Agenda

> Welcome

> Roll Call

> Carbon Farm Study Presentation – Dr. Peter Woodbury

> Agriculture and Forestry Draft Work Plan

> Meeting Schedule: next meeting
OUTLINE OF TALK

- C-Farming report
- What is Carbon Farming?
- What we evaluated
- Importance of counting all 3 greenhouse gases (GHG)
- SMART decision matrix
- Our Ranked Top 5 Opportunities for Ag GHG Mitigation
- Importance of permanence
- Issues of verifiability
- Things to work towards
- Current project
- Your Questions
NY AGRICULTURE & CLIMATE CHANGE:
KEY OPPORTUNITIES FOR MITIGATION, RESILIENCE, AND ADAPTATION

JENIFER WIGHTMAN & PETER WOODBURY

• Supported by the State of New York
• Administered by the NYS Department of Agriculture and Markets (NYS AGM)
  • Thanks to Brian, Steinmuller Greg Albrecht, and Jennifer Clifford
• Following
  • the NYSAGM mandate (2008 NYS Bill S8143/A10685)
  • NYS fiscal year 2017-2018 budget (S2004-D)
  • And the Carbon Farming Act (A3281)
• 2018-2020
WHAT IS CARBON FARMING?

• In the Carbon Farming Act (A3281),
  • Carbon Farming was defined as:
  • “the implementation of a land management strategy for the purposes of reducing, sequestering, and mitigating greenhouse gas emissions on land used in support of a farm operation and quantifying those greenhouse gas benefits”
WHAT WE EVALUATED

- Sources of emissions and mitigation from different farm activities
  - 3 greenhouse gases
  - 5 general mitigation strategies
- Preliminary mitigation potential for 13 different practices
- Qualifying the Mitigation
  - Co-benefits
  - Scale of opportunity (big or small)
  - Cost to Implement (cost savings or expensive)
  - Realistic? (easy or hard to implement)
  - Timeline (how permanent is the mitigation)
We evaluated three key greenhouse gases associated with working lands:

- Carbon dioxide, CO$_2$
- Methane, CH$_4$
- Nitrous oxide, N$_2$O

Carbon Farming is something of a misnomer.

GHG mitigation on farms involves both N and C.
<table>
<thead>
<tr>
<th>Greenhouse Gas</th>
<th>Potency (relative to CO2) 20 year-time (IPCC AR5)</th>
<th>Potency (relative to CO2) 100 year-time (IPCC AR4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide (CO2)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Methane (CH4)</td>
<td>84</td>
<td>25</td>
</tr>
<tr>
<td>Nitrous Oxide (N2O)</td>
<td>264</td>
<td>298</td>
</tr>
<tr>
<td>NYS 2019 CLCPA* uses these 20-year values</td>
<td>Carbon Farming report used these 100-year values</td>
<td></td>
</tr>
</tbody>
</table>

Methane and nitrous oxide are common gases in agriculture.

Because they are so much more potent GHG, very small amounts of methane and nitrous oxide are very large players in farm GHG accounting.

“Carbon Farming” is a misnomer, must account for nitrogen also.
5 CATEGORIES OF FARM GHG MITIGATION

- **Sequester Carbon**: Trees, Soils, Long-lived wood products
- **Destroy Methane**: Capture methane from manure storage and flare it
- **Increase Efficiency**: Energy use on farm, Milk production efficiency, Crop production efficiency, Nitrogen-use efficiency
- **Displace Fossil Fuels**: Produce renewable energy
- **Conserve**: Energy, Natural Resources, Leave forest as forest
**Types of Practices**

- **Dairy**
  - Feed management (CH$_4$, N$_2$O)
  - Manure storage (CH$_4$, N$_2$O)
  - Milk product efficiency (CH$_4$, N$_2$O)

- **Crops**
  - Nitrogen management (N$_2$O, CO$_2$)
  - Soil Carbon (N$_2$O, CO$_2$)

- **Woodlands**
  - Improve forest management (CO$_2$)
  - Agroforestry (alley crop, silvopasture)

