VOLUNTARY RENEWABLE ENERGY MARKETS 101

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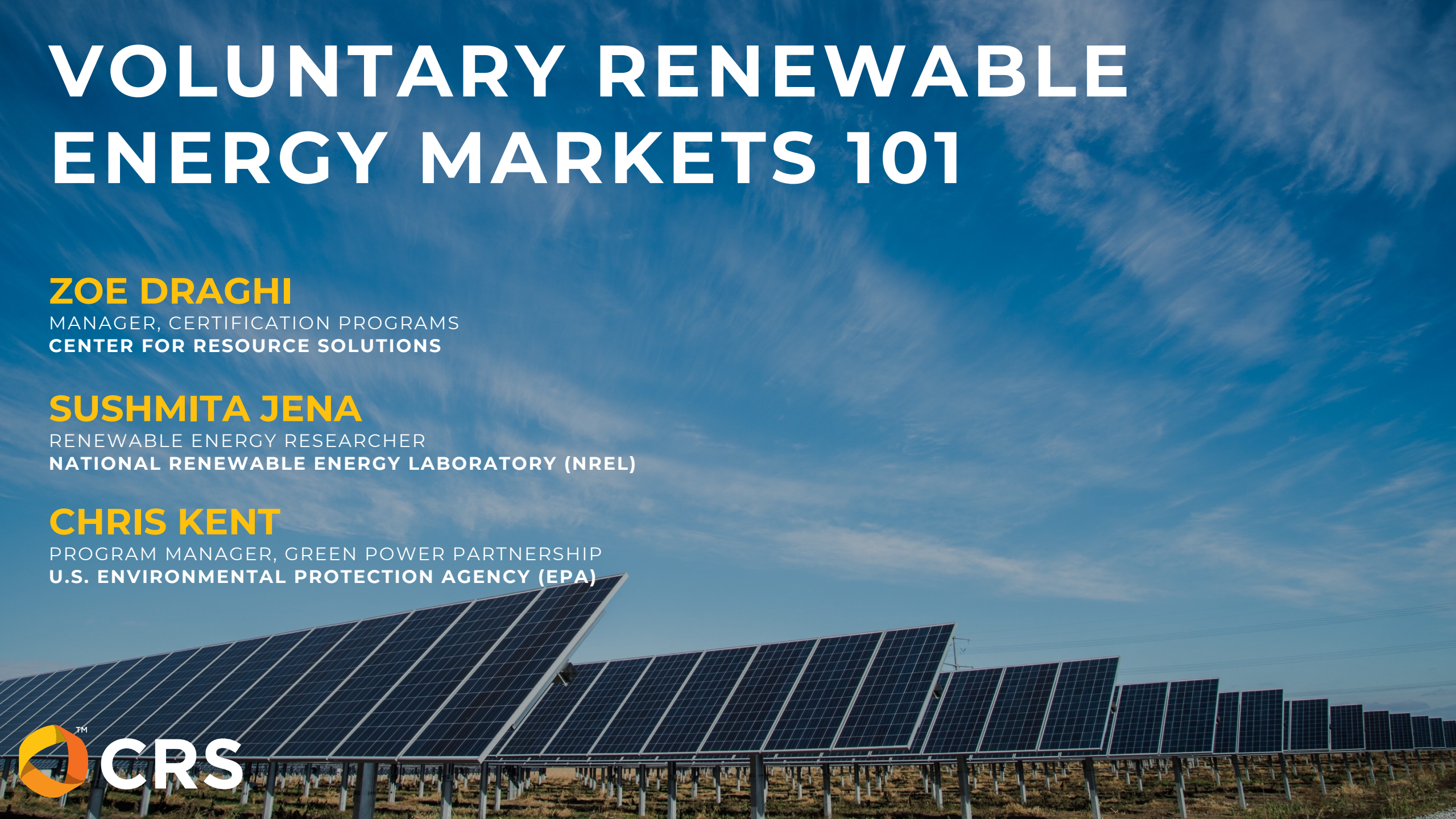


CRS™

About Center for Resource Solutions

Nongovernmental Organization (NGO) creating policy and market solutions to advance sustainable energy since 1997.

- Expert assistance resource for corporate buyers
- Renewable energy and climate policy
  - Clean Energy Accounting Project (CEAP)
- Renewable Energy Markets annual conference
- Green-e® certification for suppliers and users of renewable energy, carbon offsets and biomethane in the voluntary market

The Basics.

Renewable Resource Types

- Solar
- Wind
- Geothermal
- Biomass
- Hydroelectric

Capacity (MW) vs. Output (MWh)

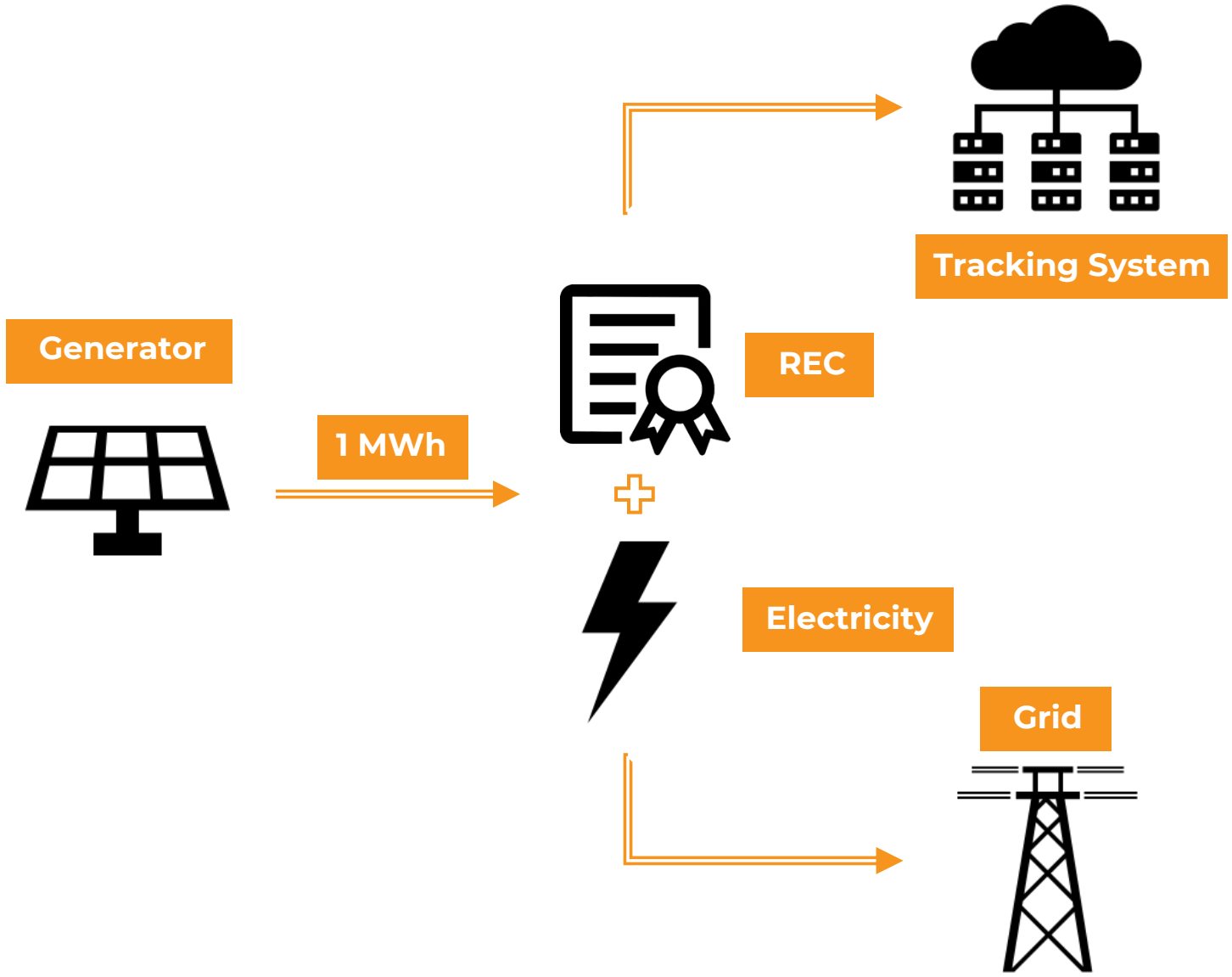
Measuring Energy

1 Megawatt hour = 1000 Kilowatt hours

Graphic Source: Climate Council
https://www.climatecouncil.org.au/resources/the-difference-between-installed-capacity-mw-and-energy-generation-mwh/

Renewable Energy Certificates (RECs)

1 REC represents the renewable attributes of 1 MWh of renewable energy generation

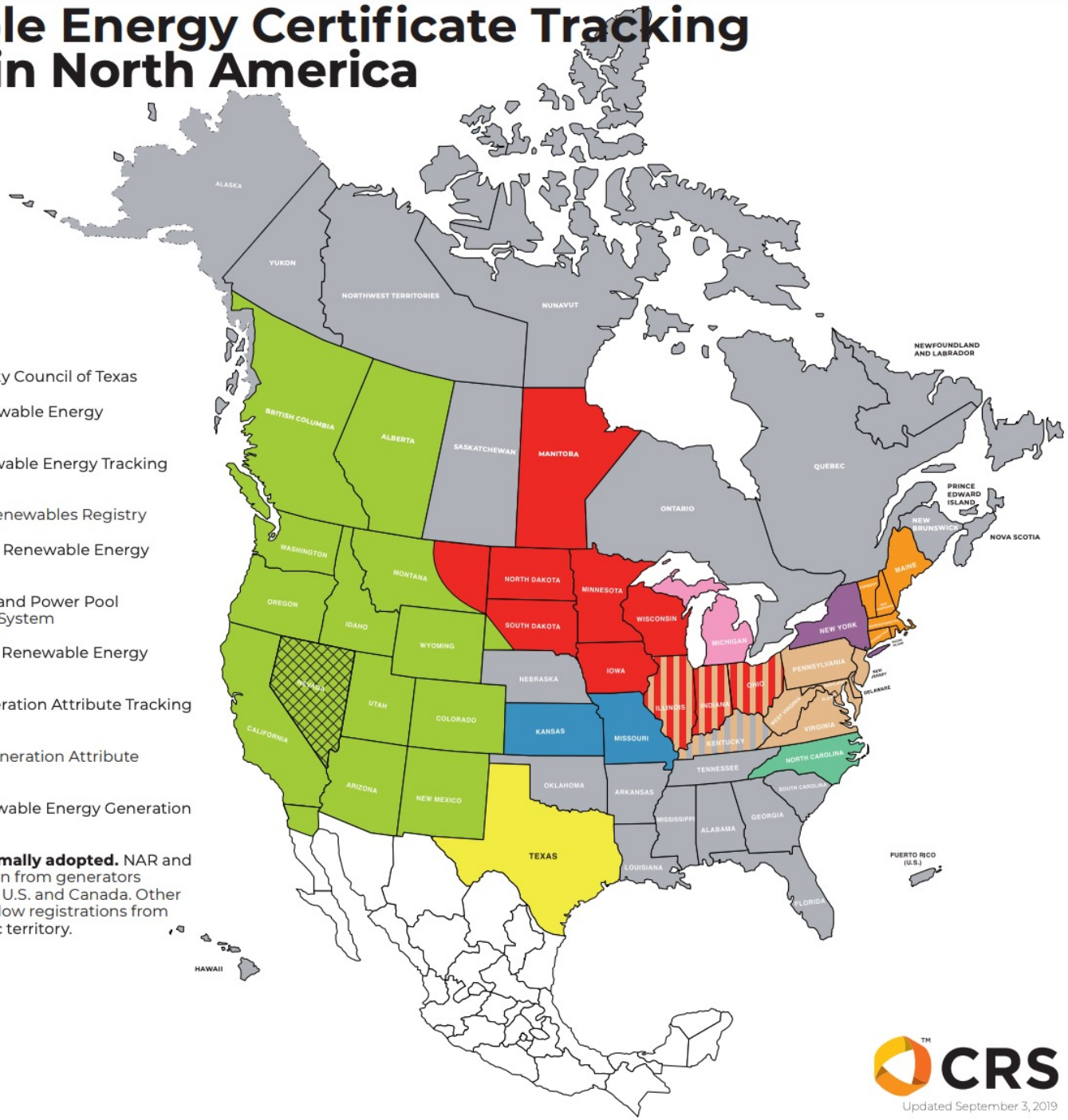


RECs

are needed to:

1. Allocate and claim use of renewable generation on a shared grid
   - For both the voluntary and regulatory market
2. Avoid double counting and double claiming
3. Create a national market for renewable energy

Renewable Energy Certificate Tracking Systems in North America



KEY

- **ERCOT**: Electric Reliability Council of Texas
- **MIRECS**: Michigan Renewable Energy Certification System
- **M-RETS**: Midwest Renewable Energy Tracking System
- **NAR**: North American Renewables Registry
- **NC-RETS**:North Carolina Renewable Energy Tracking System
- **NEPOOL-GIS**: New England Power Pool Generation Information System
- **NVTREC**: Nevada Tracks Renewable Energy Credits
- **NYGATS**: New York Generation Attribute Tracking System
- **PJM-GATS**: PJM EIS's Generation Attribute Tracking System
- **WREGIS**: Western Renewable Energy Generation Information System
- **No tracking system formally adopted.** NAR and M-RETS allow registration from generators located anywhere in the U.S. and Canada. Other tracking systems may allow registrations from outside their geographic territory.

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Updated September 3, 2019

Attribute Tracking

- Databases used to track, trade, and "retire" RECs
- Claims are substantiated with retired RECs
- Used for both voluntary and compliance markets

All renewable energy procurement methods involve RECs

Self Generation

(Lease and Own Generation)

- Onsite self-generation or lease
- Offsite self-generation or lease

Direct Purchasing

(Purchase from a Generator)

- Onsite PPA
- Offsite physical PPA
- Virtual PPA
- Direct attribute-only purchase

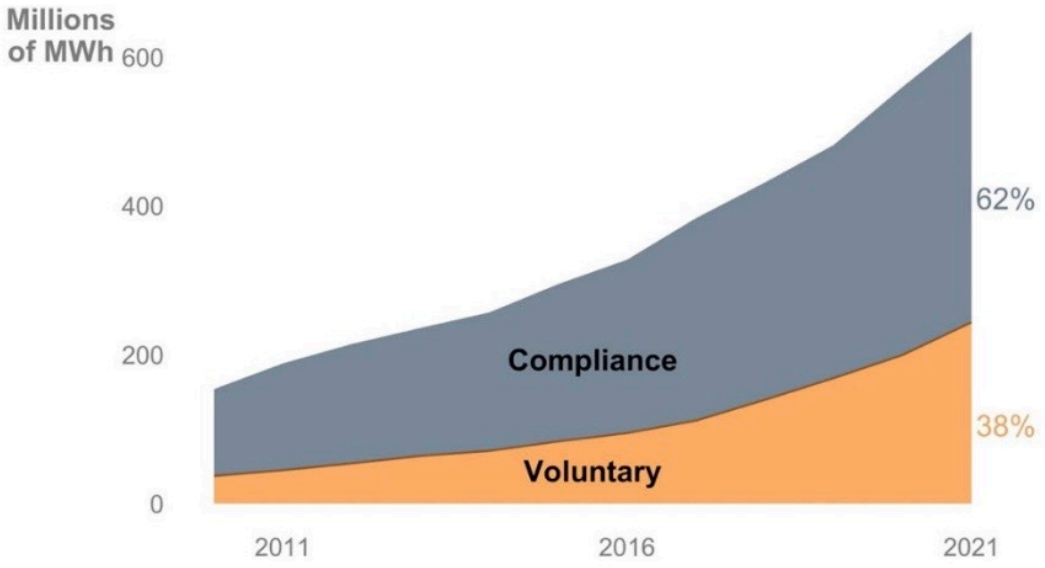
Retail Purchasing

(Purchase from a Supplier or Utility)

- Utility green pricing
- Competitive green power
- Community renewables
- Direct access tariff
- Unbundled certificates

