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Agriculture, Forestry, and Waste Management (AFW) Subcommittee

Summary List of Draft Priority Policy Options for Analysis

Draft Option #	Draft Policy Option Name	Straw Proposal Volunteers
AFW-1	Nutrient and Water Management	**Richard Cruse**, Dean Lemke, Dave Miller
AFW-2	Wetlands Protection and Drainage Management	**Dean Lemke,** Richard Cruse
AFW-3	Expanded Use of Agriculture and Forestry Biomass Feedstocks for Electricity, Heat or Steam Production	**Dave Miller,** Sen. Robert Hogg, Richard Cruse, Duane Sand
AFW-4	Encourage Large-Scale Manure Management/Methane Capture & Utilization	Dave Miller, Sen. Robert Hogg.
AFW-5	Land Management to Promote Sequestration Benefits	**Duane Sand**, David Miller (assisted by Rick Robinson), Paul Tauke (nominated because of forestry expertise)
AFW-6	Cellulosic Fuel Incentives	**Peter Thorne**, Duane Sand (with possible assistance from John Sellers – State Soil Conservation Committee)
AFW-7	Improved On-Farm (or First Point of Purchase) Energy Use and Efficiency	Dave Miller
AFW-8	Front End Waste Management Technologies	**Tom Hadden**, Peter Thorne
AFW-9	Landfill Methane Energy Programs	**Tom Hadden**

Sample Draft Policy Option Template

AFW-1 Nutrient and Water Management

Policy Description

Demonstrate and encourage the implementation of GHG-beneficial management practices including: nutrient and soil management techniques to lower N_2O emissions and increase soil carbon retention; carbon mapping; and various other possibilities offered through advanced technology.

Improve the efficiency of fertilizer use and other nitrogen-based soil amendments through implementation of management practices, including advanced technologies for commercial fertilizer application and offsetting commercial fertilizer use with manure. Better nutrient utilization can lead to lower nitrous oxide emissions from run-off and lower lifecycle GHG emissions associated with commercial fertilizer manufacture and transport.

Policy Design

Goals: TBD

Examples:

Increase fertilizer application efficiency by X% by 2020

Sub group note:

The unanimous consensus of the sub-group was that we are not in a position to make recommendations regarding changes in nutrient management and GHG mitigation. Since irrigation is such a small practice in Iowa, and other forms of water management such as drainage and wetlands are covered in other options, we did not address water management other than ponder what 'water management' options exist.

The dilemma relative to nutrient management, nitrogen in particular, involves balances. We are confident, for example, that mandating nitrogen application reductions would reduce N2O emissions and GHG emissions associated with nitrogen manufacture. However, reduced rates would very likely result in lower yields, lower plant biomass production, and net loss of soil organic matter and CO2 emissions. We have the science to understand direction of change, but do not have the scientific capability to quantify these input/output values on a highly variable landscape in a variable climate and thus determine whether or not a given recommendations would make us winners or losers.

A couple of related areas seem potential targets for GHG reductions. Those are nitrogen manufacture techniques and use of cover crops. Cover crops have been studied for decades with marginal advances and at this time seems very risky as a target mandate for this group. Nitrogen manufacture is likely a better topic for AFW-7.

- **Timing:**

- **Parties Involved:**
- **Other:**

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Types(s) of GHG Reductions

- *N_2O: reductions occur when nitrogen run-off and leaching are reduced, which leads to the formation and emission of N_2O.*
- *CO_2: reductions occur as soil carbon levels in crop soils are increased above business as usual levels. Increasing the levels of carbon in soils indirectly sequesters carbon from the atmosphere.*

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources: [**TBD by CCS on subcommittee approval]
- **Quantification Methods: [e.g.** Full life-cycle analysis with supply/demand equilibrium adjustments on subcommittee approval]
- **Key Assumptions: [**TBD, as needed on subcommittee approval]

Key Uncertainties

TBD – [as needed and approved by the subcommittees]

Additional Benefits and Costs

TBD – [as needed and approved by the subcommittees]

Subcommittee Suggestion:

Feasibility Issues

TBD – [as needed and approved by the subcommittees]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until ICCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Sample Draft Policy Option Template

AFW-2 Wetlands and Drainage

Policy Description

Research – research is needed to identify and quantify the greenhouse gas (GHG) implications, both from N_2O and CO_2, of

- subsurface drainage in agricultural croplands,
- strategically-located and designed nitrogen removal wetlands
- denitrification in receiving streams and rivers.

