 Agenda

- Origination of MEA agriculture energy efficiency programs
  - Maryland Statewide Farm Energy Audit Program
- Current MEA agriculture programs
  - Mathias Ag Programs 2012-13, 2014
  - Mathias Ag Program 2015
- Observations
- Programmatic Considerations
- Programs and Policy
- Lessons Learned
- Funding Resources
- Questions

Origination of MEA agriculture energy efficiency programs

- Energy Costs continue to Increase
  - According to the U.S. Department of Agriculture (USDA) 2007 Census of Agriculture, Maryland’s farms increased in number, fossil fuel consumption, and energy use between 2002 and 2007.
  - Maryland’s approximately 12,000 farms spent about $26 million on electricity in 2008.
  - For a decadal perspective,
    - Maryland farms spent about $33 million on petroleum products, gasoline, diesel fuel, natural gas, LPG, kerosene, fuel oil, and other fuels in 1997.
    - In 2007, Maryland farms spent about $67 million on “gasoline, fuels, and oils.”
  - In 1997 the average retail rate for electricity in Maryland was 7 cents per kilowatt hour (kWh); in 2007 it was 11.4 cents per kWh.
- Maryland Energy Administration’s Mission
  - “to promote affordable, reliable, clean energy”
Origination of MEA agriculture energy efficiency programs continued

- A coalition of government agencies, trade groups, and private sector participants came together in 2006 to establish a process by which the agriculture sector could reduce its energy consumption in the state.
- The program designed to establish a process by which the agriculture sector could reduce its energy consumption in Maryland was entitled the Maryland Statewide Farm Energy Audit Program.
- Audits were used to identify and quantify energy consumption and to make cost-effective efficiency recommendations.

Maryland Statewide Farm Energy Audit Program

- Program was run in three phases
  - Phase I: 25 energy audits on the Eastern Shore
    - Annual energy savings of 471,700 kWh and 46,000 gallons of propane identified
  - Phase II: 51 energy audits in Western Maryland
    - Annual energy savings of 1.6 million kWh and 22,808 gallons of propane identified
  - Phase III: 42 additional energy audits, and the implementation of some of the measures recommended by the previous audits
- Program total: 118 audits and 129 implemented projects with an estimated annual savings of:
  - 2.9 million kWh
  - 52,733 gallons of propane
  - 527,627 Therms of natural gas

In 2010, the American Council for an Energy-Efficient Economy (ACEEE) awarded the Phase III program with Exceptional State-led Energy Efficiency Program.

2012-13 Kathleen A. P. Mathias Agriculture Energy Efficiency Program

- American Recovery and Reinvestment Act (ARRA) Program
  - Funding source - Better Buildings Neighborhood Program
  - Competitive program
  - Program sought to leverage utility programs wherever possible
  - Program was for 15% energy savings per building or in some cases per measure
  - 16 farms/businesses
  - Estimated electricity savings ≈ 800,000 annual kWh
  - http://energy.maryland.gov/Business/mathiasag/
2014 Kathleen A. P. Mathias Agriculture
Energy Efficiency Program

- Strategic Energy Investment Fund (SEIF) Program funding source
  - Competitive program
  - Energy efficiency only projects
  - Program sought to leverage utility programs whenever possible
  - Program was for 20% energy saving per building or in some cases per measure
  - 13 farms/businesses
  - Estimated electricity savings ≈ 800,000 annual kWh

http://energy.maryland.gov/Business/MathiasAg14.htm

2015 Kathleen A. P. Mathias Agriculture
Energy Efficiency Program

- Strategic Energy Investment Fund (SEIF) Program funding source
  - Competitive program
  - Energy efficiency AND renewable energy projects
    - Program is seeking out cost-effective deeper-retrofit upgrades in the agriculture sector
    - To be eligible for renewable energy upgrades a project must incorporate significant energy savings
    - Renewable energy proposal must be best practices
      - Wind (consider capacity factor), Biomass (location and access to wood/fuel), Solar PV (optimizing in orientation, location, and siting — i.e., not on usable farmland), Methane digester (is the fuel on site? How much can it burn?)
  - Program seeks to leverage utility programs whenever possible
    - Subject to funding availability - $550,000 is available for FY15
      - $300,000 for energy efficiency projects
      - $250,000 for renewable energy projects
  - We anticipate giving 8-16 awards
  - Award amounts will be between $15,000 and $60,000
    - Minimum project size of at least $30,000 no maximum size – however, maximum award amount will be $60,000

Observations

- Propane consumption reduction opportunities
  - Propane is the fuel used is many farms/farm businesses
  - There are no programs specifically for propane reduction

- Whole building savings opportunities
  - 15-20% energy reduction can be done in many buildings
  - Can be done cost effectively

- Many opportunities exist for saving energy on the farm
  - Early retirement
  - Cost effective
  - Best practices

- Need exists for programs to drive this change
  - Share information for farmers, policy stakeholders, utilities
Programmatic Considerations for Ag Measures

- MEA observations from running agriculture efficiency programs
  - Farms/Ag. businesses require additional outreach and technical assistance
  - Farmers and small farm businesses generally seemed to be unaware of utility programs and how to leverage utility programs
  - Measures must be pre-approved
  - Uncertain about how to qualify for custom measures
  - Difficult to build custom-measure leverage/leak into the agriculture business model
  - Not energy experts — no engineer on staff to help develop energy projects
  - "Farms" are not one size fits all and can be on residential or commercial meters
  - Farms/Ag. businesses benefit from audits that identify and confirm savings
    - Audits useful for custom measures
    - Audits allow for aggregated costs/savings for multiple measures
  - Audits can be done remotely (desk audits)
  - Farms/Ag. businesses may have specific energy efficiency project considerations that are unique to their sector
  - Many of the energy efficiency measure opportunities require specialized knowledge of agriculture