- **Idle Lands**
  - Afforestation (CO$_2$)
  - Solar/Wind energy (CO$_2$)
  - Biomass for feed or fuel (CO$_2$)

- **Conserve**
  - Reduce Energy or Resource Use
  - Conserve Land (Forest stays forest)
MULTIPLE EVALUATION CRITERIA:

• **S**ervices – co-benefits
• **M**easurable quantity at the NYS level
• Cost to **A**chieve implementation
• **R**ealistic to implement?
• **T**imeframe of implementation
SMART MATRIX

- **Services**
  - Measurable
  - Achievable
  - Realistic
  - TimeFrame

**Services**: co-benefits or “ecosystem services” provided by a practice

- Soil health
- Community relations
- Adaptation to climate change
- Profitability
- Air quality
- Water quality
- Biodiversity
- Energy
SMART MATRIX

- **Services**
- **Measurable**
  - Achievable
  - Realistic
  - TimeFrame

**Measurable:**
- Estimated statewide GHG mitigation potential for a practice
- Degree to which it is *Verifiable*.
SMART MATRIX

• Services
• Measurable
• Achievable
• Realistic
• TimeFrame

Achievable: Estimated direct cost

• (0-$100/ Mg CO$_2$e, where Mg is megagram or metric ton).

• Note: Costs are for implementation only, not including cost to educate, measure, verify, or account in formal registries.
SMART MATRIX

- Services
- Measurable
- Achievable
- **Realistic**
- TimeFrame

**Realistic:** amount of engagement required, such as:

- acres of applicable lands,
- number of stakeholders to be engaged,
- availability of technical tools.

- Can we do it now?
- Do we need more research/education/tools?
SMART MATRIX

- **Services**
- **Measurable**
- **Achievable**
- **Realistic**

**Time Frame:** lifespan of infrastructure, time limits of mitigation strategy, and short-and-long term effectiveness.

- (indirectly a measure of **Permanence**)
13 practices evaluated

1. Afforestation of Idle Lands
2. Manure Storage Cover & Flare
3. Reduced Food Waste
4. Renewable Energy
5. Woodland Management
6. Cover Crops & Double Crops
7. Feed Management
8. Alley Cropping (10% of Ag land)
9. Replace Annuals with Perennials
10. Crop Nutrient Management (N-fertilizer reduction)
11. Riparian Buffers
12. Biochar
13. Reduced Tillage/No Tillage
OUR TOP 5

BASED ON

SMART CRITERIA

- Manure Cover and Flare
- Nitrogen-Use Efficiency
- Feed Efficiency
- Improved Management of Woodlands
- Planting Trees on Idle Lands
TOP 5 MITIGATION PRACTICES

Cost 0-$50 per MT CO2e mitigated
Represent real and permanent mitigation
Most can be directly verified
Have a suite of co-benefits
Many increase production/efficiency of NYS Agriculture.
### Opportunites and Barriers

#### Manure Cover & Flare

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Large mitigation opportunity for NYS</td>
<td>- Upfront cost to Farmer</td>
</tr>
<tr>
<td>- ~1.3 MMT CO2e/yr</td>
<td>- May require engineering to retrofit</td>
</tr>
<tr>
<td>- Low cost per MT CO2e</td>
<td>- Milk pricing/farm ability to participate in cost-share</td>
</tr>
<tr>
<td>- Small stakeholder group of 500 farms</td>
<td>- Technical Assistance</td>
</tr>
<tr>
<td>- Several co-benefits: community relations, hauling costs, and water quality benefits</td>
<td>- New policy to require new manure storages to be designed to easily accept cover/flare systems</td>
</tr>
<tr>
<td>- Existing programming through CRF</td>
<td></td>
</tr>
</tbody>
</table>
### OPPORTUNITIES AND BARRIERS

