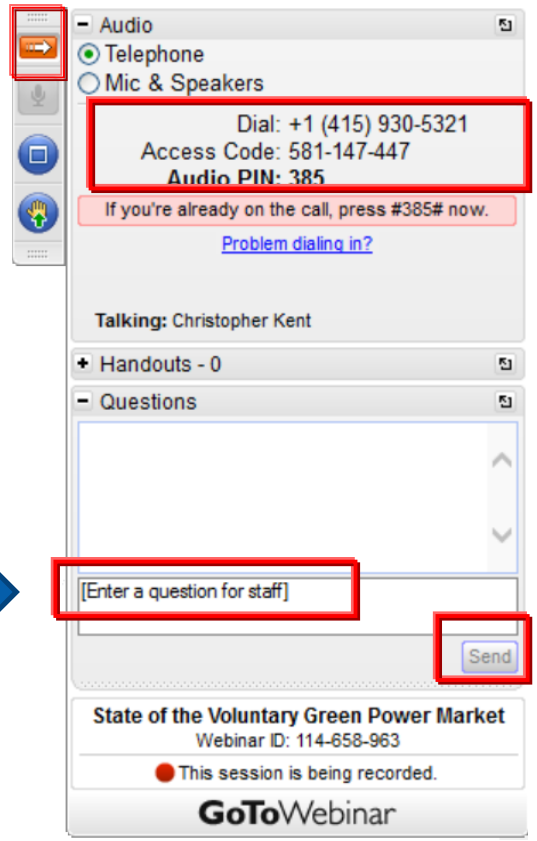
State of the Voluntary Green Power Market

February 21, 2018

Webinar Logistics

Open and close your control panel



Audio is available your computer's microphone and speakers (VoIP) or telephone:
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Type in your questions here

Hit "send" to submit your questions

- If you experience technical difficulties, please contact Grant Strauss at: Grant.Strauss@erg.com

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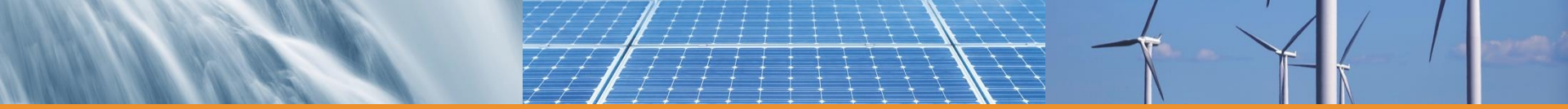

Speakers and Agenda

- Speakers:
  - Christopher Kent, Program Manager, U.S. EPA's Green Power Partnership
  - Eric O'Shaughnessy, Renewable Energy Analyst, National Renewable Energy Laboratory

- Agenda:
  - Basics of Green Power
  - Green Power Partnership Overview
  - GPP Program Data Summary
  - Status and Trends in U.S. Voluntary Green Power Market
  - Question and Answer session

What is Green Power?

- Subset of renewable energy – representative of resources and technologies that offer the highest environmental benefit.
- Electricity generated from natural resources that replenish themselves over short periods of time, including the sun, wind, moving water, organic plant and waste material (biomass), and the Earth's heat (geothermal).
- Must be from "new" facilities placed into service within last 15 years.
- Must be from the "voluntary" market.

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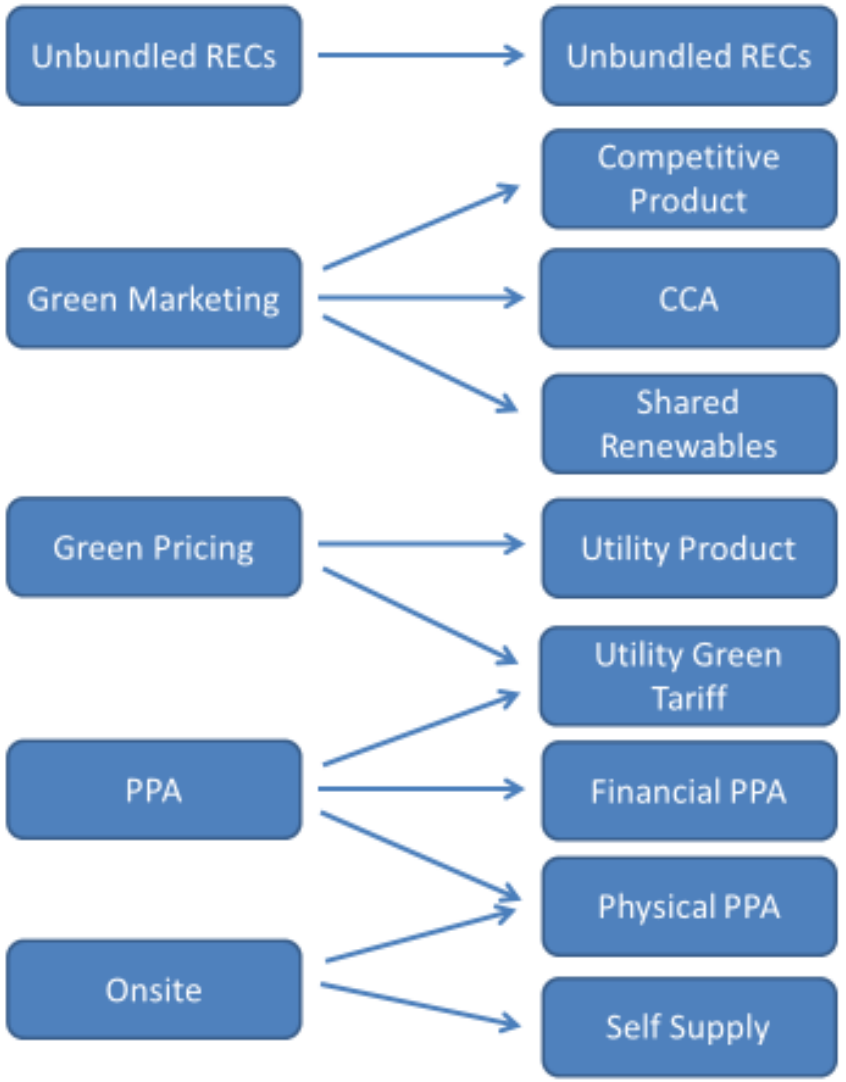
Supply Options

- **Unbundled Renewable Energy Certificates (RECs)**
  - RECs that are sold, delivered, or purchased separately from electricity.
  - RECs provide no physical delivery of electricity to customers and as such the customer is purchasing power from a separate entity than the one selling them the REC. Does not include the underlying electrons -> "unbundled"
- **Utility Supplied Green Power Products**
  - "Bundled" green power product offered by utility suppliers
- **Competitive Green Power Products**
  - "Bundled" product offered by competitive suppliers in electricity markets that are not traditionally regulated
- **On-site**
  - Produces both electricity and RECs from an on-site source (e.g. solar panels, wind turbine)
  - Can be a self-owned renewable system or an on-site PPA
- **Off-site Power Purchase Agreement (PPA)**
  - Usually a long-term contract to procure RECs and underlying electrons from a specific project, can be signed pre- or post-project development
  - PPAs can be "physical" or "financial" (also called virtual PPAs)

https://www.epa.gov/greenpower/green-power-supply-options

Evolving Product Categories



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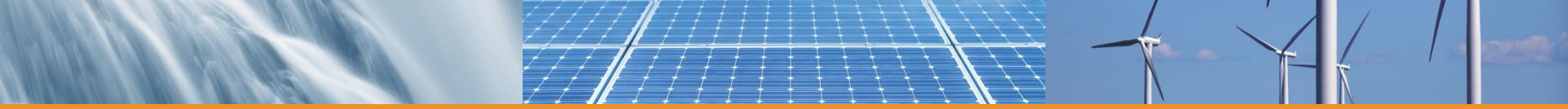

