



# State of the Voluntary Green Power Market

January 25, 2017



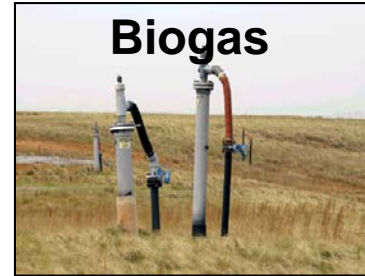


# Speakers and Agenda

- 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
  - Introduction to Green Power Partnership
    - Mission and Goals
    - Tools and Resources
    - 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.



# Procurement Options

## 1. Renewable Energy Certificates (RECs)

- The environmental “attributes” of electricity generated from renewable resources (1 REC = 1 MWh)
- Attributes are based on the generation technology type and age, geographic location, and time of generation
- Does not include the underlying electrons – “unbundled”



## 2. Utility Supplied Green Power Products

- Green power offered by utility suppliers generated from renewable sources
- “Bundled” product that includes both the RECs and underlying electrons



## 3. Self Generation

- Install a self-owned renewable system (e.g. solar panels, wind turbine)
- Produces both electricity and RECs from the on-site source

## 4. Power Purchase Agreement (PPA) for Renewables

- Usually a long-term contract to procure RECs and underlying electrons from a specific project, can be signed pre- or post-project development
- Can be from onsite or offsite project
- PPA can be “physical” or “virtual”



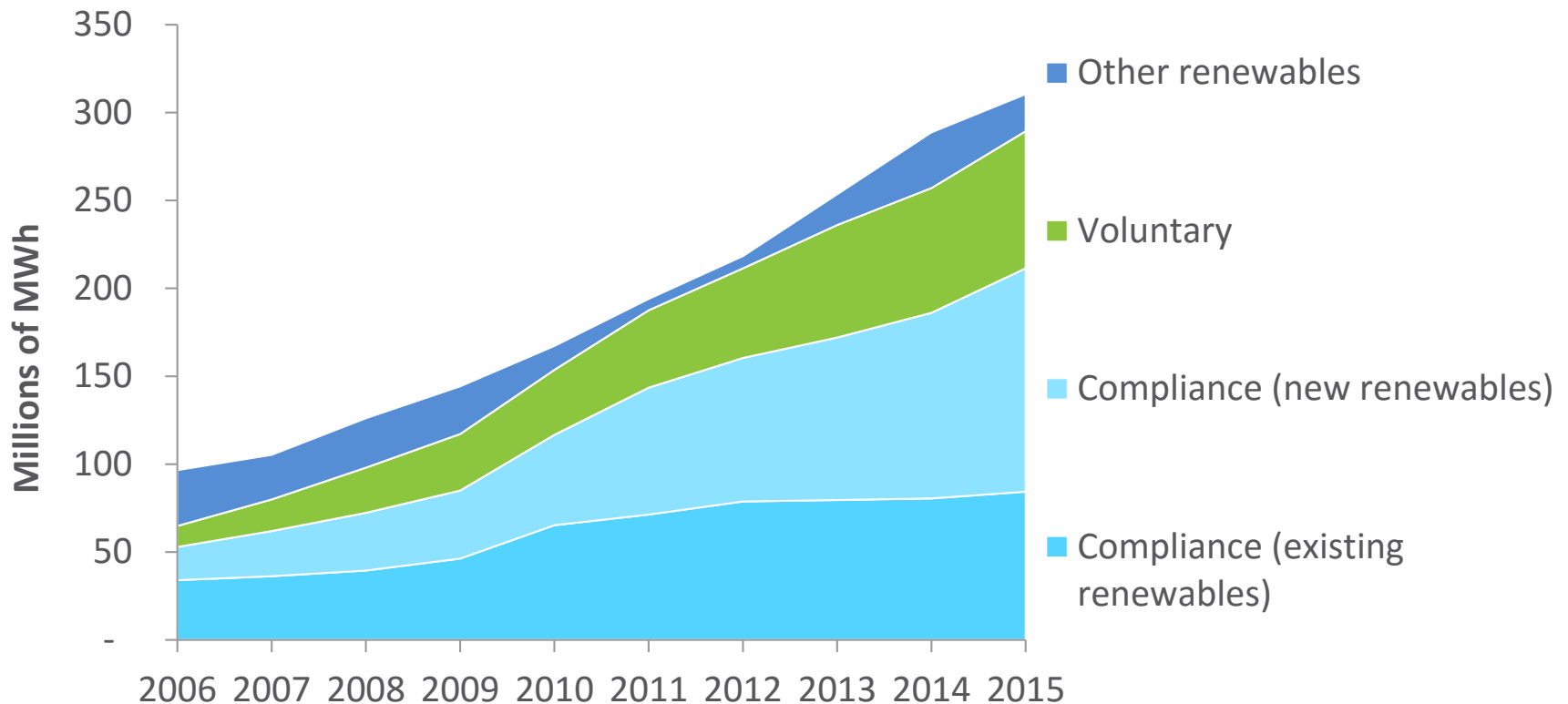
## 5. Virtual Net-metering / Community Solar