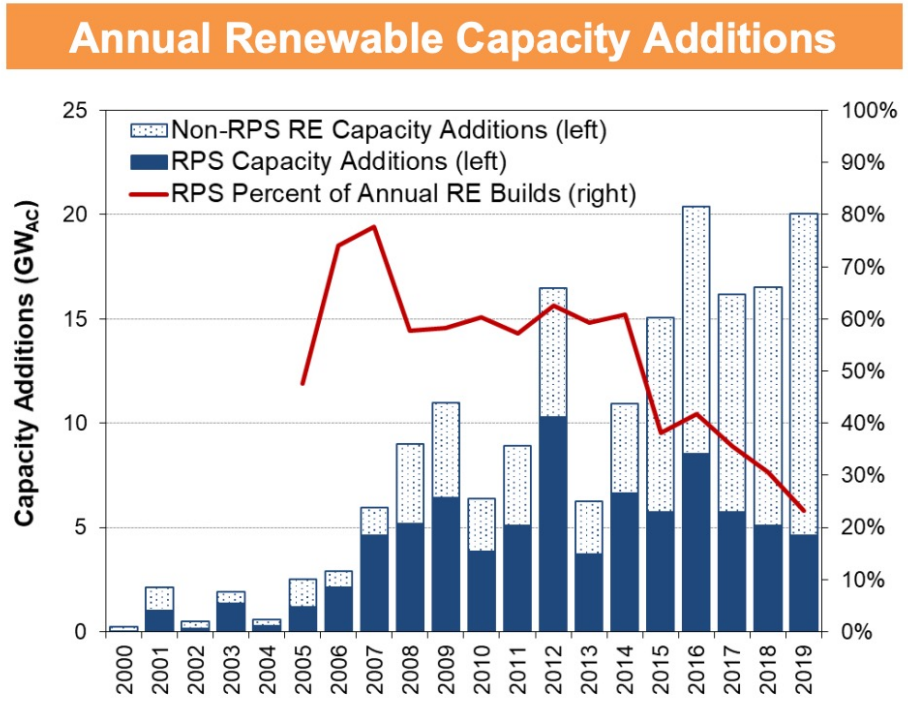
U.S. Voluntary Renewable Energy Market

Renewable energy sales in voluntary, compliance, and other markets, 2011–2021



Source: National Renewable Energy Laboratory
https://www.nrel.gov/docs/fy23osti/86162.pdf

Renewable Capacity Additions, 2000–2019



Source: Lawrence Berkeley National Laboratory
https://eta-publications.lbl.gov/sites/default/files/rps_status_update-2021_early_release.pdf

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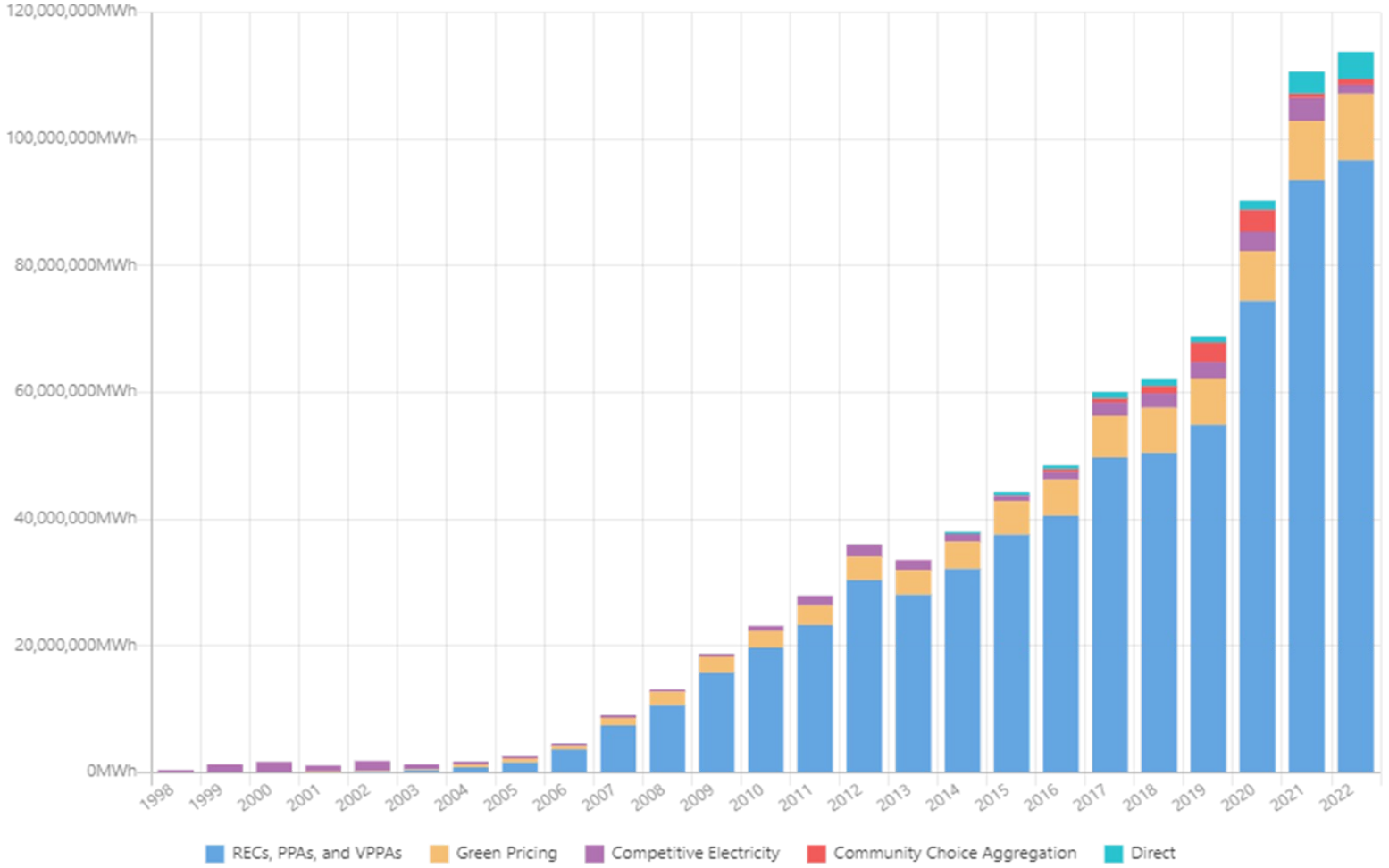
Green-e® Certification

Green-e® Certified Renewable Energy

Green-e® Energy Certified Retail Sales by Product Type (MWh)



Full Verification Report Data: www.resource-solutions.org/g2021/

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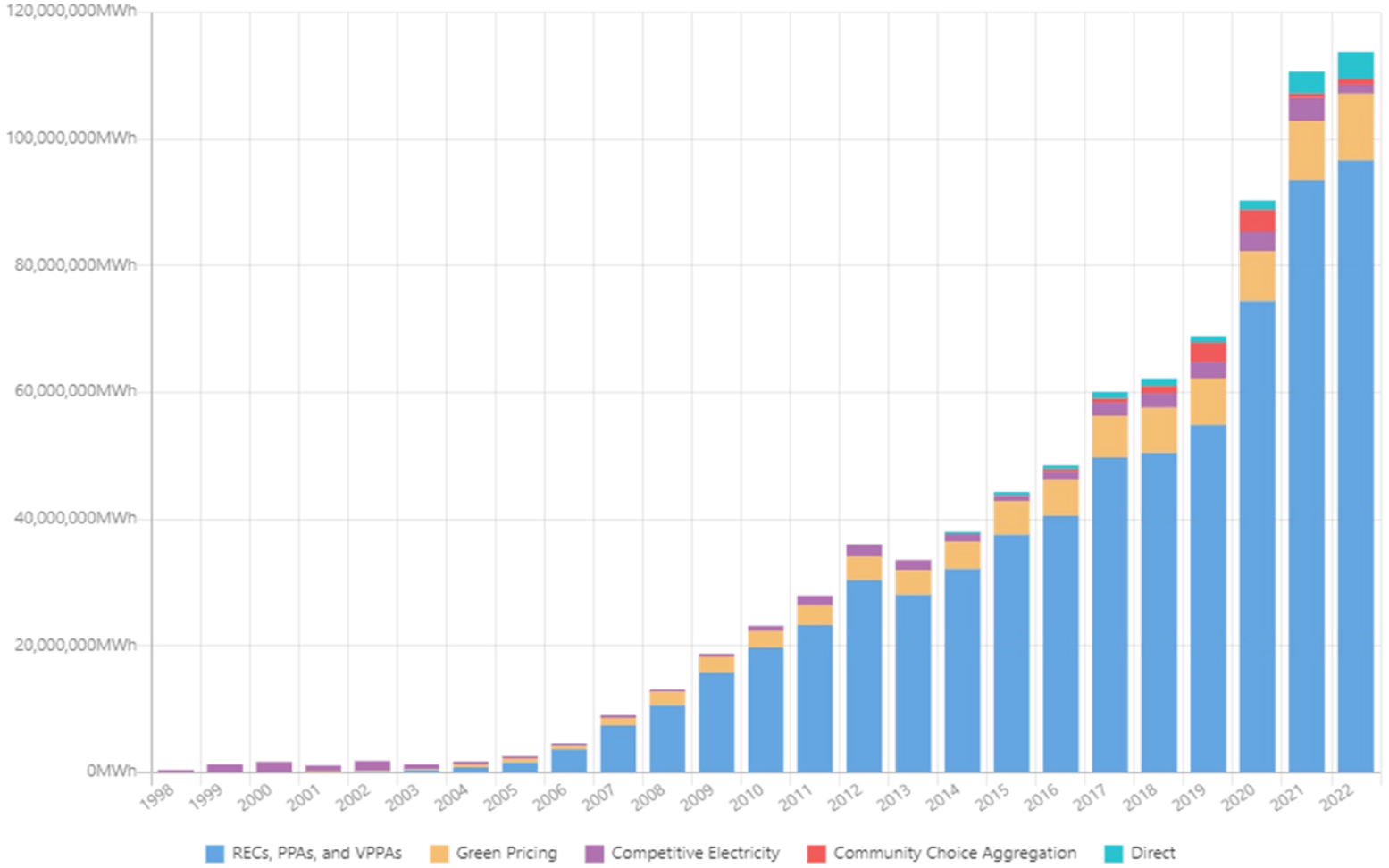
Buyer protections for voluntary renewable electricity purchases

- Green-e® Energy Standard and Code of Conduct
- Independent Governance Board
- From newer generators meeting environmental requirements
- Third-party Audit of:
  - REC retirements
  - Seller disclosures

Green-e®

Green-e® Certified Renewable Energy

Green-e® Energy Certified Retail Sales by Product Type (MWh)



Full Verification Report Data: www.resource-solutions.org/g2021/

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Buyer protections for voluntary renewable electricity purchases

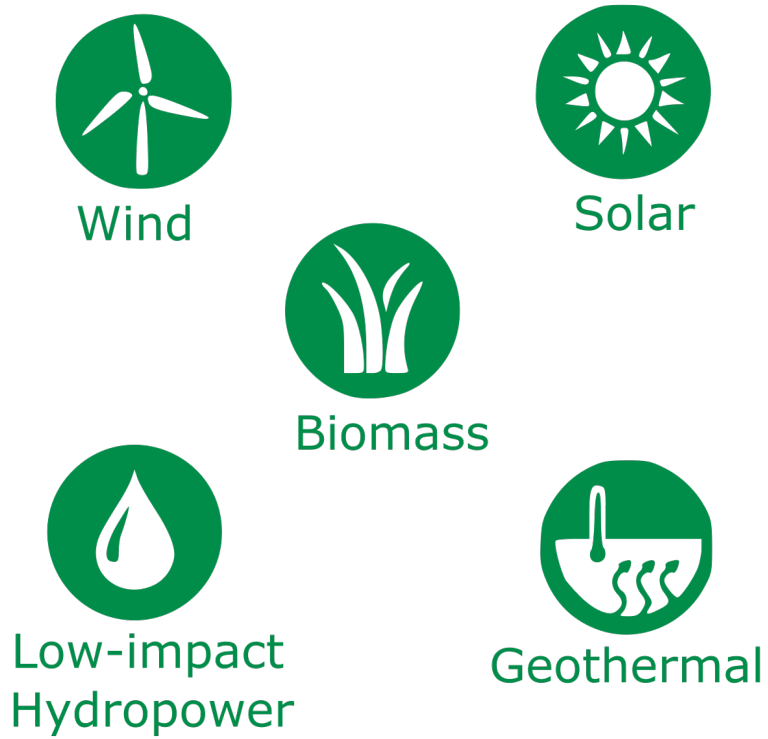
By the Numbers

- Nearly **114 million** MWh
- **1.3 million** retail purchasers, of those, more than 300,000 were businesses
- New renewables

Green-e®

Supply Must Meet the Green-e® Standard

- 15-year “New Date”
- Must be surplus to regulation
- No double counting, selling or claiming
- GHG reduction benefits must be included
- State-specific requirements and restrictions
- Vintage requirements



Q&A

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NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Voluntary Renewable Energy Markets 101 Workshop

Sushmita Jena
National Renewable Energy Laboratory
18 September 2023

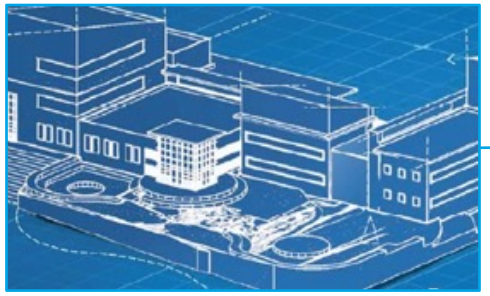
Renewable Energy Markets Conference 2023
Washington DC

NREL Brings Distinct Capabilities

Foundational Science | Accelerated Technology Scale-Up | Systems | Markets

Bench-scale- discovery | Scaling R&D and Process Engineering | R&D with Industry Partners

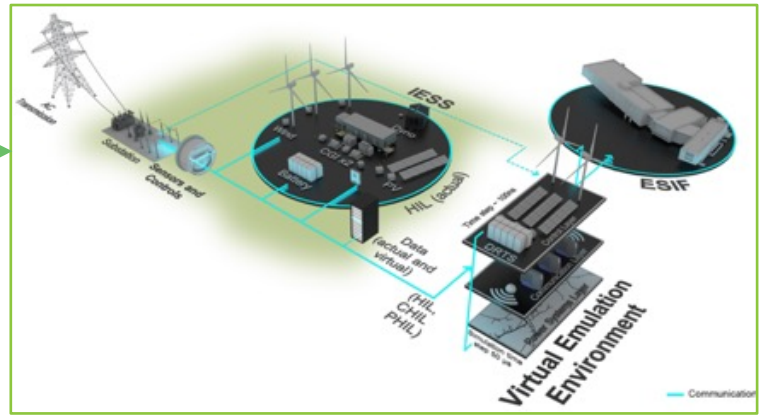
Solar Energy Research Facility
Science and Technology Facility
Field Test Laboratory Building



Energy Materials and Processing at Scale (Completion 2025)

Energy Systems Integration Facility

- Carbon-free H2
- Products from electrochemical processes and CO2
- Advanced Batteries
- PV, Wind, Water Power, Geothermal
- New Buildings and Industrial Materials, Manufacturing and Systems
- Grid and security tech



Advanced Research on Integrated Energy Systems

High-Performance Computing, Simulation, and Visualization

NREL at a Glance

3,343 workforce, including:

- 2,482 regular/limited term
- 485 contingent workers
- 183 postdoctoral researchers
- 125 graduate students
- 68 undergraduate students

—as of 12/31/2022

World-class research expertise in:

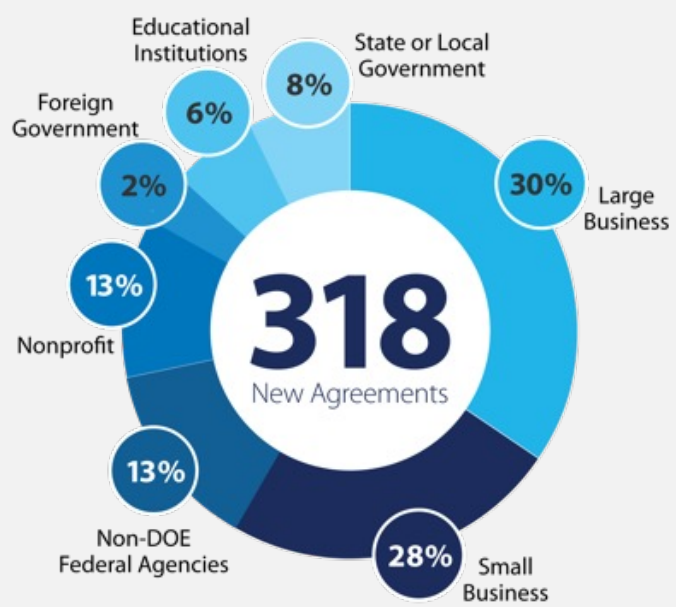
- Renewable Power
- Energy Efficiency
- Sustainable Transportation
- Energy Systems Integration

Partnerships with:

- Industry
- Academia
- Government

3 campuses operate as living laboratories

More Than 1,000 Active Partnerships in FY 2022



Agreements by Business Type

Funding by Business Type

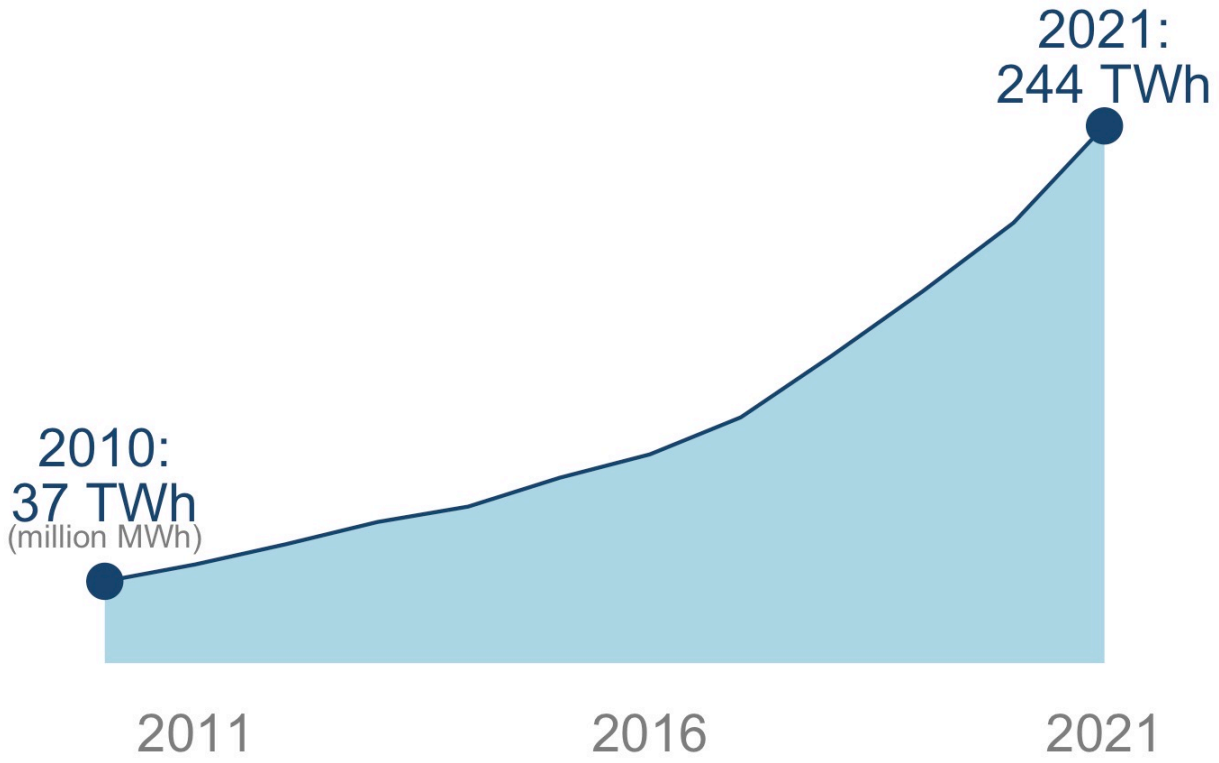
Voluntary Green Power Markets

- Voluntary green power refers to renewable electricity voluntarily purchased by retail electricity customers
- The voluntary green power market refers to the suite of products that allow customers to procure green power:
  - Utility green pricing programs
  - Utility renewable contracts
  - Competitive suppliers
  - Unbundled RECs
  - Community choice aggregation
  - Power purchase agreements

The Big Picture

In 2021, about **8 million customers** procured about

244 million MWh of renewable energy through green power markets.



Total green power sales 2010-2021 (million MWh)

That represents about:

1 in 20
U.S. retail electricity customers

6%
of U.S. retail electricity sales

38%
of U.S. non-hydro renewable energy generation

Note: Estimates compiled from survey data and various data providers including the Energy Information Administration, Center for Resource Solutions, and Bloomberg New Energy Finance

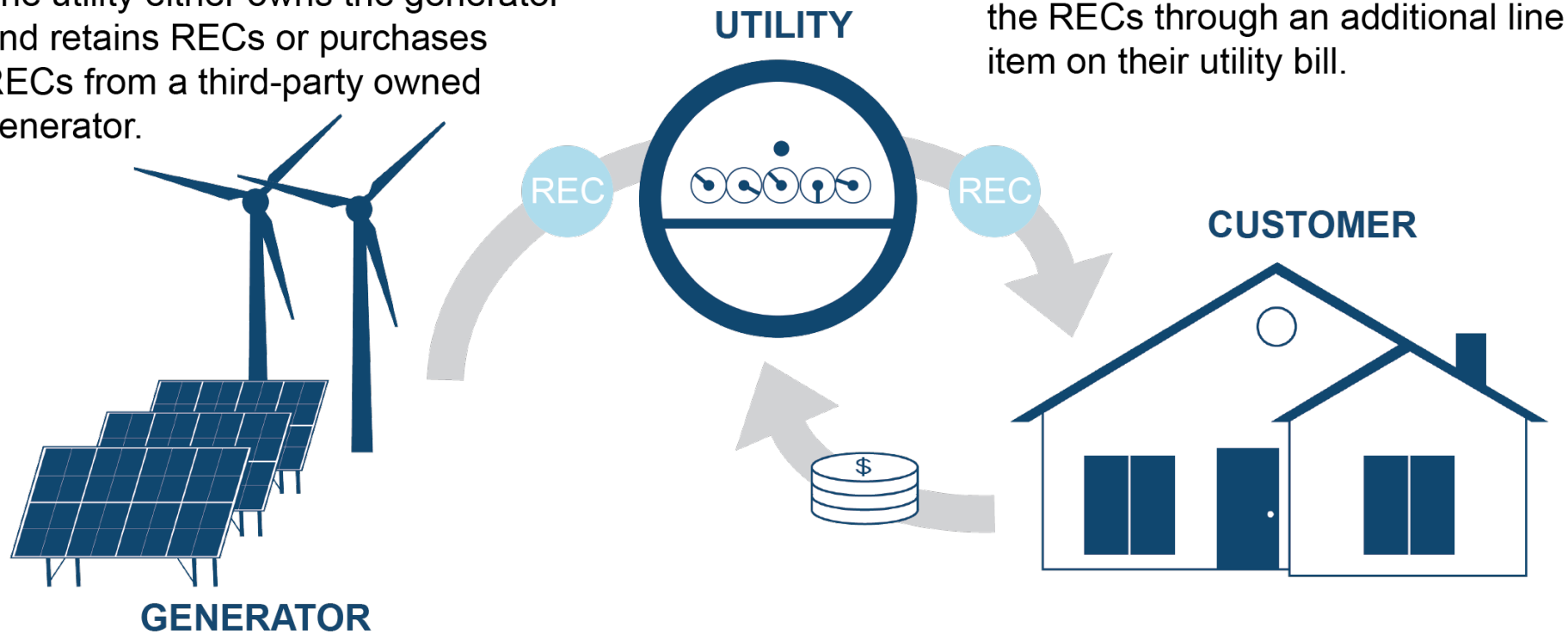
The Supply Mechanisms

Utility Green Pricing

Renewable Energy Certificate (REC): Environmental attributes from one MWh of renewable generation

Utility green pricing programs begin with a renewable energy generator. The utility either owns the generator and retains RECs or purchases RECs from a third-party owned generator.

The utility retires the RECs on behalf of green pricing customers, who pay for the RECs through an additional line item on their utility bill.



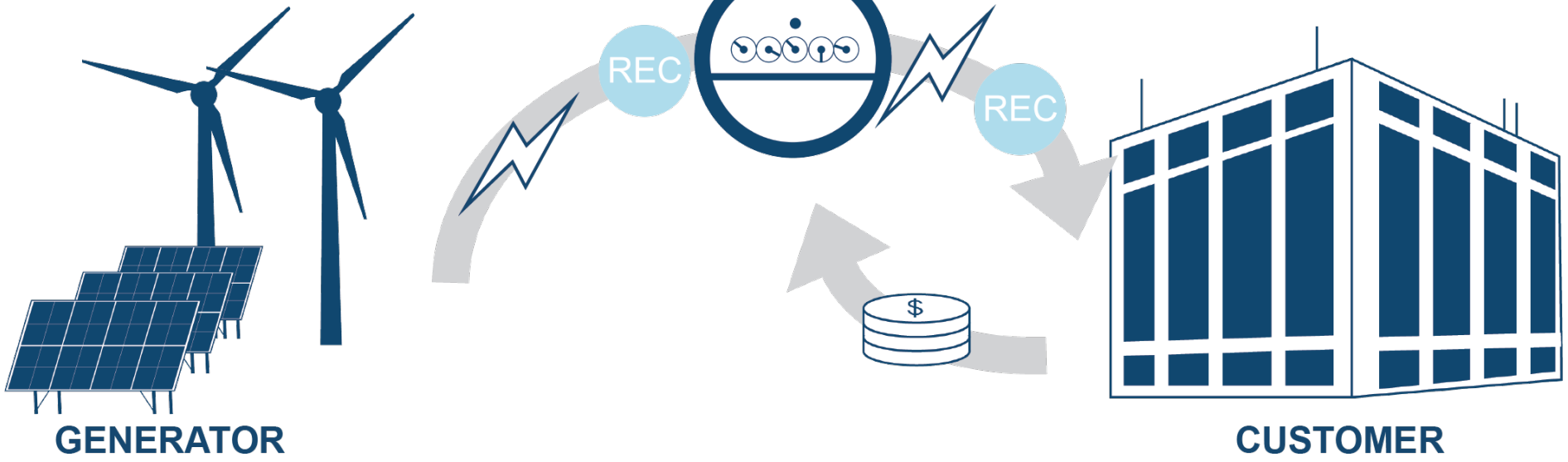
Basic utility green pricing program structure

Specific program structures vary

Utility Renewable Contracts

In a utility renewable contract, the customer enters into a contract with the utility to procure power and RECs from a renewable energy provider. Unlike green pricing programs, the customer may be able to specify the resource for the product.

The utility provides the power and RECs to the customer. The customer continues to pay the utility with a modified green tariff or bilateral contract rate.



Basic utility renewable contract structure

Specific program structures vary

Comparing Green Pricing & Green Tariffs

Comparison of Green Pricing vs. Green Tariffs

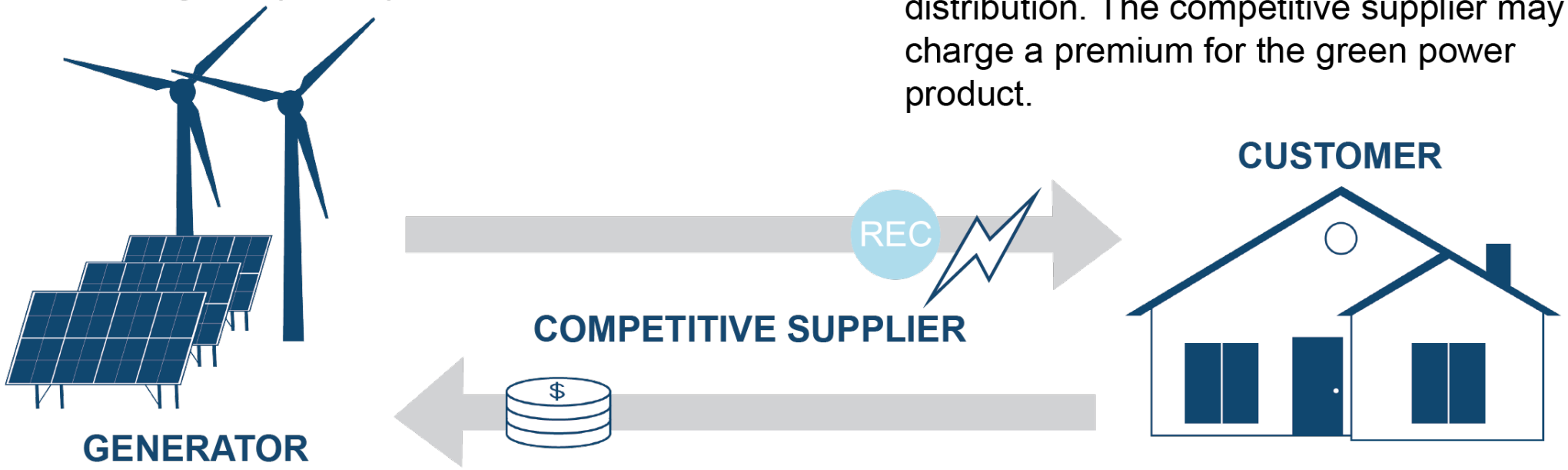
- Green tariff products have a longer contract term and potential utility cost savings, while green pricing products involve a premium and shorter contract term.
- Some convergence of products is occurring (e.g. green tariffs that have some attributes of green pricing, like shorter contract lengths).

Program Characteristics	Green Pricing	Green Tariff
Cost savings potential	No, products average around 1.5 cents/kWh premium	May be cost-competitive, depending on structure and term
Price stability	No, continue to pay utility rate that is subject to change	Possible under certain program structures
Contract length	Shorter contract terms (typically month-to-month)	Longer agreements possible (10-20 years)
Ease of joining	Typically a simple sign-up process	Often limited availability, longer contract is potential barrier
Choice of RE resource	Utility determines	Customer may have input

Competitive Suppliers

In restructured electricity markets, customers may choose a competitive electricity supplier that offers a green power product.

The competitive supplier provides the customer with power and RECs. The utility remains responsible for transmission and distribution. The competitive supplier may charge a premium for the green power product.



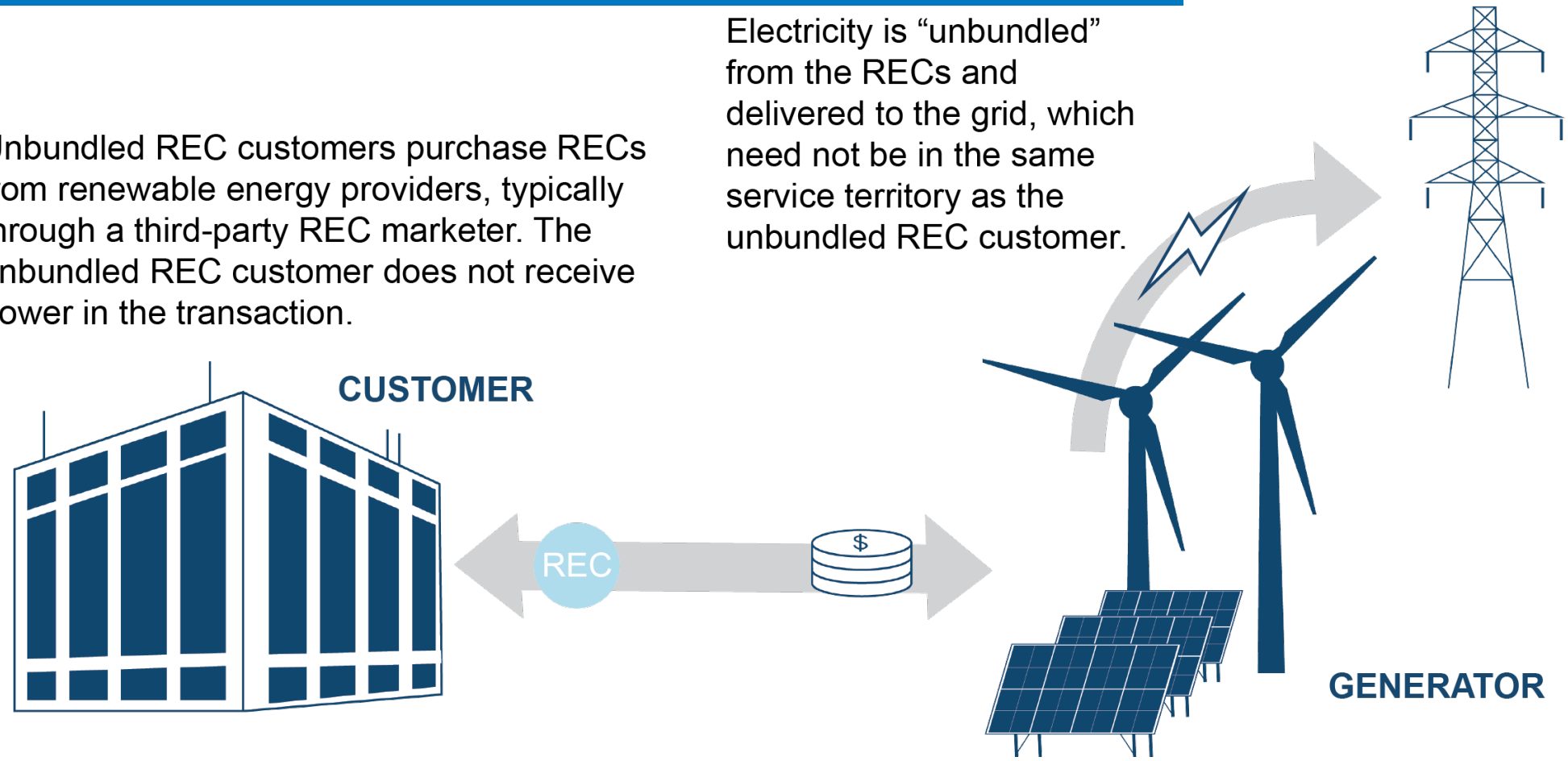
Basic competitive supplier sales structure

Specific program structures vary

Unbundled RECs

Unbundled REC customers purchase RECs from renewable energy providers, typically through a third-party REC marketer. The unbundled REC customer does not receive power in the transaction.