Renewable Energy Certificates (RECs)

- Tradable commodity produced by renewable electricity generators
  - 1 REC = 1 megawatt-hour (MWh) of renewable electricity
- Represent the environmental value of renewable electricity
- RECs prices are strongly influenced by voluntary market supply and demand, as well as by state RPS policies
- They may be bundled with power or unbundled
  - Are the only means of tracking the emissions benefits and environmental attributes associated with the generation from a renewable energy facility

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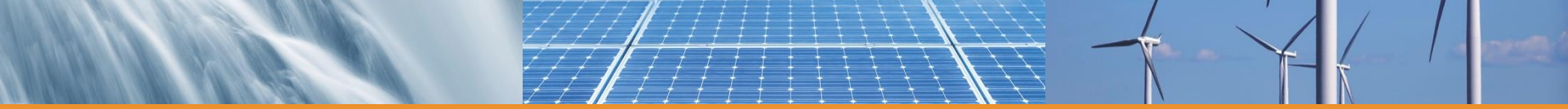

Value Proposition to Companies

- Environmental
  - Addresses indirect GHG emissions (Scope 2 emissions)
- Potential Electricity Cost Savings and/or Stability
  - Reduce exposure to fossil fuel price volatility
- Economic Development
  - Job creation
  - Local/regional economic growth
- Demonstrate Leadership
  - Enhance image
  - Differentiate products/services
  - Improve employee morale/attract and retain talent

> *As a health care provider, we have an obligation to operate in a manner that supports health in our communities and reduces our environmental footprint. By renewing and expanding this wind power purchase agreement, Kaiser Permanente is increasing its investments in cleaner energy. It's the right thing to do for our communities, and it makes good business sense.*
>
> *– Ramé Hemstreet, Kaiser Permanente*

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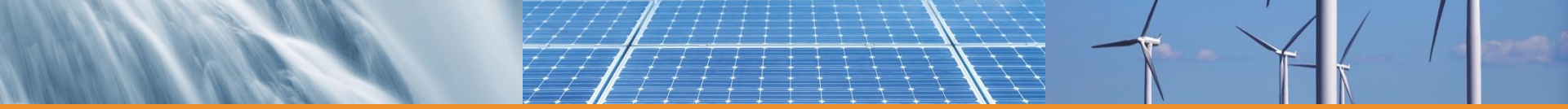

Green Power Partnership Overview

- Summary
  - The U.S. EPA's Green Power Partnership is a voluntary program that encourages organizations to use green power.
- Objectives
  - Reduce U.S. greenhouse gas emissions
  - Expand the voluntary green power market
  - Standardize green power procurement as part of best practice environmental management
- Program Activities
  - Provide technical assistance and tools on procuring green power
  - Provide recognition platform for organizations using green power in the hope that others follow their lead
- ~1,700 Partners are purchasing >45 billion kWh annually

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Partnership Requirements

- EPA supports Partners' procurement of green power by offering advice, technical support, tools and resources, and recognition.
- Partners agree to procure green power and provide an annual update.
- In return, EPA commits to:
  - Provide public recognition
  - Provide procurement and communications assistance, as requested
  - Provide a brief description of the Partner's green power use on EPA's website

	Partnership Benchmark
If your annual electricity use is:	You must, at minimum, use this much green power:
Over 100,000,000 kWh	3% of your use
10,000,001-100,000,000 kWh	5% of your use
1,000,001-10,000,000 kWh	10% of your use
Under 1,000,000 kWh	20% of your use

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EPA's 1,700 Green Power Partners

Helping Leverage Organization's Green Power Use

- **Credible Benchmarks & GHG Quantification**
  - Metrics for "How much green power is enough?"
  - Definition of eligible renewables & products
  - Carbon footprint reduction guidance and calculations
- **Planning & Implementation Resources**
  - Purchasing strategy guidance
  - Marketing and communications support
- **Recognition**
  - Top Partner Lists
  - Use of the Partner mark
  - Green Power Leadership Awards
  - Promotional opportunities
- **Best Practices & Innovation**
  - Collaborative solar procurement
  - New contract mechanisms

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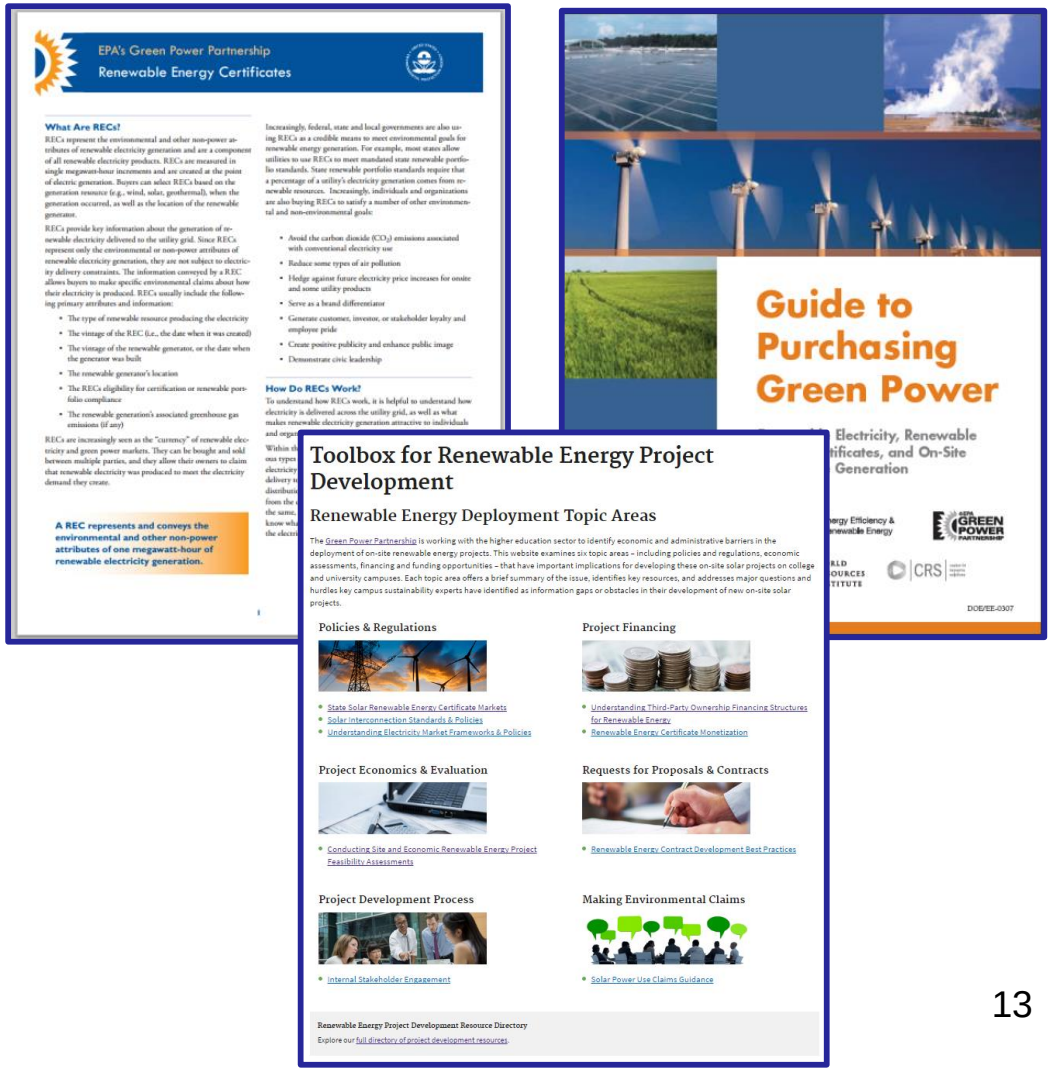
Program Resources for Procuring Green Power