- Allows utility customers to share the electricity output from a single power project, typically in proportion to their ownership of the shared system



# Green Power Markets

- **Mandatory/compliance markets** exist because of policy decisions, such as state Renewable Portfolio Standards (RPS).
- **Voluntary markets** are driven by consumer preference.



Sources: EIA (2016), Barbose (2016), O'Shaughnessy et al. (2016)



# 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*





# 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
- 1,400 Partners are purchasing >37 billion kWh annually, equivalent to the annual electricity use of nearly 3.4 million American homes





# 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







# EPA's Green Power Partnership: Helping You Leverage Your Green Power Use

- **Credible Benchmarks & GHG Quantification**
  - Metrics for “How much green power is enough?”
  - Definition of eligible renewables & products
  - GHG 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







# Examples of Outreach

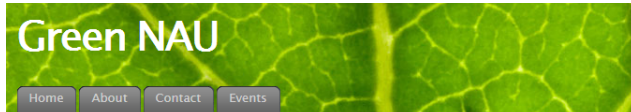
## Videos



Intel Tops EPA's List of Green Power Partners



## Websites



EPA RECOGNIZES NORTHERN ARIZONA UNIVERSITY FOR LEADING GREEN POWER USE



Northern Arizona University reduces carbon footprint with green power use

Northern Arizona University has officially been purchasing Green Power for one year and has received recognition from the U.S. Environmental Protection Agency from joining their Green Power Partnership. Northern Arizona University is using more than 8 million kilowatt-hours (kWh) of green power this year, which is enough green power to meet 13 percent of the organization's electricity use. Northern Arizona University is buying a combination of renewable energy certificates (RECs) and utility green power products from Arizona Public Service and Renewable Choice Energy. In addition, Northern Arizona University is generating green power from on-site renewable energy systems, including their 163 mWh solar field. This demonstrates a proactive choice to switch away from traditional sources of electricity generation and support cleaner renewable energy alternatives.

"This is a huge honor and we are proud to be recognized by the U.S. Environmental Protection Agency," said John Morris, Assistant Vice President of Facility Services. "Using green power helps our organization become more sustainable and is an essential choice in reducing fossil fuel pollution and mitigating climate risk."



## Print Advertisements



TD Bank is committed to environmental responsibility.

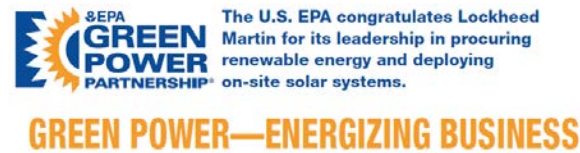
TD Bank is the largest US-based bank to go carbon neutral and the first company to have a North American, closed-loop recycling system which diverts 1,500 metric tons of paper from landfills to the production of recycled paper. In addition, we purchase renewable energy credits for 100 percent of the electricity used by our operations from Maine to Florida.

TD Bank is committed to building environmentally-friendly buildings, and this year, we are building the first "net-zero energy" bank location in the US in Ft. Lauderdale, Florida. To learn more about these and our other green initiatives, visit [www.tdbank.com/green](http://www.tdbank.com/green).