Electricity is “unbundled” from the RECs and delivered to the grid, which need not be in the same service territory as the unbundled REC customer.



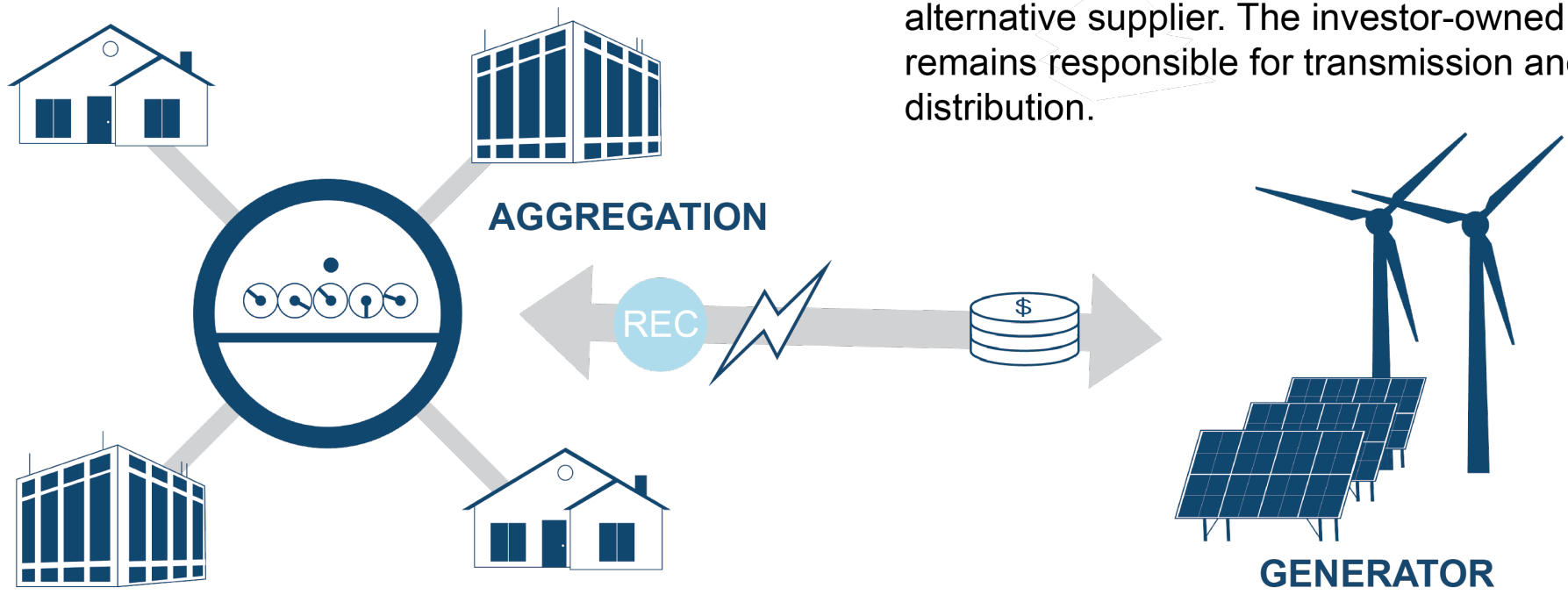
Basic unbundled RECs sales structure

Specific program structures vary

Community Choice Aggregation

A CCA effectively "aggregates" the electricity demand of many customers (residential and non-residential) in order to procure electricity from an alternative supplier.

CCA customers "switch" from an incumbent investor-owned utility to a local government supplier with a green power product. The CCA purchases electricity and RECs from an alternative supplier. The investor-owned utility remains responsible for transmission and distribution.

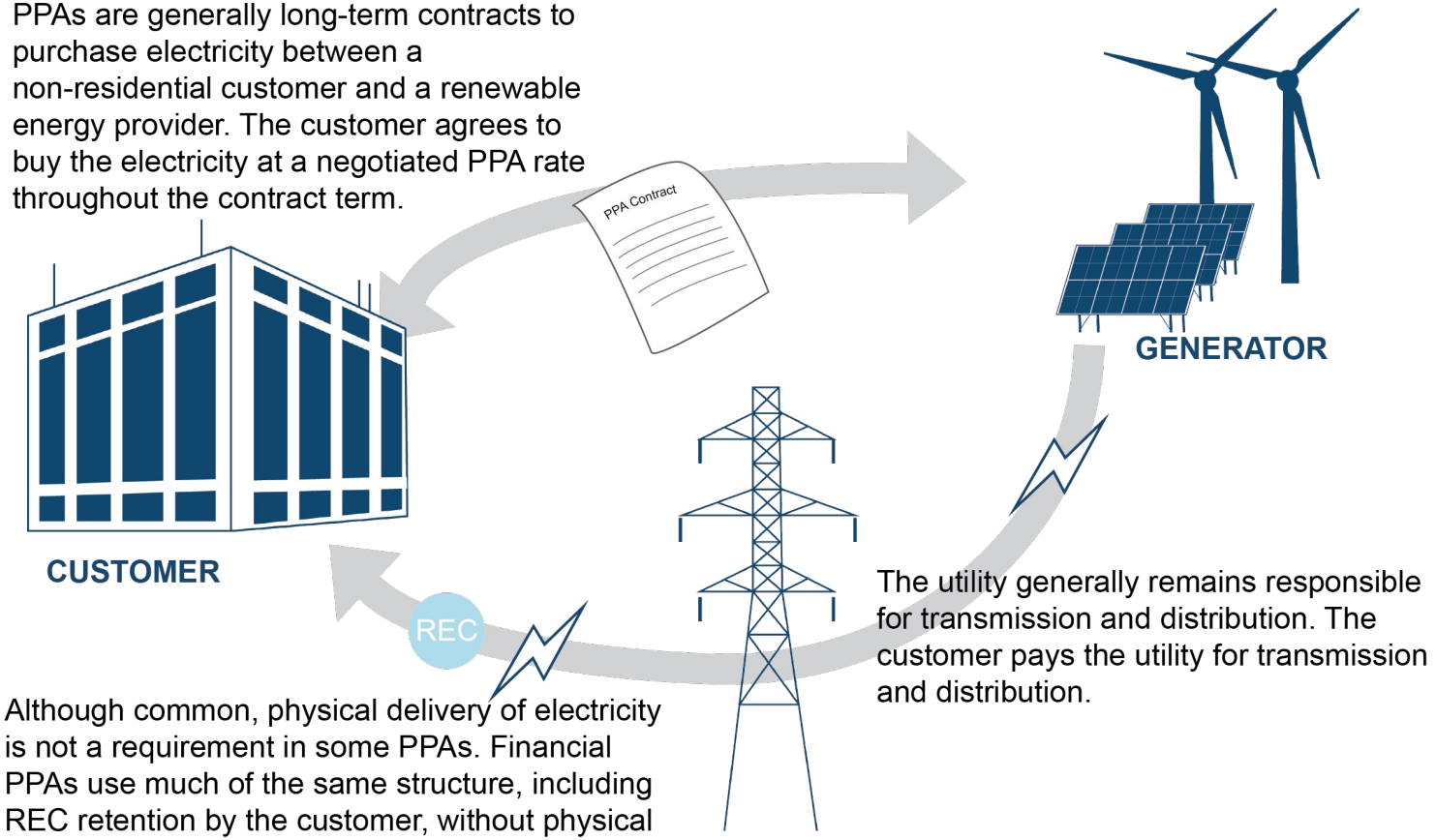


Basic CCA structure

Specific program structures vary

Power Purchase Agreements

PPAs are generally long-term contracts to purchase electricity between a non-residential customer and a renewable energy provider. The customer agrees to buy the electricity at a negotiated PPA rate throughout the contract term.



The utility generally remains responsible for transmission and distribution. The customer pays the utility for transmission and distribution.

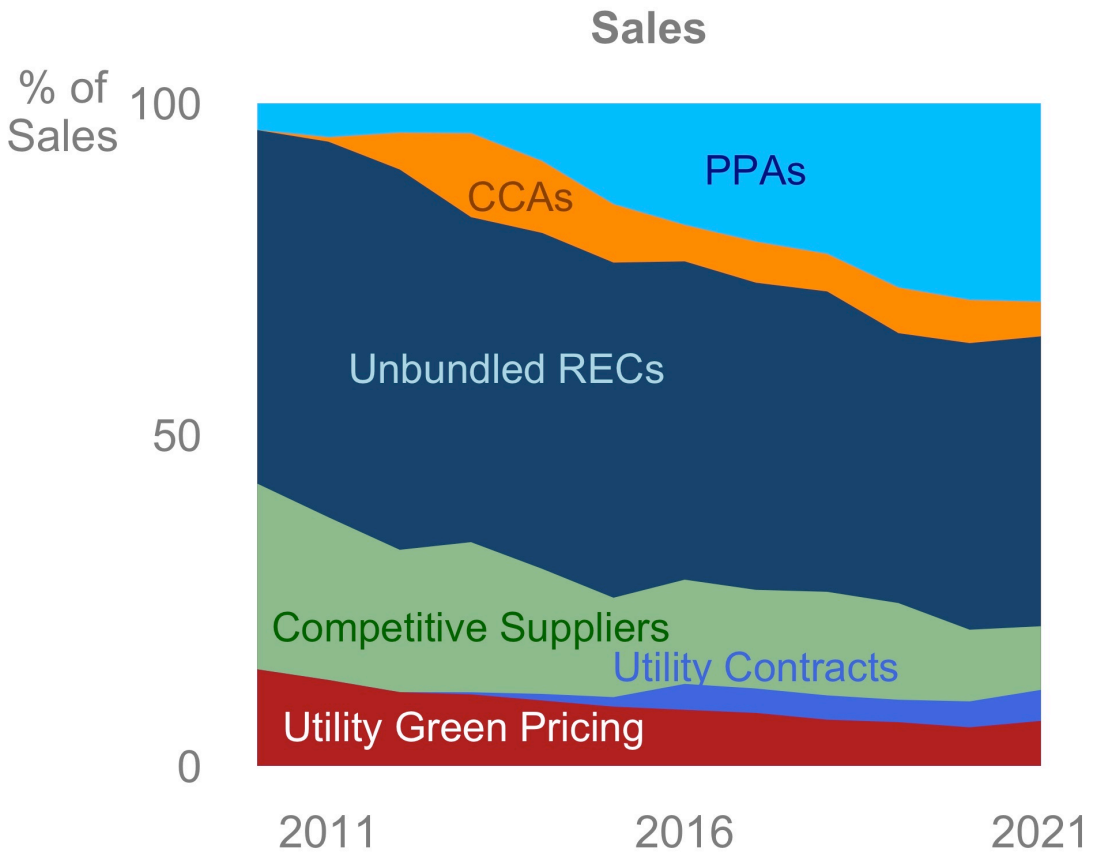
Although common, physical delivery of electricity is not a requirement in some PPAs. Financial PPAs use much of the same structure, including REC retention by the customer, without physical electricity delivery.

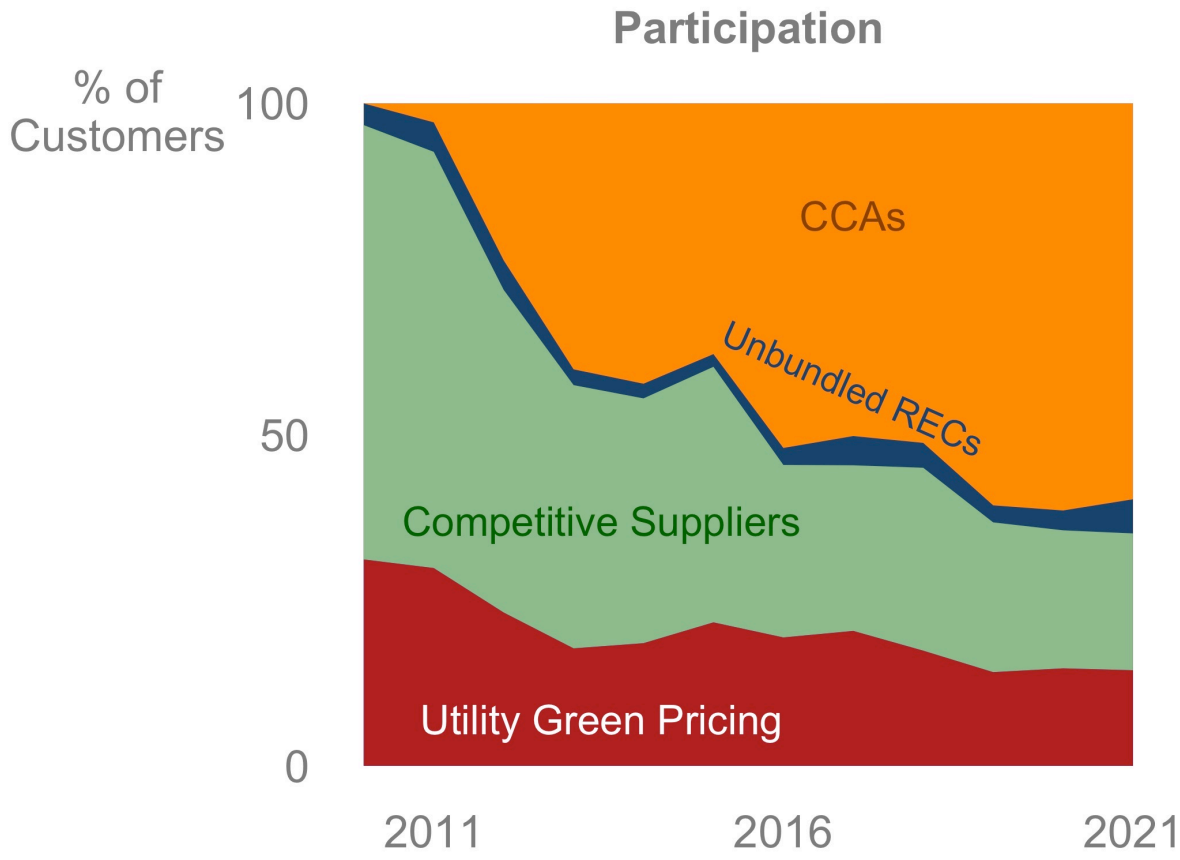
Basic PPA structure

Specific program structures vary

Green Power Sales and Customers by Mechanism

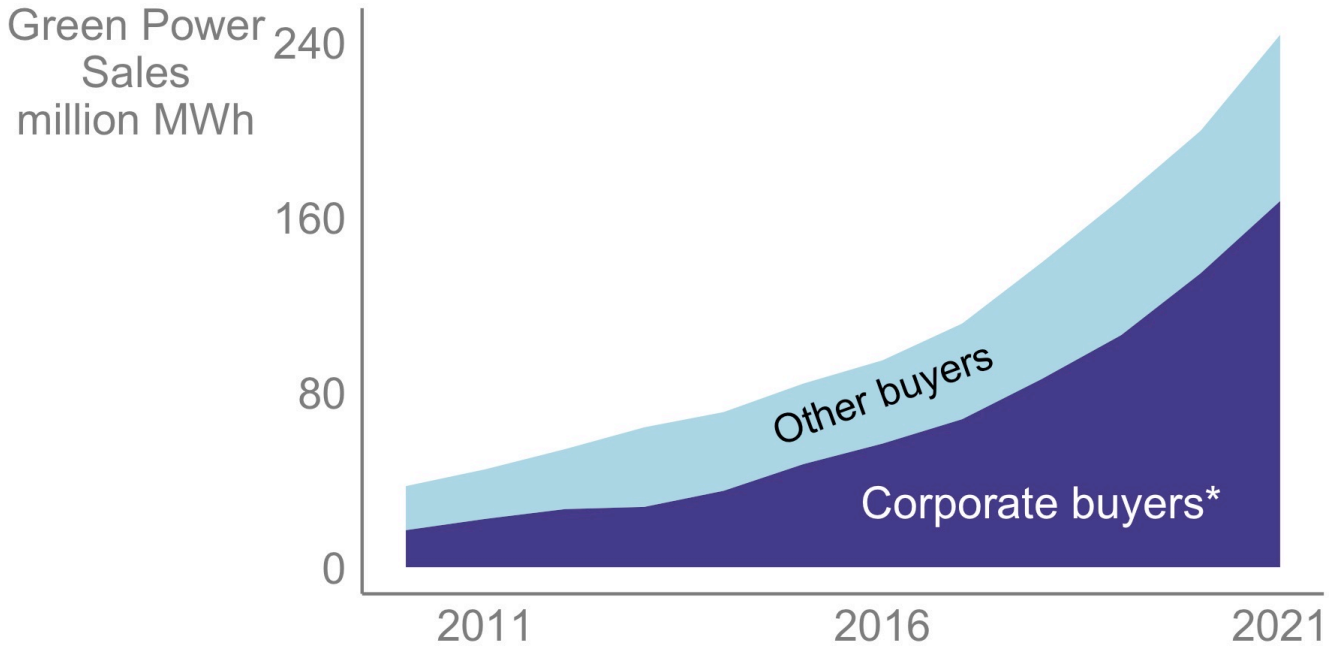
In 2021, the most voluntary sales were via unbundled RECs, while the most customers were via community choice aggregation (CCA) programs.





