
Overview of the U.S. Market for Green Certificates

Presentation for the ERRA
Licensing/Competition Committee
June 11, 2013



Topics

- ❑ Compliance Renewable Energy Certificate Markets: Renewable Energy Portfolio Standards (“RPS”)
- ❑ Voluntary Renewable Energy Certificate Markets
- ❑ Regional Greenhouse Gas Initiative (“RGGI”) CO₂ Allowances

Renewable Energy Certificates

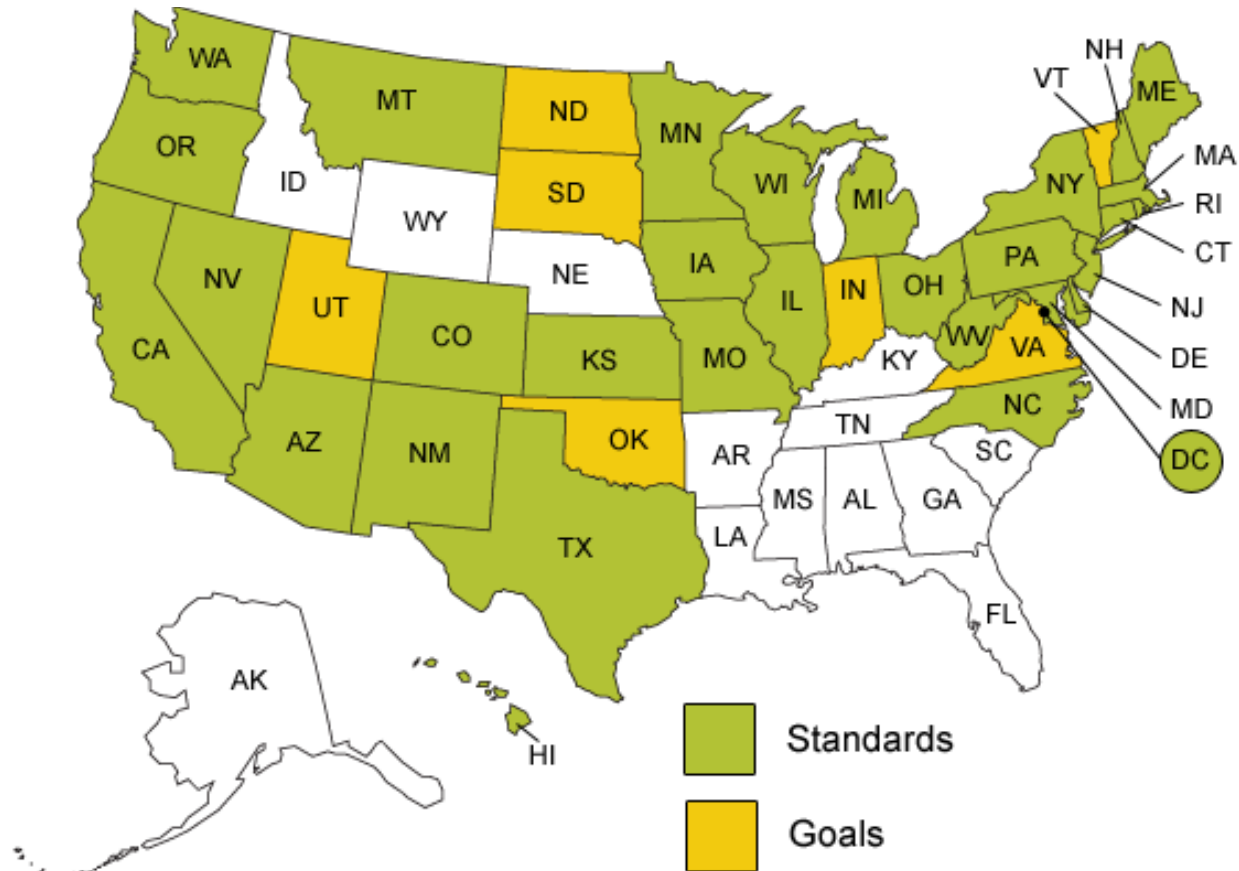
Compliance and Voluntary Obligations

Renewable Energy Portfolio Standards

General Policy Overview

- Purpose: establish renewable energy markets
 - Electricity suppliers must supply a certain percentage of their electricity from designated renewable resources
 - Cost of obligation may be passed through to end users
- Legal Framework:
 - Currently no U.S. federal policy
 - Established on a state-by-state basis