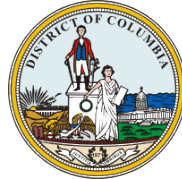
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## Banners





# EPA's 1,400 Green Power Partners





# EPA's Top Partner Lists

## Green Power Partnership National Top 100

Released on October 24, 2016



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 nearly 30 billion kilowatt-hours annually, which represents more than 83 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. <a href="#">Intel Corporation</a>	3,419,967,843	100%	Technology & Telecom	Renewable Choice Energy°, 3Degrees°, On-site Generation, PNM	Biomass, Geothermal, Small-hydro, Solar, Wind
2. <a href="#">Microsoft Corporation</a>	2,699,210,000	100%	Technology & Telecom	Sterling Planet°, Renewable Choice Energy°, Enbridge LLC°, On-site Generation	Biogas, Biomass, Solar, Wind
3. <a href="#">Kohl's Department Stores</a>	1,430,381,349	109%	Retail	3Degrees°, Carbon Solutions Group°, Renewable Choice Energy°, On-site Generation	Solar, Wind
4. <a href="#">Cisco Systems, Inc.</a>	1,085,086,742	97%	Technology & Telecom	3Degrees°, Sterling Planet°, Austin Energy°, On-site Generation	Solar, Wind
5. <a href="#">Google Inc.</a>	1,061,619,944	36%	Technology & Telecom	NextEra Energy Resources°, Grand River Dam	Biogas, Solar, Wind





# 2016 Green Power Leadership Award Winners

## 2016 EPA Green Power Partner Awards

### Excellence in Green Power Use

- [Biogen, Inc.](#)
- [BNY Mellon](#)
- [Forest County Potawatomi Community, Wisconsin](#)
- [Goldman Sachs](#)
- [Government of the District of Columbia \(Washington, DC\)](#)
- [Intel Corporation](#)
- [SC Johnson](#)

### Green Power Partner of the Year

- [Cisco Systems](#)
- [Jackson Family Wines](#)
- [University at Buffalo, the State University of New York](#)

### Sustained Excellence in Green Power

- [Apple Inc.](#)
- [Kohl's Department Stores](#)

### Direct Project Engagement

- [General Motors / GM Orion Assembly Plant](#)
- [Google Inc.](#)
- [HARBEC, Inc.](#)

### Green Power Community of the Year

- [Maplewood Community, Missouri](#)



# Top Green Power Use by State

STATE	TOTAL GREEN POWER USE (kWh)	AVERAGE GREEN POWER USE (kWh)	# OF PARTNERS
California	8,222,179,985	40,108,195	205
Washington	4,622,307,539	78,344,196	59
New York	3,291,570,845	29,128,946	113
Texas	3,153,720,023	33,910,968	93
District of Columbia	3,146,158,386	45,596,498	69
Wisconsin	2,047,229,763	32,495,711	63
New Jersey	1,588,653,055	54,781,140	29
Pennsylvania	1,458,251,893	22,434,645	65
Massachusetts	1,120,660,668	20,011,798	56
Maryland	1,114,356,771	14,662,589	76

