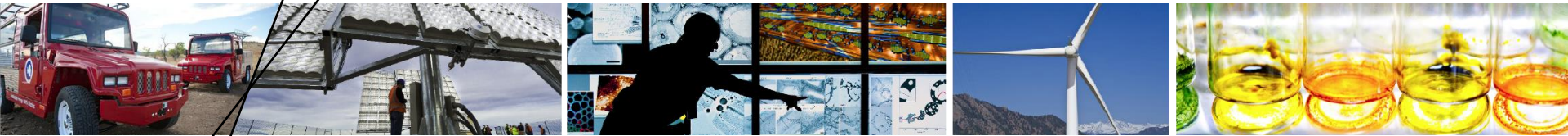


Renewable Energy Tracking and Claims: Experience from the United States



Clean Energy Solutions Center
Webinar

Jenny Heeter

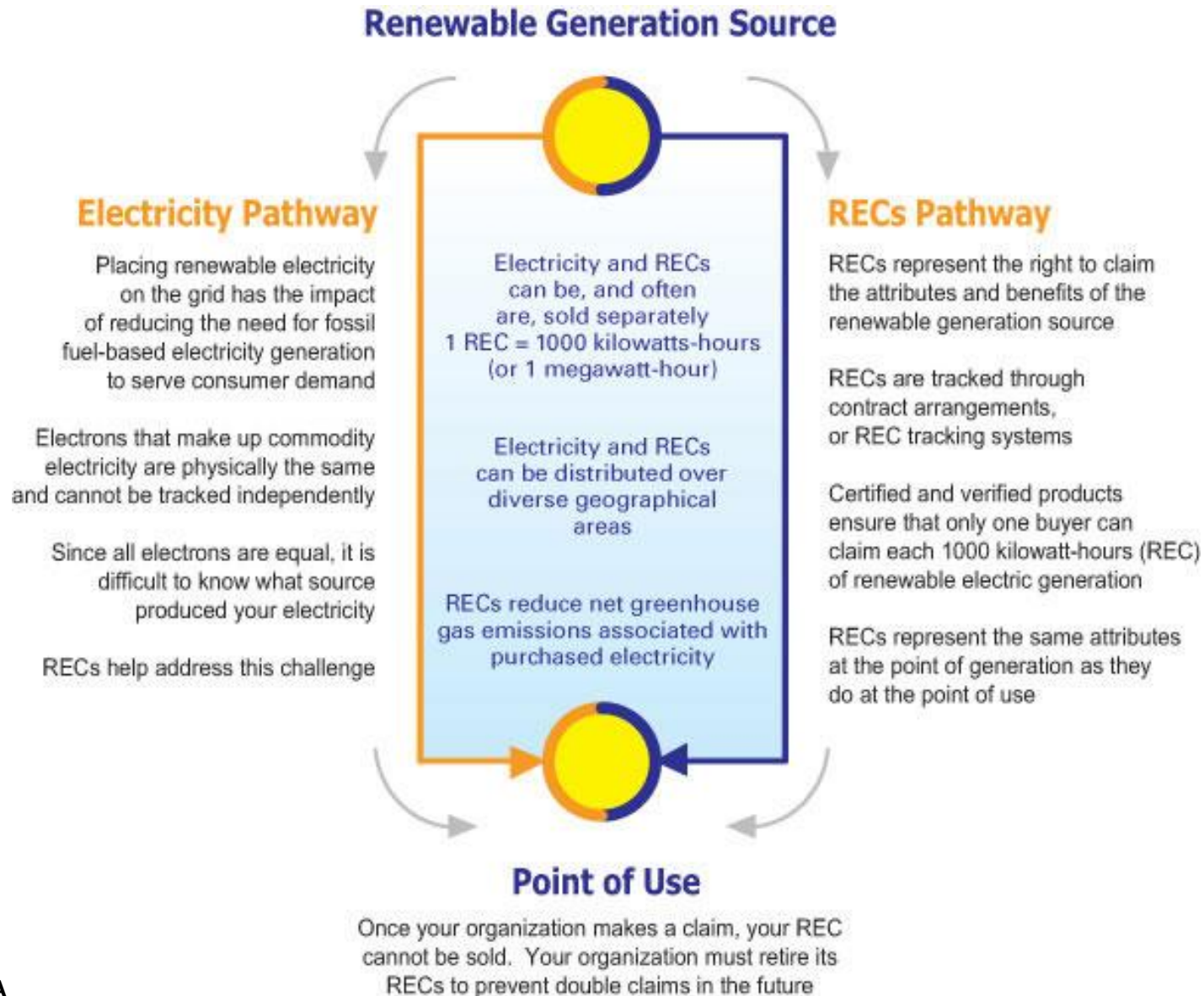
July 8, 2015

Overview

- **Defining RECs and other tracking instruments**
- **Motivations for creating tracking instruments**
- **U.S. market context**
- **Roles of:**
 - Regulators
 - Host sites and purchasers
 - Utilities and generators
- **International perspectives**
- **Q&A**

Definitions and Motivation

What are Renewable Energy Certificates?



Source: US EPA

REC Definitions Provide Clarity

- **REC definitions that explain the treatment of environmental attributes have been developed by Green-e and REC tracking systems.**
 - For the purposes of Green-e Energy, a REC must contain all of the environmental attributes associated with a unit of renewable generation, with the exception of cap and trade pollutants. See the Green-E Energy National Standard: http://www.green-e.org/getcert_re_stan.shtml#standard.
 - North American Renewables Registry (NAR) Whole Certificate: A Whole Certificate is one where none of the Environmental Attributes have been separately sold, given, or otherwise transferred to another party by a deliberate act of the Certificate owner. See the NAR Operating Procedures: <http://narecs.com/resources/index.htm>.