The Partnership Offers:

- Toolbox for Renewable Energy Development
- Guide to Purchasing Green Power
- Screening tool
- Resource Library
- Webinars showcasing best practices
- Issue whitepapers



New Resource – Supply Options Screening Tool

- Easy-to-use spreadsheet tool
- Available at: www.epa.gov/greenpower/procurement-tools-resources

Green Power Supply Options Screening Tool

The purpose of this tool is to help organizations identify possible green power supply options that are available to them. To learn more about the various supply options available in the renewable energy market, visit:
https://www.epa.gov/greenpower/green-power-supply-options

DIRECTIONS

Answer the screening questions using the drop-down menus. Your answers will help identify possible supply options based on your organizational details as well as federal, state and utility policies. To learn more about each of the supply options and whether it works for your organization, click on the respective link in the results section at the bottom.

SCREENING QUESTIONS

Please answer the following questions by selecting an option from each drop-down menu:

1. Is your organization a for-profit or a non-profit organization?	Non-profit
2. In what state does your organization operationally consume electricity? View State's Policy Landscape >>	New Mexico
3. Is your organization open to procuring renewables from offsite projects outside of your state or the grid-region where you operate?	Yes
4. Is your organization willing to commit to a long-term energy purchase/use of 10+ years?	Yes
5. Does your organization use more than 40 million kWh per year of electricity?	Yes
6. Does your organization have investment grade credit?	Yes

RESULTS: Your Organziation's Supply Options

Following is a listing of green power supply options and whether they are viable for your organization based on your answers to the screening questions. Click the links to learn more details about the different procurement options, including considerations and policy implications.

Project-Specific Supply Options						Retail Supply Options		
Onsite Self Supply	Onsite Power Purchase Agreement	Offsite Physical Power Purchase Agreement	Offsite Financial Power Purchase Agreement	Community Solar	Utility Green Tariff	Utility Green Power Product	Competitive Green Power Product	Renewable Energy Certificates
Very Likely	Very Likely	Unlikely	Very Likely	Potentially in the Future	Possibly	Very Likely	No	Yes

EPA's Top Partner Lists

Green Power Partnership National Top 100

Released on January 22, 2018

The National Top 100 list represents the largest green power users within the Green Power Partnership. The combined green power usage of these Top 100 Partners amount to almost 39 billion kilowatt-hours annually, which represents approximately 85 percent of the green power commitments made by all EPA Green Power Partners.

- [**National Top 100**]
- Top 10 Federal Government
- Top 30 College & University
- Top 30 K-12 Schools
- Top 30 Local Government
- Top 30 On-site Generation
- Top 30 Retail
- Top 30 Tech & Telecom
- 100% Green Power Users
- Fortune 500® Partners List
- Long-term Contracts

Partner Name	Annual Green Power Usage (kWh)	GP % of Total Electricity Use*	Organization Type	Providers (listed in descending order by kWh supplied to Partner)	Green Power Resources
1. Microsoft Corporation	4,557,278,000	100%	Technology & Telecom	Sterling Planet°, Enbridge LLC, EDF Renewable Energy, Black Hills Corp., Renewable Choice Energy°, On-site Generation	Solar, Wind
2. Intel Corporation	4,152,034,623	100%	Technology & Telecom	Renewable Choice Energy°, 3Degrees°, On-site Generation, PNM	Biomass, Geothermal, Small-hydro, Solar, Wind
3. Google Inc.	1,763,588,904	47%	Technology & Telecom	MidAmerican Energy°, NextEra Energy Resources°, Grand River Dam Authority°, Northern Wasco County PUD, On-site Generation	Biogas, Small-hydro, Solar, Wind
4. Kohl's Department Stores	1,429,423,791	115%	Retail	3Degrees°, Carbon Solutions Group°, Renewable Choice Energy°, On-site Generation	Solar, Wind

2017 Green Power Leadership Award Winners

Excellence in Green Power Use
Capital One
Clif Bar & Company
Equinix, Inc.
Google Inc.
Microsoft Corporation
TOTO USA / Morrow, Georgia Facility
University of California
University of Tennessee, Knoxville
Green Power Partner of the Year
City of Houston, Texas
L'Oréal USA

Direct Project Engagement
Amphitheater Public Schools
Apple Inc.
Intel Corporation
Iron Mountain Information Management, LLC
Lockheed Martin Corporation
Stanford University
University of Missouri
Victor Valley Wastewater Reclamation Authority
Green Power Community of the Year
Bainbridge Island, Washington

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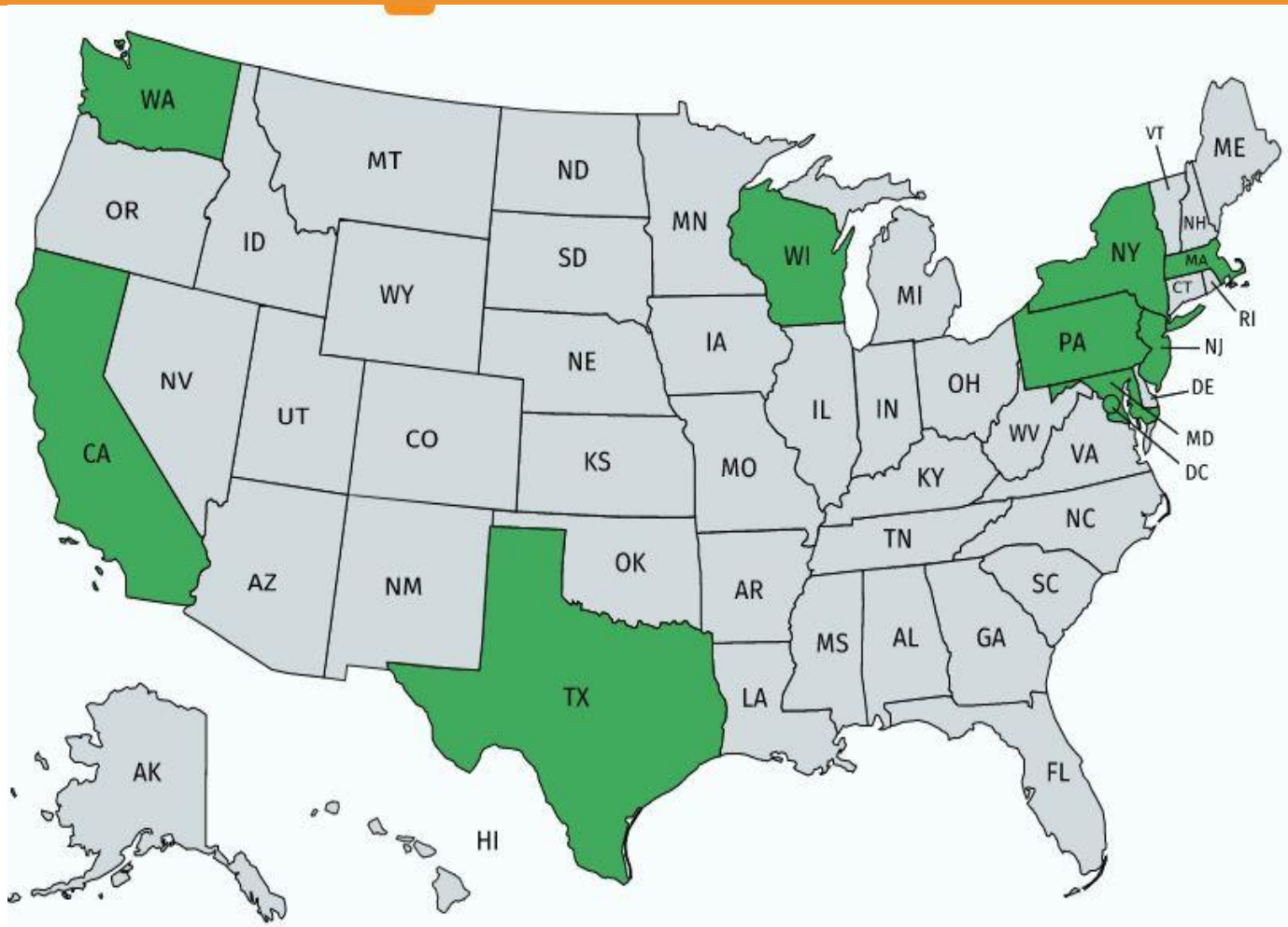
Top Green Power Usage by State