#### FEED EFFICIENCY

<table>
<thead>
<tr>
<th>OPPORTUNITY</th>
<th>BARRIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ~0.7 MMT CO2e/yr mitigation opportunity</td>
<td>• Upfront cost to farmer</td>
</tr>
<tr>
<td>• Cost saving per MT CO2e</td>
<td>• Technical Assistance</td>
</tr>
<tr>
<td>• All livestock, particularly ruminants</td>
<td>• Feed management planning and implementation</td>
</tr>
<tr>
<td>• Many farms are doing it (farmer: farmer)</td>
<td>• Improved diet</td>
</tr>
<tr>
<td></td>
<td>• Feed and forage management</td>
</tr>
<tr>
<td></td>
<td>• Implementation</td>
</tr>
<tr>
<td></td>
<td>• Sustaining implementation</td>
</tr>
</tbody>
</table>
### OPPORTUNITIES AND BARRIERS

#### NITROGEN-USE EFFICIENCY

<table>
<thead>
<tr>
<th>OPPORTUNITY</th>
<th>BARRIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ~0.2 MMT CO2e/yr mitigation opportunity</td>
<td>• Cultural shift away from ‘insurance N’</td>
</tr>
<tr>
<td>• Cost saving or low cost per MT CO2e</td>
<td>• Upfront cost to farmer</td>
</tr>
<tr>
<td>• Implement 4-R Guidelines</td>
<td>• Soil testing/planning</td>
</tr>
<tr>
<td>• right source, time, rate, &amp; place</td>
<td>• Precision nutrient management may be more costly</td>
</tr>
<tr>
<td>• All farms that use nitrogen</td>
<td>• Technical assistance</td>
</tr>
<tr>
<td>• Many farms are doing it (farmer: farmer)</td>
<td>• Implementation</td>
</tr>
<tr>
<td>• Co-benefits:</td>
<td>• Sustaining implementation</td>
</tr>
<tr>
<td>• Improved water quality</td>
<td></td>
</tr>
<tr>
<td>• Reduced upstream manufacturing emissions</td>
<td></td>
</tr>
</tbody>
</table>
## OPPORTUNITIES AND BARRIERS
### WOODLAND MANAGEMENT
### 1.4 MILLION ACRES

### OPPORTUNITY
- 21% of ag land is wooded, 1.4 million acres!
- Farmers are great land managers
- Long-term profit potential
- Many forest owners are doing it – share knowledge between groups
- Several co-benefits,
  - diversify farm income
  - improve diversity and habitat
  - Improve water and air quality

### BARRIER
- Forest harvest often done to address a financial need
- Upfront costs:
  - Forest management plan
  - Periodic maintenance
  - Cultural separation between forest managers and farm managers
  - Technical assistance

**NOTE:** Statewide GHG mitigation potential not yet estimated.
OPPORTUNITIES AND BARRIERS
ACTIVATE IDLE LANDS
1.7 MILLION ACRES

OPPORTUNITY – GROW TREES
• 4.9 MMT CO2e/yr mitigation potential!
• Long lived wood products (C-sequestration)
• Increased profitability of land area

BARRIER
• Existing deer, pests, and invasive shrubs
• Diverse ownership
• Parcels all over the state
• Varying soil quality, slope
• Landowner interests/goals
• High upfront costs
• Technical assistance
• Lots of possibility, Lots of unknowns!

OTHER COMPETING OPPORTUNITIES
• Solar
• Wind
• Bioenergy
• Grazing
• New Products?
## Five Star Versus One Star Ranking: Two Example Practices

<table>
<thead>
<tr>
<th>GHG BMP</th>
<th>System Co-benefits</th>
<th>Measurable Mitigation</th>
<th>Cost to Achieve</th>
<th>Realistic to Implement</th>
<th>Time Frame of Mitigation Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manure Cover + Flare</td>
<td>Water, resiliency to extreme weather, reduced hauling costs, decreased odor for neighbor relations</td>
<td>Large 1.3 MMT CO2e, Easily verifiable with meter and flare</td>
<td>&lt;$10 MT CO2e</td>
<td>Yes, Only engage 500 large farms, Technology is available and working</td>
<td>Methane destruction is permanent</td>
</tr>
<tr>
<td>Biochar</td>
<td>Water quality, soil health</td>
<td>Potentially large</td>
<td>TBD</td>
<td>Real potential but <strong>more research needed</strong></td>
<td>Great potential but full life cycle must be evaluated</td>
</tr>
</tbody>
</table>
Table A. Preliminary Estimates of Greenhouse Gas Emissions from New York Agriculture. Units are million metric tons of carbon dioxide equivalents per year. Positive values are emissions, negative values are mitigation or sequestration.

