)

The Company asked the SAB to either treat all wood-based biogenic energy as categorically excluded from CO₂ emission regulation, or alternatively to treat the materials as *a priori* carbon neutral. The SAB's report did not support either such position.

c) Summary of Dominion's disclosures

Dominion's disclosures in SEC filings make the concrete risks facing the Company sound vague and nonspecific. The Company has not disclosed that EPA's deadline for regulating biogenic CO₂ emissions is approaching, or that EPA's Science Advisory Board has stated that bioenergy can not be assumed to be carbon neutral and that EPA seems likely to adopt the SAB approach for carbon accounting. The Company has not disclosed that EPA's deferral for counting biogenic CO₂ toward PSD applicability was deemed illegal by the Court. Finally, there is no disclosure that there is a strenuous effort in Dominion's own service territory to eliminate renewable energy subsidies for biopower, including for Dominion's coal plant conversions, which by Dominion's own admission would “eliminate a key revenue stream that is considered critical to their economic viability.”

⁸⁶ Direct Testimony of Glenn A. Kelly on behalf of Virginia Electric and Power Company Before the State Corporation Commission, Case No. PUE-2011-00073, -74, -75, page 13.

⁸⁷ Pamela F. Faggert, Dominion Resources Services, Inc. Comments to the Science Advisory Board biogenic carbon emissions panel on its draft advisory report regarding EPA's accounting framework for biogenic CO₂ emissions from stationary sources. March 16, 2012.

4. Associated Potential Material Harms

a) Financial Impacts

Virginia and North Carolina have both set Renewable Portfolio Standards (RPS) to ensure a certain amount of electricity is produced from renewable sources. Dominion has committed to meeting Virginia's voluntary goals of 12% of base year electric energy sales from renewable power sources by 2022, and 15% by 2025, and North Carolina's RPS of 12.5% by 2021.⁸⁸ The company has stated that the coal plant conversions to biomass will generate 1.2 million Tier I RECs per year, of which 80.69% will be available toward meeting Dominion's RPS requirements in Virginia.

However, the company has stated that it is likely to sell its Tier I biomass RECs in another state where prices are higher, and purchase back less expensive Tier II RECs to meet its obligations in-state, using the difference in price to defray the costs of converting the coal plants to biomass.⁸⁹ Maryland Tier I RECs are currently around \$14/MWh, suggesting that the company could collect around \$13.5 million per year from sale of biomass RECs in that state, with the net gain being the cost of those RECs, minus whatever Virginia Tier II RECs cost. Dominion lobbied against the 2013 bill that would have made low-efficiency, high-emissions biopower ineligible to receive RECs in Maryland.⁹⁰ The bill did not pass, but is likely to be offered again. If the bill passes, and Dominion loses access to bioenergy RECs in Maryland, the company would further face additional costs in paying for the coal plant conversions.

Dominion may face further permitting costs for its coal-to-biomass conversions. The facilities all "avoided" PSD permitting, but all are major sources for CO₂ that received permits during the period that EPA's deferral for biogenic CO₂ was in place. As a result of the *Center for Biological Diversity* decision, these facilities may be compelled to apply for new permits under the PSD program. This process would incur additional costs for the coal plant conversions.

b) Reputational Damage

As the greenhouse gas impacts of bioenergy are increasingly recognized and regulated, Dominion's heavy emphasis on biopower to meet its renewable energy generation goals could expose the company to reputational damage. Dominion portrays biomass energy as an investment that reduces greenhouse gas emissions, marketing it to individual customers who voluntarily pay extra for "renewable" power through the Company's Green Power Program. Dominion brands itself as an ethical and environmentally responsible company. As the company states in its 2011-2012 Citizenship and Sustainability Report, "Integrity, individual responsibility and accountability go hand-in-hand with bottom-line results. We cannot and will not take shortcuts to achieve our goals and fulfill our obligations to stakeholders."⁹¹ Contrary to this statement, however, it can be argued that keeping old coal plants operating by converting them to

⁸⁸ Dominion 2012 10-K, page 30.

⁸⁹ Altavista Biomass Application Vol. 1, Page 15, Section J.40.

⁹⁰ Letter from Carolyn Moss, Dominion Resources, to Thomas Middleton, Chair of the Senate Finance Committee of the Maryland Legislature. March 5, 2013.

⁹¹ Dominion 2011-2012 Citizenship & Sustainability Report, page. 10
(<http://www.dominioncsr.com/assets/pdf/2011-12-DominionCSR.pdf>).

burn biomass, instead of developing no-emissions renewable energy resources, is actually a significant shortcut.