State	# of GPP Partner	Total GP Usage (kWh)
CA	203	11.2 B
WA	51	5.8 B
NY	107	3.6 B
TX	429	3.6 B
DC	66	3.5 B
WI	62	2 B
NJ	30	2 B
PA	64	2 B
MA	48	1.3 B
MD	75	1 B



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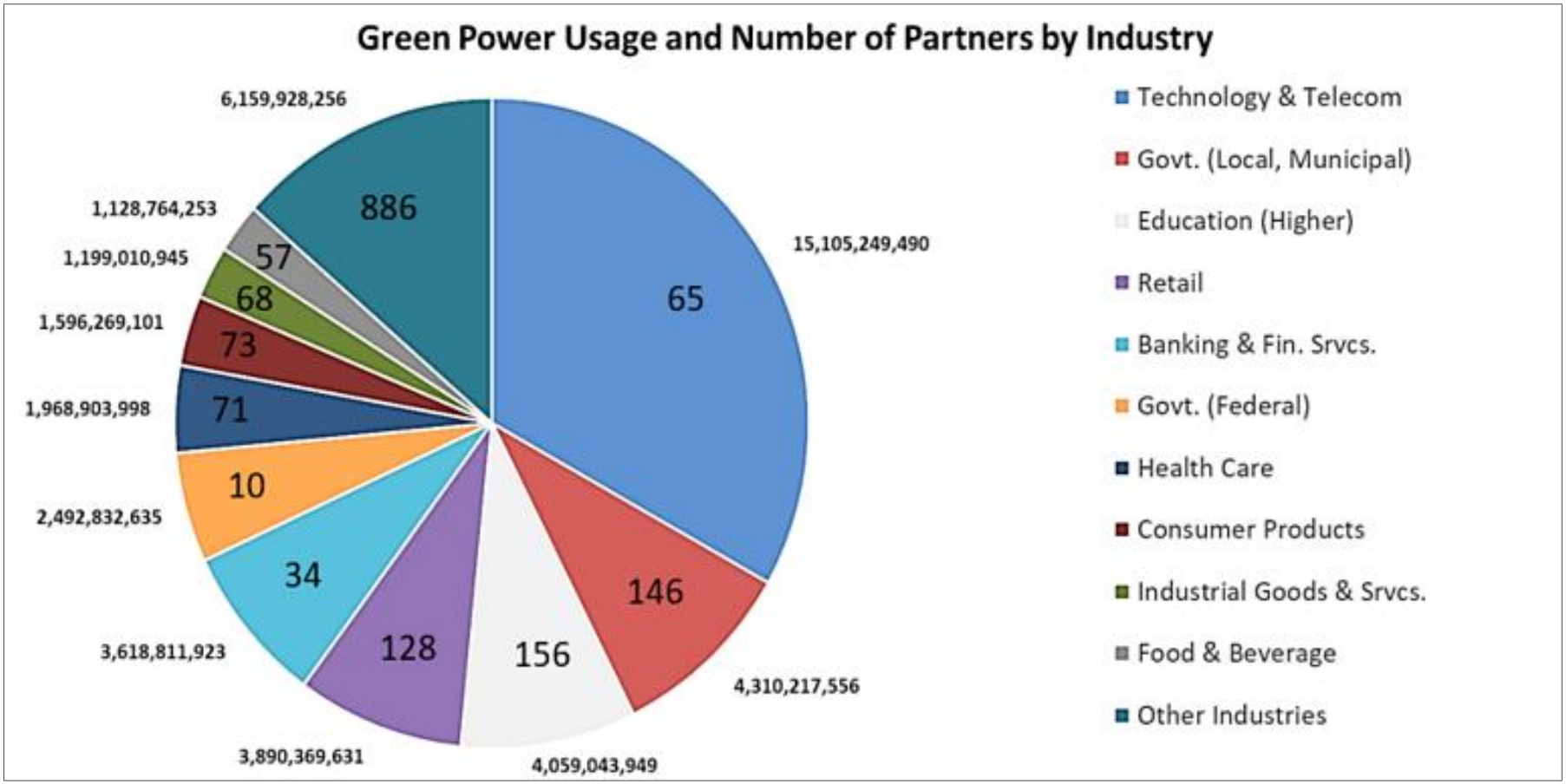
Green Power Usage by Industry



