State-Federal RPS Collaborative Webinar

Renewable Thermal in RPS

March 10, 2014

This webinar is co-sponsored by the
Renewable Energy Markets Association (REMA)

REMA
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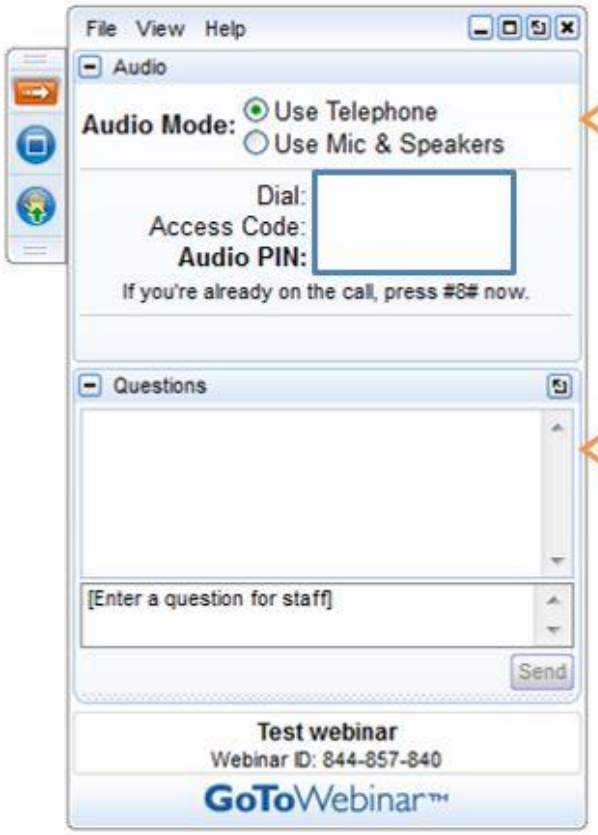

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http://www.cleanenergystates.org/webinars/

About CESA

Clean Energy States Alliance (CESA) is a national nonprofit organization working to implement smart clean energy policies, programs, technology innovation, and financing tools, primarily at the state level. At its core, CESA is a national network of public agencies that are individually and collectively working to advance clean energy.

State-Federal RPS Collaborative

- With funding from the Energy Foundation and the US Department of Energy, CESA facilitates the **Collaborative**.
- Includes **state RPS administrators**, **federal agency representatives**, and other stakeholders.
- Advances dialogue and learning about RPS programs by **examining the challenges and potential solutions** for successful implementation of state RPS programs, including **identification of best practices**.
- To sign up for the Collaborative listserve to get the **monthly newsletter** and announcements of **upcoming events**, see: www.cleanenergystates.org/projects/state-federal-rps-collaborative

REMA
Renewable Energy Markets Association

Background

- The only US organization solely dedicated to the protection and promotion of the REC markets
- Representing all renewable energy sectors
  - Utilities
  - Marketers
  - Developers
  - Manufacturers
  - Consumers
  - Non-profits

"If you want your voice to be heard while the future of the renewable industry is decided, you need to join REMA."

– Jay Carlis, **Community Energy**

REMA
Renewable Energy Markets Association

About REMA

Dedicated to protecting and promoting the voluntary and compliance REC markets

Our Members:

Today's Guest Speakers

Elizabeth Nixon, Energy Analyst, New Hampshire Public Utilities Commission

Kyle Haas, Energy Policy Manager for Clean Energy Policy, Maryland Energy Administration

Maryland Energy
ADMINISTRATION
Powering Maryland's Future

Thank you for attending our webinar

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NEW HAMPSHIRE RENEWABLE PORTFOLIO STANDARD THERMAL ENERGY PROVISIONS

Elizabeth Nixon
NH Public Utilities Commission
March 10, 2014

RPS Legislation

- Enacted in July 2007. RSA 362-F.
- Established REC requirement for 4 classes:
  - Class I: New sources (wind, biomass, methane gas, etc.) and new capacity added to existing biomass, LFG, and hydro facilities (Began operation after January 1, 2006)
  - Class II: Photovoltaic systems
  - Class III: Existing biomass < 25 MW and landfill gas facilities
  - Class IV: Existing small hydro facilities < 5 MW