Subsurface drainage[1] – improve subsurface drainage in poorly-drained cropped lands to reduce denitrification and N_2O emissions.

Wetlands[2] – utilize strategically-located and designed nitrogen-removal wetlands to reduce N_2O emissions from nitrogen transported to receiving streams through subsurface drainage[3].

Integrated Drainage-Wetland Systems Initiative[4] – support policy development and public costs of this voluntary, market-driven private/public partnership which combines nitrogen-removal wetlands with improved subsurface drainage for enhanced crop production.

Policy Design

Goals:

By 2015

[1] While the research foundation is not adequate to quantify, improved subsurface drainage of row-cropped lands is felt to reduce N2O emissions by, reducing nitrogen losses through enhanced nitrogen uptake by plants as result of earlier crop planting, reducing in-field denitrification, and increasing feasibility of no-till cropping.

[2] Permanent wetlands not being cropped are already protected under federal/state regulations and programs. Restoration of wetlands without significant nitrogen loadings have minimal GHG implications, with reductions primarily from surrounding grassed buffers that provide GHG reductions in linear relationship to land area converted from row-crop to grassed buffer.

[3] Strategically-located and designed wetlands for nitrogen removal – technology developed and adapted to row-cropped landscapes in the corn belt by Iowa State University, and currently being implemented through the Iowa Conservation Reserve Enhancement Program (CREP). Wetland pools of 0.5-2.0% of the contributing watershed area receive predominantly subsurface drainage from watersheds 500-4000 acres, and will remove 40-90% of nitrate through denitrification, primarily as elemental N_2 rather than N_2O. Nitrate-removal wetlands will significantly reduce GHG emissions over that of denitrification in receiving watercourses and the Gulf of Mexico.

[4] Combining nitrate-removal wetlands through this voluntary Iowa initiative will reduce nitrate transport to water resources, protect drinking water supplies, reduce hypoxia in the Gulf of Mexico, and reduce emissions of GHG.

Support research needed to identify and quantify GHG implications of subsurface drainage, strategically-located and designed nitrate removal wetlands, and denitrification in receiving streams and rivers.

By 2050
Have fully supported the needed policy development and public sector costs for the voluntary Integrated Drainage-Wetland Systems Initiative and deployment of nitrogen-removal wetlands in Iowa's subsurface-drained row-cropped landscape.

- **Timing:** As stated above.

Parties Involved: Involved parties include public conservation agencies, research institutions, existing Iowa drainage districts, and private landowners.

- **Other:**

Implementation Mechanisms

TBD –

Related Policies/Programs in Place

Types(s) of GHG Reductions

- ***CO_2:*** *Conservation of wetlands helps maintain the ability of the land to sequester carbon in soil and biomass.*
- ***CH_4:*** *Improved drainage reduces anaerobic decomposition, thereby preventing methane creation.*

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources: [**TBD by CCS on subcommittee approval]
- **Quantification Methods: [e.g.** Full life-cycle analysis with supply/demand equilibrium adjustments on subcommittee approval]
- **Key Assumptions: [**TBD, as needed on subcommittee approval]

Key Uncertainties

TBD – [as needed and approved by the subcommittees]

Additional Benefits and Costs

TBD – [as needed and approved by the subcommittees]

Feasibility Issues

TBD – [as needed and approved by the subcommittees]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until ICCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Sample Draft Policy Option Template

AFW-3 Expanded Use of Agriculture and Forestry Biomass Feedstocks for Electricity, Heat or Steam Production

Policy Description

Increase the amount of biomass (including biomass from forest sources) available for co-generation of electricity or for use in combined heat and power applications to displace the use of fossil energy sources recognizing that local electricity or heat production yields greatest net energy and carbon displacement payoff. Increase both the acreage and the yield of energy crop production and utilization through the planning of energy purpose

Note that this option is focused on the supply-side aspects of promoting biomass fuel, with an emphasis on the development of feedstocks, collection, processing and transport technologies. The demand-side aspects of renewable fuels (including biomass use) are being addressed through options in the CRE Subcommittee (Generation Portfolio Standards; Technology-Focused Initiatives).

Policy Design

Goals:

Energy Crop:

i. Establish 1 million acres of identified energy crop production by 2020.

ii. Transition 50 percent of expiring CRP contracts to energy crop production.

iii. Annually harvest at least 5 million tons of dedicated energy crop production materials by 2020.

Agriculture Crop Residue: Annually harvest at least 10 million tons of annual crop residue biomass for energy production by 2020.