<table>
<thead>
<tr>
<th>Category &amp; Sub-Categories</th>
<th>Recent Year Emission Category</th>
<th>Mitigation Potential Category</th>
<th>Possibly outside sector?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sub-Category</td>
<td>Sub-Category</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Enteric Fermentation</td>
<td>12.46</td>
<td>-2.34</td>
<td></td>
</tr>
<tr>
<td>Manure Management (storage)</td>
<td>6.68</td>
<td>-4.33</td>
<td></td>
</tr>
<tr>
<td>Agriculture Soil Management</td>
<td>4.08</td>
<td>-1.68</td>
<td></td>
</tr>
<tr>
<td>Reduce Food Waste</td>
<td>n/a</td>
<td>-3.60</td>
<td>Yes</td>
</tr>
<tr>
<td>Farm Energy Conservation</td>
<td>?</td>
<td>?</td>
<td>Yes</td>
</tr>
<tr>
<td>Wind &amp; Solar Energy on Agric</td>
<td>?</td>
<td>?</td>
<td>Yes</td>
</tr>
<tr>
<td>Avoided Grassland Conversion</td>
<td>n/a</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Forested Riparian Buffer</td>
<td>-0.06</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Alley Cropping</td>
<td>0.00</td>
<td>-0.67</td>
<td></td>
</tr>
<tr>
<td>Bioenergy</td>
<td>?</td>
<td>?</td>
<td>Yes</td>
</tr>
<tr>
<td>Reforestation of Former Agric</td>
<td>0.00</td>
<td>-4.90</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>23.16</td>
<td>-17.52</td>
<td></td>
</tr>
<tr>
<td>TOTAL, WITHIN SECTOR</td>
<td>21.65</td>
<td>-13.92</td>
<td></td>
</tr>
</tbody>
</table>

Orange highlighted values are approximate estimates based on 20-year GWP for methane.

Table B. Preliminary Estimates of Greenhouse Gas Emissions from New York Agriculture. Breakdown of Agricultural Soil Management. Units are million metric tons of carbon dioxide equivalents per year. Positive values are emissions, negative values are mitigation or sequestration.

<table>
<thead>
<tr>
<th>Category &amp; Sub-Categories</th>
<th>Recent Year Emission</th>
<th>Mitigation Potential</th>
<th>Possibly outside sector?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sub-Category</td>
<td>Sub-Category</td>
<td></td>
</tr>
<tr>
<td>Agriculture Soil Management</td>
<td>4.08</td>
<td>-1.68</td>
<td></td>
</tr>
<tr>
<td>Manure management (field)</td>
<td>0.01</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Field emissions from liming</td>
<td>0.28</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Crop N$_2$O emissions (direct &amp; indirect)</td>
<td>2.20</td>
<td>-0.20</td>
<td></td>
</tr>
<tr>
<td>Cover crops</td>
<td>?</td>
<td>-0.85</td>
<td></td>
</tr>
<tr>
<td>Reduced tillage</td>
<td>0.00</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Drained wetlands</td>
<td>0.07</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Replace annual with perennial crops</td>
<td>n/a</td>
<td>-0.62</td>
<td></td>
</tr>
<tr>
<td>Equipment (fuel)</td>
<td>0.26</td>
<td>0.00</td>
<td>Yes</td>
</tr>
<tr>
<td>Equipment (embodied)</td>
<td>0.09</td>
<td>0.00</td>
<td>Yes</td>
</tr>
<tr>
<td>Production of herbicide, P, K, seed</td>
<td>0.18</td>
<td>0.00</td>
<td>Yes</td>
</tr>
<tr>
<td>Production of lime</td>
<td>0.79</td>
<td>0.00</td>
<td>Yes</td>
</tr>
<tr>
<td>Production of synthetic N</td>
<td>0.19</td>
<td>?</td>
<td>Yes</td>
</tr>
<tr>
<td>TOTAL</td>
<td>4.08</td>
<td>-1.68</td>
<td></td>
</tr>
<tr>
<td>TOTAL, WITHIN SECTOR ONLY</td>
<td>2.57</td>
<td>-1.68</td>
<td></td>
</tr>
</tbody>
</table>
A NOTE ON GHG ACCOUNTING -- BOUNDARIES

- If we reduce nitrogen fertilizer use in NY State while maintaining crop yields.