RPS Legislation –Thermal

- SB218 became effective June 19, 2012.
- Created Class I sub-class for useful thermal renewable energy.
- 0.2% of Class I REC requirement to be met with thermal resources beginning 2013; delayed by an Order of the Commission to January 1, 2014 at 0.4%.
- SB 148 and HB542 in 2013 revised the % obligation to ramp it up faster
- Requires NHPUC to adopt procedures for the metering, verification, and reporting of useful thermal energy output. RSA 362-F:13 VI-a

Key Provisions - Definition

Useful Thermal Energy means

renewable energy derived from Class I sources that can be metered and is delivered in NH to an end user in the form of direct heat, steam, hot water, or other thermal form that is used for heating, cooling, humidity control, process use or other valid thermal end use requirements and for which fuel or electricity would otherwise be consumed. RSA 362-F:2, XV-a.

Key Provisions - % Obligation

Calendar Year	Total Requirement	Total Class I	Thermal Class I	Class II	Class III	Class IV
2008	4.00%	0.00%	0.00%	0.00%	3.50%	0.50%
2009	6.00%	0.50%	0.00%	0.00%	4.50%	1.00%
2010	7.54%	1.00%	0.00%	0.04%	5.50%	1.00%
2011	9.58%	2.00%	0.00%	0.08%	6.50%	1.00%
2012	5.55%	3.00%	0.00%	0.15%	1.40%	1.00%
2013	6.80%	3.80%	0.00%	0.20%	1.50%	1.30%
2014	9.70%	5.00%	0.40%	0.30%	3.00%	1.40%
2015	15.80%	6.00%	0.60%	0.30%	8.00%	1.50%
2016	16.70%	6.90%	1.30%	0.30%	8.00%	1.50%
2017	17.60%	7.80%	1.40%	0.30%	8.00%	1.50%
2018	18.50%	8.70%	1.50%	0.30%	8.00%	1.50%
2019	19.40%	9.60%	1.60%	0.30%	8.00%	1.50%
2020	20.30%	10.50%	1.70%	0.30%	8.00%	1.50%
2021	21.20%	11.40%	1.80%	0.30%	8.00%	1.50%
2022	22.10%	12.30%	1.90%	0.30%	8.00%	1.50%
2023	23.00%	13.20%	2.00%	0.30%	8.00%	1.50%
2024	23.90%	14.10%	2.00%	0.30%	8.00%	1.50%
2025	24.80%	15.00%	2.00%	0.30%	8.00%	1.50%

Key Provisions – Est. MWH RECs

Calendar Year	Total Retail Sales to Retail Customers (MWh)*	Total Class I	Thermal Class I	Class II	Class III	Class IV	Total Obligation
2008	10,550,550	0	0	0	369,269	52,753	422,022
2009	10,202,233	51,011	0	0	459,100	102,022	612,134
2010	10,631,756	106,318	0	4,253	584,747	106,318	801,634
2011	10,610,657	212,213	0	8,489	689,693	106,107	1,016,501
2012	10,681,310	320,439	0	16,022	149,538	106,813	592,813
2013	10,825,483	411,368	0	21,651	162,382	140,731	736,133
2014	10,987,865	549,393	43,951	32,964	329,636	153,830	1,065,823
2015	11,152,683	669,161	66,916	33,458	892,215	167,290	1,762,124
2016	11,319,973	781,078	147,160	33,960	905,598	169,800	1,890,436
2017	11,489,773	896,202	160,857	34,469	919,182	172,347	2,022,200
2018	11,662,120	1,014,604	174,932	34,986	932,970	174,932	2,157,492
2019	11,837,051	1,136,357	189,393	35,511	946,964	177,556	2,296,388
2020	12,014,607	1,261,534	204,248	36,044	961,169	180,219	2,438,965
2021	12,194,826	1,390,210	219,507	36,584	975,586	182,922	2,585,303
2022	12,377,749	1,522,463	235,177	37,133	990,220	185,666	2,735,482
2023	12,563,415	1,658,371	251,268	37,690	1,005,073	188,451	2,889,585
2024	12,751,866	1,798,013	255,037	38,256	1,020,149	191,278	3,047,696
2025	12,943,144	1,941,472	258,863	38,829	1,035,452	194,147	3,209,900

*2008 -2012 figures are based on MWH Sales reported on the E2500 RPS Compliance Reports. 2013 is based on estimates provided by the distribution utilities. 2014 to 2025 figures assume 1.5 percent annual growth in sales based on ISO New England's 2011 Regional System Plan.