B. Southern Company

Southern Company is one of the largest electric utilities in the nation, providing electricity service to over 4.4 million retail customers through its subsidiaries Alabama Power, Georgia Power, Gulf Power, Southern Power, and Mississippi Power. At the end of 2012, the company directly owned one biomass facility, the Nacogdoches plant near Sacul, Texas. Using 1 million tons of wood per year and with 116 MW capacity, the Nacogdoches facility is one of the largest biomass power stations in the United States (although the facility was idled a few months after it went online, due to the high cost of its power relative to other available sources, including wind and natural gas).⁹²

Southern Company subsidiaries own biomass power facilities or interest in biomass energy facilities across the United States. Alabama Power has been co-firing biomass as part of normal operations at its Plant Gadsden for nine years and is planning to add another 22.5 MW of biopower to its generation mix.⁹³ Mississippi

Power is actively researching the use of biomass for re-powering and co-firing its existing plants and is currently working with the U.S. Forest Service to evaluate co-firing biomass from the Talladega National Forest with pulverized coal (wood harvesting is already under way).⁹⁴ Georgia Power has a 20-year agreement for power from woody biomass with Yellow Pine Energy Co. LLC in Fort Gaines, GA, a 110 MW biomass plant, and a 15-year contract for biomass power from Greenway Renewable Power LLC near Franklin, GA.⁹⁵ Georgia Power was in the process of converting its Plant Mitchell coal boiler to biomass, but put this project on hold in 2011, requesting a delay of 2 - 4 years while the company determines costs associated with new pollutant emission regulations.⁹⁶

Southern Company's 116 MW Nacogdoches biomass power plant in Texas was idled after startup due to high costs compared to natural gas and wind

1. Claims Made in Southern Company's Website and Marketing Materials

Southern Company's website claims biopower is carbon neutral, clean, and "good for the community."

⁹² O'Grady, Eileen. Top US biomass plant largely idle; Austin Energy cuts purchases. Reuters. December 2, 2012. <http://www.reuters.com/article/2012/12/06/utilities-southern-biomass-idUSL1E8N5CAD20121206>

⁹³ Corporate Responsibility, Building Renewable Resources, (<http://www.southerncompany.com/corporate-responsibility/energy-innovation/building.aspx>).

⁹⁴ Biomass Energy, Mississippi Power website, http://www.mississippipower.com/topic_renewable/biomass.asp

⁹⁵ Georgia Farm Bureau, "Georgia's Largest Biomass Power Plant Under Development," 8/16/2011 (by Biomass Magazine) (<http://www.gfb.org/gfbnews/GFBNewsMoreInfo.asp?RecordID=1993>).

⁹⁶ Georgia Power notes in a recent petition to the Georgia Public Service Corporation that the Industrial Boiler MACT, new coal combustion residuals rule and biogenic GHG considerations may make the conversion economically unfeasible. "Georgia Power's Petition for Approval of the First Construction Monitoring Report for the Mitchell Project and Request for a Delay in Construction", GPSC Docket No. 28158, page 6.

- It states, “Southern Company continues to develop and deploy smarter and cleaner energy technologies, including increased energy efficiency, nuclear power, clean coal and renewables.” Referencing the 100 MW wood-burning plant the Company built in Texas, the website states, “Nacogdoches represents another step in developing a diverse portfolio to meet the nation's growing energy demands.”⁹⁷
- A promotional video claims, “Using a renewable resource [biomass] to produce electricity is clean and environmentally responsible, and good for the community.”⁹⁸
- The website states, “Benefits of Biomass Energy. In Georgia, trees are an abundant, renewable natural resource when properly managed as part of a balanced energy program. Georgia Power is investing in the research and technology required to convert coal-burning plants to biomass. Processing wood as biomass is considered carbon-neutral since the resultant emissions equal the carbon dioxide absorbed by the trees as they matured.”⁹⁹

2. Southern Company's disclosures to the SEC

a) Disclosures concerning federal regulation of bioenergy

Southern Company appears to be aware of the risk that federal regulation of biogenic CO₂ would present to the Company’s bioenergy holdings – for instance, the Company’s comments to EPA on the deferral rule stated, “By not properly exempting biogenic CO₂ emissions, the PSD and Title V Programs potentially create disincentives to proceed with bioenergy projects” and that “Future biomass projects will be impacted if biogenic CO₂ emissions are not provided a permanent applicability exemption from the PSD and Title V Programs.”¹⁰⁰ In its SEC filings, however, Southern only notes that there is uncertainty surrounding environmental regulation and that future regulation of greenhouse gases could negatively impact the company, but does not give any hint that biogenic CO₂ emissions may present a special risk.

Southern Company told EPA that regulating biogenic CO₂ would impact bioenergy projects, but has not disclosed this to investors

The only relevant statements we were able to locate in the company’s 2012 10-K were the following, which specifically mention coal, but not bioenergy:

- (1) “The Southern Company system's costs of compliance with environmental laws are significant. The costs of compliance with current and future environmental laws,

⁹⁷ Nacogdoches Generating Facility, Southern Company Website (<http://www.southerncompany.com/about-us/our-business/southern-power/nacogdoches.cshtml>).

⁹⁸ “Nacogdoches Facility Video Update July 2012,” located on Nacogdoches Facility page of company website, and separately: (<http://www.youtube.com/watch?v=KbX6uPBVC2g>).

⁹⁹ Biomass Energy Sources, Georgia Power Website (<http://www.georgiapower.com/about-energy/energy-sources/biomass.cshtml>).