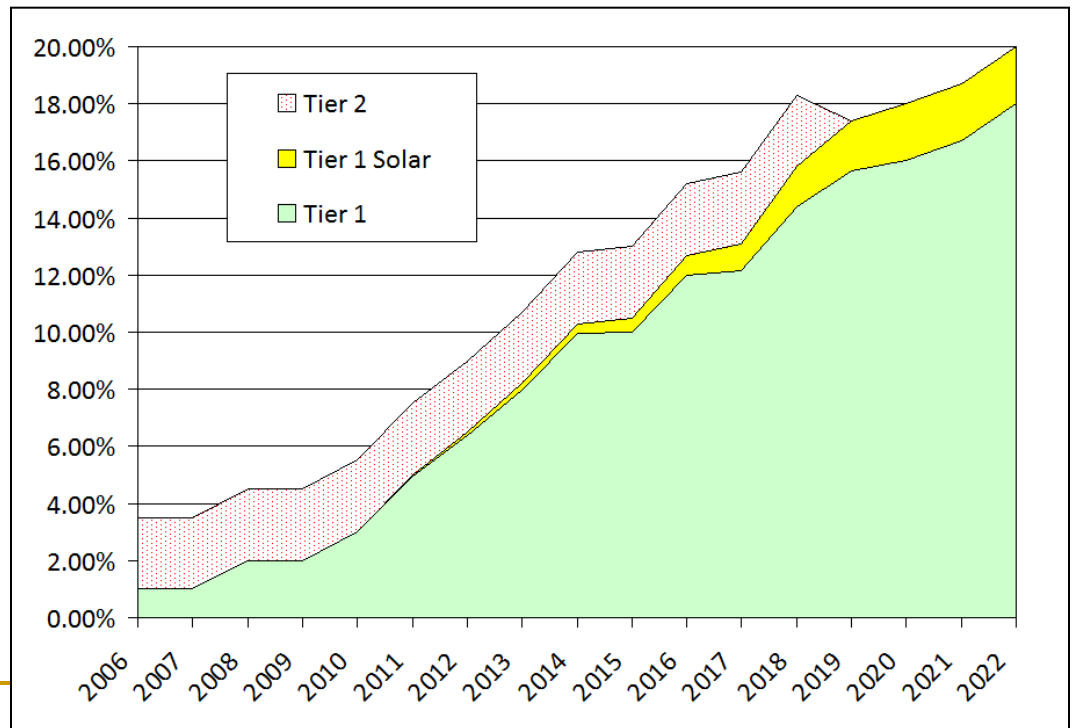
Renewable Energy Portfolio Standards Across the U.S.



Source: *Today In Energy*, U.S. Energy Information Administration (Feb. 3, 2012), <http://www.eia.gov/todayinenergy/detail.cfm?id=4850>.

Renewable Energy Portfolio Standard In the State of Maryland

- Codified by the legislature , implemented by the Maryland Public Service Commission
- Compliance obligations escalate on an annual basis



Renewable Energy Portfolio Standards

Maryland Compliance Mechanisms

Renewable Energy Certificates

- Split into two commodities:
 1. Electricity or electrons
 2. Environmental and other non-power attributes of generation
- 1 REC = the right to claim attributes of 1 MWh of electricity generation

Alternative Compliance Payments

Compliance Year	Tier 1 Non-Solar	Tier 1 Solar	Tier 2
2006	\$40	--	\$15
2007	\$40	--	\$15
2008	\$40	\$450	\$15
2009	\$40	\$400	\$15
2010	\$40	\$400	\$15
2011	\$40	\$400	\$15
2012	\$40	\$400	\$15
2013	\$40	\$400	\$15
2014	\$40	\$400	\$15
2015	\$40	\$350	\$15
2016	\$40	\$350	\$15
2017	\$40	\$200	\$15
2018	\$40	\$200	\$15
2019	\$40	\$150	
2020	\$40	\$150	
2021	\$40	\$100	
2022	\$40	\$100	
2023 +	\$40	\$50	