Eligible Technologies

- Solar Thermal
- Geothermal - Ground Source Heat Pumps
- Thermal Biomass Renewable Energy Technologies
- Biomass Combined Heat and Power Facilities
- Biomass facilities must meet emission requirements:
  - PM: 0.1 lb/MMBtu for 3-30 MMBtu/hr;
    0.02 lb/MMBtu >30 MMBtu/hr
  - NOx: 0.075 lb/MMBtu ≥ 100 MMBtu/hr
  - Best Management Practices (annual tune-ups; combustion efficiency) <100 MMBtu/hr
- To be REC eligible, systems must begin operation after January 1, 2013.

Program Development Process

- Held 3 stakeholder meetings in Aug. 2012, Jan. 2013, Sept. 2013.
- Worked with NEPOOL GIS – Incorporated into GIS by July 2013.
- Challenge to develop rules for metering and measurement.
- Hired Antares Group to assist Summer 2013.
- Antares issued draft report on metering and measurement in September 2013.
- Antares provided preliminary draft rule language to PUC in late 2013.
- Based on stakeholder comments, needed to simplify methodology.

Measuring and Metering Thermal Energy Proposed Approaches

- Boundary for thermal measurement – before delivery to distribution
- Measuring thermal energy:
  - Air/Water Systems: based on flow, temperature, and specific heat
  - Steam systems: based on flow and specific enthalpy (temp. & pressure)
- Metering
  - Must meet accuracy of EN1434 standard; or
  - Must meet accuracy ≤ ±5%; RECs discounted; or
  - Alternative methodology
- Parametric monitoring for small sources allowed:
  - 100 kW or 350,000 Btu/hr
  - Solar Thermal: operating hours of pump and SRCC rating taking into account shading/orientation losses
  - Geothermal: operating hours of pump and HC and COP
  - Thermal Biomass: operating hours and auger feed rate

Proposed REC Calculation

- Measure thermal output
- Discount for meter accuracy if meter does not meet standard
- Discount for operating energy and thermal energy storage losses
- RECs reported to NEPOOL GIS in mWh (1 mWh = 3.412 MMBtu)

Proposed REC Calculation– Meter Accuracy Discount Factor

- Upper and lower boundary for metering system accuracy (±5%)
- REC is discounted by accuracy of metering
- Example:
  - Meter accuracy = ±4%
  - Measured thermal output = 100,000 mWh
  - REC = 100,000 mWh*(1-0.04) = 96,000 mWh of RECs

Proposed REC Calculation– Parasitic Energy Discount Factors

- Solar thermal: 3.0%
- Geothermal: 3.6%
- Thermal biomass: 2.0%
- Actual Metering of Parasitic Load
- Only for large sources

Verifying and Reporting Thermal Energy

- Professional Engineer must attest to the thermal energy metering/measurement methodology
- Independent monitor must inspect facility initially
- Independent monitor must verify and report thermal output to NEPOOL GIS
- RECs retroactive to January 1, 2014 if source certified to be eligible to create RECs