¹⁰⁰ Southern Company's Response to EPA's Call for Information: Information on Greenhouse Gas Emissions Associated with Bioenergy and Other Biogenic Sources (75 Fed. Reg. 41173 (July 15, 2010)), Docket ID No. EPA-HQ-OAR-2010-0560, page 3.

including laws and regulations designed to address air quality, water, coal combustion byproducts, global climate change, renewable energy standards, and other matters and the incurrence of environmental liabilities could negatively impact the net income, cash flows, and financial condition of Southern Company, the traditional operating companies, and/or Southern Power.”¹⁰¹

- (2) “The Southern Company system's ultimate environmental compliance strategy, including potential unit retirement and replacement decisions, and future environmental capital expenditures will be affected by the final requirements of new or revised environmental regulations and regulations relating to global climate change that are promulgated; the outcome of any legal challenges to the environmental rules; the cost, availability, and existing inventory of emissions allowances; and the fuel mix of the electric utilities. Compliance costs may arise from existing unit retirements, installation of additional environmental controls, upgrades to the transmission system, and adding or changing fuel sources for certain existing units.”¹⁰²
- (3) “Although the outcome of federal, state, and international initiatives cannot be determined at this time, additional restrictions on the Southern Company system's greenhouse gas emissions or requirements relating to renewable energy or energy efficiency at the federal or state level could result in significant additional compliance costs, including capital expenditures. These costs could affect future unit retirement and replacement decisions and could result in the retirement of a significant number of coal-fired generating units. Also, additional compliance costs and costs related to unit retirements could affect results of operations, cash flows, and financial condition if such costs are not recovered through regulated rates or through PPAs. Further, higher costs that are recovered through regulated rates could contribute to reduced demand for electricity, which could negatively impact results of operations, cash flows, and financial condition.”¹⁰³ (Emphasis added)

b) Other disclosures

Southern Company's SEC filings from 2012 state that the Company received renewable energy tax incentives for its Nacogdoches biomass plant and three solar facilities as part of the American Recovery and Reinvestment Act of 2009. These incentives had “a material impact on cash flows and net income.”¹⁰⁴ The company's disclosure explicitly references the Act's extension of investment tax credits for biomass projects which begin construction before January 1, 2014.

c) Summary of Southern Company's disclosures

Southern Company's disclosures about the potential risks of CO₂ regulation refer to coal, not biomass. The Company does not disclose that EPA will likely resume regulating biogenic CO₂ in July 2014, if not before. There is no mention of how EPA's Science Advisory Board has recommended that EPA carefully consider the factors that affect net CO₂ emissions, and no

¹⁰¹ Southern Company 2012 10-K, page I-14.

¹⁰² *Id.* at page I-15.

¹⁰³ *Id.* at page II-27.

¹⁰⁴ *Id.* at page II-454.

mention of the Court decision that EPA's deferral of regulation was never legal to begin with. There is also no mention that some states are eliminating subsidies for low-efficiency biopower, or the effect that federal regulation might have on willingness to continue subsidizing biopower.

3. Associated Potential Material Harms

a) Financial Impacts

The Company's disclosure regarding the materiality of renewable energy tax incentives demonstrates what is at stake if tax incentive programs end. Southern's subsidiaries are co-firing biomass at some coal plants, but it is unclear that this strategy will continue to be viable, particularly given that EPA's New Source Performance Standards for new coal plants include biomass CO₂ in total emissions. It is possible that performance standards for existing facilities, if they are issued, will also count CO₂ from biomass co-firing. Potential new limits on greenhouse gas emissions could also require substantial capital expenditures for existing facilities, and the loss of the PSD permitting deferral for new and modified facilities could also involve significant financial impacts. However, Company has not provided investors with adequate information about these relevant issues.

b) Reputational Damage

Southern Company brands itself as a company that cares about the environment. For example, its website states, "We work at all levels from the grass roots in field offices and power plants up through corporate channels at each of our subsidiaries and headquarters to support communities and ecologies within our service territory."¹⁰⁵ The Company seeks a green reputation through its donations of land for conservation and support of various ecosystems and endangered species. The company also supports its environmental-steward reputation through green power programs offered through its subsidiaries. Georgia Power's Earth Cents program allows customers to voluntarily pay extra on their monthly electric bills to support alternative energy. The portfolio of technologies supported by Georgia Power's Earth Cents program includes biomass energy. Earth Cents is advertised as a way to "show your commitment to the environment,"¹⁰⁶ and the company claims that participation in its green energy programs "help improve our communities" because "Green Energy sources have a reduced impact on the environment."¹⁰⁷ However, as the public comes to understand the negative environmental impacts of biomass power generation, especially the fact that on a day-to-day basis it emits more CO₂ than coal per megawatt-hour, these issues could prove damaging to the company's reputation.

¹⁰⁵ Economic Stewardship, Corporate Responsibility, Southern Company website (<http://www.southerncompany.com/corporate-responsibility/economic-stewardship/>).

¹⁰⁶ Green Energy, Georgia Power website (<http://www.georgiapower.com/earthcents/green/home.cshtml>).

¹⁰⁷ Green Energy Special Purchase Event Option, Georgia Power (<http://www.georgiapower.com/earthcents/green/pdfs/Special%20Event%20Purchase.pdf>).