Corporate Green Power

- Corporations have become the key source of voluntary green power demand
- Corporate demand is projected to continue to grow, with corporate green power possibly exceeding 10% of U.S. demand by 2030



Corporate Renewable Energy Targets

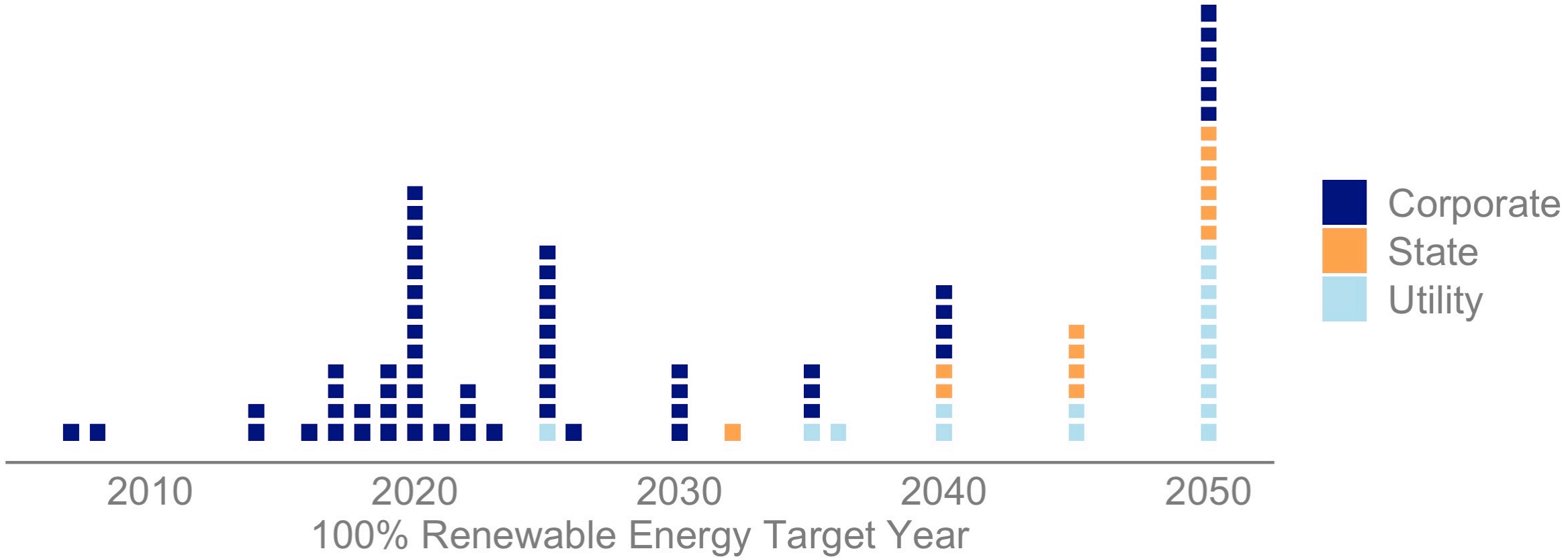


Figure source: O'Shaughnessy et al. 2021. Renewable & Sustainable Energy Reviews 146:111160.

Additional NREL Resources

Find additional resources at the NREL Voluntary Green Power Procurement landing page:

www.nrel.gov/analysis/green-power.html

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EPA GREEN POWER PARTNERSHIP

VOLUNTARY RENEWABLE ENERGY MARKETS 101:

IMPORTANCE, MOTIVATIONS, & CLAIMS

Christopher Kent
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EPA's Green Power Partnership

September 18, 2023

What is the Green Power Partnership

- The U.S. EPA's Green Power Partnership is a **voluntary** program that encourages organizations to use green power.

  We seek to:

  - Reduce U.S. GHG emissions.
  - Expand the voluntary green power market.
  - Standardize green power procurement as part of best practice. environmental management

- We provide Partners with:
  - Technical assistance and tools on procuring green power.
  - A recognition platform for organizations using green power.

https://www.epa.gov/greenpower & https://www.epa.gov/green-power-markets

Who are Green Power Partners

- Organizations that are leaders in both sustainability and energy
- Partners include:
  - Fortune 500 corporations
  - Higher Education institutions
  - Federal, State and local governments
  - All sized businesses
  - Non-profits
- Currently 700+ Partners
- +100 Green Power Communities
- +85 billion kWh used annually

EPA GREEN POWER PARTNERSHIP

https://www.epa.gov/greenpower & https://www.epa.gov/green-power-markets

https://www.epa.gov/greenpower/meet-our-partners

GPP Requirements

Partner Organization Green Power Use Requirement	
If Your Organization's Total Annual Electricity Use in kWh is...	Your Minimum Green Power Use Requirement as a Percentage of Total Annual Electricity Use is...
≥ 100,000,001 kWh	7% of use
10,000,001–100,000,000 kWh	10% of use
1,000,001–10,000,000 kWh	25% of use
100,000–1,000,000 kWh	50% of use

Partners must have a minimum total annual electricity use of 100,000 kWh to be eligible for Partnership.

Eligible organizations use green power at or above benchmarks and agree to update EPA on their green power use each year.

Green Power Partners:

- Receive recognition and support in promoting their green power use.
- Are listed on the GPP website
- Can place on Top Partner List Rankings and additional recognition opportunities like the Green Power Leadership Awards.
- Can access expert tools and resources, press and other media promotions

Agenda

- **IMPORTANCE** — **How green power makes a difference?**
- CLAIMS — What are safe statements?
- SUPPORT — Who can help?

Green Power Makes a Difference

- Renewables are an important energy supply option
- Can sustainably meet a portion of future energy demand with little impact on atmosphere & human health
- Can avoid several negative impacts of energy generation: air and water pollution, vulnerability to supply disruptions, and fossil fuel extraction through mining and drilling

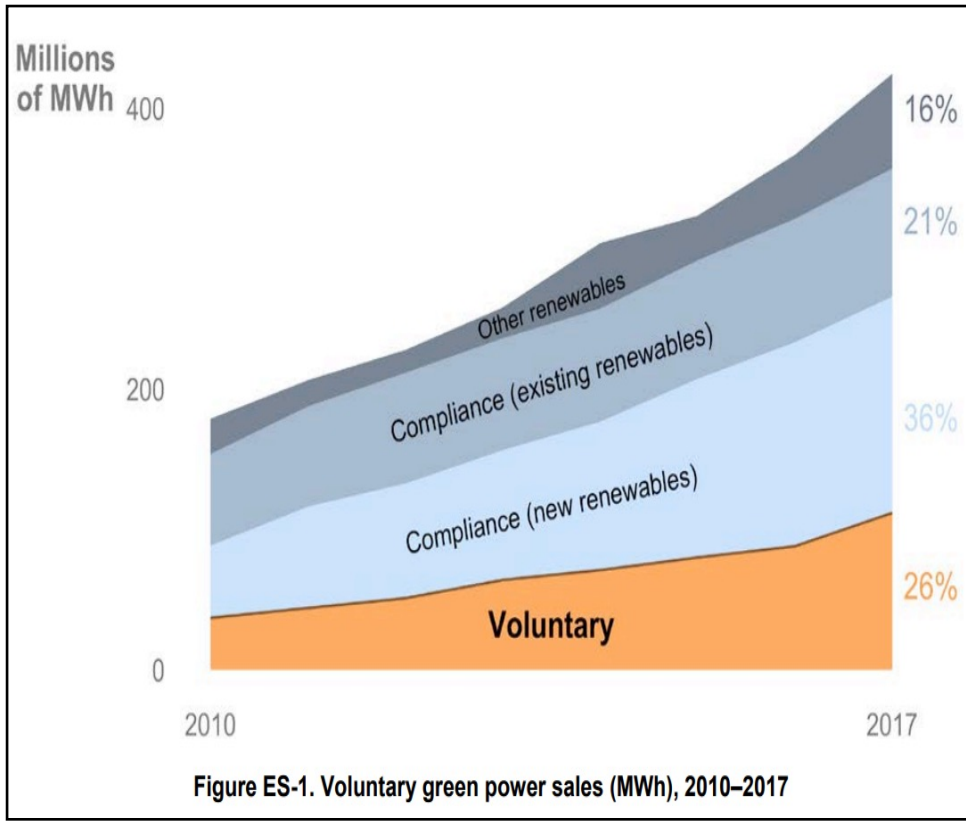
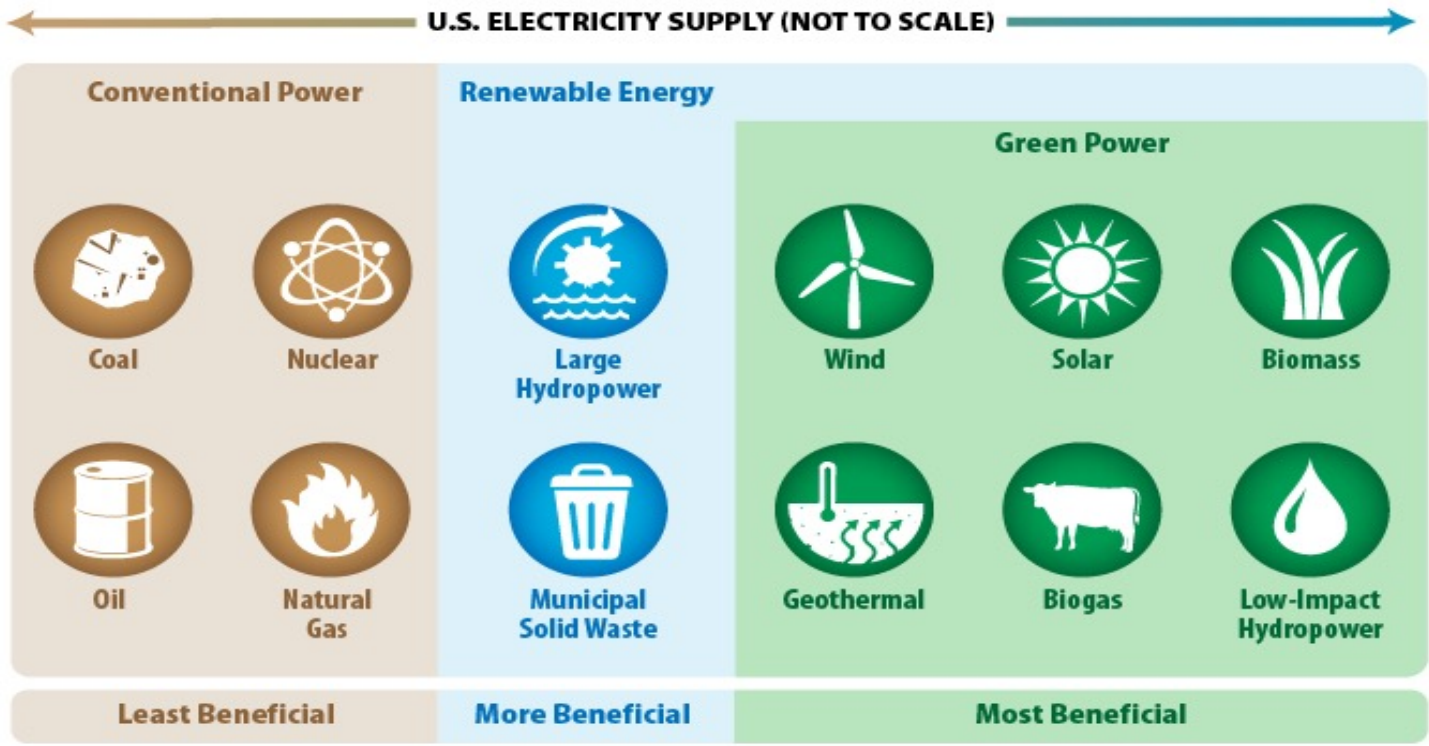
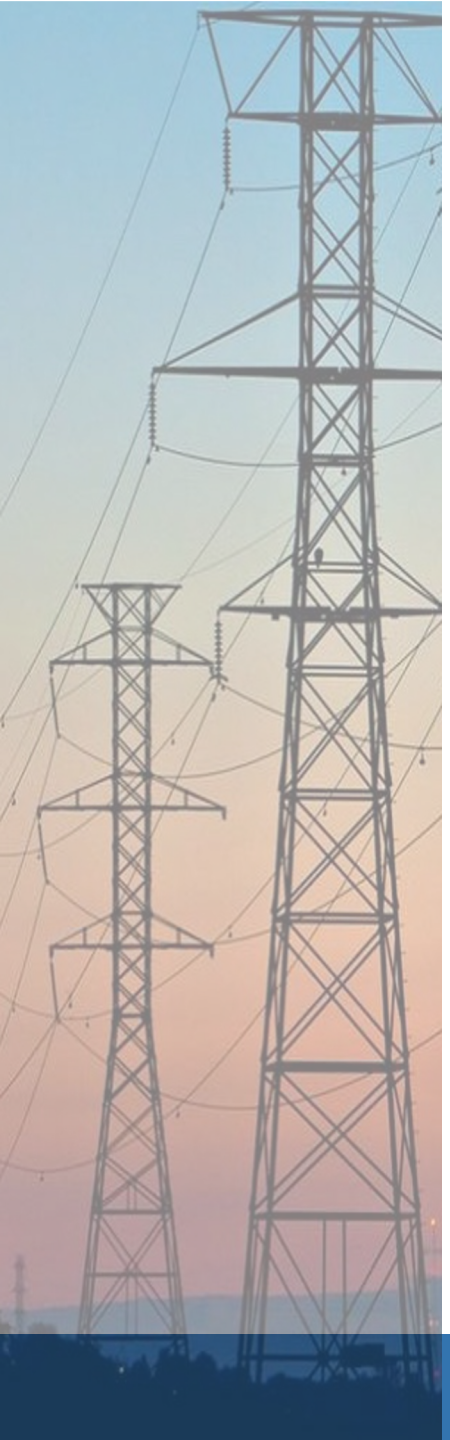


Figure ES-1. Voluntary green power sales (MWh), 2010–2017

What is Green Power?

- **Green power** is a subset of renewable electricity and represents those renewable energy resources and technologies that provide the highest environmental benefit.
  - Meets national standards for product quality and content
  - Green Power is specific to the "voluntary market" and is driven by consumer preference rather than by policy mandate
  - Is generation that is incremental to what is required by mandate
- **Renewable Electricity** is a broader category and includes some resources and technologies that have significant impact on the environment.