Renewable Energy Portfolio Standards

Maryland REC Tiers

Tier 1 Renewable Sources

- **Solar (Tier 1 Solar)**
- Wind
- Qualifying Biomass
- Methane from a landfill or wastewater treatment plant
- Geothermal
- Ocean
- Fuel Cell that produces electricity from a Tier 1 source
- Hydroelectric power plant less than 30 MW capacity
- Poultry litter-to-energy
- Waste-to-energy
- Refuse-derived fuel
- Thermal energy from a thermal biomass system

Tier 2 Renewable Sources

- Hydroelectric power other than pump storage generation

(Note: Tier 1 RECs may be used to satisfy Tier 2 obligations)

Renewable Energy Portfolio Standards

Role of Regulatory Agencies

- Market Regulation
 - Certification of renewable energy facilities
- Market Monitoring:
 - Monitor projected supply of qualifying RECs
 - Annual compliance monitoring against state's RPS requirements
 - Retirement of "claimed" RECs
 - Collection of any owed Alternative Compliance Payments

Renewable Energy Portfolio Standards

New Program Considerations

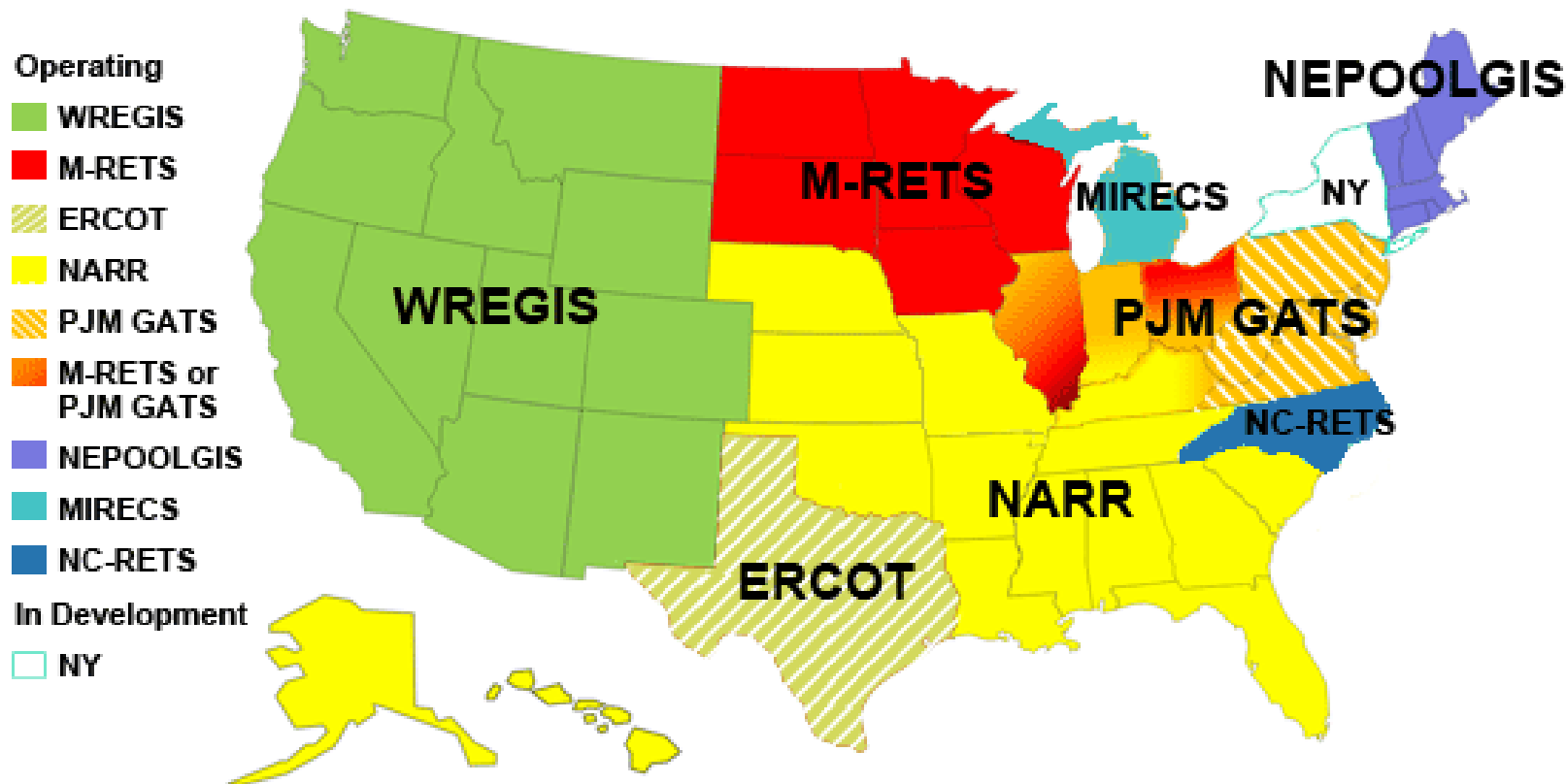
- Market certification systems must prevent usage of one REC for multiple obligations (in multiple markets or regional systems)
- Consider the ultimate goal of green certification:
 - ❑ Carbon based? Technology based?
 - ❑ Renewable?
 - ❑ Zero-emission?
 - ❑ New?
 - ❑ In-state?