C. Covanta

Covanta Holding Corporation (Covanta) is an international company with biomass energy and "energy-from-waste" facilities in 16 U.S. states.¹⁰⁸ Covanta owns eight biomass power plants – six in California and two in Maine – with a gross energy output of 191MW (about 11% of total generating capacity across the company's "Americas" sector). In 2012, 2011, and 2010, revenue from Covanta's biomass projects represented approximately 4%, 4%, and 5%, respectively, of the company's Americas' segment revenue.¹⁰⁹

1. Claims made in Covanta's Sustainability Report and on its website

Covanta's website makes several statements on the environmental benefits of bioenergy, asserting bioenergy produces "significant reductions in greenhouse gas emissions," that it is "clean" energy, and that "waste" wood is used as fuel. As discussed above, however, this "waste" wood includes whole trees.¹¹⁰

The inclusion of whole trees as fuel is significant because the Company is familiar with the Manomet Study and the net increase in CO₂ emissions when whole tree are cut for fuel. In comments submitted to the EPA's Science Advisory Board on biogenic carbon accounting,¹¹¹ Covanta stated that the Manomet study "properly recognized that certain sources of standing timber used for bioenergy in Massachusetts are not carbon neutral over the short term." What they do not state, however, is that the "short term" period they are referring to is the time required not for carbon neutrality, but simply the time required for emissions to be drawn down so that they equal net emissions from fossil fuels. This is at least 40 years (if the comparison of net biopower emissions is made to coal) and at least 90 years (if biopower is compared to gas).¹¹²

Covanta claims bioenergy is "clean" and that it achieves "significant reductions" in greenhouse gas emissions

Covanta's sustainability report from 2009/2010 does acknowledge that bioenergy is sometimes climate-unfriendly:

"Not all biomass-based (biogenic) carbon is carbon neutral. For example, the use of biomass for energy that results in land-use change, such as the conversion of tropical rainforests to cropland or clear cutting of old growth forests, has serious negative climate impacts. Conversely, waste sources of biomass, such as forestry residues and MSW, do not result in land-use change, and are widely recognized as

¹⁰⁸ Covanta Corporate Sustainability Report 2010-2011, page 11. (http://www.covantaenergy.com/pdf/Covanta_2012_CSR.pdf).

¹⁰⁹ Covanta 2012 10-K, page 11 (<http://www.sec.gov/Archives/edgar/data/225648/000022564813000007/cva-123112x10k.htm>).

¹¹⁰ <http://www.covantaenergy.com/what-we-do/our-services/other-renewable-energy.aspx>

¹¹¹ Letter from Michael E. Van Brunt, Covanta Energy, re: May 9, 2012 SAB review of EPA's draft accounting framework for biogenic CO₂ emissions from stationary sources. May 18, 2012.

¹¹² Walker, T., et al. Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy. Manomet Center for Conservation Sciences. 2010.

a sustainable source of biogenic carbon that can play a significant role in reducing global GHG emissions.”¹¹³

However, the Company never reveals that the day to day emissions from their wood-burning power plants exceed emissions from coal plants of equivalent size, and does not explain how the prospects for these facilities to “reduce” greenhouse gas emissions is a long term endeavor that is rendered speculative by numerous assumptions and complicating factors.

2. Covanta's disclosures to the SEC

a) Disclosures concerning federal regulation of bioenergy

Out of the three companies analyzed, Covanta had the most complete set of disclosures to the SEC. For instance, in its 2012 10-K the Company disclosed that EPA had deferred regulation of biogenic CO₂, but that regulation might be coming in the future:

“In 2011, GHG emissions became subject to the Prevention of Significant Deterioration (“PSD”) and Title V programs of the CAA. While the inclusion of GHGs under the Title V program does not introduce new requirements for existing facilities other than additional reporting requirements, the inclusion of GHGs under PSD will impact new facilities and potentially expansions of existing facilities. In 2011, the EPA also finalized a three year deferral of CAA requirements for biogenic CO₂ emissions (CO₂ emissions that result from the combustion of naturally-occurring materials, e.g. paper, cardboard, food, cotton, wood, and leaves)... However, significant rule development is still required in advance of the 2014 expiration of the deferral.”

The 2012 10K implies, however, that the Company expects regulations to be favorable:

“As required by the deferral regulation, EPA drafted an accounting methodology for biogenic CO₂ emissions in response to growing questions regarding the carbon neutrality of certain types of biomass, for example, the use of standing timber for energy generation. In 2012, the EPA Science Advisory Board (“SAB”) completed a review of the EPA's draft methodology. Both the draft methodology and the subsequent review were generally favorable to the waste sources of biomass managed at our facilities, including the biogenic portion of municipal solid waste and forestry and agricultural residues.”

This disclosure is misleading because it fails to reveal that the SAB concluded that “For logging residues and other feedstocks that decay over longer periods, decomposition cannot be assumed to be instantaneous and the Framework could be modified to incorporate the time path of decay of these residues if they are not used for bioenergy.”¹¹⁴

¹¹³ Covanta Corporate Sustainability Report 2010-2011, page 11.
(http://www.covantaenergy.com/pdf/Covanta_2012_CSR.pdf).

¹¹⁴ United States Environmental Protection Agency. SAB review of EPA's Accounting Framework for Biogenic CO₂ Emissions From Stationary Sources. EPA-SAB-12-011. September 28, 2012. Washington, DC.
([http://yosemite.epa.gov/sab/SABPRODUCT.NSF/57B7A4F1987D7F7385257A87007977F6/\\$File/EPA-SAB-12-011-unsigned.pdf](http://yosemite.epa.gov/sab/SABPRODUCT.NSF/57B7A4F1987D7F7385257A87007977F6/$File/EPA-SAB-12-011-unsigned.pdf)).

Covanta’s disclosure also omits what we believe is likely to prove the most impactful finding of the SAB: that bioenergy sources can not be considered *a priori* carbon neutral, which means that review of the particular materials and sources, as well as offset strategies, would be necessary to determine net carbon impacts.