Green Power Supply Options

Retail Options

- Retail (Unbundled) RECS
- Utility Products or Programs
- Community Choice Aggregations

Project Specific

- Self- Supply
- Physical PPAs
- Shared Renewables
- Utility Green Tariffs
- Financial Contracts (PPAs)

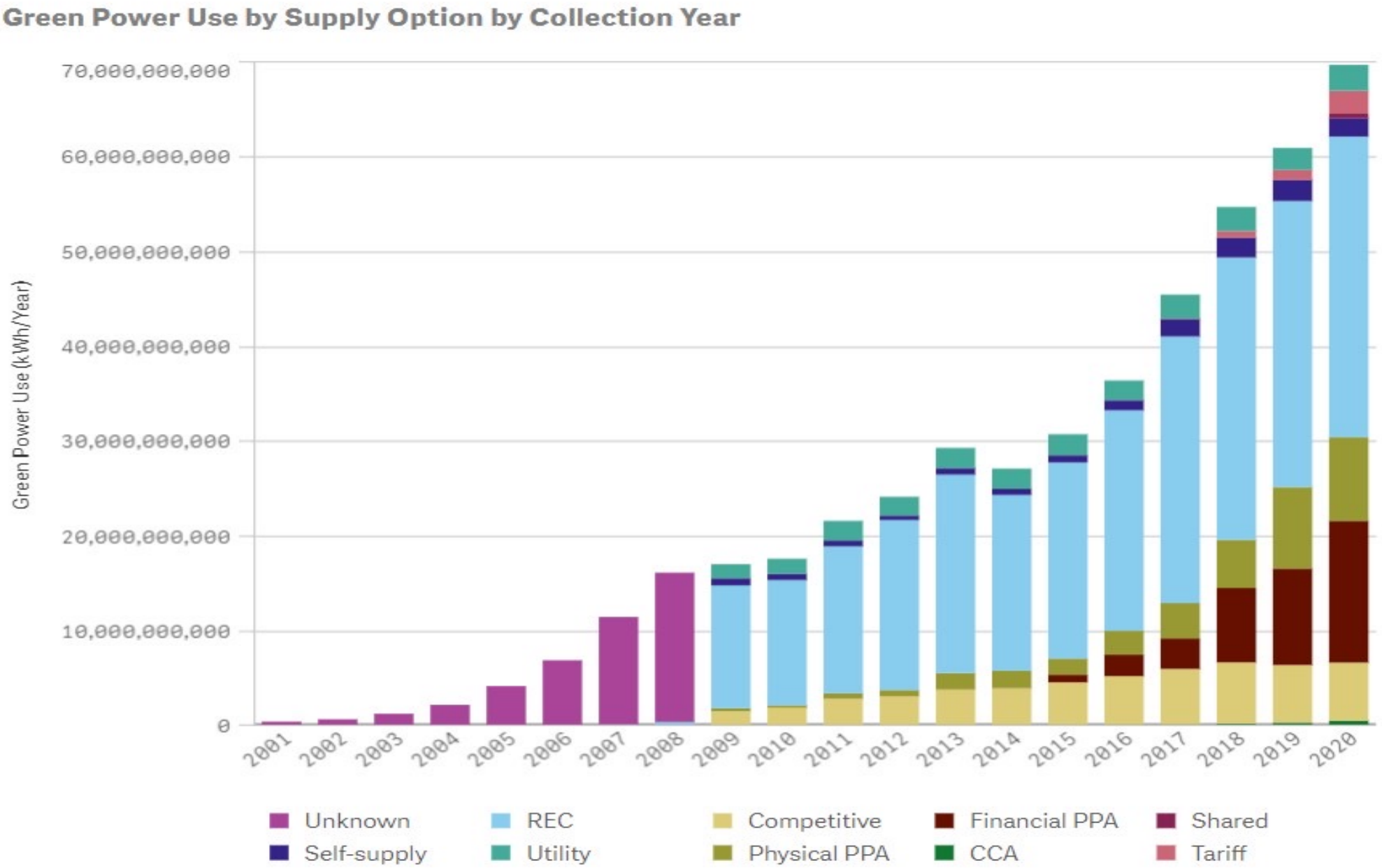
Green Power Supply Options

Will Cost More

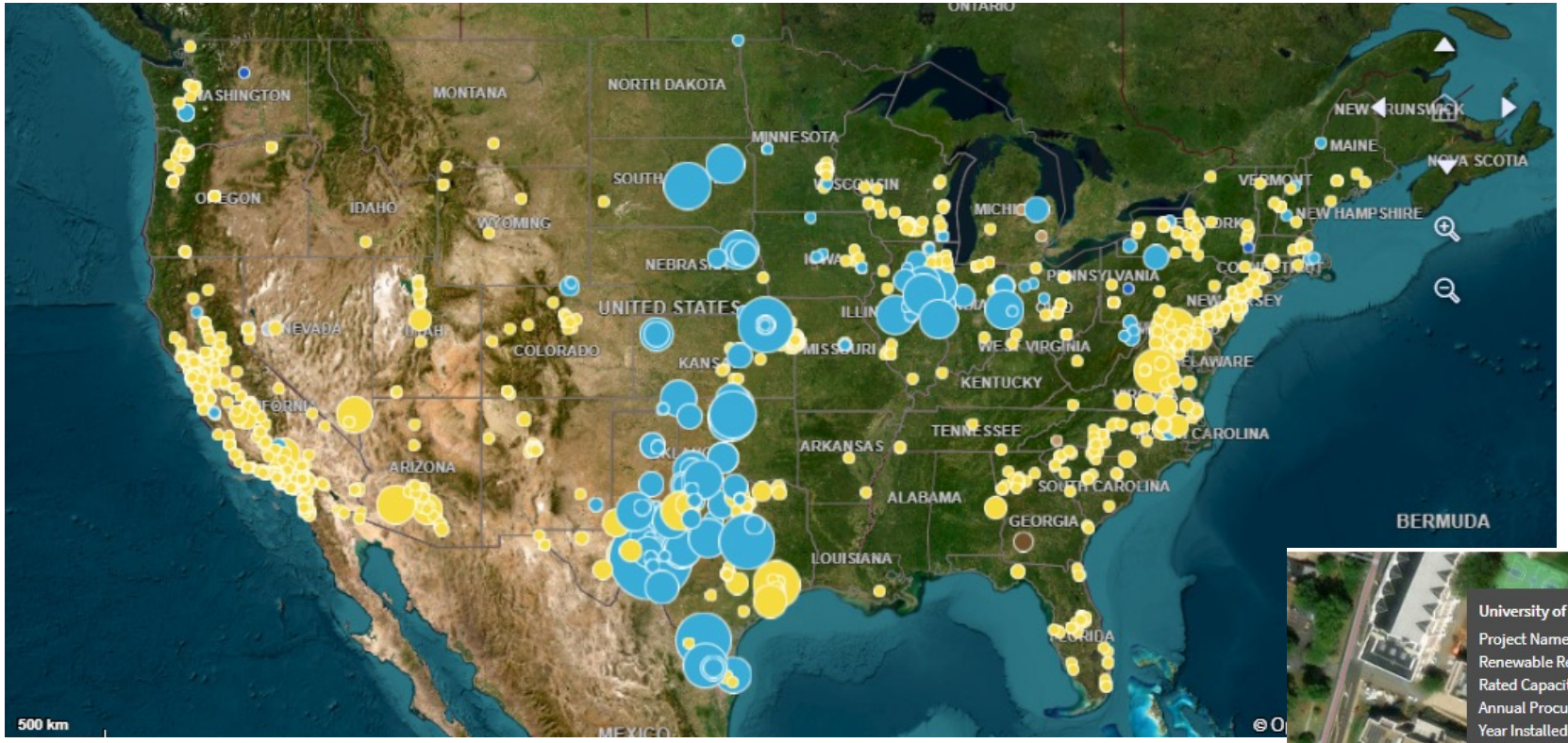
May Save You Money

Retail Options	Current Electricity Costs	Retail Options	Project Specific
• Unbundled RECS • Utility Products or Programs		• Community Choice Aggregations	• Self- Supply • Physical PPAs • Shared Renewables • Utility Green Tariffs • Virtual PPAs

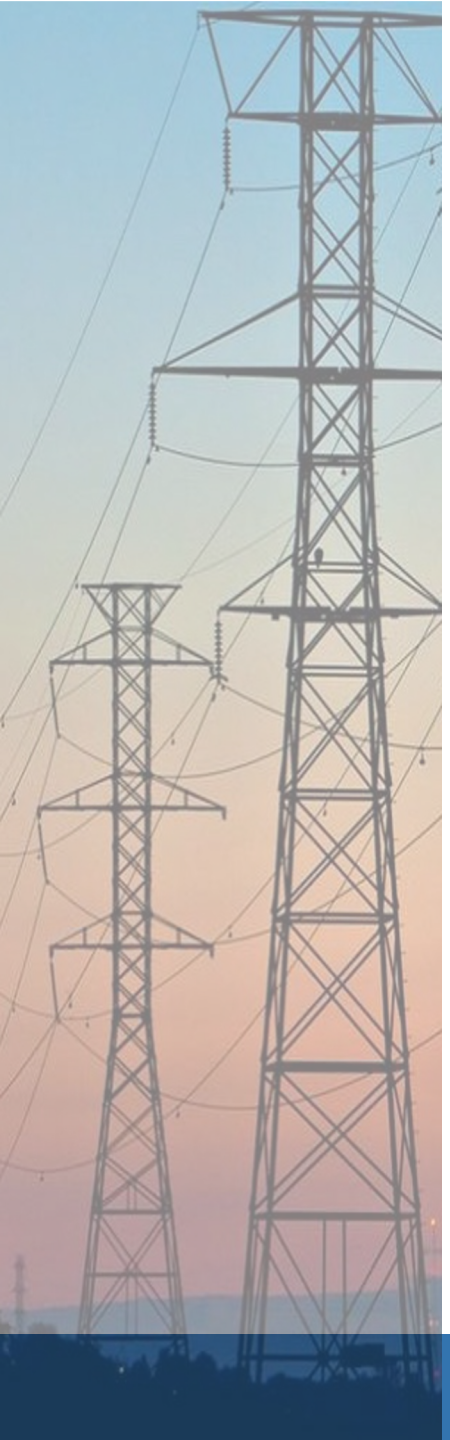
GPP Partner Supply Options



GPP Project Map



https://www.epa.gov/greenpower/project-map

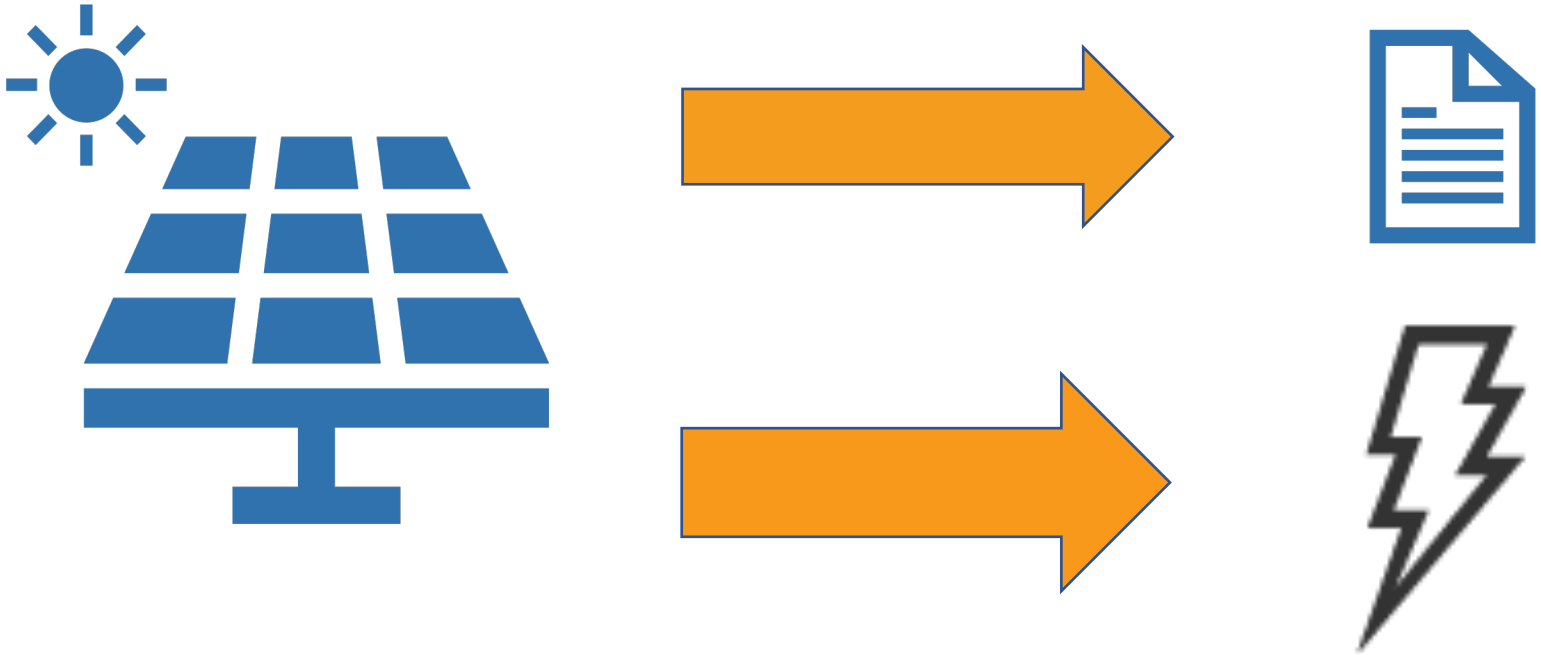


Manage Risks for Organizations

- Green power can help organizations manage risk by
  - Reducing corporate GHG emissions
  - Reducing exposure to fossil-fuel price volatility
  - Maintaining/enhancing corporate image
  - Differentiating products/services
  - Improved resiliency

- IMPORTANCE — How green power makes a difference?
- **CLAIMS** — **What are safe statements?**
  - **RECS**
  - **Best Practice**
  - **Interactive session**
- SUPPORT — Who can help?

Renewable Energy Certificates =RECs



Why Are Recs Important?

- Currency of renewable energy markets – both compliance and voluntary
- Inherent in all green power procurements; from unbundled RECs to investing in your own RE project
- They are not offsets – different instruments, different applications and claims
- EPA recommends buying certified and verified green power products as a best practice

Determining REC Ownership

- Review power purchase agreement (PPA) contracts, interconnection and net-metering agreements, state and utility incentives, and other green power contracts.
- Look for “renewable energy certificates”, “renewable energy credits”, “environmental attributes”, “green tags”, or similar.
- Solar Energy Industries Association’s Solar Business Code
  - Guiding Principles
    - 5.12: Renewable Energy Certificate (“REC”) ownership is a Material Term in a solar contract, regardless of ownership structure (e.g., purchase, lease, power purchase agreement).
    - 5.14: Many Consumers are unfamiliar with RECs and their characteristics…. The Company must take steps to educate its Consumer about RECs, including providing …: Guidelines for Renewable Energy Claims: Guidance for Consumers and Electricity Providers, Center for Resource Solutions (Feb. 26, 2015) [http://resource-solutions.org/site/wp-content/uploads/2015/07/Guidelines-for-Renewable-Energy-Claims.pdf]

Determining REC Ownership

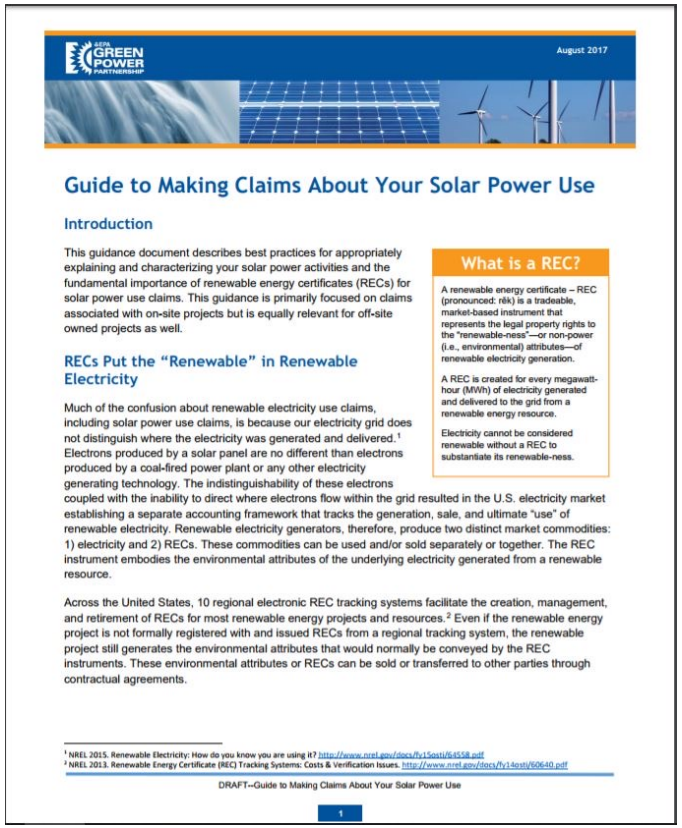
Environmental Attributes and Environmental Incentives.

Unless otherwise specified on **Exhibit 1**, Seller is the owner of all Environmental Attributes and Environmental Incentives and is entitled to the benefit of all Tax Credits, and Purchaser's purchase of electricity under this Agreement does not include Environmental Attributes, Environmental Incentives or the right to Tax Credits or any other attributes of ownership and operation of the System, all of which shall be retained by Seller. Purchaser shall cooperate with Seller in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits, including by using the electric energy generated by the System in a manner necessary to qualify for such available Environmental Attributes, Environmental Incentives and Tax Credits. Purchaser shall not be obligated to incur any out–of–pocket costs or expenses in connection with such actions unless reimbursed by Seller. If any Environmental Incentives are paid directly to Purchaser, Purchaser shall immediately pay such amounts over to Seller. To avoid any conflicts with fair trade rules regarding claims of solar or renewable energy use, Purchaser, if engaged in commerce and/or trade, shall submit to Seller for approval any press releases regarding Purchaser's use of solar or renewable energy and shall not submit for publication any such releases without the written approval of Seller. Approval shall not be unreasonably withheld, and Seller's review and approval shall be made in a timely manner to permit Purchaser's timely publication.

"**Environmental Attributes**" means any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to the System, the production of electrical energy from the System and its displacement of conventional energy generation, including (a) any avoided emissions of pollutants to the air, soil or water such as sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO) and other pollutants; (b) any avoided emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride and other greenhouse gases (GHGs) that have been determined by the United Nations Intergovernmental Panel on Climate Change, or otherwise by law, to contribute to the actual or potential threat of altering the Earth's climate by trapping heat in the atmosphere; and (c) the reporting rights related to these avoided emissions, such as Green Tag Reporting Rights and Renewable Energy Credits. Green Tag Reporting Rights are the right of a party to report the ownership of accumulated Green Tags in compliance with federal or state law, if applicable, and to a federal or state agency or any other party, and include Green Tag Reporting Rights accruing under Section 1605(b) of The Energy Policy Act of 1992 and any present or future federal, state, or local law, regulation or bill, and international or foreign emissions trading program. Environmental Attributes do not include Environmental Incentives and Tax Credits. Purchaser and Seller shall file all tax returns in a manner consistent with this Section 5. Without limiting the generality of the foregoing, Environmental Attributes include carbon trading credits, renewable energy credits or certificates, emissions reduction credits, emissions allowances, green tags tradable renewable credits and Green-e® products.