Voluntary Certificate Markets

- Electricity suppliers may advertise to customers that they sell “green” power (usually wind or solar)
- Voluntary and compliance RECs can be purchased in the same regional market, but MAY NOT BE USED FOR BOTH
 - Voluntary REC purchases must be above and beyond any compliance obligation
 - Once a REC is “claimed” for purposes of compliance, the REC is retired and cannot be used to satisfy another compliance or voluntary obligation.

Renewable Energy Certificate Markets

Regional Markets



Source: *Other REC Markets Nationwide*, The Leaf Exchange (2013),
<http://www.theleafexchange.com/knowledge/rec-marketsprograms-nationwide/>.

Renewable Energy Certificate Markets

Trade on Regional Basis – Maryland

PJM GATS: Generation Attribute Tracking System

- Tracks the generation output for the issuance of RECs
- Each REC is assigned a unique serial number
- Interested parties purchase RECs from the generators
- GATS transfers the REC from generator to the buyer's account
- Buyers can “bank” the RECs for future years, or retire the RECs claim its attributes for the compliance period

Renewable Energy Certificate Markets

Recent REC Prices

- No minimum price
- Prices set by tier
- Varies state-by-state
- ACP sets the cap

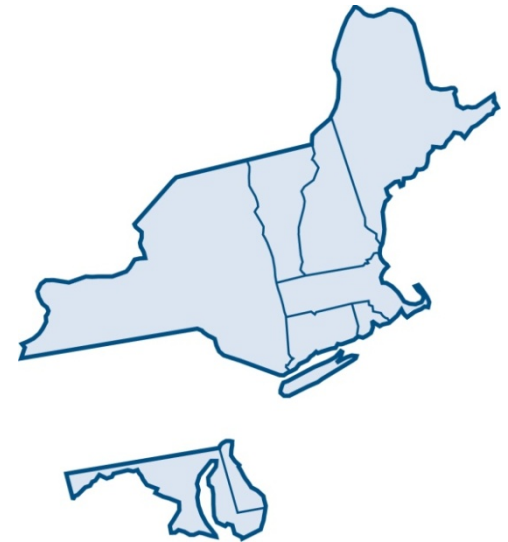
Product	Term	Price	Product	Term	Price
CA RPS Bundled Bucket 2	2013	5.00	MD Tier II	2012	0.55
CA RPS Bundled Bucket 2	13-14	5.00	ME Class I	2012	39.00
CA RPS-REC Bucket 3	2012	0.68	ME Class I	2013	19.25
CA RPS-REC Bucket 3	2013	0.90	ME Class I	2014	14.88
CT Class I REC	2012	55.38	NH Class I	2012	62.00
CT Class I REC	2013	52.94	NH Class II	2012	115.00
CT Class I REC	2014	39.88	NJ Class I REC	2013	4.88
CT Class I REC	2015	34.19	NJ Class I REC	2014	4.98
CT Class II REC	2012	0.41	NJ Class I REC	2015	5.06
CT Class II REC	2013	0.60	NJ Class II REC	2013	2.55
CT Class III REC	2012	10.17	NJ Class II REC	2014	2.71
CT Class III REC	2013	10.75	NJ Solar REC	2013	115.00
DC Solar REC	2012	395.00	NJ Solar REC	2014	116.67
DC Tier I REC	2012	2.00	NJ Solar REC	2015	120.63
DC Tier I REC	2013	2.25	OH Adjacent Solar	2012	17.50
MA APS	2012	19.50	OH Contiguous REC	2012	2.00
MA APS	2013	20.95	OH In-State Solar	2012	58.75
MA Class I	2012	63.72	OH In-State Solar	2013	57.50
MA Class I	2013	63.88	OH Located REC	2012	3.80
MA Class I	2014	62.54	PA Solar REC	2013	15.25
MA Class I	2015	53.79	PA Tier 1 REC	2013	4.78
MA Class II WTE	2012	7.42	PA Tier 1 REC	2014	4.88
MA Class II WTE	2013	7.63	PA Tier 2 REC	2013	0.10
MA Solar	2012	222.50	PA Tier 2 REC	2014	0.15
MA Solar	2013	216.25	RI Existing REC	2012	0.78