- There will be a reduction in GHG emissions from fertilizer manufacturing.

- Will this be counted under the CLCPA?
Climate change is a long term problem, so we need long term solutions.

Covering and flaring methane from manure storage is permanent.

Sequestering carbon in soil with reduced tillage is not permanent, it can be released later.
A leguminous cover crop can add soil carbon, but can also increase N2O emission.

Carbon sequestered the soil can be measured and verified (but is expensive).

N2O emission from a field can only be estimated, not measured (much too expensive)

N2O is ~300x more potent than CO2,

How to evaluate net GHG Mitigation?
**TWO KEY ATTRIBUTES**

**PERMANENT**

- Climate change is long-term
- So we need long-term mitigation

**VERIFIABLE**

- Must account for all 3 GHG’s as NET mitigation
- Some practices are more easily or cost effectively monitored, or measured
- Some practices are very difficult to verify
A QUALIFICATION ON COST

Our estimate only includes Implementing a Practice on farm

- **Education**
  - Cost to create education materials, new research, and distribution

- **Policies**
  - Cost to develop, implement and administer new policies

- **Implementing a Practice on farm**
  - Cost just to implement a project on a farm or in a field

- **Measuring, Ensuring, Reporting**
  - Measuring evidence of mitigation, ensuring permanence, and associated reporting

- **Verifying/Registering**
  - Cost of hiring a 3rd party verifier and cost of the registries that account for all activities
WHAT DO WE PAY FOR?

- GHG mitigation only?

- GHG and other benefits like clean water and healthy soils?

- Or do we set GHG caps and use the markets to accommodate for the increased costs to mitigate?
<table>
<thead>
<tr>
<th>Market Driven</th>
<th>Voluntary actions</th>
<th>Public Financial Support</th>
<th>Compliance Driven</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Double cropping to increase product sales on farm</td>
<td>Federal/State/Local Govt’s provide expertise, grants, tax incentives, and/or peer-support systems</td>
<td>Cap and Trade programs like RGGI – For example, the electric sector regulation paying for reforestation ‘offset’ projects for carbon mitigation.</td>
</tr>
</tbody>
</table>
SOME EXISTING PROGRAMS

- Climate Resilient Farming (CRF)
  - Cover/flare
  - Soils
  - Water quality
- Trees for Tributaries
- SWCD & Cooperative Extension outreach
- Ag & Markets Tier II
- NYS Environmental Protection Fund (EPF) “Open Space Program”
- Conservation Easements
- Potentially -- Regional Greenhouse Gas Initiative (RGGI) offsets
CLIMATE RESILIENT FARMING, NY AGRICULTURE & MARKETS

SINCE 2015

PROJECT FUNDING
• 4 rounds
• $8 million for projects on 121 farms

MITIGATION
• -231,000 MT CO2e/yr

SCALE UP
• Basic infrastructure is in place!
MOVING FORWARD: CONSIDERATIONS

1. Evaluate all GHGs together

2. Prioritize Permanent & Verifiable practices

3. Consider co-benefits & other State objectives

4. Compare alternatives for current and former agricultural land
   - Bioenergy
   - Solar
   - Wind
   - Afforestation
   - Increased agricultural production
MOVING FORWARD:
RECOMMENDATIONS

1. Integrate GHG into current soil & water initiatives
2. Improve forest management in farm planning
   21% of farmland is wooded
3. Prioritize permanent GHG mitigation activities
4. Celebrate/Share current farm mitigation activities
5. Advocate expansion of Climate Resilient Farming
6. Continue/expand great work in existing programs!
In April 2020 we began a three-year project with DEC to:

1. Create a new NYS agricultural GHG Inventory,
2. Quantify GHG Mitigation Potential, and
3. Develop three Future Mitigation Scenarios.