Forest Biomass: Annually harvest at least 1 million tons of forest products or wood residues for biomass energy production by 2020.

Biomass Plant: Have at least on major industrial operation contracting with producers to use biomass as the primary energy source for plant operations by 2015.

Biofuels: Have at least one biofuels production plant contracting with producers to use biomass as the primary energy source for fuel conversion by 2015.

- **Timing:**
- **Parties Involved: Farmers and landowners.**
- **Other: Energy conversion facilities**

Implementation Mechanisms

Voluntary Incentive programs

* Section 476C tax incentives
* State and/or federal cost-share programs for energy crop establishment
* USDA value-added ag development grants

Federal Renewable Fuel Standard

- Cellulosic fuel requirement standards and incentives
- Research funding
- State fuel standards and incentives

Related Policies/Programs in Place

Section 476C of the Iowa code provides for a renewable energy tax credit for biomass and other qualifying renewable energy sources that are used to generate electricity or heat for a commercial purpose.

A producer or purchaser of renewable energy may receive renewable energy tax credits under this chapter in an amount equal to one and one-half cents per kilowatt-hour of electricity, or four dollars and fifty cents per million British thermal units of heat for a commercial purpose, or four dollars and fifty cents per million British thermal units of methane gas or other biogas used to generate electricity, or one dollar and forty-four cents per one thousand standard cubic feet of hydrogen fuel generated by and purchased from an eligible renewable energy facility.

Alternative Energy Law (Iowa's Renewable Portfolio Standard)—*Iowa requires its two investor-owned utilities—MidAmerican Energy and Alliant Energy Interstate Power and Light—to contract for a combined total of 105 megawatts (MW) of their generation from renewable-energy resources.*

Fuel Mix Disclosure—*Iowa's rate-regulated electric utilities must report annually to customers the percentage mix of fuel and energy used to produce electricity. The percentages for renewables must further be broken down into percentages of electricity generated by wind, solar, hydropower, biomass, and other resources. Each utility's annual report must also include an estimate of sulfur dioxide, nitrogen oxides, and carbon dioxide emissions for each fuel and resource.*

Energy Research Grants—*The Iowa Energy Center provides grants for energy research on topics that have strong relevance to Iowa.*

Types(s) of GHG Reductions

- ***CO_2, N_2O, CH_4:*** *Displaces emissions from fossil fuel combustion.*

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources: [**TBD by CCS on subcommittee approval]
- **Quantification Methods: [e.g.** Full life-cycle analysis with supply/demand equilibrium adjustments on subcommittee approval]
- **Key Assumptions: [**TBD, as needed on subcommittee approval]

Key Uncertainties

TBD – [as needed and approved by the subcommittees]

Additional Benefits and Costs

TBD – [as needed and approved by the subcommittees]

Feasibility Issues

TBD – [as needed and approved by the subcommittees]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until ICCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Sample Draft Policy Option Template

AFW-4 Encourage Large-Scale Manure/Methane Management Capture Utilization

Policy Description

Reduce methane emissions from livestock manure by installing large-scale anaerobic digester systems at locations that can service multiple concentrated animal feeding operations (CAFOs).

Reduce methane emissions from livestock manure by installing anaerobic digester systems at larger individual concentrated animal feeding operations (CAFOs).

Methane captured from the digesters is used to create heat or power, which offsets fossil fuel-based energy production and the associated greenhouse gas GHG emissions. This option is focused on implementing these projects at the large-scale level (e.g. community-based systems or large CAFOs).

Reduce GHG emissions associated with manure handling and storage. Potential practices include but are not limited to manure composting (to reduce methane emissions) and improved methods for application of effluent to fields (for reduced nitrous oxide [N_2O] emissions). Application improvements include incorporation into soil instead of surface spray/spreading.

Policy Design

Goals: TBD

Utilization: By 2020, utilize 50% of available methane from livestock manure for renewable electricity, heat and steam generation or incorporation into natural gas distribution systems.

Management: By 2020, apply improved manure handling and storage practices on 50% of manure generated

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

Tax Incentives

Grants

Loan Guarantees

Related Policies/Programs in Place

Section 476C of the Iowa code *provides for a renewable energy tax credit for biomass and other qualifying renewable energy sources that are used to generate electricity or heat for a commercial purpose.*

A producer or purchaser of renewable energy may receive renewable energy tax credits under this chapter in an amount equal to one and one-half cents per kilowatt-hour of electricity, or four dollars and fifty cents per million British thermal units of heat for a commercial purpose, or four dollars and fifty cents per million British thermal units of methane gas or other biogas used to generate electricity, or one dollar and forty-four cents per one thousand standard cubic feet of hydrogen fuel generated by and purchased from an eligible renewable energy facility.