Making Environmental Claims

- Explain green power & the environmental benefits
  - Public has limited understanding of green power and its benefits
  - Provide simple information about the difference you will make
  - Ensure that you have retained the contractual rights to make claims
- Make your message transparent and tangible
- - EPA's Equivalency Calculator
- A simple, safe claim
  - I use renewable electricity from a zero emissions resource
  - Be precise in your percentages
- Retire RECS before making claims
- Don't Confuse "RECs" and "Offsets"



August 2017

Guide to Making Claims About Your Solar Power Use

Introduction

This guidance document describes best practices for appropriately explaining and characterizing your solar power activities and the fundamental importance of renewable energy certificates (RECs) for solar power use claims. This guidance is primarily focused on claims associated with on-site projects but is equally relevant for off-site owned projects as well.

What is a REC?

A renewable energy certificate – REC (pronounced: rĕk) is a tradeable, market-based instrument that represents the legal property rights to the "renewable-ness"—or non-power (i.e., environmental) attributes—of renewable electricity generation.

A REC is created for every megawatt-hour (MWh) of electricity generated and delivered to the grid from a renewable energy resource.

Electricity cannot be considered renewable without a REC to substantiate its renewable-ness.

RECs Put the "Renewable" in Renewable Electricity

Much of the confusion about renewable electricity use claims, including solar power use claims, is because our electricity grid does not distinguish where the electricity was generated and delivered.[1] Electrons produced by a solar panel are no different than electrons produced by a coal-fired power plant or any other electricity generating technology. The indistinguishability of these electrons coupled with the inability to direct where electrons flow within the grid resulted in the U.S. electricity market establishing a separate accounting framework that tracks the generation, sale, and ultimate "use" of renewable electricity. Renewable electricity generators, therefore, produce two distinct market commodities: 1) electricity and 2) RECs. These commodities can be used and/or sold separately or together. The REC instrument embodies the environmental attributes of the underlying electricity generated from a renewable resource.

Across the United States, 10 regional electronic REC tracking systems facilitate the creation, management, and retirement of RECs for most renewable energy projects and resources.[2] Even if the renewable energy project is not formally registered with and issued RECs from a regional tracking system, the renewable project still generates the environmental attributes that would normally be conveyed by the REC instruments. These environmental attributes or RECs can be sold or transferred to other parties through contractual agreements.

[1] NREL 2015. Renewable Electricity: How do you know you are using it? http://www.nrel.gov/docs/fy15osti/64558.pdf
[2] NREL 2013. Renewable Energy Certificate (REC) Tracking Systems: Costs & Verification Issues. http://www.nrel.gov/docs/fy14osti/60640.pdf

DRAFT--Guide to Making Claims About Your Solar Power Use

1

https://www.epa.gov/sites/default/files/2017-09/documents/gpp-guidelines-for-making-solar-claims.pdf

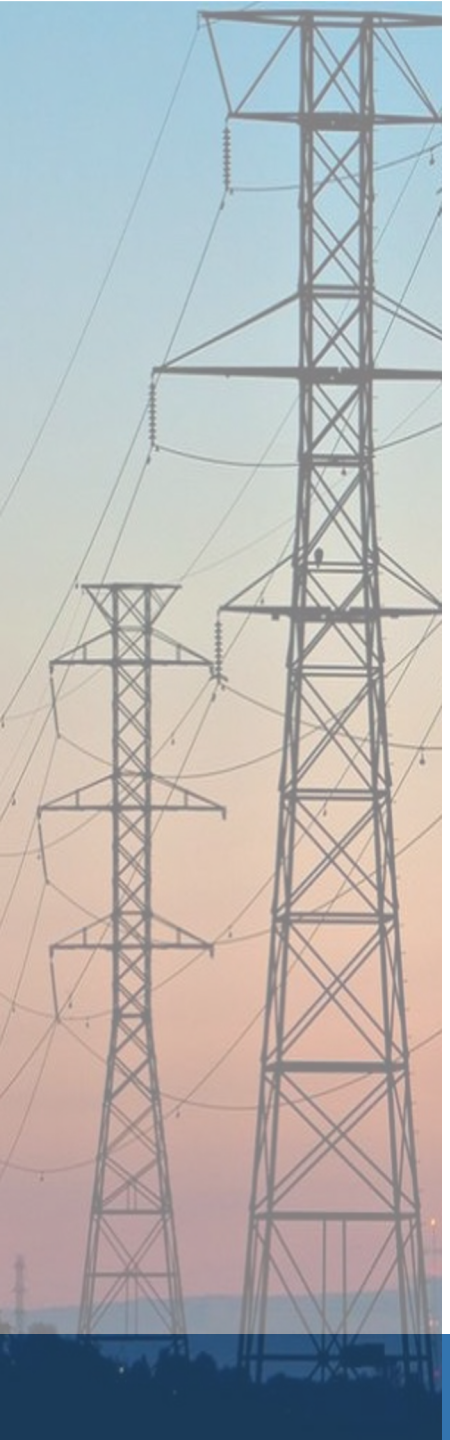
Direct or Express Claims

- FTC Example: A toy manufacturer places solar panels on the roof of its plant to generate power and advertises that its plant is “100% solar-powered.” The manufacturer, however, sells renewable energy certificates based on the renewable attributes of all the power it generates. Even if the manufacturer uses the electricity generated by the solar panels, it has, by selling renewable energy certificates, transferred the right to characterize that electricity as renewable.

- The manufacturer’s claim is therefore deceptive.

Implied Claims

- A toy manufacturer places solar panels on the roof of its plant to generate power….
- It also would be deceptive for this manufacturer to advertise that it “hosts” a renewable power facility because reasonable consumers likely interpret this claim to mean that the manufacturer uses renewable energy.

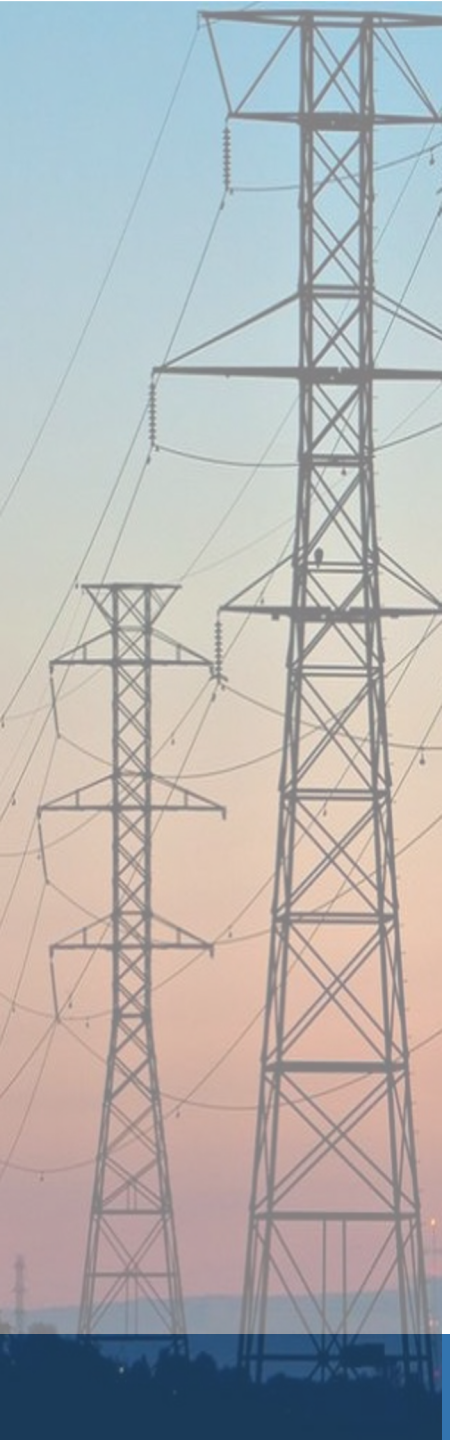


Implied Claims, continued

- A university issues a press release about its recent power purchase agreement for a on-campus, 1 MW solar array
- Press release highlights:
  - University's goal of achieving carbon neutrality by 2030
  - University's new purchase of fixed price electricity from the on-campus solar facility.
- Both claims are technically accurate.
- However, reasonable consumer would interpret as the university is using solar to reduce its carbon footprint.

Potential Consequences of Deceptive Claims

- **Legal:** Federal Trade Commission and state attorney general offices
- **Contractual & Financial**: Breach of contract
- **Brand & Reputation**: Issuance of clarifying statement
- **Renewable Energy Market**: Double "use" claim on the same renewable electricity
- **GHG Accounting:** Double accounting for same zero emission resource



Market Standards & Guidance

- **U.S. EPA**
  - Green Power Partnership minimum purchase requirements
- **U.S. FTC revised Green Guides on marketing claims**
- **WRI/WBCSD GHG accounting standards**
- **Third-party certification/verification**
  - Certification is a best practice for voluntary REC markets
  - While certification is not mandatory or necessary for REC generation, the standards used by REC certifiers set expectations for both the compliance and voluntary REC markets

Interactive Claims Workshop

Instructions:

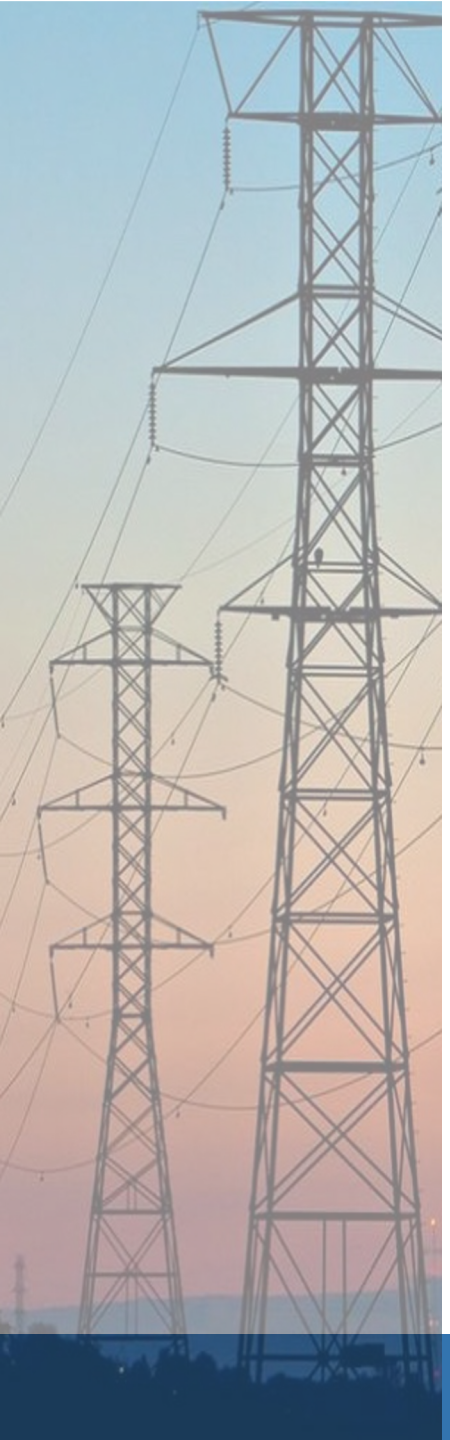
1. Break up into small groups
2. Introduce yourselves to your group
3. Select a spokesperson
4. Select all appropriate answers for your scenario
5. Prepare to report back on which are the correct claims and why

Scenario 1

- Scenario 1: Company A has onsite solar system and owns associated RECs. What claims can this company claim about their use and generation of renewable energy and associated greenhouse gas emissions? Select all that apply.
  - We are using solar power
  - Our solar panels are reducing our carbon footprint
  - Our solar panels are helping to reduce our energy costs and generate revenue through the sale of the RECs
  - Apply the zero emissions rate conveyed by the REC to your purchased electricity consumption under Scope 2
  - Apply grid average emissions rate or grid residual mix

Scenario 1

- Scenario 1: Company A has onsite solar system and owns associated RECs.
  - **We are using solar power**
  - **Our solar panels are reducing our carbon footprint**
  - Our solar panels are helping to reduce our energy costs and generate revenue through the sale of the RECs
  - **Apply the zero emissions rate conveyed by the REC to your purchased electricity consumption under Scope 2**
  - Apply grid average emissions rate or grid residual mix



Scenario 2

- Scenario 2: Company B has onsite solar system but does not own associated RECs. What claims can this company claim about their use and generation of renewable energy and associated greenhouse gas emissions? Select all that apply.
  - We are using solar power
  - We are not using solar power but our solar system is helping to green the grid
  - Our solar panels are helping to reduce our energy costs and generate revenue through the sale of the RECs
  - Apply the zero emissions rate conveyed by the REC to your purchased electricity consumption under Scope 2
  - Apply grid average emissions rate or grid residual mix

Scenario 2

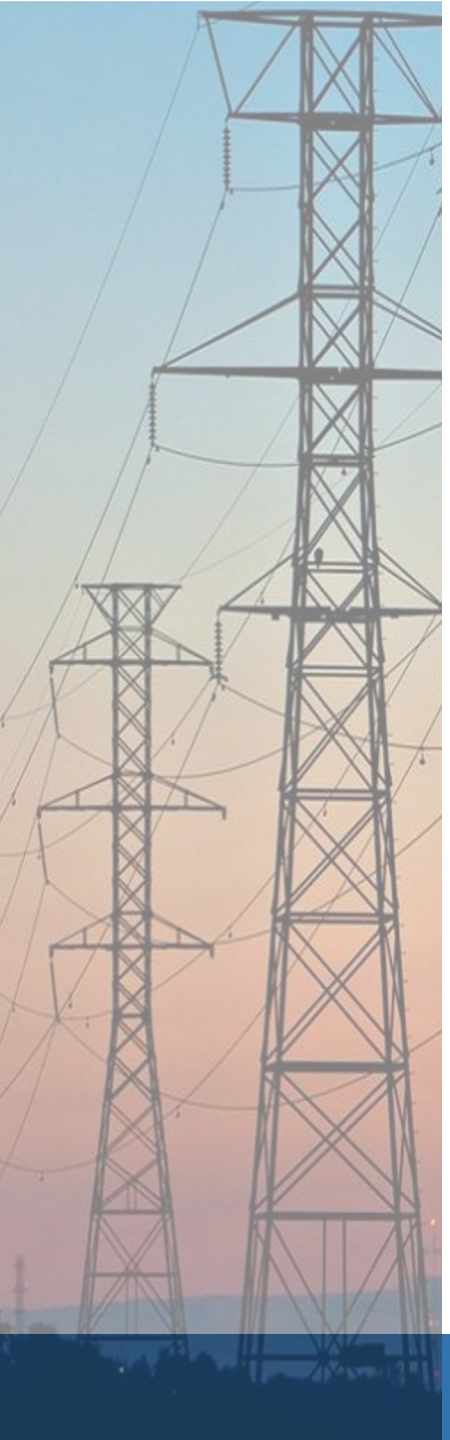
- Scenario 2: Company has onsite solar system but does not own associated RECs.
  - We are using solar power
  - **We are not using solar power but our solar system is helping to green the grid**
  - **Our solar panels are helping to reduce our energy costs and generate revenue through the sale of the RECs**
  - Apply the zero emissions rate conveyed by the REC to your purchased electricity consumption under Scope 2
  - **Apply grid average emissions rate or grid residual mix**

Scenario 3

- Scenario 3: Company C has onsite solar and does not own associated Solar RECs, but purchases wind RECs equal to 100% of power needs. What claims can this company claim about their use and generation of renewable energy and associated greenhouse gas emissions? Select all that apply.
  - We are not using solar power but our solar system is helping to green the grid
  - Our solar panels are reducing our carbon footprint
  - Our solar panels are helping to reduce our energy costs and generate revenue through the sale of the RECs
  - Apply grid average emissions rate or grid residual mix

Scenario 3

- Scenario 3: Company has onsite solar and does not own associated Solar RECs, but purchases wind RECs equal to 100% of power needs.
  - **We are not using solar power but our solar system is helping to green the grid**
  - Our solar panels are reducing our carbon footprint
  - **Our solar panels are helping to reduce our energy costs and generate revenue through the sale of the RECs**
  - Apply grid average emissions rate or grid residual mix
  - **Apply zero emissions rate from the replacement wind RECs but not claim it to be of solar origin.**



Scenario 4

- Scenario 4: University D signs a physical PPA to offtake production from 10 MW of wind power (and associated RECs) with a yet-to-be developed off-site 100 MW system. Nine other institutions have similar 10 MW PPA agreements and because of this PPA, the project is now being built. What claims can this company claim about their use and generation of renewable energy and associated greenhouse gas emissions? Select all that apply.
  - We are using solar power
  - We helped develop new renewable energy supply
  - We are not using solar power but our solar system is helping to green the grid
  - Apply the zero emissions rate conveyed by the REC to your purchased electricity consumption under Scope 2
  - Apply grid average emissions rate or grid residual mix

Scenario 4

- University D is getting **some** of its power through the PPA and the associated RECs. Their off-take represents 10% of the output. Their engagement **helped** get this project built.
  - **We are using solar power**
  - **We helped develop new renewable energy supply**
  - We are not using solar power but our solar system is helping to green the grid
  - **Apply the zero emissions rate conveyed by the REC to your purchased electricity consumption under Scope 2**
  - Apply grid average emissions rate or grid residual mix

Scenario 5

- Scenario 5: Company E signs a 20-year physical PPA with a new off-site system, but per agreement the developer owns RECs for the first 5 years and company will receive replacement nationally sourced wind RECs. For years 5-20 the company will own RECs. What claims can this company claim about their use and generation of renewable energy and associated greenhouse gas emissions?
  Select all that apply.
  - We generate solar energy but do not keep the RECs.
  - We are using solar power /powered by solar energy
  - Our solar panels reduce our carbon footprint
  - Apply zero emissions rate from the replacement wind RECs but not claim it to be of solar origin.
  - Apply the zero emissions rate conveyed by the REC to your purchased electricity consumption under Scope 2

Scenario 5

- Scenario 5: Company E signs a 20-year physical PPA with a new off-site system, but per agreement the developer owns RECs for the first 5 years and company will receive replacement nationally sourced wind RECs. For years 5-20 the company will own RECs.
  - **For Year 1 – 5**: We generate solar energy but do not keep the RECs. However, we purchase 100% wind power and have zero scope 2 emissions.
- Apply zero emissions rate from the replacement wind RECs but not claim it to be of solar origin.
  - **For year 5 – 20**:
    - We are using solar power /powered by solar energy
    - Our solar panels reduce our carbon footprint
    - Our electricity comes from solar panels
- Apply the zero emissions rate conveyed by the REC to your purchased electricity consumption under Scope 2

- IMPORTANCE — How green power GP makes a difference?
- CLAIMS — What claims are appropriate
- SUPPORT — Who can help?