Covanta discloses that its “business and future prospects could be adversely affected if renewable technologies we use were not included among those technologies identified in any final law as being clean or renewable or greenhouse gas reducing,” but the Company does not disclose to investors the growing body of scientific literature documenting the large greenhouse gas impacts of bioenergy.

The Company includes this closing statement on regulatory issues affecting bioenergy:

“We cannot predict at this time the potential impact to our business of the EPA’s regulatory initiatives under the CAA, or whether EPA’s regulation will be impacted or superseded by any future climate change legislation. “

Importantly, this 2012 10-K was filed February 15, 2013, but there is no disclosure in this or any preceding filing of the *Center for Biological Diversity* case that challenged EPA’s deferral, which was filed in 2011. The case was decided in July 2013, but as of September 18, 2013 Covanta still had never disclosed this case and the Court’s finding that EPA’s deferral was not legal.

b) Other disclosures

Covanta’s biopower facilities already appear to be struggling financially due to relatively low natural gas prices driving down electricity prices. The Company notes in its 2013 10-K that “electricity and steam sales decreased in 2012 due to lower pricing and lower energy revenue related to our biomass facilities,”¹¹⁵ and according to the Covanta website,¹¹⁶ three of Covanta’s eight biomass power plants are currently offline.

The somewhat marginal nature of the bioenergy industry makes it relatively dependent on subsidies, and Covanta’s comment letters to regulatory dockets demonstrate that the company is aware of the potential financial risks from regulation. When Massachusetts invited comment on proposed regulations that would eliminate renewable energy subsidies for low-efficiency biomass power plants in that state, Covanta submitted multiple comments to regulators arguing for exclusion of existing plants from the regulations. In one letter to the Massachusetts regulators they noted that such regulatory changes could result in major facility investments having been “made in vain.”¹¹⁷

Covanta’s two 27 MW biomass plants in Maine will no longer qualify for renewable energy credits in Massachusetts

¹¹⁵ Covanta 2012 10-K, page 46.

¹¹⁶ See Covanta website, (<http://www.covantaenergy.com/en/what-we-do/our-services/other-renewable-energy.aspx>).

¹¹⁷ Letter from Paula Soos, Vice President of Government Relations for Covanta, to the Massachusetts Department of Environmental Resources Commissioner, “Comments on DOER Biomass RPS Rulemaking Process,” August

Because of the regional nature of the energy market, companies often sell power and obtain renewable energy credits (RECs) in multiple states. Covanta's Jonesboro (ME) plant is qualified to receive Class I RECs in Maine, and both the Jonesboro and West Enfield (ME) facilities are qualified to receive Class II RECs in Connecticut, and Class I RECs in Massachusetts. Of these subsidies, the Massachusetts Class I RECs are by far the most lucrative. Nonetheless, following enactment of the Massachusetts regulations, the company has made no disclosure that beginning in 2016, Covanta's two 27 MW plants in Maine will no longer be eligible to receive RECs in Massachusetts, as both plants fail to meet that state's new requirement that biomass facilities be 50% efficient to obtain one-half REC per megawatt-hour. Far from disclosing this, as of November 2013, Covanta's website still stated that its Jonesboro facility in Maine "qualifies for Massachusetts Class I renewable energy certificates."

c) Summary of Covanta's disclosures

Covanta has disclosed that EPA exempted biogenic CO₂ from regulation, and that the exemption would end in three years. However, the disclosure misrepresents the conclusions of EPA's SAB regarding the carbon neutrality of forestry residues, making statements which could be read to imply that the SAB "signed off" on these fuels when this is not the case. Covanta has not disclosed the significant Court decision finding that EPA can not exempt biogenic CO₂ from regulation under the Clean Air Act. Finally, despite having commented in opposition to the Massachusetts bioenergy regulations that are poised to take subsidies away from Covanta's two wood-burning plants in Maine, Covanta has not disclosed the existence of these regulations nor revealed the impending loss of these subsidies.

3. Associated Potential Material Harms

a) Financial Impacts

Even before Massachusetts enacted its new bioenergy regulations, Covanta had already been materially affected by policy changes that reduce subsidies for biopower. The Company's Jonesboro plant in Maine was acquired in 2008 but was switched from full-time operation to dispatch-only operation in 2010, partially in response to the cessation of fuel payments from the Biomass Crop Assistance Program, a federal financial incentive that produced matching payments for biomass fuel, including wood chips and bark.¹¹⁸

The loss of Massachusetts RECs may have an impact on the Company. The value of RECs fluctuates over time, but at 2012 prices of around \$63 per megawatt-hour for Massachusetts Class I RECs,¹¹⁹ Covanta's two Maine biomass plants would have the potential for generating over \$25 million per year in RECs at close to full-time operation. Actual operation of the two Maine plants appears to have been at about 32% of capacity in 2012,¹²⁰ thus REC revenues may

12, 2010.

¹¹⁸ The Biomass Crop Assistance Program (BCAP) is a Farm Bill program. One component of the program, now ended, matched payments of up to \$45/dry ton or \$22.50/green ton for wood used as boiler fuel. See Lora Whelan, "Jobs and biomass market lost with Jonesboro plant cutback", *The Quoddy Tides*, Vol. 42, No. 21, October 8, 2010, (<http://quoddytides.com/jonesboro10-8-10.html>).