Alternate Energy Revolving Loan Program (AERLP)—*The Iowa Energy Center provides zero-percent interest loans for up to half of the project cost, up to a maximum of $250,000.* *http://www.energy.iastate.edu/AERLP/index.htm*

Energy Research Grants—*The Iowa Energy Center provides grants for energy research on topics that have strong relevance to Iowa.* *http://www.energy.iastate.edu/Funding/gp-research.htm*

Alternative Fuel Production Loans—*The Value-Added Agricultural Products and Processes Financial Assistance Program offers a combination of forgivable and traditional low-interest loans for business projects involving the production of biomass or alternative fuels.* *http://www.iowalifechanging.com/business/vaapfap.html*

Iowa DNR Anaerobic Digestion Outreach Program—*Recognizing the enormous opportunity for the wide-scale implementation of farm-scale and community-based anaerobic digester systems in Iowa, the Iowa Department of Natural Resources Energy and Waste Management Bureau set about promoting the digester concept to Iowa Communities having large concentrations of livestock production, large volumes of organic wastes, and large energy users. For more information, contact Allan Goldberg at 515-281-8912 or at allan.goldberg@dnr.iowa.gov.*

Types(s) of GHG Reductions

- *CO_2, N_2O, CH_4: Displaces emissions from fossil fuel combustion.*
- *CH_4: Capture and utilization or preventing the creation of methane.*
- *N_2O: reductions occur when nitrogen run-off and leaching are reduced, which leads to the formation and emission of N_2O.*

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources: [**TBD by CCS on subcommittee approval]
- **Quantification Methods: [e.g.** Full life-cycle analysis with supply/demand equilibrium adjustments on subcommittee approval]

- **Key Assumptions: [**TBD, as needed on subcommittee approval]

Key Uncertainties

TBD – [as needed and approved by the subcommittees]

Additional Benefits and Costs

TBD – [as needed and approved by the subcommittees]

Feasibility Issues

TBD – [as needed and approved by the subcommittees]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until ICCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Sample Draft Policy Option Template

AFW-5 Land Management to Promote Sequestration Benefits

Policy Description

On cultivated lands, the amount of carbon stored in the soil can also be increased by the adoption of practices such as continuous conservation and no-till cultivation. By minimizing mechanical soil disturbance, these practices reduce the oxidation of soil carbon compounds and allow more stable aggregates to form. Other benefits include reduced wind and water erosion, reduced fuel consumption, and improved wildlife habitat.

Convert marginal agricultural land used for annual crops to permanent cover such as grassland/rangeland, orchard, or forest where the soil carbon and/or carbon in biomass is higher under the new land use. Adopt mechanisms to discourage theses acres from either returning to conventionally tilled production or to suburban/urban development.

Heavy grazing can cause significant soil disturbance and result in carbon losses from soils. Rotational grazing where animals are moved from field to field on a regular basis can reduce soil disturbance, improve plant vigor and enhance soil carbon levels.

Establish forests on land that has not historically been forested (e.g., afforestation of agricultural land) and promote forest cover and associated carbon stocks by regenerating or establishing forests in areas with little or no present forest cover ("reforestation"). Maintain and improve the health and longevity of trees in urban and residential areas to protect and enhance the carbon stored in tree biomass. Indirect emissions reductions may also occur by reducing heating and cooling needs as a result of planting shade trees.

Apply biochar to crop production fields to increase soil productivity and increase soil carbon levels.

Policy Design

Goals: TBD

Conservation Tillage: By 2020, 75 percent of annual cropland will be managed with continuous no-till or low-till production practices

Agriculture land conversion: By 2020, convert 1 million acres of marginal agricultural land to higher sequestration permanent cover (including grassland, rangeland, orchard, or forest).

Conservation grazing: By 2020, apply conservation grazing practices including rotational grazing to 2 million acres of Iowa pastures.

Reforestation: By 2020, establish 250,000 acres of new forest lands and 500,000 acres of reforestation.

Urban Forestry: By 2020, increase the canopy cover of urban forest in Iowa communities by 25%.

Biochar: By 2020, apply biochar to 5 million acres of Iowa land annually.