Schedule

- Draft Rule
- Public Hearing
- Comments Due
- Final Rule

- Send Liz an e-mail if would like to be on service list

Contact info

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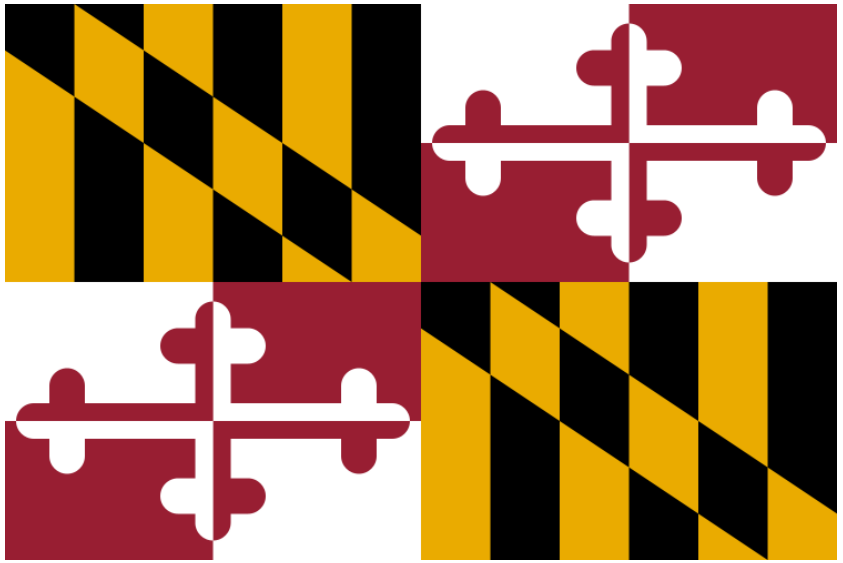


Thermal Energy Task Force Brief
Clean Energy States Alliance

Kyle Haas 3/10/2014

Background

- MD RPS had no unified means of awarding RECs for thermal renewable energy
- Legislative action in subsequent years incorporated SWH, geothermal and poultry biomass thermal systems
  - Each treated differently
- SB797/HB1084 was initially written to offer electricity RECs to woody biomass
- As written, it had errors, potential pitfalls
- Modified the bill to establish a task force
  - MEA; MD Senate; MD House; Solar; Geo; Wood industry; Sustainable forestry; Enviro; DNR; MDE; Agriculture; PSC

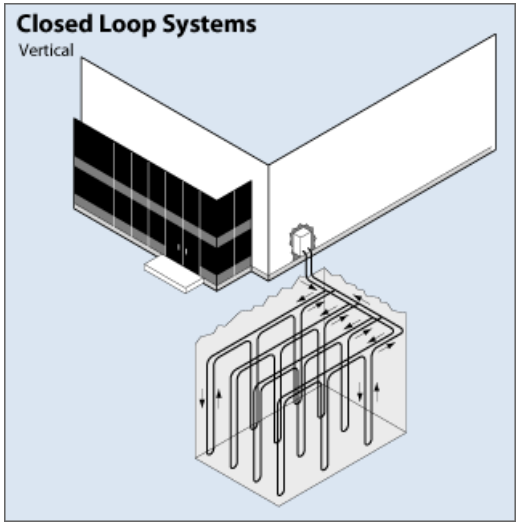
Task Force Recommendations

- Members of the Task Force had a variety of perspectives, opinions and recommendations
- I will cover the highlights, but we do not have the time to cover each member of the Task Force's perspectives
- More detail can be found in the report itself

The Report:

http://energy.maryland.gov/documents/TRECTaskForceReportJanuary2014.pdf

Rec 1: Thermal Tiers



- Move new, non-solar Tier 1 technologies, including geothermal heating and cooling, animal manure-based biomass, and qualifying biomass technologies, into a primary thermal tier