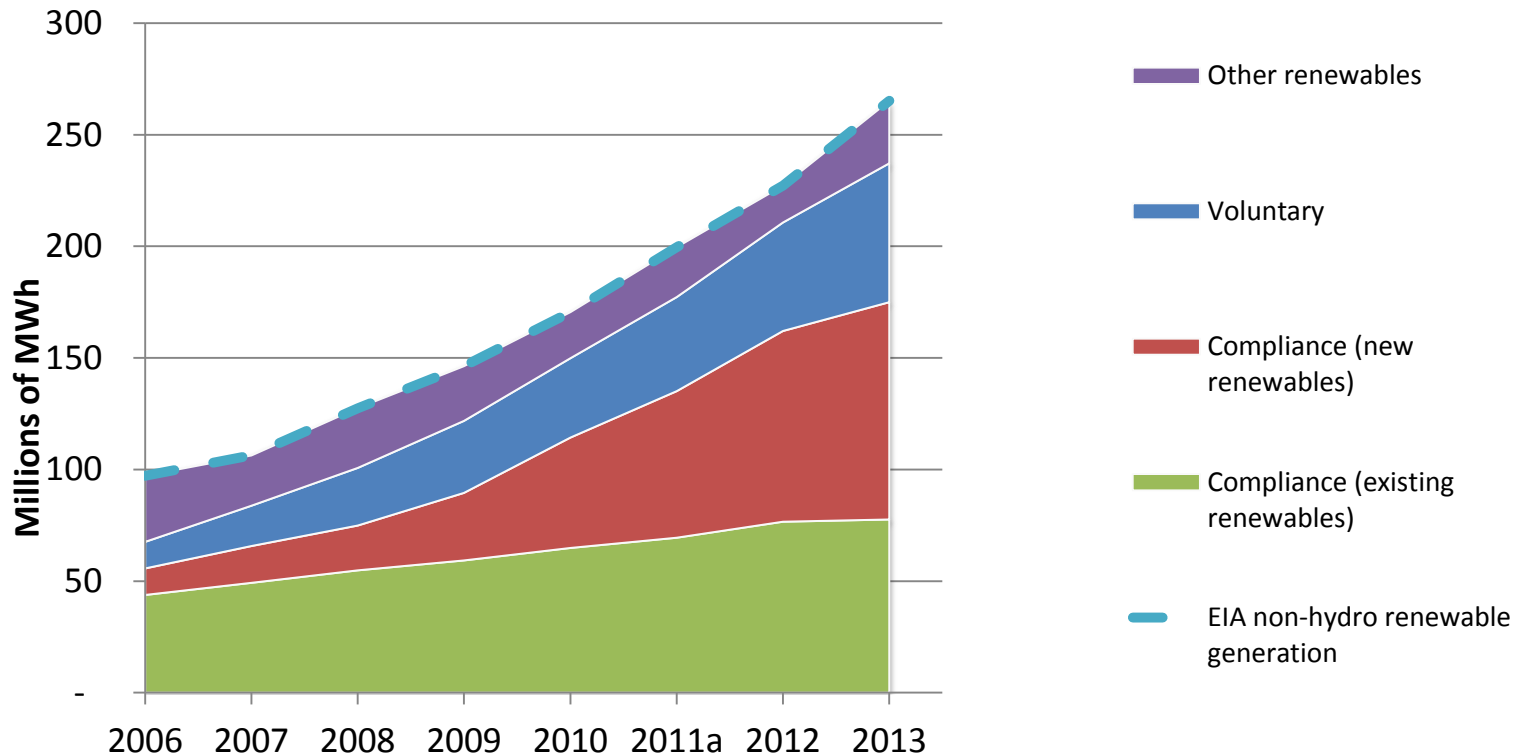
Why do we track renewable electricity?

- **In the U.S., attributes and tracking emerged for two key reasons:**
 - Renewable Portfolio Standard (RPS) compliance
 - Fuel disclosure policies
- **Later, attributes and tracking began being used in the voluntary green power market.**

U.S. Market Characteristics

How Large are Renewable Markets in the U.S.?

This figure is only an estimate as some hydropower is used in compliance and voluntary markets.



a Voluntary sales for 2011 are estimated as the mid-point of 2010 and 2012 sales. Estimates of compliance market demand assume that RPS targets are fully met. Solar generation assumes a 25% capacity factor for CSP and an 18% capacity factor for PV.

Purchasing Options are Expanding; Value Propositions and REC Treatment Vary

Existing and emerging purchasing methods

Utility green pricing

Competitive supplier

Unbundled RECs

On-site renewables

Power purchase agreements

Community choice aggregation

Community solar

Large customer renewable energy tariff

Direct project investment/crowdfunding

Value proposition

- Match all or part of electricity consumption with renewable energy
- Meet corporate sustainability goals

- Provide location for renewable development
- Potentially lower electricity bill
- Meet municipal GHG reduction targets
- Support local solar development
- Potential price hedge