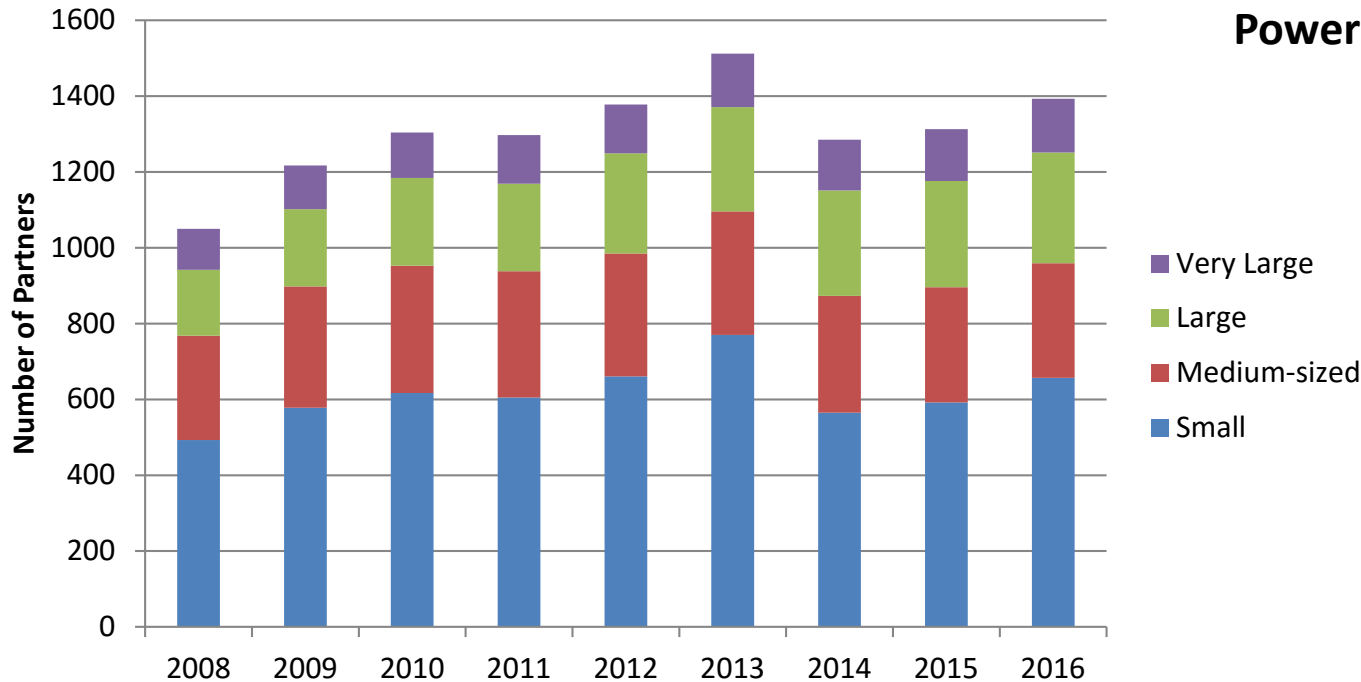


# Top Green Power Use by Industry

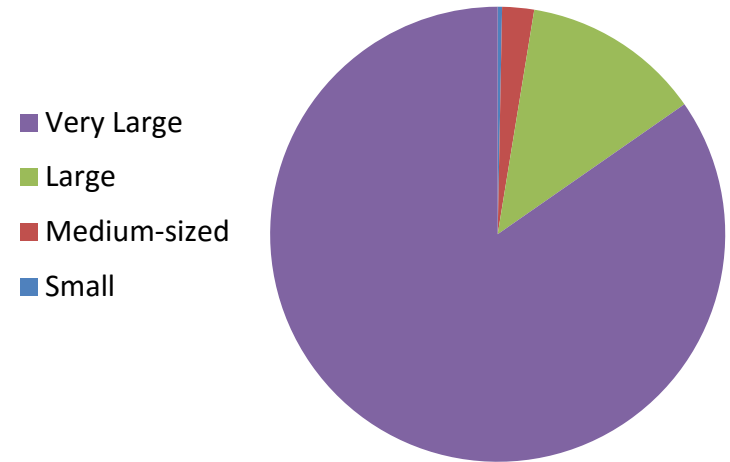
INDUSTRY	TOTAL GREEN POWER USE (kWh)	AVERAGE GREEN POWER USE (kWh)	# OF PARTNERS
Tech & Telecom	11,612,154,539	193,535,909	60
Local Govt.	3,901,594,528	26,723,250	146
Higher Education	3,381,847,787	23,815,829	142
Retail	3,309,834,437	39,877,523	83
Federal Govt.	2,246,982,647	204,271,150	11
Banking & Fin. Svcs.	1,986,494,747	82,770,614	24
Health Care	1,097,203,532	25,516,361	43
Industrial Goods & Svcs.	1,086,457,480	22,634,531	48
Consumer Products	1,069,809,274	14,858,462	72
Restaurants & Cafes	1,019,504,202	9,102,716	112