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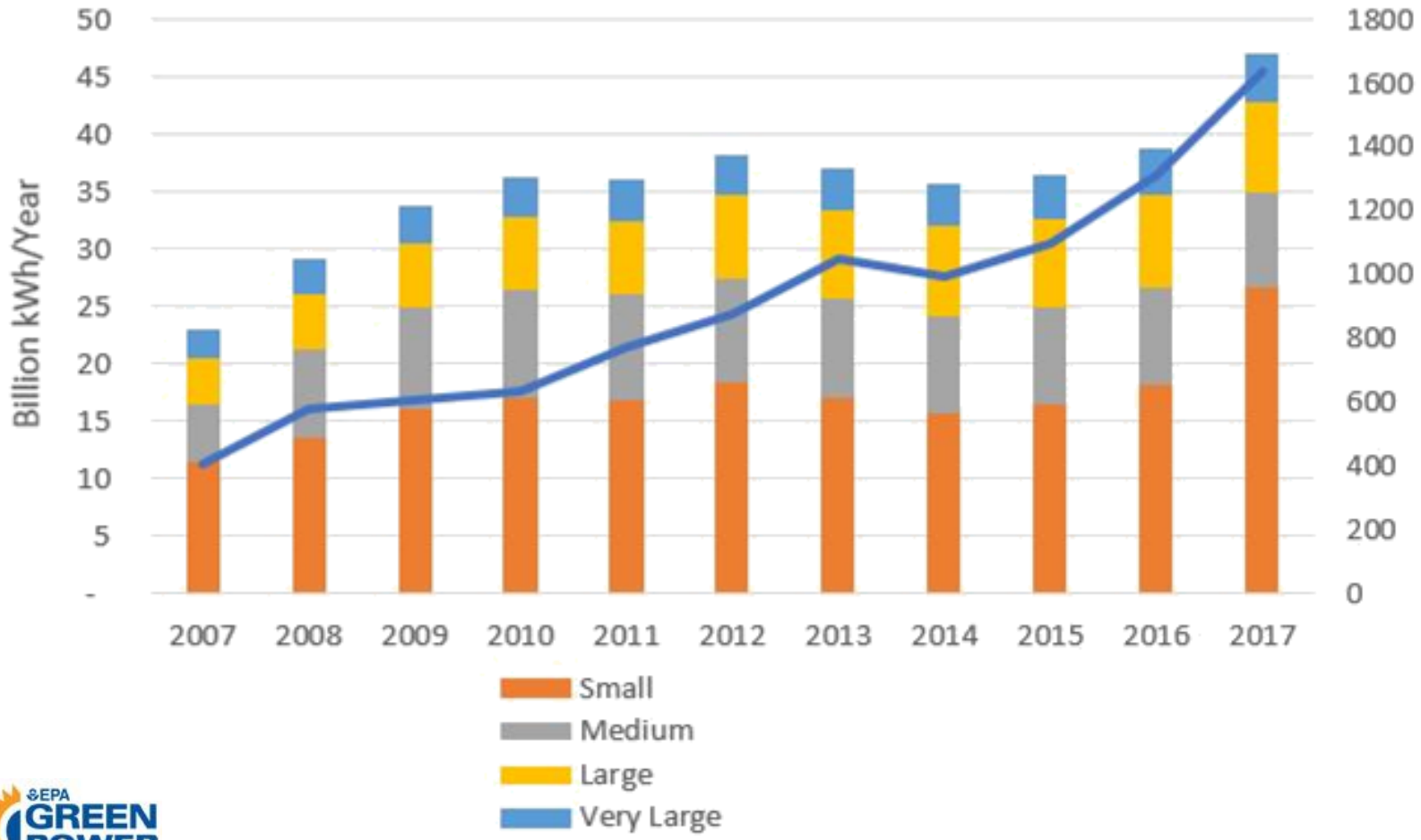
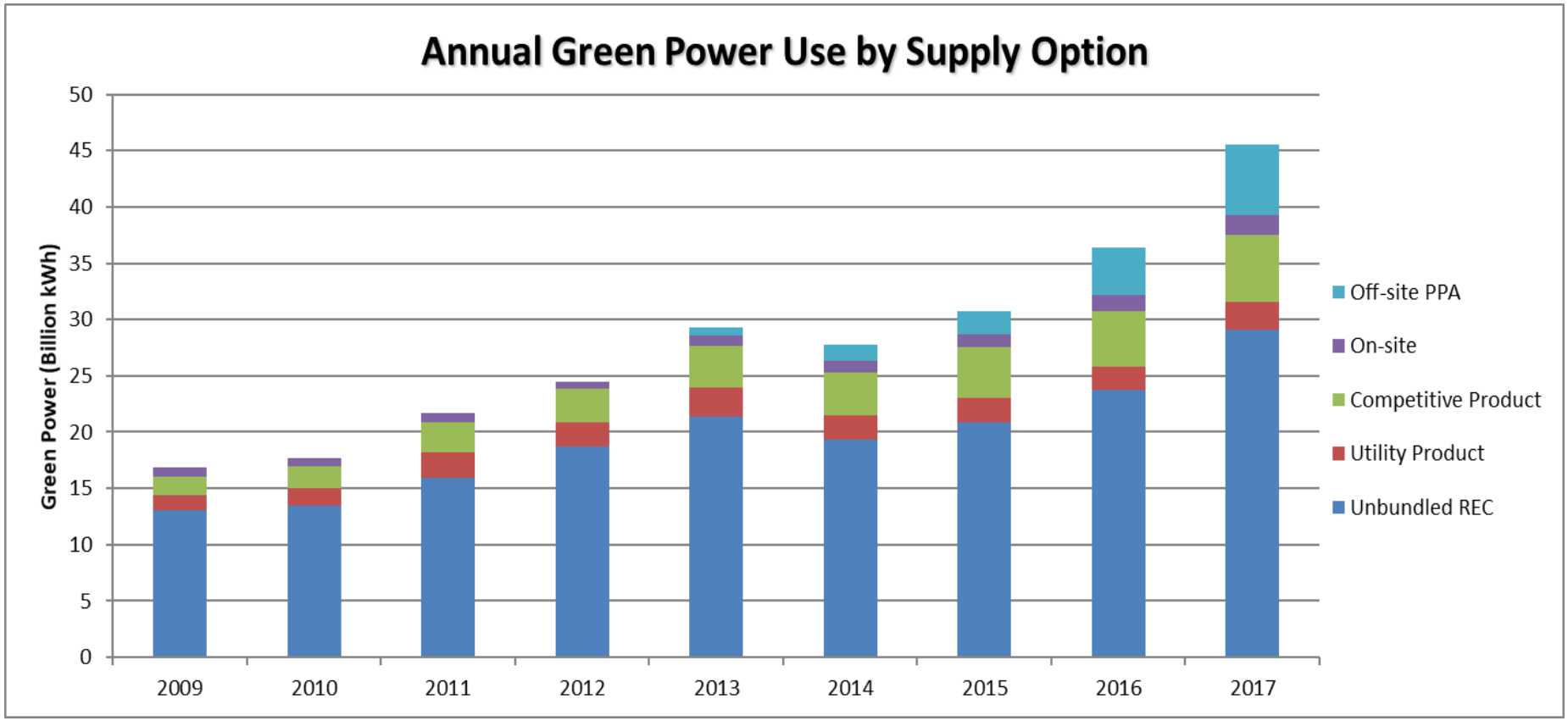
GPP Green Power Use and Number of Partners



Annual Green Power Use by Supply Option



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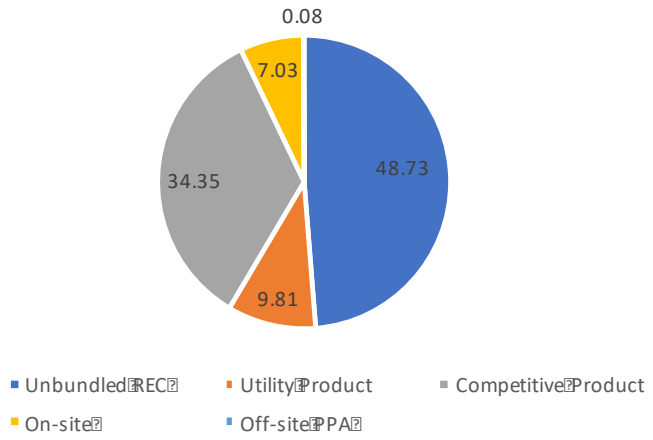
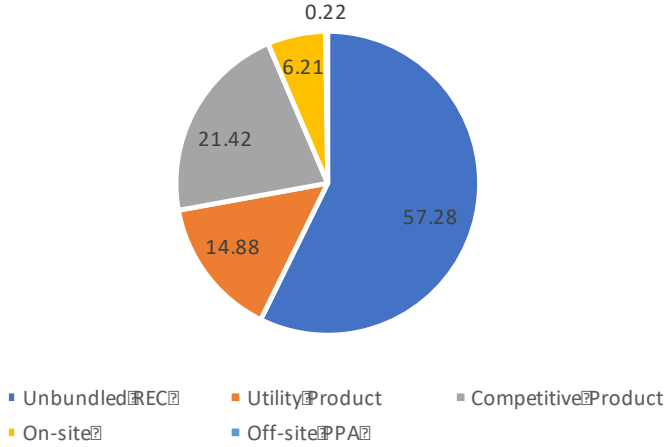
Green Power Supply Options by Benchmarks