REC treatment

Purchaser keeps RECs

Purchaser does not necessarily keep RECs

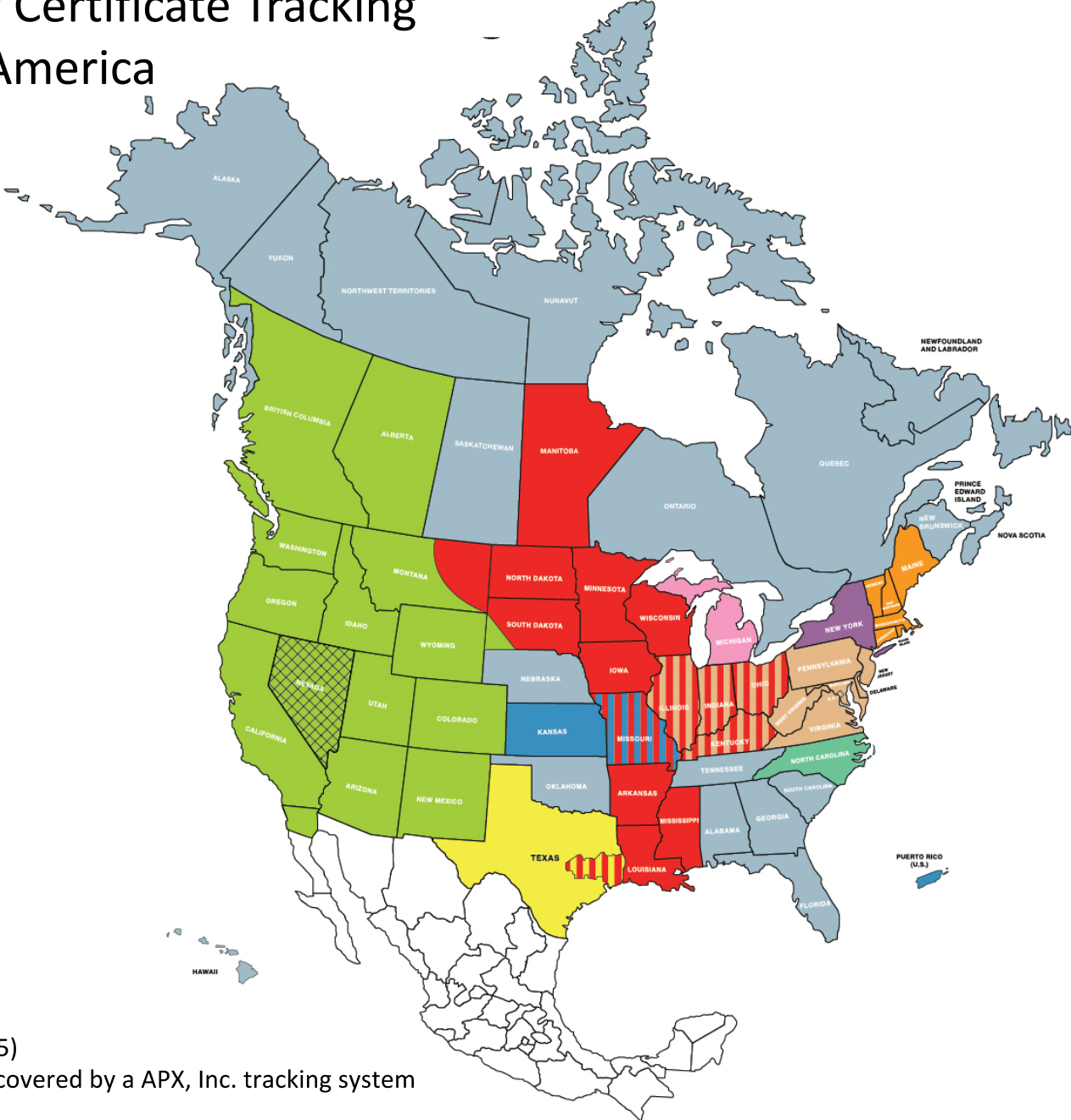
Tracking Systems Overview

What are REC Tracking Systems?

- Renewable energy certificate “REC” tracking systems are electronic tracking systems that ensure that RECs are only “retired” once. “Retirement” of a REC means that the REC has been used by the owner; it can no longer be sold.
- Tracking systems work by assigning a unique serial number to each megawatt-hour of renewable energy generation, which constitutes a REC.
- Tracking systems were originally created to facilitate renewable portfolio standard (RPS) compliance and for product disclosure labels, but increasingly, voluntary RECs are also utilizing REC tracking systems.
- Renewable generator participation in REC tracking systems is fairly high due to state RPS requirements that generators participate in REC tracking systems. So, if a generator wants to sell RECs to meet RPS compliance, it will in most states will be required to use a REC tracking system.

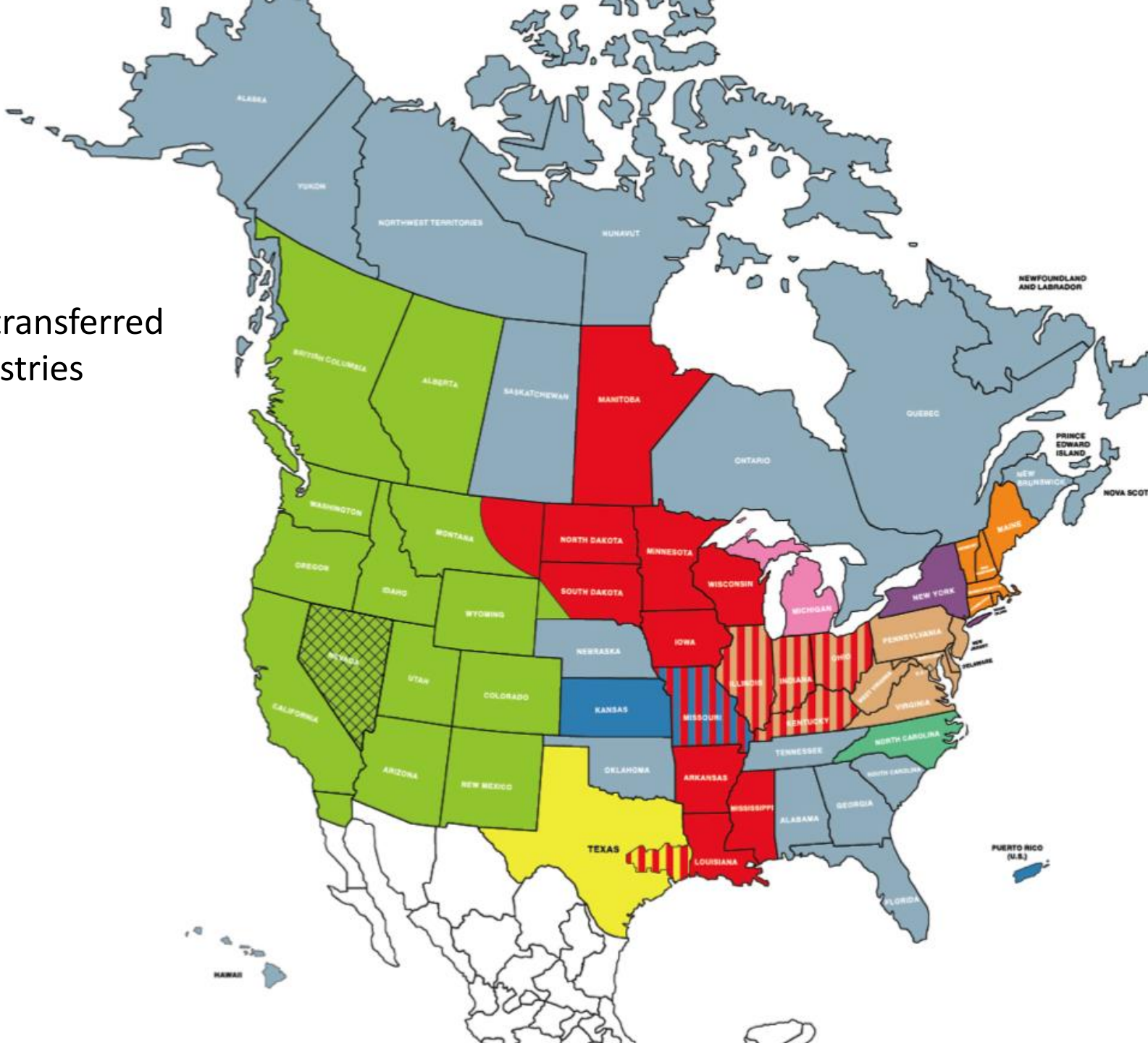
Renewable Energy Certificate Tracking Systems in North America