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

TBD – [CCS drafts based on subcommittee inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on subcommittee approval]

Related Policies/Programs in Place

Types(s) of GHG Reductions

- *CO_2: Increase the sequestration of carbon, as well as preventing carbon currently stored in Iowa's forests and farm land from being released. Reductions also occur as soil carbon levels in crop soils are increased above business as usual levels. Increasing the levels of carbon in soils indirectly sequesters carbon from the atmosphere.*

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources: [**TBD by CCS on subcommittee approval]
- **Quantification Methods: [e.g.** Full life-cycle analysis with supply/demand equilibrium adjustments on subcommittee approval]
- **Key Assumptions: [**TBD, as needed on subcommittee approval]

Key Uncertainties

TBD – [as needed and approved by the subcommittees]

Additional Benefits and Costs

TBD – [as needed and approved by the subcommittees]

Feasibility Issues

TBD – [as needed and approved by the subcommittees]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until ICCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Sample Draft Policy Option Template

AFW-6 Cellulosic Fuel Incentives

Policy Description

Promote research and production of sustainable in-state fuels derived from cellulose (biomass) to displace the use of conventional petroleum-based fuels. Promote the in-state development of cellulosic feedstocks (including perennials) that are able to be utilized for the production of cellulosic fuels. Promote research into conversion technologies, such as thermo-chemical Fischer-Tropsch processes and enzymatic conversion, to facilitate their development.

Promote cellulosic biofuel production systems that improve the embedded energy content, life-cycle, and carbon profile of biofuels. Focus on plant material feedstocks that favor energy production and are carbon neutral or negative and have multiple other positive environmental benefits, such as maintaining carbon sequestration potential and soil productivity, and decreasing water and fossil fuel inputs in their production. This could help provide a strong economic market within the state and reduce GHG emissions through avoided fossil fuel consumption.

Note that this option is focused on the supply-side aspects of promoting biofuels, with an emphasis on the development of feedstocks and production technologies. The demand-side aspects of renewable fuels (including cellulosic biofuels) are being addressed through the Transportation and Land Use subcommittee through TLU-8.

Policy Design

Goals: TBD

Example:

Increase in-state cellullosic fuel production to offset XX% of fossil-based gasoline and/or XX% of fossil-based diesel consumption by 2020.

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

TBD – [CCS drafts based on subcommittee inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on subcommittee approval]

Related Policies/Programs in Place

Types(s) of GHG Reductions

- ***CO_2:*** *Lifecycle emissions are reduced to the extent that biofuels are produced with lower embedded fossil-based carbon than conventional (fossil) fuel. Feedstocks used for producing biofuels can be made from crops or other biomass, which contain carbon sequestered during photosynthesis (e.g., biogenic or short-term carbon).*

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources: [**TBD by CCS on subcommittee approval]
- **Quantification Methods: [e.g.** Full life-cycle analysis with supply/demand equilibrium adjustments on subcommittee approval]
- **Key Assumptions: [**TBD, as needed on subcommittee approval]

Key Uncertainties

TBD – [as needed and approved by the subcommittees]

Additional Benefits and Costs

TBD – [as needed and approved by the subcommittees]

Feasibility Issues

TBD – [as needed and approved by the subcommittees]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until ICCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Sample Draft Policy Option Template

AFW-7 Improved On-Farm (or First Point of Purchase) Energy Use and Efficiency

Policy Description

Renewable energy can be produced and used on-site at agriculture operations. For example, installation of solar or wind power, use of hydro-powered generators for irrigation, and converting diesel farm equipment to liquid natural gas/compressed natural gas (LNG/CNG) or hybrid technology will reduce carbon dioxide emissions by displacing the use of fossil-based fuels. The use of energy efficient products should also be promoted. This could include improved grain dryers, heat exchangers (dairy), electric motors, and energy efficient building design.

Policy Design

Goals:

Renewable Energy: Increase renewable energy use at agriculture operations by 10% by 2020.

Energy Efficiency: Increase energy efficiency of on-farm operations by 30% by 2020.