MA Solar	2014	200.00	RI NEW REC	2012	63.63
MD Solar	2012	145.00	RI NEW REC	2013	63.63
MD Solar	2013	133.33	TX REC	2012	2.48
MD Tier I	2012	4.69	TX REC	2013	2.61
MD Tier I	2013	4.83	TX REC	2014	2.69

Regional Greenhouse Gas Initiative

CO₂ Allowances

RGGI In Brief

- Northeast and Mid-Atlantic states cap and reduce carbon dioxide emissions from the power sector
- Requires all power plants 25 MW or greater to hold one RGGI allowance for each ton of CO₂ emitted for three year compliance periods
- Quarterly allowance auctions
- Allowance proceeds are re-invested in energy efficiency, the development of low-carbon energy sources, direct bill assistance, and other abatement strategies



RGGI's Market-Based System

- At the end of the first control period, compliance entities and their affiliates held 98 percent of all allowances in circulation
- After four years no evidence of anti-competitive conduct
- 19 quarterly auctions held since September 2008
 - 487,381,050 total allowances sold
 - \$1.2 billion in total proceeds
- First control period allowance auction clearing prices ranged from \$1.86 to \$3.51.
- Second control period allowance auction clearing prices have ranged from \$1.93 to \$2.80.

RGGI: Policy and Economics



- CO₂ emissions capped and reduced 10% by 2018
- Driving long term investments toward cleaner fuel and energy sources
- Average 2009-2011 emissions from RGGI units more than 30 percent lower than 2005 emissions
- 97% of RGGI units successfully met compliance obligations

RGGI 2012 Program Review

Updated Model Rule

- A 45% reduction of the 2014 regional CO₂ budget, or “RGGI cap” from 165 million tons to 91 million tons
- Cap declines 2.5% per year from 2015 through 2020.
- Adjustments each year to account for allowances held privately by market participants
- Cost containment reserve (CCR) of allowances that injects a fixed additional supply of allowances at certain allowance price triggers to ensure a flexible mechanism to mitigate unexpected price spikes.

RGGI 2012 Program Review

Benefit Analyses

- Reduce emissions
 - Reduce projected 2020 power sector CO₂ pollution more than 45 percent below 2005 levels across the RGGI region
 - Reduce cumulative 2020 emissions by approximately 80 - 90 million tons (annual 14-20m), when compared to the current RGGI program
 - Generate income
 - Increase gross state product by approx. \$USD 8.2b
 - Increase real personal income by approximately \$USD 6.8b
 - Add approximately 124,800 job-years
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For more information...



www.psc.state.md.us



www.rggi.org