- **Center for Resource Solutions**
  - Green-e Energy for sellers
  - Green-e Marketplace for purchasers
- **US EPA's Green Power Partnership**
- **Regional tracking systems**
  - Tracking systems provide a basis for creating, managing, and retiring RECs, ensuring that each REC is counted only once

Claims: Additional Resources

- Visit Green Power Partnerships' Green Power Market Claims web page:
  - https://www.epa.gov/green-power-markets/environmental-claims
- Center for Resource Solutions (CRS) REC claims and ownership
  - http://resource-solutions.org/learn/rec-claims-and-ownership
- National Association of Attorneys General (NAAG) *Environmental Marketing Guidelines for Electricity*
  - http://apps3.eere.energy.gov/greenpower/buying/pdfs/naag_0100.pdf
- Vermont Attorney General's Office *Guidance for Third-Party Solar Projects*
  - https://ago.vermont.gov/wp-content/uploads/2018/01/Guidance-on-Solar-Marketing.pdf
- RE100 *Making credible renewable energy usage claims*
  - https://www.there100.org/sites/re100/files/2020-09/RE100%20Making%20Credible%20Claims.pdf

Review Quiz

Question #1

What is a REC?

1. Something, esp a vehicle or a building, that is badly damaged
2. A solid collection of mineral grains that have cemented together
3. A tradeable, market-based instrument that represents the legal property rights to the “renewable-ness”—or non-power (i.e., environmental) attributes—of renewable electricity generation.

Question #1

What is a REC?

1. Something, esp a vehicle or a building, that is badly damaged

2. A solid collection of mineral grains that have cemented together

3. **A tradeable, market-based instrument that represents the legal property rights to the "renewable-ness"—or non-power (i.e., environmental) attributes—of renewable electricity generation.**

Question #2

What is the best definition of the voluntary energy market?

- The voluntary or “green power” market is that in which consumers and institutions voluntarily purchase renewable energy to match all or part of their electricity needs.
- Voluntary power requires obligated electric service providers to have a minimum amount of renewable energy in their electricity supply.
- The compliance market as a natural floor to the market, representing what is the basic minimum percentage of renewable energy provided to users. The voluntary market theoretically represents an unlimited opportunity above this market floor that is only constrained by voluntary demand and capped by total demand for electricity.

Question #2

What is a good definition of voluntary energy market?

- The voluntary or “green power” market is that in which consumers and institutions voluntarily purchase renewable energy to match all or part of their electricity needs.
- Voluntary power requires obligated electric service providers to have a minimum amount of renewable energy in their electricity supply.
- The compliance market as a natural floor to the market, representing what is the basic minimum percentage of renewable energy provided to users. The voluntary market theoretically represents an unlimited opportunity above this market floor that is only constrained by voluntary demand and capped by total demand for electricity.

Question #3

What is an RPS?

1. Speed at which records are played

2. Renewable portfolio standard - a requirement that a specific percentage of electricity the utility sells comes from renewable resources

3. A genre of video games

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1. Speed at which records are played

2. **Renewable portfolio standard - a requirement that a specific percentage of electricity the utility sells comes from renewable resources**

3. A genre of video games

Question #4

What consumer best-practice ensures that the RECs purchased meet industry standards?

1. Purchasing Green-e certified products
2. That they are purchased via cryptocurrency
3. That they are the prettiest REC in the market

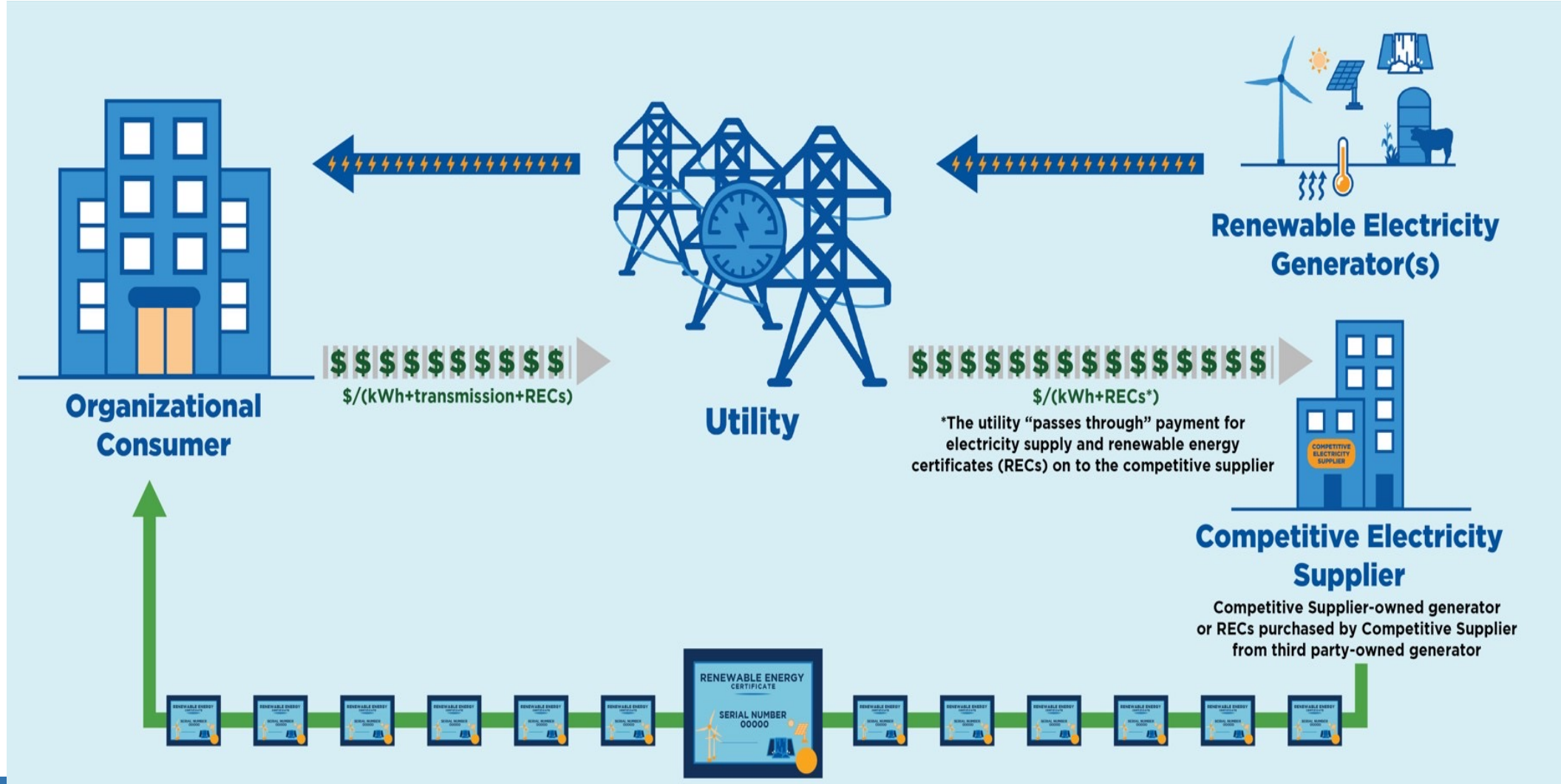
Question #4

What consumer best-practice ensures that the RECs purchased meet industry standards?

1. **Purchasing Green-e certified products**
2. That they are purchased via cryptocurrency
3. That they are the prettiest REC in the market

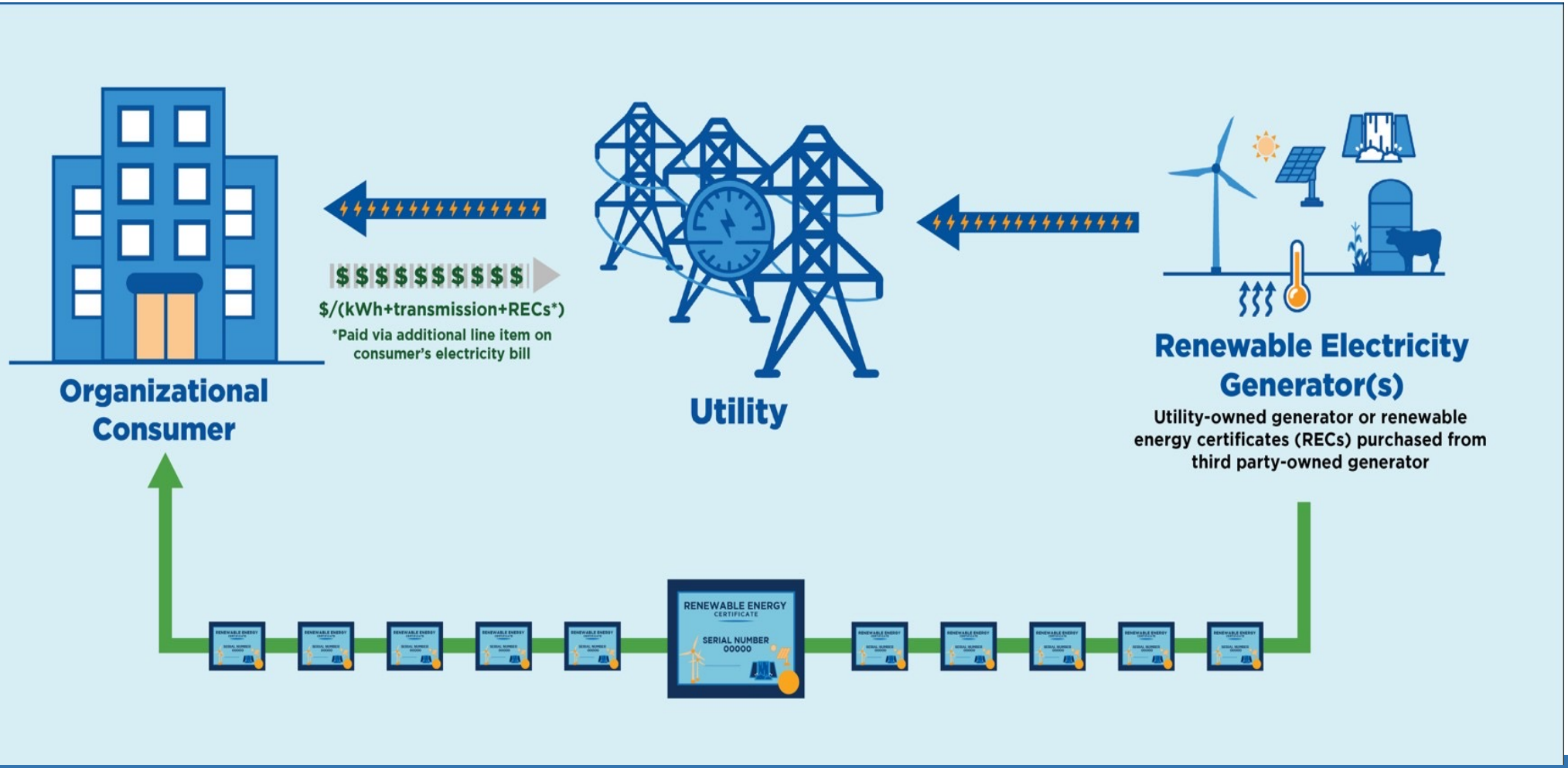
Question # 5

What sort of green power supply is this representing?



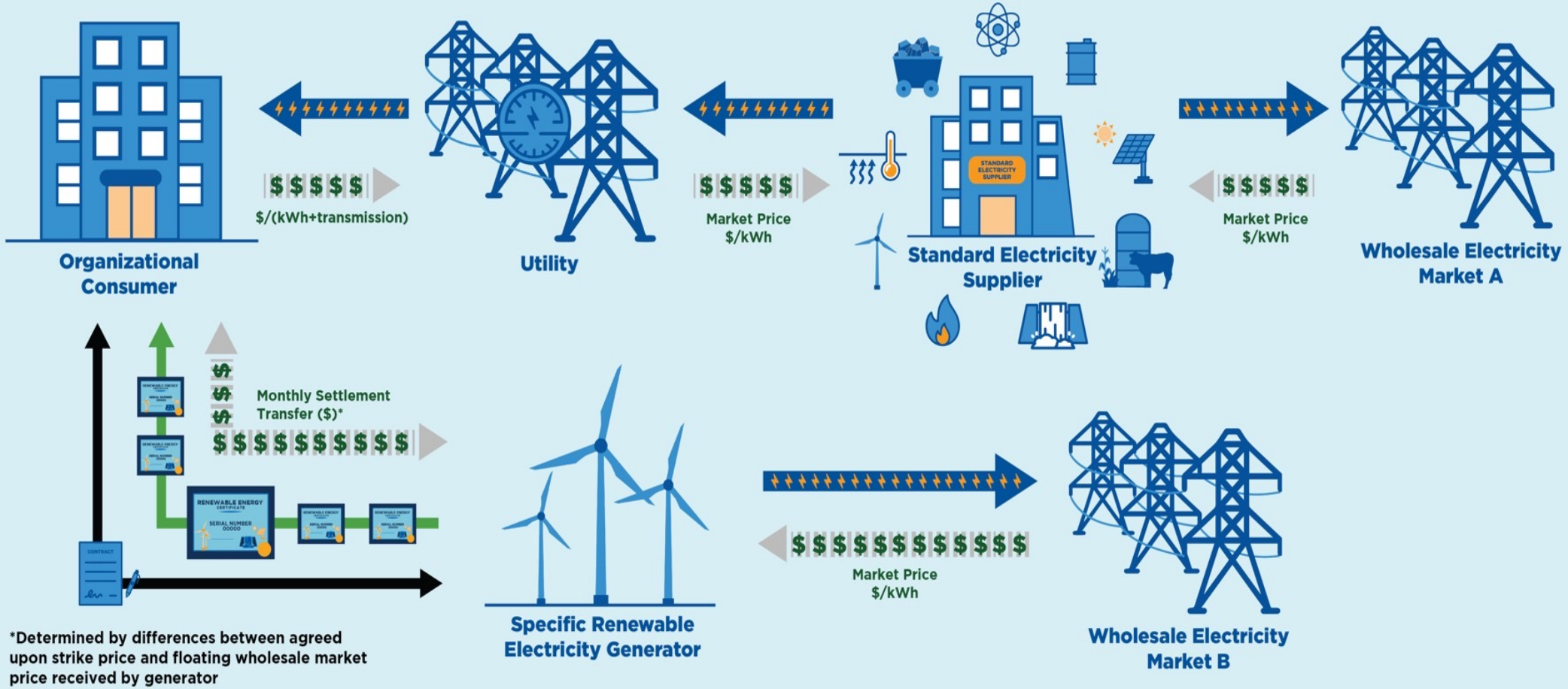
Question # 6

What is this and how is this power supply different than the preceding graphic?



Extra Credit

What sort of green power supply is this representing?
Clue: Follow the money , power, and RECs



Q and A

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