We will have preliminary results to share during coming months.
THANK YOU!

NYS Department of Agriculture and Markets
Funding and collaboration for this project
Previous funding & collaboration to create GHG Tier II and Information Sheets.

NYS Department of Environmental Conservation for current work
NYS Energy Research and Development Authority for previous work

Further Information & publications
Blogs.cornell.edu/woodbury

QUESTIONS?
Draft Workplan
Draft Work Plan

- Section 1 – Identification of Panel Members
- Section 2 – Roles and Responsibilities of Chair, Panel members and agency staff
- Section 3 – Goals for the Agriculture and Forestry Sector
- Section 4 – Scope of Work
- Section 5 – Plans for Public Participation
- Section 6 - Timeline
Section 3 – Goals for the Agriculture and Forestry Sector

1. Carbon Sequestration Goals:

2030: Return to 1990 levels of forest carbon sequestration, or approximately 30mmt of net CO2e sequestered on forested lands on an annual basis, or an increase of approximately 5mmt over current conditions, as also considered in Pathways.

2050: Enhance carbon sequestration across all land use types to achieve the net zero goal, or approximately 60mmt of CO2e sequestered. This includes forests, urban trees, harvested wood products, agricultural lands, and freshwater and coastal wetlands.
Section 3 – Goals for the Sector

Section 3 – Goals for the Agriculture and Forestry Sector

2. Agriculture GHG Emission Reduction Goals (in CO2e using a 20-year GWP)

2030: Reduce emissions from livestock and cropland soil management 15 percent from current levels, or approximately 3.5mmt CO2e.

2050: Reduce emissions from livestock and cropland soil management 30 percent from current levels, or approximately 7mmt CO2e and equivalent to 1990 levels and in line with projections that informed Pathways.
Section 3 – Goals for the Sector

Section 3 – Goals for the Agriculture and Forestry Sector

3. Cross-sectoral GHG Emission Reduction Goals

Reduce energy (electricity and fuel combustion) emissions associated with agricultural and forestry operations in line with the goals of the CLCPA, including the benefits of increased tree canopy in our urban areas and the resulting reduction in the heat island effect.
Section 3 – Goals for the Agriculture and Forestry Sector

4. Other Goals

Avoid the leakage of GHG emissions into other jurisdictions and ensure resiliency of the food and forest products systems by maintaining and enhancing the agriculture and forestry industries in New York.

Ensure resiliency and resource conservation by maintaining the ecosystem services provided by the ‘natural and working lands’ (farms, forests, wetlands, and other land uses), including the benefits of enhanced right of way (ROW) maintenance of the state in light of changing climatic conditions.
Section 4 – Scope of Work

This Panel will consider the following general topics in order to propose recommendations related to the Goals described above:

Land Use Conversions (avoiding conversions to more carbon intensive land uses and promoting conversions to less carbon intensive land uses)
- Farmland protection
- Riparian buffers and agricultural woodlands
- Private and public forest lands
- Urban and community forests

Forestry and Forest Management
- Climate adaptive forest management
- Forest regeneration (including climate-adaptive silviculture)
- Harvested Wood Products and maintaining viable forest products markets
Section 4 – Scope of Work

Livestock Management
- Enteric fermentation (animal feeding)
- Manure management (manure storage)

Agricultural Soil Management
- Nitrogen fertilizer/manure use
- Soil carbon management (including regenerative agriculture)
Section 4 – Scope of Work

Cross-cutting Issues
- Costs and innovative financing
- New York’s Bioeconomy

Cross-sector Issues (to be discussed in conjunction with other Panels)
- Energy emissions (electricity and fuel use in this sector)
- Energy production (electricity and fuel use in this sector)
- Renewable energy siting
- Food waste and waste-based fuel production
- Net emissions and bioenergy accounting
- Land use (Local Government and Land Use)
- Adaptation and resilience
Meeting Schedule:
Next Meeting