¹¹⁹ Skystream REC price report from 4/15/2013 shows 2012 Massachusetts Class I RECs at \$63.40/MWh.

¹²⁰ Energy Information Administration. EIA-923 monthly generation and fuel consumption time series file, 2012

have been around \$9.6 million that year, a significant portion of the \$61 million¹²¹ in total revenues from biopower holdings in Covanta's Americas Segment in 2012. Qualification of Covanta's facilities for Connecticut Class II RECs will not make up for this loss in revenue, as these RECs are worth less than 1 percent of what Massachusetts Class I RECs are worth. Federal policy changes, including the reversal of EPA's deferral for biogenic CO₂ from PSD applicability, may also affect the profitability of Covanta's wood-burning facilities. Regulation of biogenic CO₂ would mean that new facilities and existing facilities undergoing major modifications that would significantly increase emissions of CO₂ will have to go through PSD permitting, entailing significant time and cost investments.

b) Reputational Damage

Covanta's stated goal is to "grow so that it can expand its positive impact on the environment and deliver benefits to shareholders, employees, and the communities where it operates."¹²² The company's business model is based on its image as an environmentally responsible, innovative company that is primarily focused on waste disposal and energy recovery. In the opening words of a message to the company's shareholders, Covanta emphasizes in its most recent corporate sustainability report that it is looking for "opportunities to become an even more sustainable company." In the same report, Covanta states that its Clean World Initiative (CWI) "represents a continuing investment in our future that enhances stockholder value by making our business more sustainable; economically, environmentally, and socially."¹²³ Covanta's wood-burning biomass facilities are presented as another "sustainable"¹²⁴ method of generating energy from waste materials.

As public awareness of CO₂ emissions from bioenergy becomes more widespread, and as new regulations compel companies to acknowledge and mitigate emissions of CO₂ and other pollutants from bioenergy, this could damage Covanta's quest for a reputation built on producing "clean," "sustainable," and "carbon neutral" power from biomass.

V. OUR REQUESTS TO THE SEC

A. Evaluate Bioenergy Disclosures Regarding Climate Change and Environmental Impacts

We request that the Commission evaluate the disclosures of Covanta, Dominion, Southern Company and other publicly traded companies investing in bioenergy, to ensure that their disclosures on environmental impact and on regulation of greenhouse gas emissions sufficiently inform investors of related risks and trends.

The SEC should evaluate the materiality of the omissions based on the existing legal standards

early release. Net generation at the two facilities in 2012 was 152,940 megawatt-hours.

¹²¹ Covanta 2012 10-K, page 43.

¹²² Covanta Corporate Sustainability Report 2010-2011, page 7.

¹²³ *Id.* at page 3.

¹²⁴ *Id.* at pages 11, 25.

set forth in *TSC Industries Inc. v. Northway, Inc.*¹²⁵ which states that an item is material if there is “a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the ‘total mix’ of information available.” We believe that many of the issues raised in this analysis could well rise to that level.

The obligation to disclose exists even when there is uncertainty about the ultimate impacts of emerging scientific information. The Supreme Court decision in *Matrixx Initiatives, Inc. v. Siracusano*¹²⁶ No. 09-1156 (U.S. March 22, 2011) demonstrated that whether or not a particular set of facts rises to the level of materiality that necessitates disclosure requires review of the source, content, and context.

We believe that the source, content and context of information on the following issues merits close examination by the SEC:

- Specific risks to biomass power investments arising from the vacatur of EPA’s deferral of biogenic CO₂ emissions by U.S. Court of Appeals for the DC Circuit in July 2013, and EPA’s pending regulation of biogenic CO₂, including the potential for PSD regulation to materially affect the companies operationally and financially including the costs of compliance for permitting of biomass power facilities. The SEC should consider and inquire for each of the companies, whether resumption of regulation of biogenic CO₂ under the Clean Air Act could impose new permitting and operational requirements for existing or new biomass facilities;
- Specific risks to biomass power investments from existing or pending climate change-related legislation or regulation, arising as a result of scientific findings adverse to bioenergy as a technology that mitigates CO₂ emissions, such as the loss of subsidies and special tax treatment, loss of preferential treatment and permitting exemptions;
- The risk of decreased consumer demand for biomass power in renewable energy portfolios due to increasing concern about greenhouse gas emissions and conventional pollutant emissions, as well as competition from true low-emission renewable energy options such as wind and solar power;
- Risks arising from reputational damage related to climate change, such as possible negative public reaction to data on companies’ bioenergy greenhouse gas emissions;
- Risks arising from the dependence of biomass power plant profitability upon federal and state subsidies and tax credits that are limited in duration and in some cases are dependent on the treatment of bioenergy as carbon neutral.

We further request that the Commission direct the companies named in this letter to immediately stop making any materially misleading statements about "clean" biomass, bioenergy as a means

¹²⁵ *TSC Industries, Inc v Northway, Inc*, 426 US 438, 449 (1976).