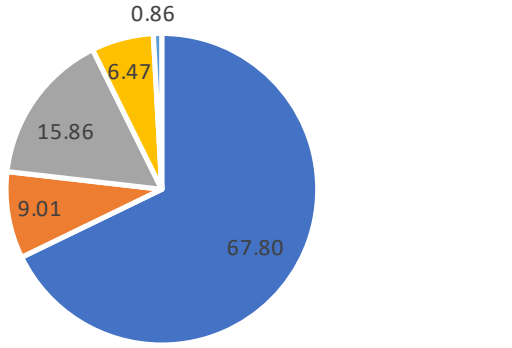
Small Partners' Supply Breakdown



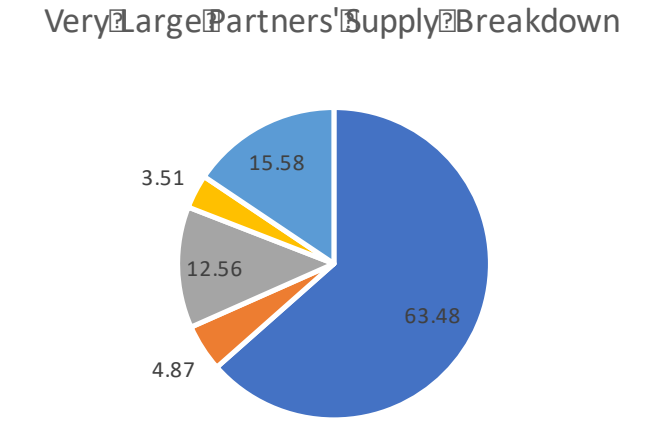
Medium Partners' Supply Breakdown



Large Partners' Supply Breakdown



Very Large Partners' Supply Breakdown



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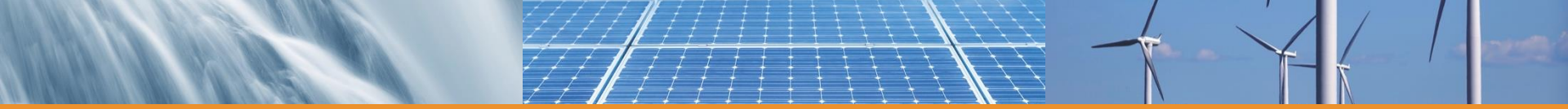
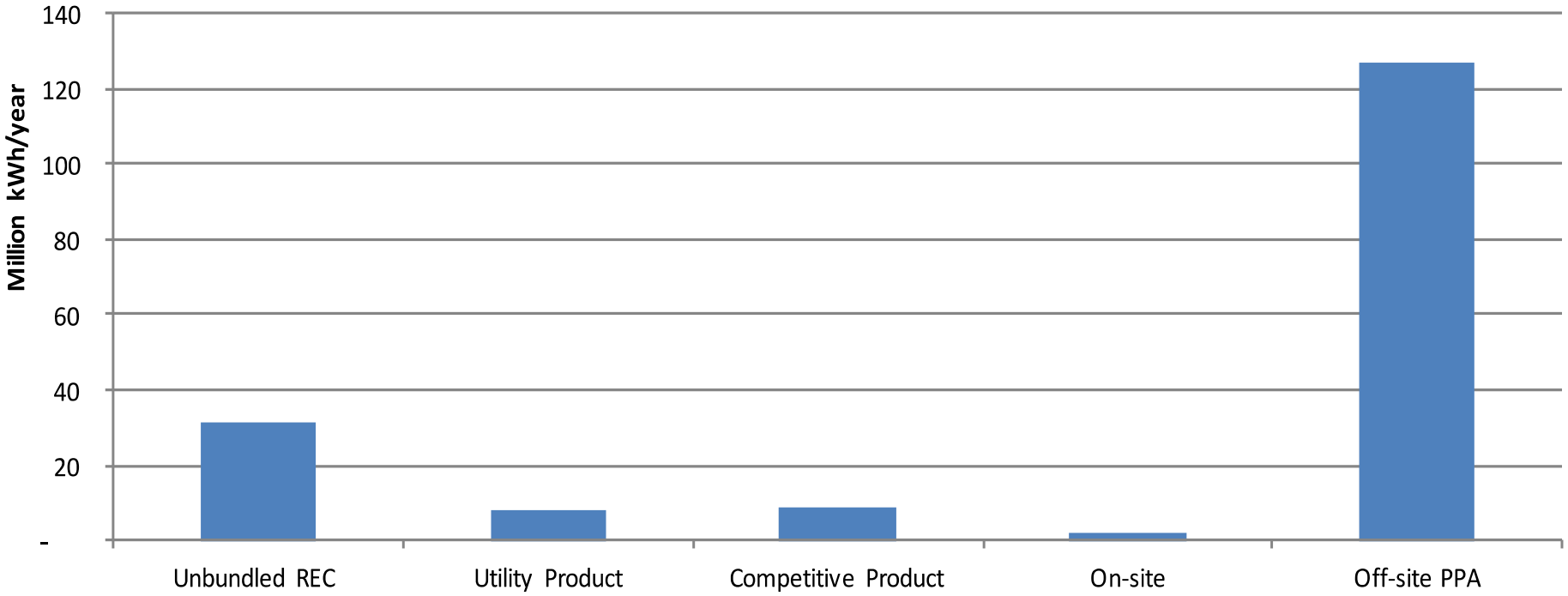