Rec 2: ACP Limitation

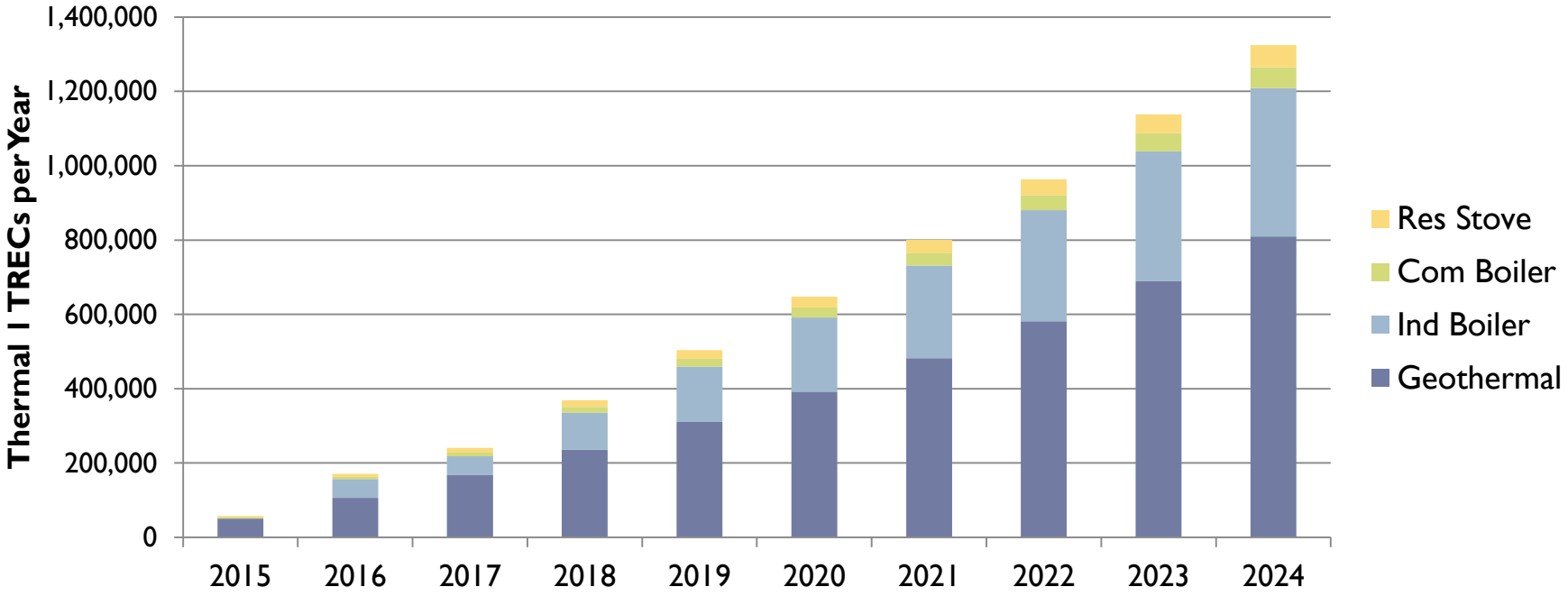
- Limit Alternative Compliance Payments ("ACP") to the extent that the market has supplied Thermal Renewable Energy Credits ("TRECs").

- Electricity suppliers should be required to purchase available TRECs, but should not need to make ACP payments for thermal obligations that were not delivered to the market.