Programs and Policy

- Programs are an opportunity to influence policy
  - Farming best practices
  - Utility programs
  - PSC
  - Federal
  - Other states
  - Other countries
- Information learned needs to be shared
  - Farms/businesses
  - State
  - Others

Programs and Policy Continued

- Use media to encourage viewers to "dig deeper"
- Include case studies and other relevant information
- Graphs, charts showing savings and costs
Programs and Policy continued

- Programs are an opportunity to influence policy
  - Old Way – get the money, spend the money
  - New Way:
    - Make it easy to understand what the program achieved
    - Provide information for others to consider
    - Influence behavior

- Information learned needs to be shared
  - Example of actual project from FY2014 Mathias Ag Program

Dairy Farm – case study

- Choptank Service Territory
- Recommended Measures: LEDs, Fans, chiller, plate cooler and compressors

<table>
<thead>
<tr>
<th>1. West Barn</th>
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</thead>
<tbody>
<tr>
<td>Lighting: Replace 61-400 watt metal halide fixtures with 61-185 watt LED high bay fixtures.</td>
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</tr>
<tr>
<td>Ventilation: Replace 130-36&quot;, ½ hp direct drive fans with 24-72&quot;, 3 hp fans with deflectors and variable speed drive units.</td>
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</tr>
</tbody>
</table>

- East Barn
- Lighting: replace 26-400 watt metal halide and 6-400 watt high pressure sodium lights with 32-185 watt LED high bay fixtures. |
- Ventilation: replace 64-36", ½ hp fans with 12-72", 3 hp fans with deflectors and variable speed drive units. |

- Calving and Sort Areas
- Lighting: Replace 44-150 watt metal halide fixtures with 44-55 watt LED high bay fixtures. This includes retrofitting for 12 fixtures.
- Replace 8-8 foot T12 fixtures with 4-55 watt LED high bay fixtures.
- Modify 14-8 foot T12 fixtures by removing ballasts and installing 40 watt LED lamps.

- Parlor and Holding Area:
- Refrigeration: Replace existing chiller, plate cooler and compressors with; new chiller consisting of a glycol unit with 5 hp pump and two 10 hp refrigeration compressor units, and 132 plate two-stage plate cooler.
- Lighting: Replace 12 of existing 16-400 watt metal halide fixtures with 185 watt LED fixtures.
- Remove remaining 4 existing 400 watt metal halide fixtures.
- Install 5 vapor-tight, water proof, 8 foot, 80 watt LED fixtures.

Programs and Policy case study

- Estimated Savings of Energy Efficiency Project (from audit)

<table>
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<tr>
<th>Recommended Measure</th>
<th>Estimated Savings (kWh)</th>
<th>Energy Savings (MMBtu)</th>
<th>Estimated Annual Energy Cost</th>
<th>Estimated Installed Cost</th>
<th>Estimated Payback in Years</th>
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<tr>
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<td>East Barn</td>
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<td>$12,128</td>
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<tr>
<td>Parlor and Holding Area</td>
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<td>Total</td>
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<td>1,138</td>
<td>$36,252</td>
<td>$244,382</td>
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</tbody>
</table>

- Saves estimated 300+ AMWh, $36,000+yr
- Electricity Demand Reduction = 44.3 kW
- Payback 6.7 years
- Cost effective, early retirement, increases productivity, helps a farmer in Maryland (4th generation) keep competitive
Lessons Learned From Running Ag Programs

- Farmers are very leveraged. Often they are unable to take out additional loans. Grant programs help to enable energy efficiency upgrades that will help them stay competitive.
- Many of the buildings/measure that were upgraded were measures or upgrades that would not have occurred without the grant program.
- Many of the farmers served under the ag programs are multi-generational farmers striving to stay competitive in today’s market.
- In today’s globalized and “agri-business” market this helps Maryland’s small farmers.
- This helps Maryland keep its agricultural heritage intact and helps with sustainability.
- MEA Ag Programs have provided information to utility programs
- Many farmers are on residential meters and the utility programs are unavailable to help them utilize the appropriate commercial-type upgrades

Agriculture Energy Project Funding Resources through MEA

- A new Mathias Ag program will be announced soon. The program will look for ways to blend energy and renewable energy together in a cost-effective way on farms/businesses in Maryland – keep an eye out for it!
  - It will have the new updated “Other Potential Funding Sources for Farms and Businesses”
  - Based on feedback at the Better Buildings Case Competition... a “one stop shopping” list of funding opportunities
- On the bottom of our webpage for this year’s (2014) program we have a list of alternative funding options for agricultural measures:
  - http://energy.maryland.gov/Business/MathiasAg14.htm
- You can sign up for our newsletter here: http://energy.maryland.gov/News/index.html
- We also announce grant programs on our Facebook page: https://www.facebook.com/MDEnergyAdministration
- The MEA has a webpage where we post grants, rebates, loans and tax incentives:
  - http://energy.maryland.gov/Govt/janeelawton.html
  - Jane E. Lawton Conservation Loan Program
  - http://energy.maryland.gov/Govt/janeelawton.html

Questions and Answers

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