Average Green Power Contract Size in kWh by Supply Option



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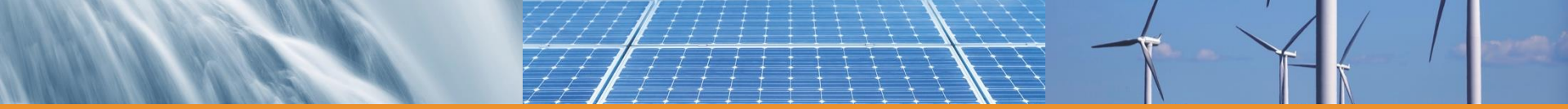
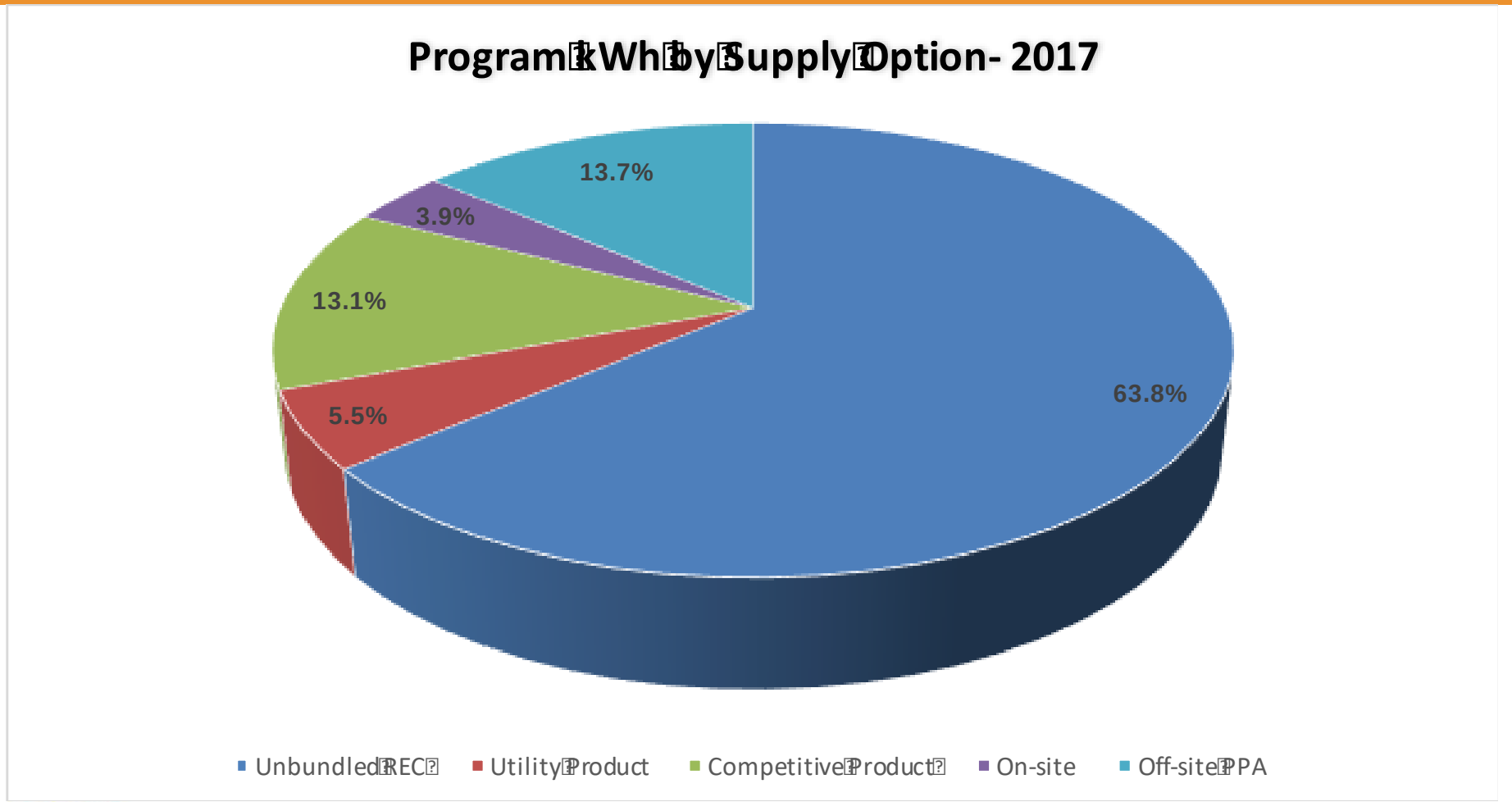
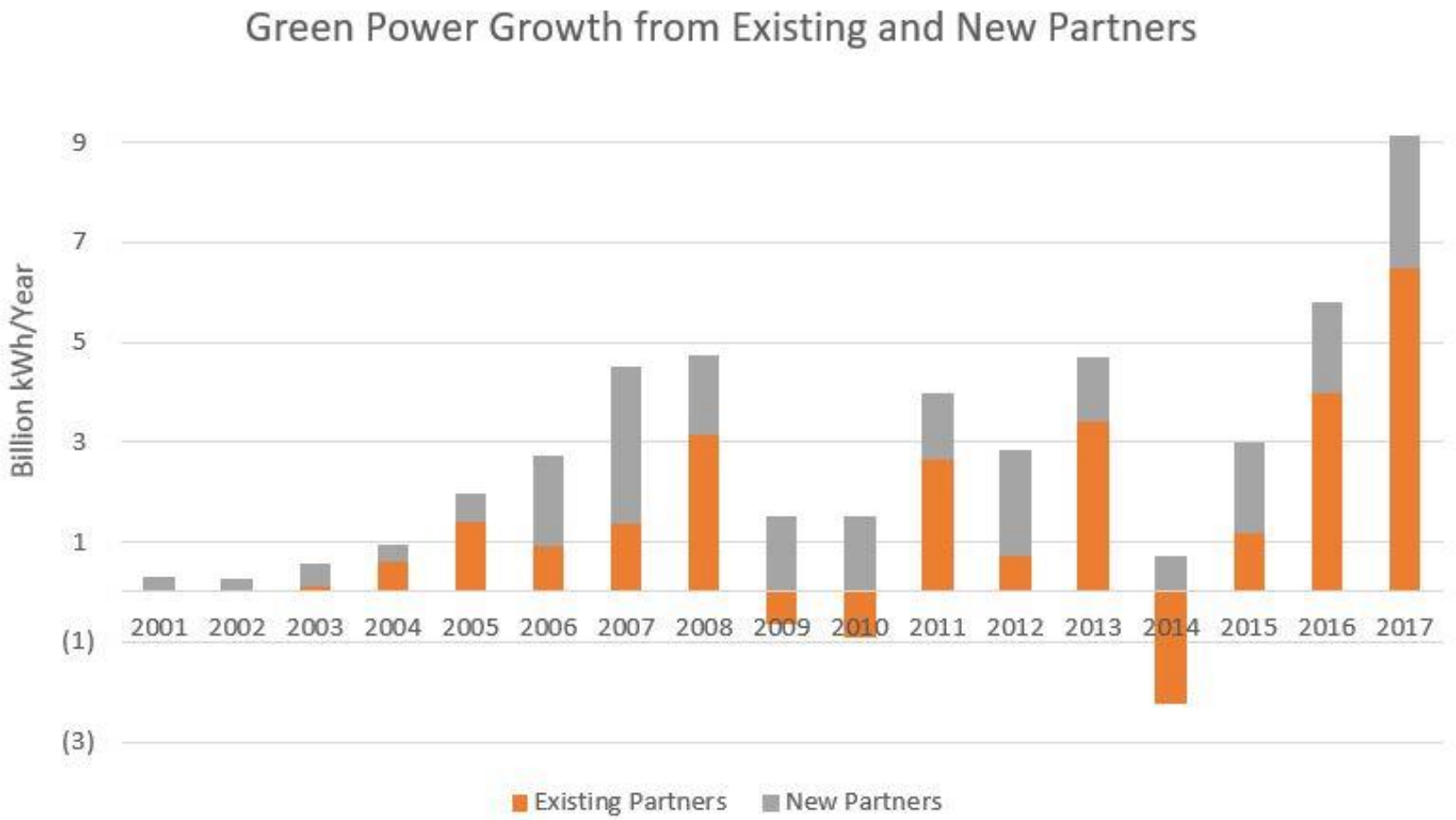



Program kWh by Supply Option- 2017
13.7%
3.9%
13.1%
5.5%
63.8%
Unbundled REC
Utility Product
Competitive Product
On-site
Off-site PPA