# Number of Partners Over Time

Green Power Partners by Electricity Loads



Share of Partnership's Green Power Use by Electricity Loads



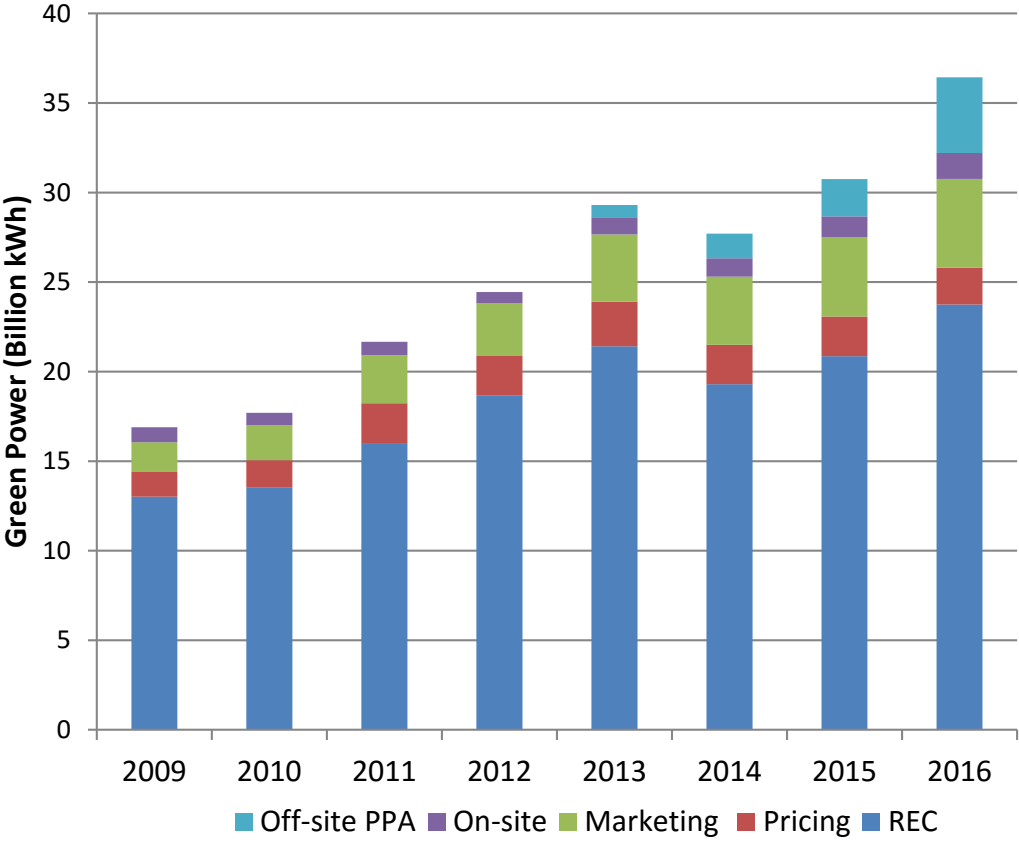
Partner Size Determined by Electricity Load:

- Very Large ( > 100 million kWh)
- Large ( 10 – 100 million kWh)
- Medium ( 1 – 10 million kWh)
- Small ( < 1 million kWh)