- ERCOT
- MIRECS
- M-RETS
- NAR
- NC-RETS
- NEPOOL-GIS
- NVTREC
- NYGATS
- PJM-GATS
- WREGIS
- No tracking system



Source: CRS and ETNNA (2015)
 Note: NAR covers states not covered by a APX, Inc. tracking system

RECs can be transferred between registries

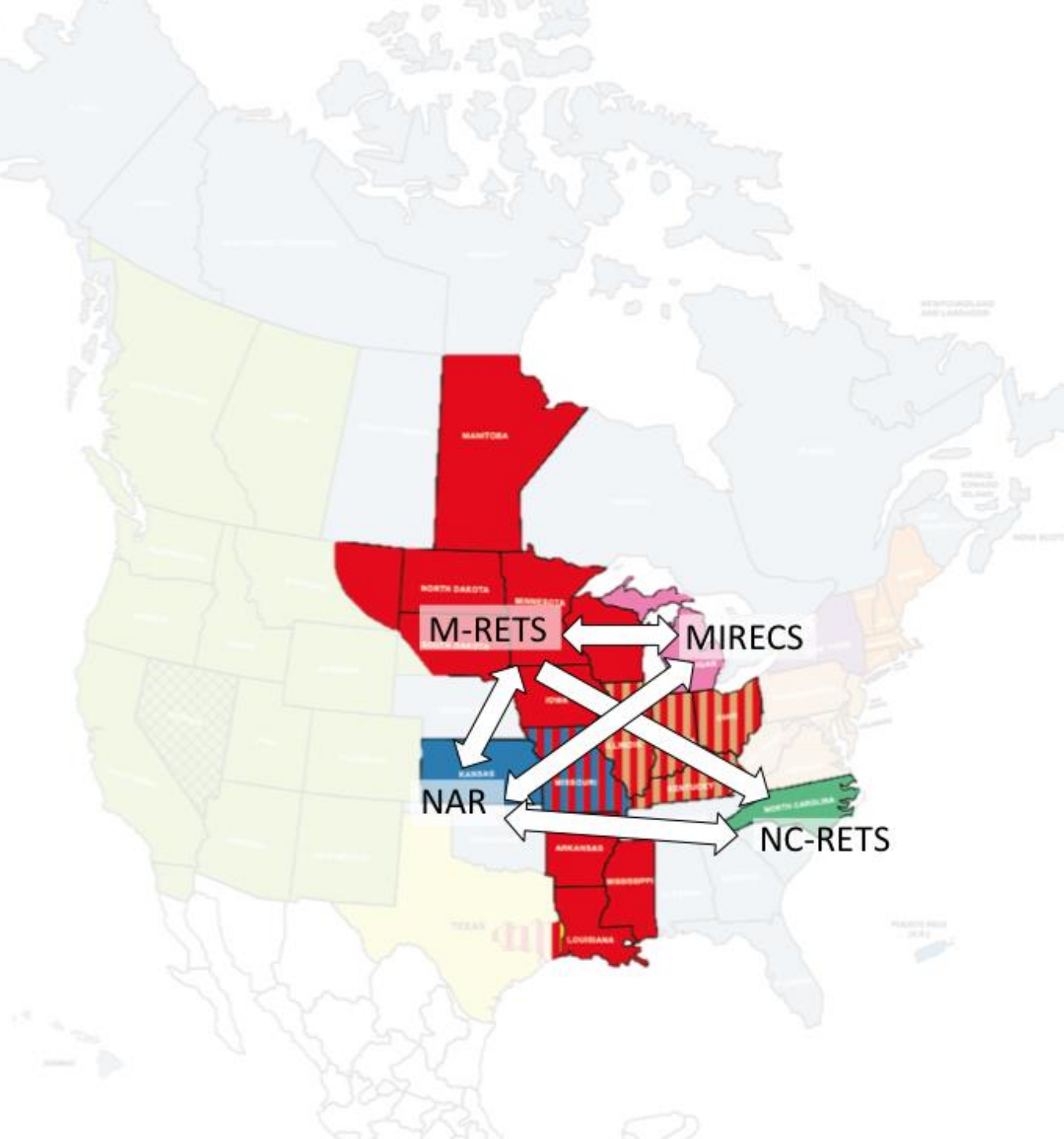


Midwest

RECs can be transferred between:

- M-RETS
- NAR
- MIRECS
- NC-RETS

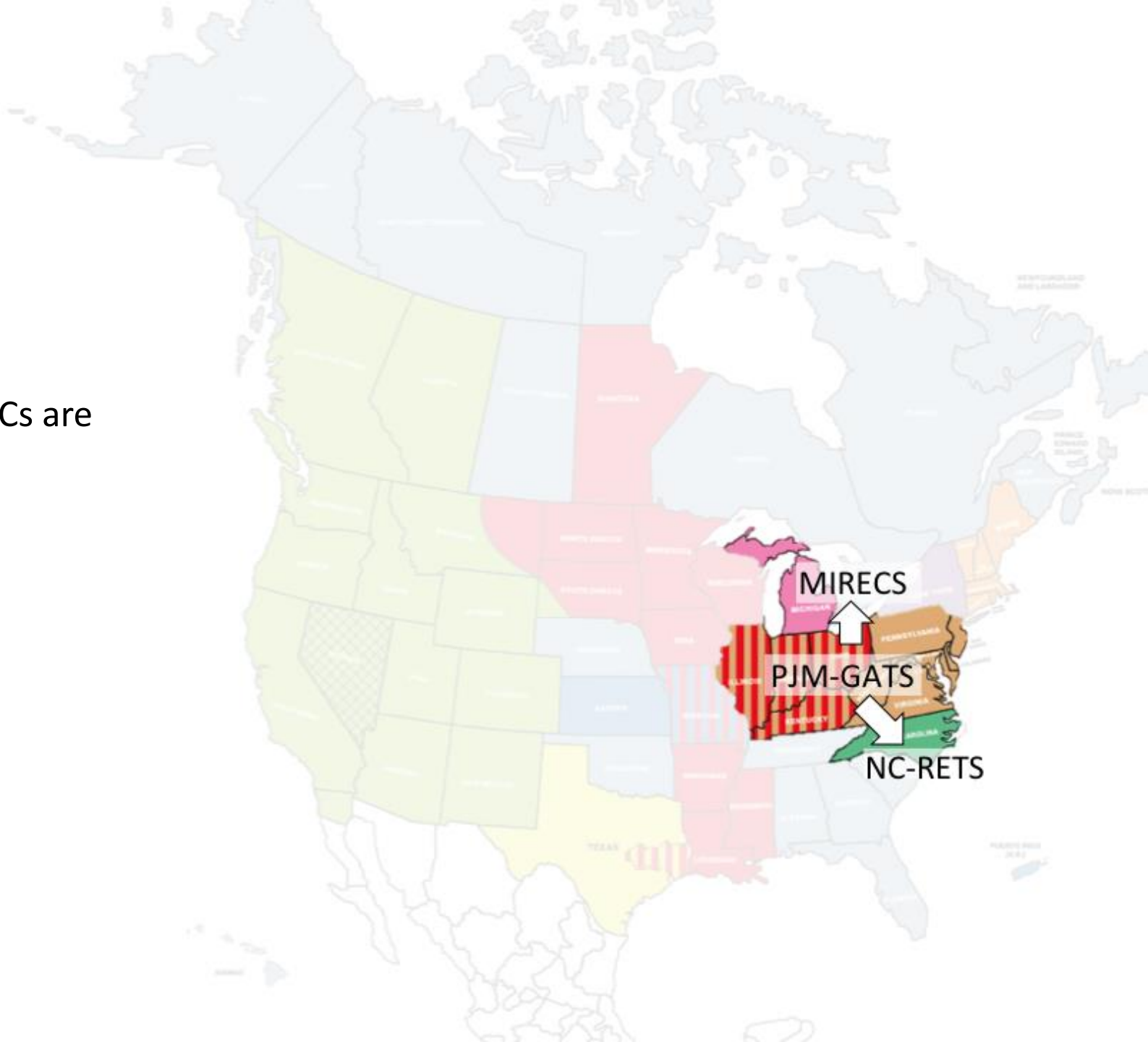
MRETS does not accept NC-RETS.



East

PJM-GATS RECs are accepted by:

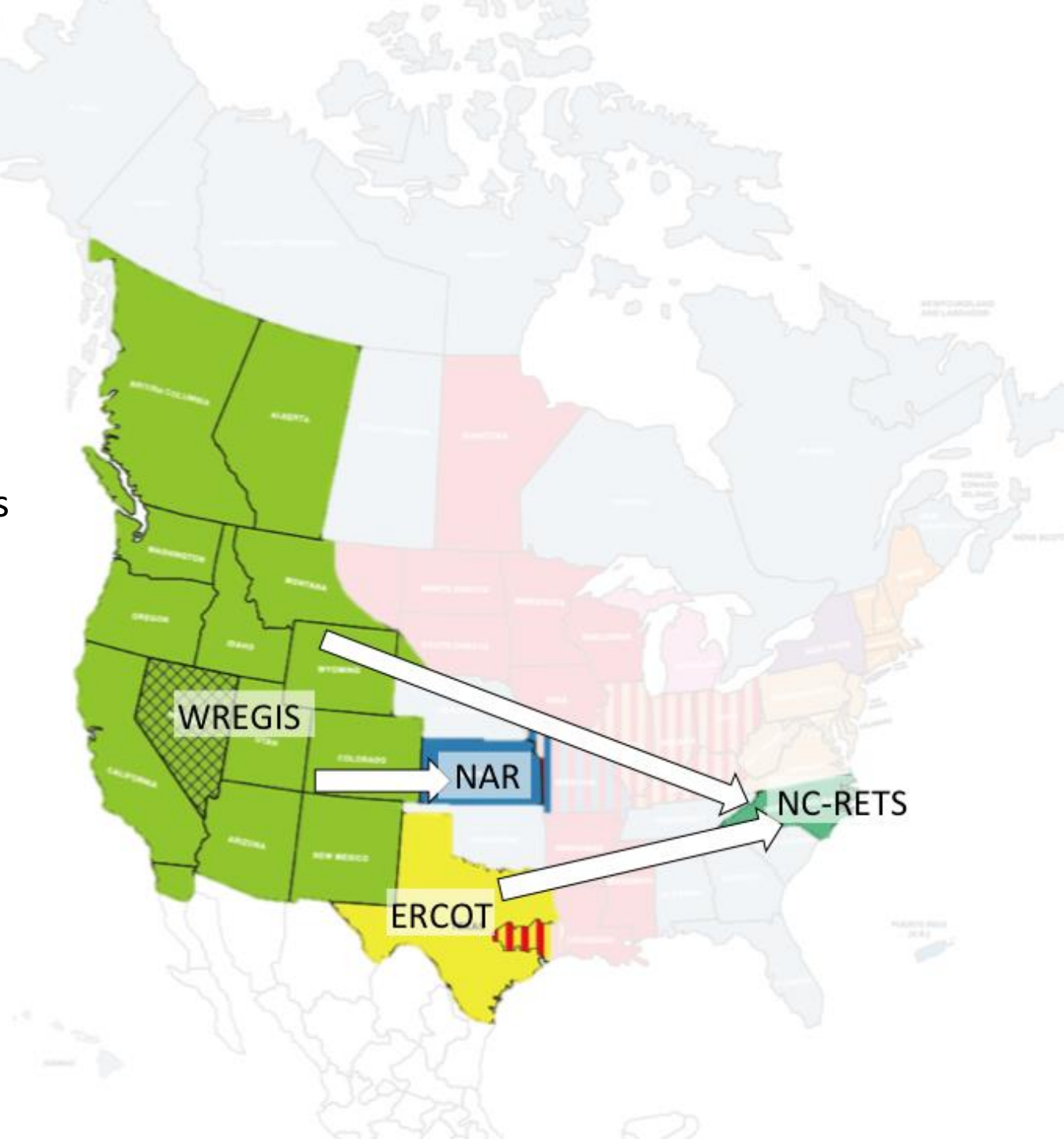
- MIRECS
- NC-RETS



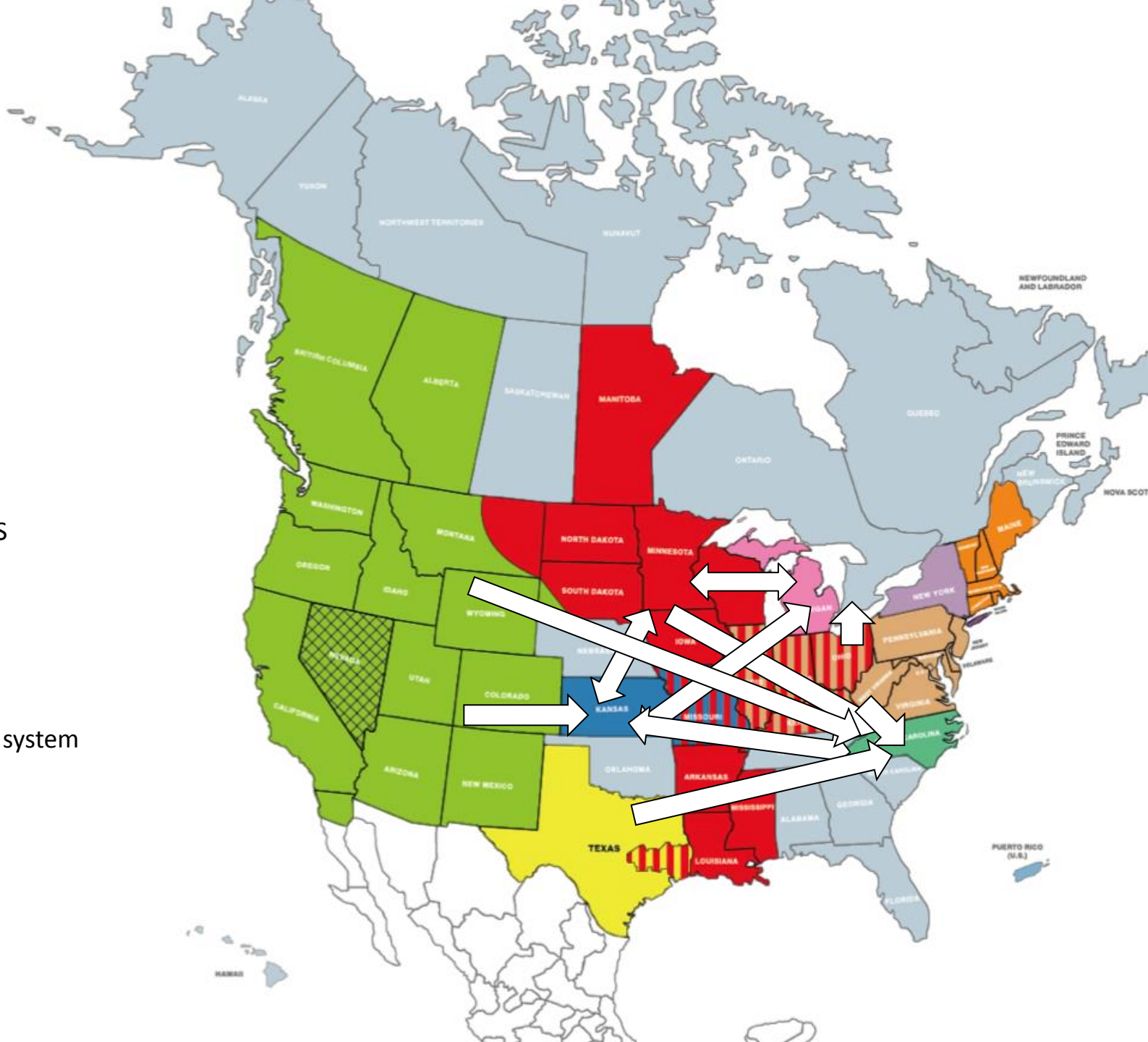
West

NC-RETS accepts
WREGIS and ERCOT RECs

NAR accepts WREGIS
RECs



- ERCOT
- MIRECS
- M-RETS
- NAR
- NC-RETS
- NEPOOL-GIS
- NVTREC
- NYGATS
- PJM-GATS
- WREGIS
- No tracking system



Tracking Systems Simplify Green-e Audit

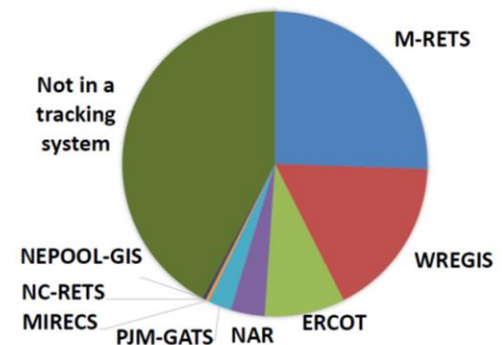
- The Center for Resource Solutions (CRS) administers Green-e programs.
- Participants in the Green-e program are audited annually to substantiate product purchases, sales, and claims. The audit is performed by an independent certified public accountant or certified internal auditor in accordance with a protocol established by Green-e.
- The auditor may utilize retirement reports available through REC tracking systems, which simplifies the audit process since it streamlines chain-of-custody tracking.
- More than 50% of 2012 Green-e Energy certified retail sales used a tracking system.



Green-e

Verified, **Certified**
Renewable Energy
and Greenhouse Gas
Emission Reductions

Use of Tracking Systems (by MWh)
Green-e Energy Certified Retail Sales, RY2012



EPA Green Power Partnership Strongly Encourages Third-Party Certification

- EPA's Green Power Partnership encourages organizations to purchase renewable energy. The GPP has more than 1,400 Partners, ranging from Fortune 500 companies to local, state, and federal governments, to colleges and universities. The GPP has minimum requirements to participate, such as the level of renewable energy purchasing.
- The GPP does *not require* the use of tracking systems or a third-party audit, but "...strongly encourages Partners to buy green power products that are certified by an independent third-party as a matter of best practice."