Program Growth



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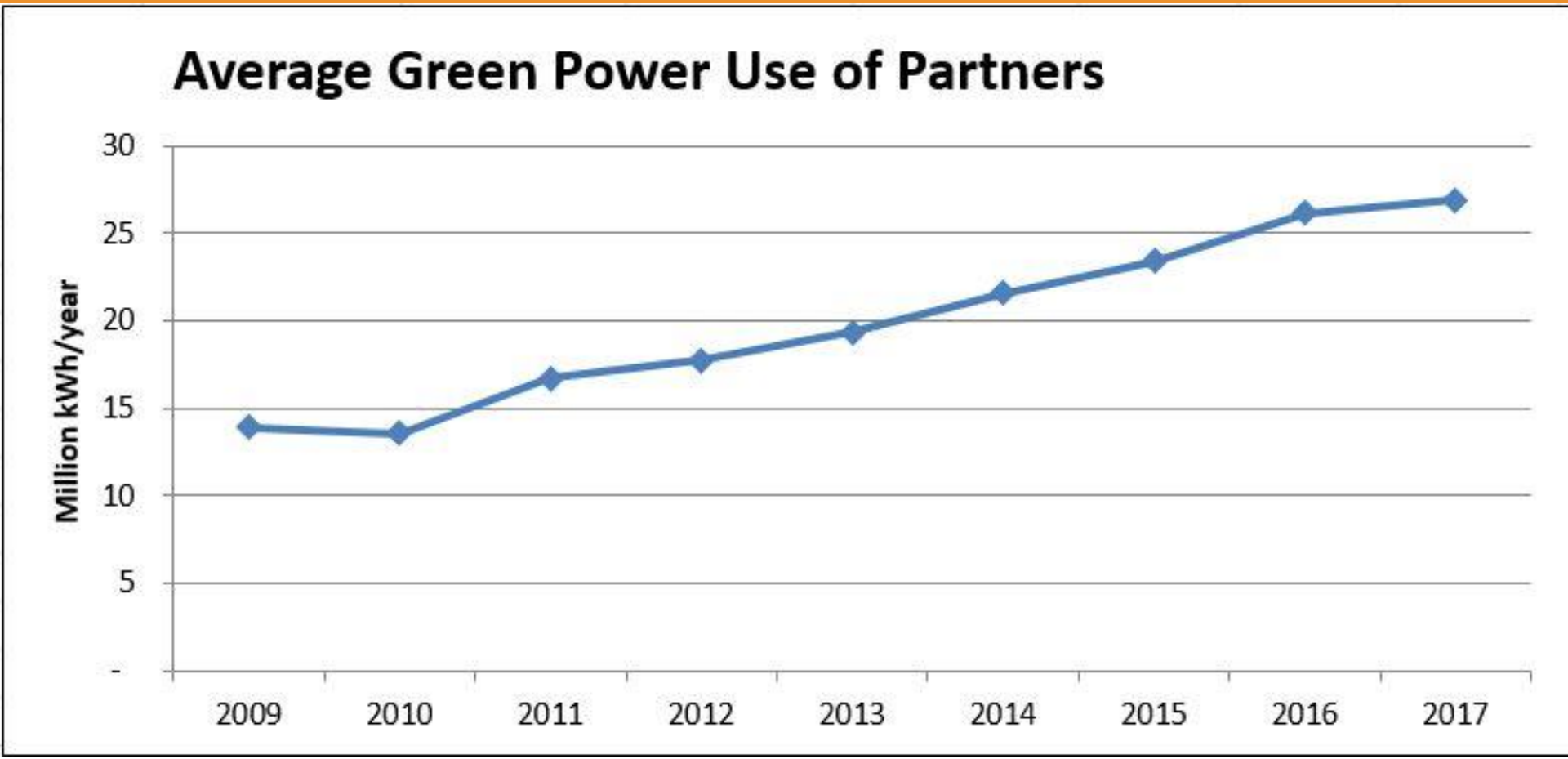
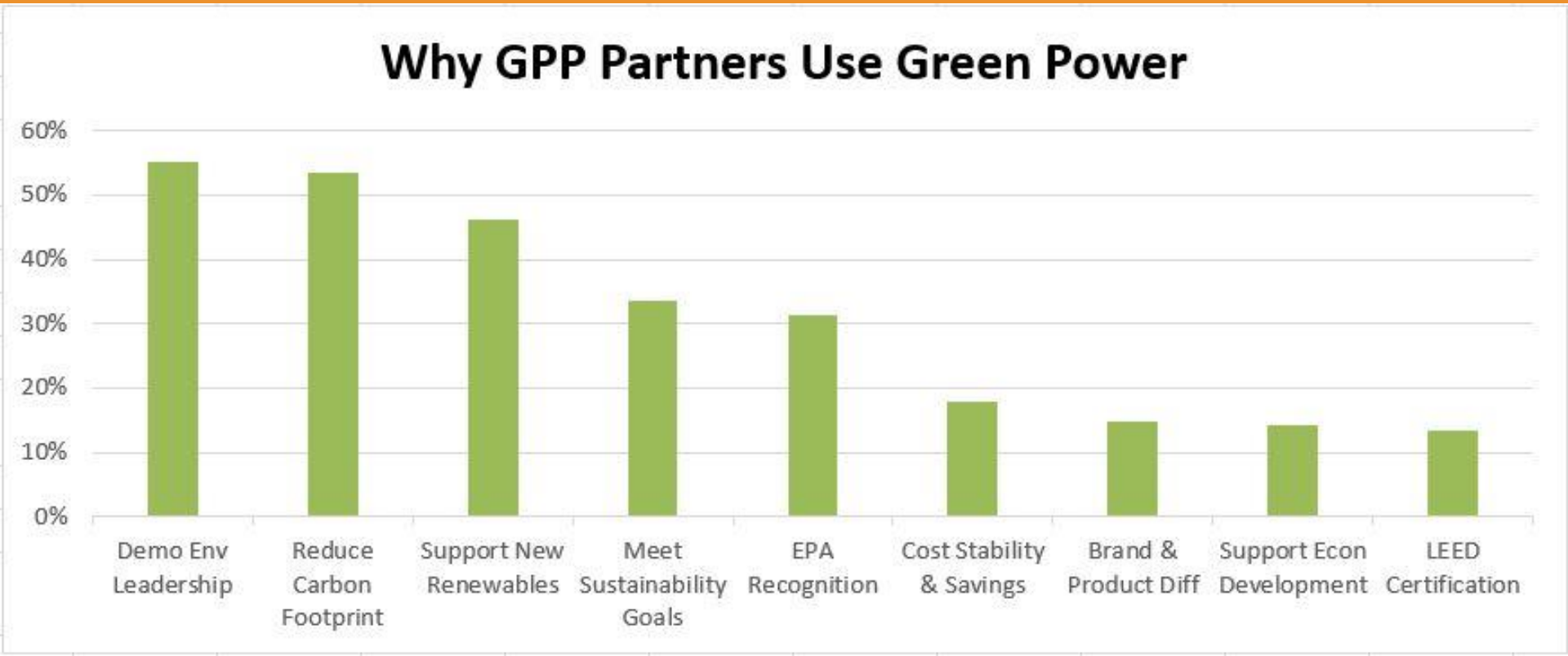
Average Green Power Use by Partners



Motivation


Why GPP Partners Use Green Power
60%
50%
40%
30%
20%
10%
0%
Demo Env Leadership
Reduce Carbon Footprint
Support New Renewables
Meet Sustainability Goals
EPA Recognition
Cost Stability & Savings
Brand & Product Diff
Support Econ Development
LEED Certification