¹²⁶ *Matrixx Initiatives, Inc. v. Siracusano*, 563 US ____ (2011).

of mitigating climate warming, and other unqualified statements about bioenergy carbon neutrality. To make these disclosures not misleading, companies should disclose additional information including:

- That per unit of power generated, biomass power plants emit more CO₂ on a day-to-day basis than fossil-fueled plants, and may also emit substantial quantities of other air pollutants;
- That addition of bioenergy assets therefore generally increases company-wide greenhouse gas emissions;
- That carbon neutrality at wood-burning power plants, if at all achievable, is shown by current science to require decades to more than a century to realize;
- That claims for bioenergy carbon neutrality rely on the assumption that forests not owned or managed by the companies themselves will continue to exhibit net growth and offset emissions;
- That policymakers are likely to consider such issues in assessing subsidies and tax relief, regulatory deferrals and exemptions, and favorable treatment of biomass energy operations.

B. Establish Carbon Accounting Principles Relevant to SEC Filings

The 2010 Commission guidance on climate disclosures touched upon some of the issues that may be involved in accounting for costs and offsets related to carbon. However, the guidance did not provide specificity, for instance regarding what level of substantiation of carbon offsets is needed for a company to refer to its biomass-based energy facilities as "carbon neutral" or as an effective climate mitigation measure.

As detailed in this letter, claims of carbon neutrality often rest on the presumption that burning waste wood is not a net source of CO₂ over timeframe of years to decades, and the idea that bioenergy stack emissions are offset by eventual regrowth of forests and the restoration and maintenance of their carbon sequestration capacity. If these events occur at all, they will occur in future decades. The effectiveness of the promised offsets are neither guaranteed nor substantiated. For example, companies that do not own or control the land where their biomass fuel was sourced, or any other forest resources, cannot guarantee that trees will be replanted, or that regrowth will occur at a rate adequate to offset emissions.

This is obviously an issue of prime interest to environmental and energy policymakers. Without any demonstration that carbon offsets are actually occurring at the appropriate rate, the asserted carbon neutrality of biomass power may yet prove to be a carbon Ponzi scheme which will eventually collapse, harming the environment. Investors are also at risk, because the companies stand to lose materially important subsidies and regulatory exemptions.

We urge the Commission to provide guidance on appropriate disclosures in this context, and to

foster the development of accounting principles that will help ensure sufficient investor protection in this marketplace. Such clarifications can be made through an additional Commission guidance, staff bulletins, or correspondence with the relevant companies.

VI. CONCLUSION

Three of the leading companies with biopower holdings, Covanta, Dominion and Southern Company, are not disclosing adequate information related to risks of their biomass operations and investments – information that we believe a reasonable investor would want to know when making decisions about buying or selling securities.

It is vital that energy companies make complete disclosure available to investors on climate change-related risks associated with biomass power, both to help individual investors make informed decisions, and to help institutional investors fulfill their fiduciary duties to examine how effectively companies are managing environmental risks.

With persistent attention and enforcement by the Commission and its staff, the Climate Guidance has great potential to ensure that companies with biomass energy holdings meet their disclosure obligations under federal securities laws and regulations.

VII. APPENDIX: LEGAL STANDARD FOR DISCLOSURE OF INFORMATION TO INVESTORS

A. Key Disclosure Requirements

The Securities Exchange Act (“the Act”) requires publicly traded companies registered with the Commission to disclose certain information to assist investors in making informed investment decisions. Regulation S-K, in particular, requires various qualitative and quantitative disclosures that are relevant to biomass energy and its environmental impacts.

Item 101, governing the company’s general description of business operations, requires disclosure of the material effects that complying with federal, state, and local environmental provisions may have upon the capital expenditures, earnings, and competitive position of the registrant and its subsidiaries. The company is required to disclose any “material estimated capital expenditures for environmental control facilities for the remainder of its current fiscal year and its succeeding fiscal year and for such further periods as the registrant may deem material.”

Item 103, governing the disclosure of legal proceedings, requires a company to disclose material environmentally-related administrative or judicial proceedings. The SEC provides two specific materiality thresholds which require disclosure if the proceeding involves a claim, sanction or expenditure that exceeds 10% of current assets, or if the proceeding involves a governmental authority seeking potential sanctions over \$100,000.

Item 303, governing disclosure in the Management Discussion and Analysis section of a

financial report, requires a registrant to disclose "where a trend, demand, commitment, event or uncertainty is both presently known to management and reasonably likely to have material effects on the registrant's financial condition or results of operation." Such trends can include environmental issues such as impending environmental regulation.

Companies' environmental disclosures are also subject to the anti-fraud provisions of SEC Rule 10b-5, which prohibits a company from making false or misleading statements in SEC filings. The Rule also prohibits a company from under-reporting or omitting information that a reasonable investor would likely consider material given the total amount of information available to the investor.

Where a Company has published information which is later materially affected by subsequent events, it must publish a Form 8-K, updating that information.

In addition to information expressly required by Commission regulations, Securities Act Rule 408 and Exchange Act Rule 12b-20 require a registrant to disclose in registration statements "such further material information, if any, as may be necessary to make the required statements, in light of the circumstances under which they are made, not misleading."¹²⁷ The "further material information" should include "known trends, events, demands, commitments and uncertainties that are reasonably likely to have a material effect on financial condition or operating performance," or cause the reported financial information to be non-indicative of future operating performance or financial condition.¹²⁸

B. Materiality

Many registrants and auditors use as a rule of thumb a quantitative definition that defines as material any data with financial impact exceeding 5%-10% of net income. Although the 5% threshold is widely used, the SEC points out that this materiality definition has no basis in accounting literature or law.⁵² On the contrary, under the SEC's pronouncement on materiality, Staff Accounting Bulletin 99 (SAB 99) clarified that qualitative information can be material, and that "exclusive reliance on certain quantitative benchmarks to assess materiality in preparing financial statements and performing audits of those financial statements is inappropriate; misstatements are not immaterial simply because they fall beneath a numerical threshold." The Bulletin provided several cases in which disclosures that fall beneath the 5% threshold can in fact be material, such as when the disclosure refers to a company's regulatory compliance, or if it relates to an important portion of the registrant's business operations. Both of these criteria are relevant to bioenergy, and to the companies we evaluated in this analysis.