<http://www.epa.gov/greenpower/buygp/certified.htm>

Double Counting

- Third-party verification can provide assurance that RECs were not double counted and that non-energy benefits are included. Double counting occurs if RECs are used in both the voluntary market and to meet a renewable portfolio standard (RPS), or by two parties in the voluntary market.
- Double counting is a concern because if two parties each claim to be using the same renewable energy represented by a REC it undermines the credibility of RECs as a certification of renewable energy use – just as two people owning the exact same stock certificate would undermine the credibility of stocks as a certification that the bearer owns a share of a company.
- Tracking systems, through their governing documents, help address double counting by ensuring that RECs are not double counted within the REC tracking systems.

U.S. Tracking Systems

Fees and Funding Mechanisms

Funding Mechanisms Differ

- REC tracking systems have different ways to recover their operational costs.
- Account holders and generators may pay fees, depending on the REC tracking system.
- However, some tracking systems are set up so that generators and/or purchasers pay nothing; fees are paid by utilities to cover the costs (see following two slides for details).

Fees for Account Holders and Retirements

Tracking System	Annual fee for account holders	Fees for REC retirement
WREGIS	\$1,500	\$0.005/REC to issue or transfer, \$0.01/REC to retire, reserve, or export voluntary REC
M-RETS	General account (\$2000 annually), Retail Purchaser account (\$1000 annually)	\$0.005/REC to issue, \$0.015/REC to retire
NAR	Project account (\$250 one-time registration), general account (\$750 one-time registration, \$2,000 annual subscription), retail purchaser account (\$1,000 annual subscription)	\$0.05/REC to issue \$0.01/REC to transfer \$0.10/REC to retire \$0.05/REC to export
MIRECS	Project account (\$250 one-time registration), general account (\$750 one-time registration, \$3,000 annual subscription), retail purchaser account (\$1,000 annual subscription), Non-profit wholesale power provider account (\$500 one-time registration, \$1000 annual subscription), additional fees for electric service providers.	None
NC-RETS	Fees paid by electric power suppliers based on retail sales	\$0.01/REC to export \$0.01/REC to retire voluntary REC
ERCOT	No fees	None
NEPOOL-GIS	Fees paid by electric power suppliers based on retail sales	None
PJM-GATS	Fees paid by electric power suppliers based on retail sales	\$0.01/REC to retire voluntary REC \$0.10/REC to retire for RPS compliance

WREGIS Fee Matrix and Definitions, under Join WREGIS: <http://www.wecc.biz/WREGIS/Documents/Forms/AllItems.aspx>

M-RETS <http://m-rets.org/resources/TOU-Appx-A-edited-for-2013-fee-reduction.pdf>

NAR: http://narecs.com/resources/downloads/NAR-Fee-Schedule_October2012.pdf

MIRECS: <http://www.mirecs.org/resources/MIRECS-Fee-Schedule.pdf>

NC-RETS: <http://www.ncrets.org/resources/downloads/NCRETS-Fee-Schedule.pdf>

PJM-GATS: <http://pjm-eis.com/~media/pjm-eis/documents/appendix-a-gats-fees.ashx>

Fees for Generating Units Vary

Tracking System	Fees for generating units
WREGIS	\$200 (Micro), \$250 (Small), \$850 (Medium), \$1,500 (Large)
M-RETS	Micro-generator project account (\$100 annually), Small generator project account (\$250 annually), Project account (\$500 annually)
NAR	\$50 annually (Micro - <40kW), \$500 annually and \$250 one-time registration (Small – 40kW-<1MW), \$1000 annually and \$500 one-time registration (Medium – 1 MW-<10MW), \$2,000 annually and \$1,000 one-time registration (Large - ≥10 MW)
MIRECS	\$100 annually and \$50 registration (Micro - <40kW), \$250 annually and \$100 one-time registration (Small – 40kW-<1MW), \$750 annually and \$350 one-time registration (Medium – 1 MW-<10MW), \$1500 annually and \$750 one-time registration (Large - ≥10 MW)
NC-RETS	None
ERCOT	None
NEPOOL-GIS	None
PJM-GATS	Annual fees: \$1,000 large brokers/traders/RE generators (>10MW); no fee for residential homeowners and aggregators with nameplate <10MW)

U.S. Tracking Systems

Generator Sizes and Resource Types

Generator Size or Type Restrictions

- **There are no restrictions on the size of generators eligible to participate in a REC tracking system.**
- **Third-party “aggregators” can handle REC tracking system registration and data inputs for multiple small renewables systems**
- **If a renewable electricity technology is not currently being tracked, it can easily be added to a REC tracking system.**

Use of Thermal RECs

- **Some state renewable portfolio standards (RPSs) allow for the use of thermal resources.**
- **Standards for measuring thermal output are in development. Once the thermal output is measured, it can be converted to an electric (MWh) equivalent.**
- **REC tracking systems are beginning to include thermal RECs. For example, PJM-GATS tracks solar thermal RECs used in Maryland and New Hampshire is developing a thermal REC program.**
 - In Maryland, solar thermal systems must be certified by the SRCC OG-300 reporting protocol or have an International Organization of Metrology compliant meter. For more information, see http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=MD55F.
 - New Hampshire legislation (SB 218) created a new renewable energy Class I subclass for thermal renewable energy under the New Hampshire RPS and the NH PUC is currently developing rules for accepting thermal RECs used to comply with the new subclass requirement. For more information see <http://www.puc.state.nh.us/sustainable%20Energy/Class%20I%20Thermal%20Renewable%20Energy.html>.