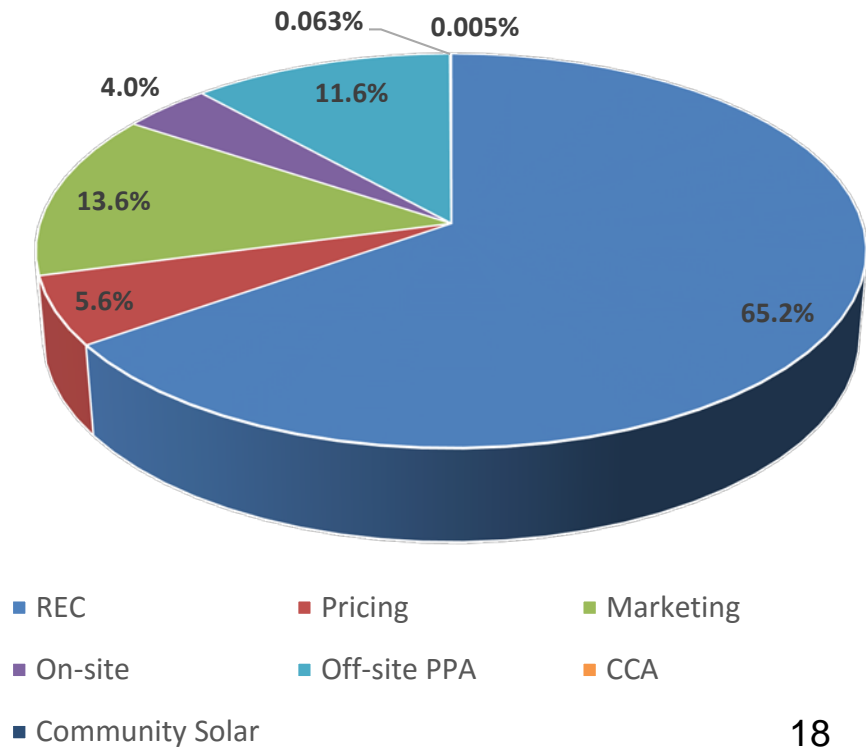


# Program kWh by Product Over Time

## Annual Green Power Use by Product Type



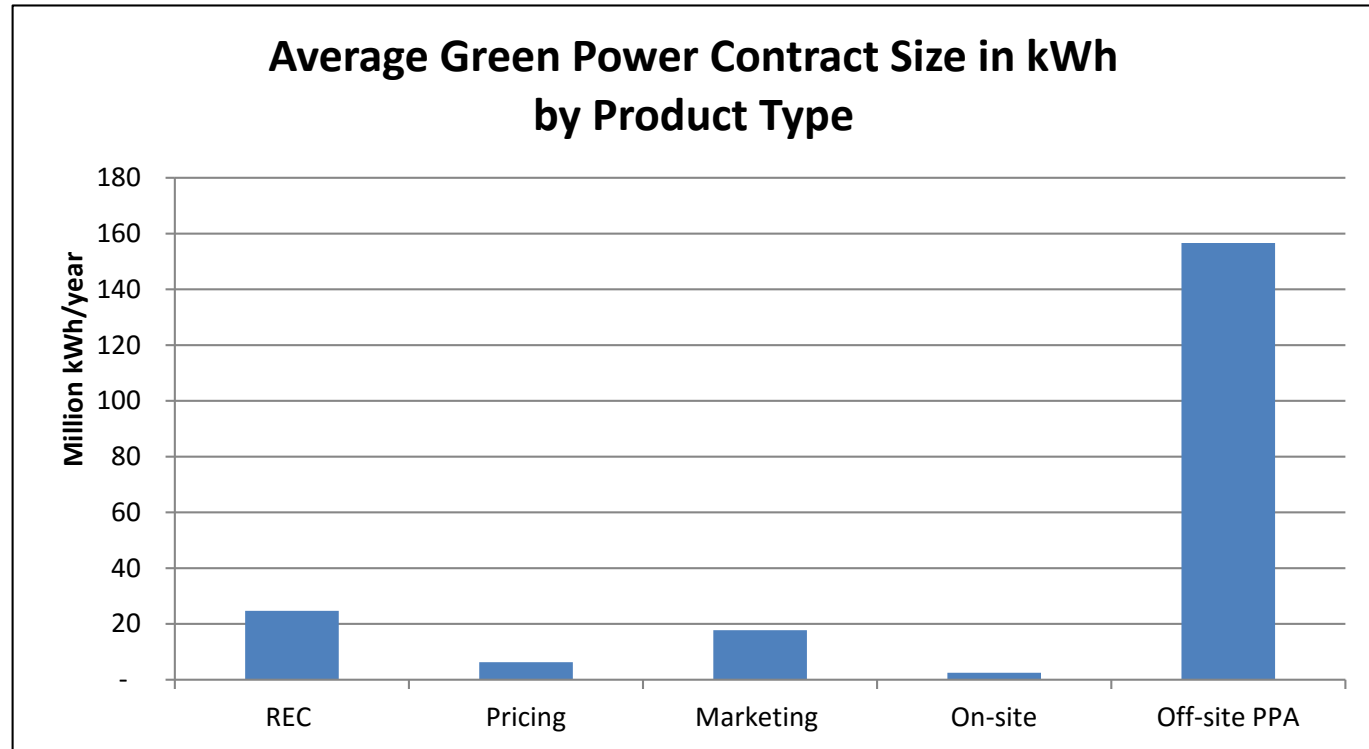
## Program kWh by Green Power Product





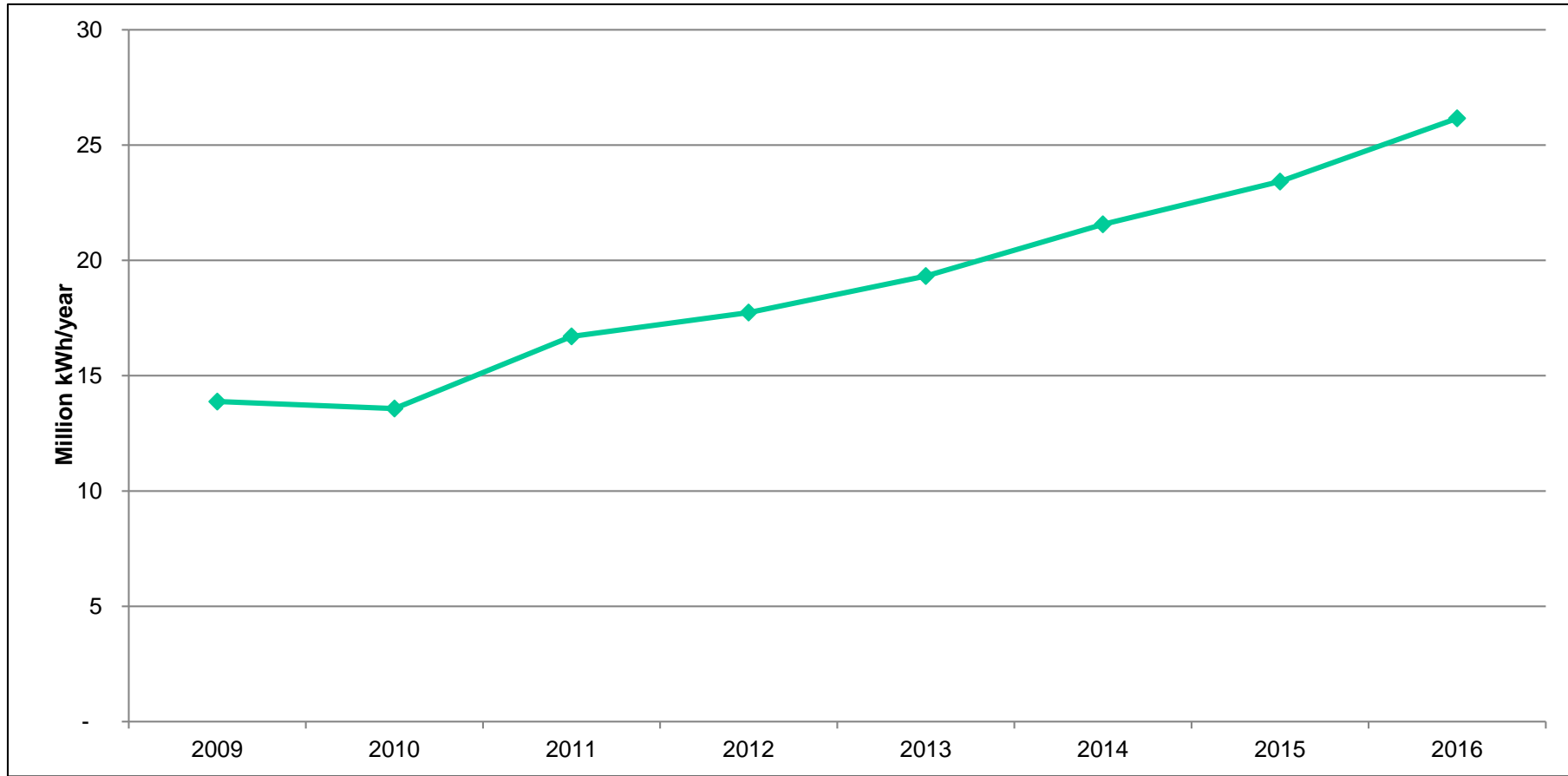
# Average Green Power Use by Product Type

- Demonstrates the importance of Offsite PPAs and RECs in current market
- On-site is compelling, but poses scale challenges





# Average Green Power Use of Partners





# GPP Updates

- GPP Webinar series: <https://www.epa.gov/greenpower/green-power-partnership-events-and-webinars>
- Next Quarterly Top Partner Rankings released: April 24  
<https://www.epa.gov/greenpower/green-power-partnership-top-partner-rankings>
- Green Power Leadership Awards will be presented at the 2017 Renewable Energy Markets Conference in New York City:  
<http://www.renewableenergymarkets.com/>
- Sign up for our monthly program updates and other GPP news on our website: <https://www.epa.gov/greenpower/forms/contact-us-about-green-power-partnership>
- [GPP LinkedIn group](#): 600+ members



# More Information

- Basic Information

- Overview of the Green Power Partnership: [www.epa.gov/greenpower](http://www.epa.gov/greenpower)
- Full details of program requirements: <https://www.epa.gov/greenpower/green-power-partnership-requirements>

- More Questions?

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