Rec 3: Market Creation

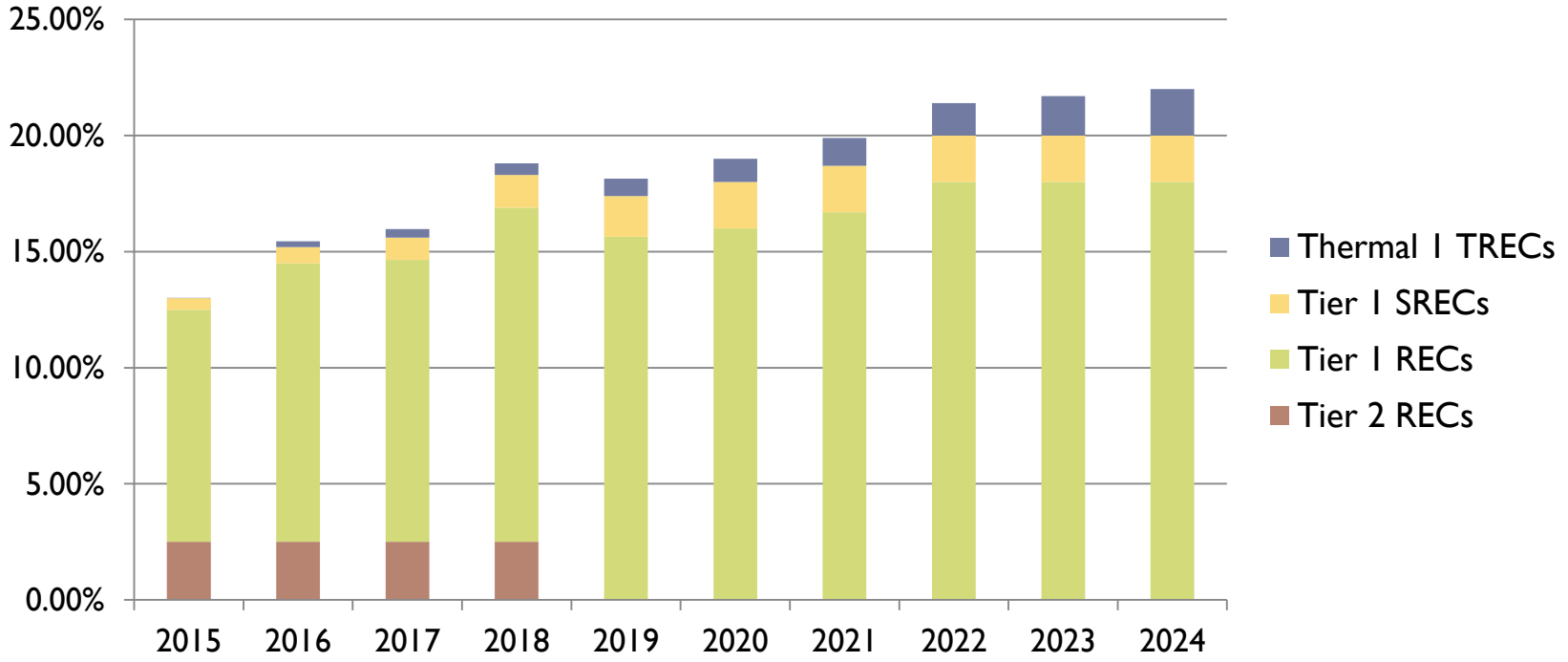
- The Thermal 1 tier should gradually ramp up to 2% of electricity sales in 2024.
- Thermal 1 ACP:
  - Start at $30 in 2015
  - Decline to $20 by 2019
- Thermal 2 ACP:
  - Start at $0.25 in 2015
  - Decline to $0.05 in 2019
- Maximum cost:
  - $0.03/month in 2015
  - $0.15/month in 2024

Rec 3: Market Creation



Technology	Per Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Geothermal	23.1	50,820	106,723	168,215	235,857	310,263	392,109	482,141	581,175	690,113	809,944
Ind Boiler	49,810	0	49,810	49,810	99,619	149,429	199,238	249,048	298,857	348,667	398,476
Com Boiler	1,314	2,627	6,569	10,510	15,765	21,020	27,588	34,157	40,726	48,608	56,490
Res Stove	7.5	3,736	7,845	12,365	17,337	22,807	28,823	35,441	42,721	50,729	59,538
Total TRECs		57,183	170,946	240,900	368,578	503,518	647,759	800,787	963,479	1,138,116	1,324,448

Rec 3: Market Creation



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Thermal I Tier	0.10%	0.25%	0.38%	0.50%	0.75%	1.00%	1.20%	1.40%	1.70%	2.00%
Tier I SRECs	0.50%	0.70%	0.95%	1.40%	1.75%	2.00%	2.00%	2.00%	2.00%	2.00%
Tier I RECs	10.00%	12.00%	12.15%	14.40%	15.65%	16.00%	16.70%	18.00%	18.00%	18.00%
Tier 2 RECs	2.50%	2.50%	2.50%	2.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Rec 4: Efficiency Requirement

- Thermal biomass systems should have a 65% minimum efficiency requirement.
- Thermal biomass systems should be limited to:
  - Clean and untreated wood
  - Agricultural crops
  - Biogas; and
  - Liquid biofuels.
- Should also exclude materials derived in whole or in part from construction and demolition debris.

Rec 5: Displacement

- Thermal energy should be required to displace electricity or a non-renewable fuel in an application in which electricity or a non-renewable fuel would have otherwise been used for a useful thermal application.

Rec 6: Grandfathering

- Existing thermal-only systems will remain in their current status.

- Alternatively, they may choose to re-register as a Thermal 1 system.

Thank you!

- A big thank you to the Task Force Members!