The Financial Accounting Standards Board provided another definition of materiality in its Statement of Financial Accounting Concepts No. 2 (FAS 2), which takes a relatively expansive view. The FAS 2 states that a disclosure should be made if its omission or correction would probably change or influence "the judgment of a reasonable person relying upon the report."

¹²⁷ 17 CFR 230.408 and 17 CFR 240.12-b.20.

¹²⁸ Release No. 33-8350 (December 19, 2003) [68 FR 75055] (the "2003 Release").

In 1976, the Supreme Court, in *TSC Industries Inc. v. Northway, Inc.*¹²⁹ mirrored the FAS 2’s definition by concluding that a disclosure is material if there is “a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the ‘total mix’ of information available.” In addition, the Court maintained that a disclosure is material if “there is a substantial likelihood that a reasonable shareholder would consider it important in deciding how to vote.”⁵⁷ In *Basic, Inc. v. Levinson*, the Court concluded that materiality must be based on "delicate assessments of the inferences a 'reasonable shareholder' would draw from a given set of facts and the significance of those inferences to him.”¹³⁰

The obligation to disclose exists even when there is uncertainty about ultimate significance of emerging scientific information. The Supreme Court decision in *Matrixx Initiatives, Inc. v. Siracusano*¹³¹ No. 09-1156 (U.S. March 22, 2011) demonstrated that there is an obligation under the federal securities laws to reveal details of the observed side effects of a drug to investors even though the information did not rise to the level of statistically significant data. *Matrixx* sought a “bright-line rule that reports of adverse events associated with a pharmaceutical company’s products cannot be material absent a sufficient number of such reports to establish a statistically significant risk that the product is in fact causing the events.” Without such scientific reliability, *Matrixx* argued, any adverse event reports would be merely anecdotal. But the Supreme Court ruled that such a “categorical rule would ‘artificially exclude’ information that ‘would otherwise be considered significant to the trading decision of a reasonable investor.’ ... “not to say that statistical significance (or the lack thereof) is irrelevant—only that it is not dispositive of every case.” The determination of whether or not a particular set of facts rises to the level of materiality that necessitates disclosure requires review of the source, content, and context.

C. Presumption in favor of disclosure

The Securities Laws have a goal of ensuring that information known to the management of a company is made available to investors through mandatory corporate financial reporting. Scientific information adverse to a company's position in regulatory and subsidy-seeking settings presents a classic example of the need for such regulated corporate disclosure, because the amount of “inside” information on these issues available to corporate managers is much greater than that available to “outside” investors.

The energy companies have demonstrated knowledge of the scientific debates concerning bioenergy emissions by participating in them in regulatory forms as shown in this report. Emerging scientific findings casting doubt upon effectiveness of bioenergy as a climate solution seems to be “material” information, i.e., information that might affect investors’ decision to buy or sell a stock.

Although disclosures are affected by management interpretation, the SEC has established a

¹²⁹ *TSC Industries, Inc v Northway, Inc*, 426 US 438, 449 (1976).

¹³⁰ *Basic Inc. v Levinson*, 485 US 224 (1988).

¹³¹ *Matrixx Initiatives, Inc. v. Siracusano*, 563 US ____ (2011).

presumption in favor of disclosure. According to a Commission Statement issued January 2002,¹³² a matter should be disclosed in the management's discussion and analysis (MD&A) of an annual report, unless the management has concluded that such item cannot reasonably impose a material impact on the company:

“Two assessments management must make where a trend, demand, commitment, event or uncertainty is known:

1. Is the known trend, demand, commitment, event or uncertainty likely to come to fruition? If management determines that it is not reasonably likely to occur, no disclosure is required.
2. If management cannot make that determination, it must evaluate objectively the consequences of the known trend, demand, commitment, event or uncertainty, on the assumption that it will come to fruition. Disclosure is then required unless management determines that a material effect on the registrant's financial condition or results of operations is not reasonably likely to occur.”¹³³

It seems unlikely at this point that the management of energy companies is in a position to have determined that the issues being raised regarding bioenergy's effectiveness for climate warming mitigation are unlikely to affect financial and operational considerations. Quite to the contrary, the evidence presented shows that these issues are squarely facing this industry.

¹³² Securities and Exchange Commission, “Commission Statement About Management's Discussion and Analysis of Financial Condition and Results of Operations,” Release No. 33-8056 (Jan. 22, 2002) [67 FR 3746] at 3748, available online at <http://www.sec.gov/rules/other/33-8056.htm>.

¹³³ From the Securities and Exchange Commission: “Commission Statement About Management's Discussion and Analysis of Financial Condition and Results of Operations,” Release No. 33-8056 (Jan. 22, 2002) [67 FR 3746] at 3748, available online at <http://www.sec.gov/rules/other/33-8056.htm>.