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

TBD – [CCS drafts based on subcommittee inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on subcommittee approval]

Related Policies/Programs in Place

Types(s) of GHG Reductions

- ***CO_2:*** *Improved efficiency can reduce electricity and fuel consumption and the associated GHGs.*

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources: [**TBD by CCS on subcommittee approval]
- **Quantification Methods: [e.g.** Full life-cycle analysis with supply/demand equilibrium adjustments on subcommittee approval]

- **Key Assumptions: [**TBD, as needed on subcommittee approval]

Key Uncertainties

TBD – [as needed and approved by the subcommittees]

Additional Benefits and Costs

TBD – [as needed and approved by the subcommittees]

Feasibility Issues

TBD – [as needed and approved by the subcommittees]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until ICCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Sample Draft Policy Option Template

AFW-8 Front End Waste Management Technologies

Policy Description

Reduce the volume of waste from residential, commercial, and government sectors through programs that reduce the generation of wastes. Reduction of generation at the source reduces both landfill emissions and upstream production emissions.

Increase recycling or re-use of waste in order to limit GHG emissions associated with landfill methane generation and with the production and transport of products/packaging from virgin materials (noting that different recycled materials will exhibit different costs and benefits on a life-cycle basis). Increase recycling programs, create new recycling programs, provide incentives for recycling construction materials, develop markets for recycled materials, and increase average participation/recovery rates for all existing recycling programs.

Increase organics management programs, such as composting, in order to reduce GHG emissions associated with landfilled organic waste.

Policy Design

Goals: TBD

Examples:

Source Reduction: Reduce waste stream by XX% by 2020. or Achieve a 0% per capita increase by 2020

Re-Use and Recycling: Increase recycling stream to XX% by 2020

Organics Management: Increase composting rates to XX% by 2020.

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

TBD – [CCS drafts based on subcommittee inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on subcommittee approval]

Related Policies/Programs in Place

Waste Management Programs—*The State of Iowa runs several programs to promote waste reduction, recycling, and composting. These programs include Iowa DNR's Solid Waste*

Alternatives Program, Pollution Prevention Services Program, and Iowa Waste Exchange, as well as Iowa Waste Reduction Center at the University of Northern Iowa.

Landfill Diversion Goals—*The State of Iowa adopted the goal of diverting 50% of waste from landfills by the year 2000 from year 1988 levels.*

Types(s) of GHG Reductions

- ***CO_2:*** *Upstream Energy Use Reductions – The energy and GHG intensity of manufacturing a product is generally less using recycled feedstocks than from using virgin feedstocks.*
- ***CH_4:*** *Diverting biodegradable wastes from landfills will result in a decrease in methane gas releases from landfills.*

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources: [**TBD by CCS on subcommittee approval]
- **Quantification Methods: [e.g.** Full life-cycle analysis with supply/demand equilibrium adjustments on subcommittee approval]
- **Key Assumptions: [**TBD, as needed on subcommittee approval]

Key Uncertainties

TBD – [as needed and approved by the subcommittees]

Additional Benefits and Costs

TBD – [as needed and approved by the subcommittees]

Feasibility Issues

TBD – [as needed and approved by the subcommittees]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until ICCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Sample Draft Policy Option Template

AFW-9 Landfill Methane Energy Programs

Policy Description

Use the renewable energy within landfills gas (methane) to make electric power, space heat, or liquefied natural gas. Methane gas generation by landfills is a GHG reduction strategy that may benefit from a cap and trade system, encouraging landfills to install flares at a minimum and possibly achieve electric generation if the economic incentives are sufficient.

Policy Design

Goals: TBD

Examples

Increase the number of landfills recovering methane as an energy source, such that XX% of the landfill gas being generated is controlled by 2020.

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

TBD – [CCS drafts based on subcommittee inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on subcommittee approval]

Related Policies/Programs in Place

Methane Gas Conversion Property Tax Exemption—*Under Iowa's Methane Gas Conversion Property Tax Exemption, property used for methane gas collection and conversion into energy and connected with, or in conjunction with, a publicly owned sanitary landfill, is exempt from property tax. If other fuels are burned as well, the exemption is equal to the ratio of methane in the overall fuel mix.*

Types(s) of GHG Reductions

- ***CO_2, N_2O, CH_4:*** *Displaces emissions from fossil fuel combustion.*
- ***CH_4:*** *Methane reductions via collection and control (via flaring, or preferentially via energy utilization).*

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources: [**TBD by CCS on subcommittee approval]
- **Quantification Methods: [e.g.** Full life-cycle analysis with supply/demand equilibrium adjustments on subcommittee approval]
- **Key Assumptions: [**TBD, as needed on subcommittee approval]

Key Uncertainties

TBD – [as needed and approved by the subcommittees]

Additional Benefits and Costs

TBD – [as needed and approved by the subcommittees]

Feasibility Issues

TBD – [as needed and approved by the subcommittees]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until ICCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]