Stakeholder Roles Regarding RECs and Tracking Systems

Regulator Role

- **Simplify compliance**
 - Have tracking system built or require participation in existing system
- **Create publically available, market information**
 - Help renewable industry understand current market dynamics
 - Credit pricing, trading volumes, retirement numbers

Considerations in Reporting REC Data

- Reporting of RECs issued and retired
- Frequency – monthly, quarterly, annual
- Reporting by RE fuel type – e.g., wind, solar, bio, hydro
- Eligibility to meet RPS or other standards
- Geographic region – retirements by state or region
- REC Use – retirement for RPS or voluntary purposes
- Reporting by company/organization retiring credits (ERCOT) or facility ownership type (MRETS)
- Clarity of data reported and availability of supporting documentation, definitions

Snapshot: Public Reports in PJM-EIS

PJM EIS Home > Reports & News > Public Reports

Public Reports

Market Reports

- Aggregator Listing
- Broker Listing
- GATS Generators
- Renewable Generators Registered in GATS
- Solar Weighted Average Price
- Bulletin Board
- Buyer's Bulletin Board
- RPS Retired Certificates (Reporting Year)
- RPS Eligible Certificates by Status (Reporting Year)
- Voluntary Market Retirement

GATS Certificates Statistics

- Monthly
- Annual
- Reporting Year

Reserved Certificate Transfers

- Monthly
- Annual

PJM System Mix

- PJM System Mix
- PJM Residual Mix
- Import System Mix



Generation Attribute Tracking System

All In-State Out Of State

DC - RPS Retired Certificates for Reporting Year 2014

Report includes all data up to 7/7/2015 12:22:53 AM

Parameters

State: Compliance Period:

Results

Note: Click on a heading label to sort the data.

Program	Fuel Type	State	DC Solar	DC Tier I	DC Tier II
DC Solar	STH	DC	2,284	0	0
DC Solar	STH	DE	4	0	0
DC Solar	STH	KY	4	0	0
DC Solar	STH	MD	49	0	0
DC Solar	STH	NC	269	0	0
DC Solar	STH	NY	4	0	0
DC Solar	STH	OH	14	0	0
DC Solar	STH	PA	56	0	0
DC Solar	STH	VA	462	0	0
DC Solar	STH	WV	26	0	0
DC Solar	SUN	DC	10,899	0	0
DC Solar	SUN	DE	2,019	0	0
DC Solar	SUN	IL	540	0	0
DC Solar	SUN	IN	200	0	0

<http://www.pjm-eis.com/reports-and-news/public-reports.aspx>

Generator and Utility Roles

Generators:

- **Register in the tracking system**
- **Ensure contracts provide clear language on attribute ownership**

Utilities:

- **Purchase attributes to ensure compliance with renewable mandates**
- **Ensure attributes are “retired” in a tracking system, if the use of a tracking system is required**

Host and Purchaser Roles

- **Evaluate trade-offs to attribute ownership**
- **Ensure accurate claims**
 - Organizations selling off the attributes cannot claim that they are getting their electricity from renewable energy and they need to avoid making false claims.

International Perspectives

- **E.U.: Guarantees of Origin**
- **Australia: RECs**
- **India: Renewable Purchase Obligations**
- **Mexico: Clean Energy Certificates (in development)**
- **Global: I-REC standard and tracking**

International REC (I-REC) Standard

- List of rules, regulations, and best practices to be used by attribute tracking systems
- Operational attribute tracking system that can be customized for individual countries
- Used by generators in Spain, Turkey, and Taiwan



THE INTERNATIONAL
REC STANDARD

Resources

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

The Green Power Network

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Find green power options in your state.

Lead Story

Alameda Municipal Power Offers New 100% Renewable Energy Option

Alameda Municipal Power (AMP) of California has announced a new voluntary program offering its customers the option to purchase 100% renewable energy. On behalf of program participants, AMP will purchase Green-e Energy certified renewable energy certificates ... [See full story](#)

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Hot Off the Press

- [Made with Renewable Energy: How to Identify Green Consumer Products](#)
- [Solar Renewable Energy Certificate \(SREC\) Markets: Status and Trends](#)
- [Status and Trends in U.S. Compliance and Voluntary Renewable Energy Certificate Markets \(2010 Data\)](#)
- [Role of Renewable Energy Certificates in Developing New Renewable Energy Projects](#)
- [Consumer Attitudes About Renewable Energy](#)
- [Voluntary Green Power Market Forecast through 2015](#)
- [Guide to Purchasing Green Power: Renewable Electricity, Renewable Energy Certificates, and On-Site Renewable Generation](#)

News

- [Walmart Introduces Industrial Wind Turbine at Distribution Center in California](#)
August 2012
- [US Army Announces \\$7 Billion Request for Proposal to Purchase Renewable Energy for Up to 30 Years](#)
August 2012
- [BMW and Green Mountain Energy Offer RECs for Electric Vehicles](#)

Renewable Energy Certificates

Environmental attributes sold separately from electricity.

On-site Renewable Energy Systems

Green Power Topics

- [Community Renewable Energy Development](#)
- [Consumer Protection](#)
- [Green Power Policies](#)
- [REC Prices](#)
- [REC Tracking Systems](#)
- [Greenhouse Gas Offsets](#)

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Top Ten Utility Green Power Programs

The annual ranking of leading utility green power programs.

Renewable Energy Markets Conference

2012 WASHINGTON, D.C.
Register Today
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Washington

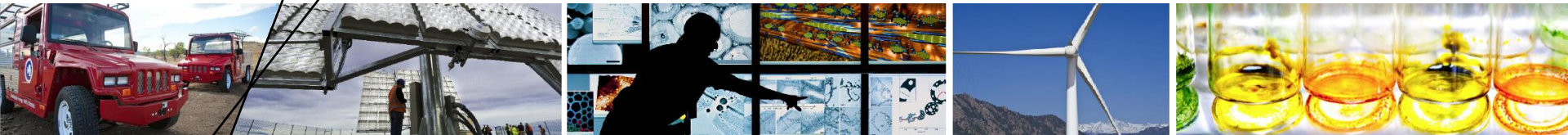
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Additional Resources

- What is a Renewable Energy Certificate? Video by Center for Resource Solutions:
<https://www.youtube.com/watch?v=opJMrzNauFQ&feature=youtu.be>.
- Heeter, J., Belyeu, K, and Kuskova-Burns, K. *Status and Trends in the U.S. Voluntary Green Power Market (2013 Data)*, 2014. <http://www.nrel.gov/docs/fy15osti/63052.pdf>
- Heeter, J. *Renewable Energy Certificate (REC) Tracking Systems: Costs & Verification Issues (Presentation)*. NREL (National Renewable Energy Laboratory), 2013. <http://www.nrel.gov/docs/fy14osti/60640.pdf>
- Federal-State RPS Collaborative reports and webinars: <http://www.cesa.org/projects/state-federal-rps-collaborative/>



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