



CHAPTER

# 2

## Introducing Green Power

To view the full Guide, visit <https://www.epa.gov/greenpower/guide-purchasing-green-power>



# DOCUMENT MAP

## Summary

### Chapter 1. Introduction

### Chapter 2. Introducing Green Power

What is Green Power?  
Introduction to Renewable Energy Certificates  
Introduction to the Voluntary Market  
Certification and Verification  
Tracking Systems

### Chapter 3. The Benefits and Costs of Green Power

The Benefits  
The Costs  
Public Relations Considerations

### Chapter 4. Green Power Product Options

Purchase Options  
Self-Generation Options  
Green Power Supply Options Summary

### Chapter 5. Using Organizational Goals to Guide Green Power Purchases

Setting Goals  
Identifying Key Decision-Makers  
Gathering Energy and Facility Data  
Choosing Green Power Options

### Chapter 6. Contracting for Green Power

Developing Criteria for Screening Green Power Suppliers and Products  
Collecting Product Information  
Creating a Procurement Plan

### Chapter 7. Planning a Self-Generation Renewable Project

Screening the Options  
Obtaining Resources and Assistance  
Creating a Project Plan  
Installing and Operating a Renewable Generation Project

### Chapter 8. Capturing the Benefits of the Purchase

The Environmental Benefits  
Promoting the Organization's Purchase

### Chapter 9. Conclusion

### Chapter 10. Resources for Additional Information

## Glossary

### Appendix A. Green Power Considerations for Federal Agencies

### Appendix B. Commercial Solar Financing Options

### Appendix C. Purchasing renewable energy as a residential customer



## What is Green Power?

The term green power can be used in several different ways. In this guide, green power refers specifically to electricity supplied from a subset of renewable resources that provide the highest environmental benefit. Green Power is also defined as renewable electricity that goes above and beyond what is otherwise required by mandate or requirement – green power is also voluntary or surplus to regulation. Renewable energy is supplied by natural resources that replenish themselves over short periods of time without being depleted. Green power is a subset of renewable energy and represents those renewable energy resources that provide the highest environmental benefit, such as:

- Solar
- Wind
- Geothermal (the earth's heat)
- Biogas
- Biomass (some forms of plant and waste material)
- Low-impact hydroelectric resources

Green power generally does not include some resources that are often considered as renewable energy including large hydropower and municipal solid waste.

## Green Power and Related Terms

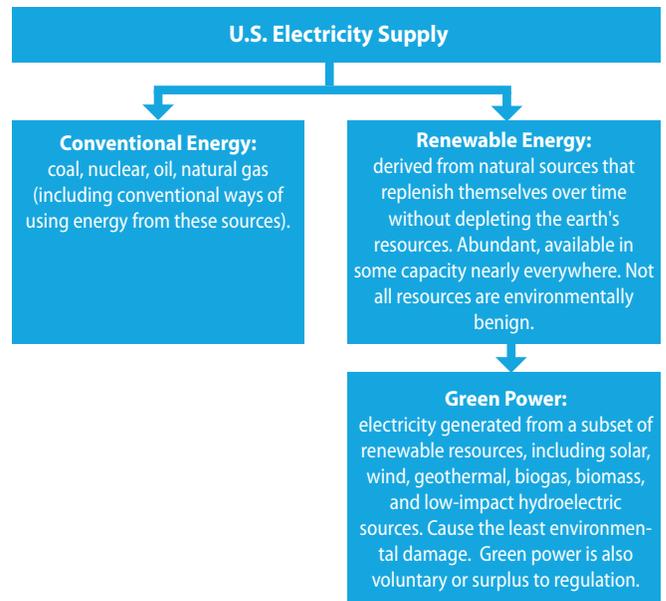
The U.S. energy supply includes a variety of energy resources. Inclusion of specific resources in certain definitions for clean or renewable energy is often driven by other factors beyond the environmental profile of the resource. Green power is viewed by the market as a subset of renewable energy which is shown in Figure 2-1. Green power, as described by EPA's Green Power Partnership, is a term that includes only electricity generated from this subset of renewable resources. Readers should keep in mind that the resources associated with renewable energy or green power vary depending on the source or program. For more discussion on the definition of green power, please refer to the websites of the organizations that collaborated on this guide, listed at the beginning of Chapter 10, Resources for Additional Information.

## Introduction to Renewable Energy Certificates

Due to the physical nature of electricity and the way it moves across the shared electric grid, it is difficult for consumers (or utilities) to know precisely the source or origin of the electricity they consume, even with onsite projects. The electricity coming through the utility grid can be generated from many different sources and is essentially mixed together prior to consumption. Historically, these generation sources were not tracked from the generator to consumer.

As states and organizations began developing targets for renewable electricity, a separate system of renewable energy certificates (RECs) was therefore developed to track generation delivered to the grid to meet consumer demand. RECs solve the problem of identification, allocation and ownership of renewable energy across a shared

**Figure 2-1. Green Power as a Subset of the U.S. Electricity Sector**



electric grid. Each REC represents 1 megawatt-hour (MWh) of electricity generated and conveys the environmental and social attributes of the generated electricity to consumers.

State or regional electronic tracking systems issue RECs to generators that have registered with and report verified generation to the tracking system. The RECs issued are tradable legal instruments that are used to verify ownership of the attributes of the energy generation from the point of generation to the point of use. The REC owner has the right to claim the attributes of the renewable electricity.

States first created RECs to track compliance with mandatory renewable energy targets for electricity suppliers (also known as state renewable portfolio standards), and in some cases to verify electricity supplier statements to consumers about fuel mix and environmental impacts of their electricity. Voluntary or non-regulatory markets and programs invariably require RECs as proof of green power purchases, and the Federal Trade Commission has issued environmental marketing guidelines that require ownership of RECs to substantiate commercial renewable energy claims. This substantiated claims guidance extends not only to those who claim to be using renewable energy, but also to those who claim to be selling renewable energy, such as renewable energy project developers.

Although there are differences in state definitions of RECs for compliance purposes, state rules and voluntary market norms generally agree that the REC instrument provides a legal basis for making green power and other environmental claims. As such, RECs provide an essential accounting and tracking function in renewable energy and green power claims.

In support of such claims, RECs convey information about each megawatt-hour of electricity generated and consumed: not only whether it is renewable or green but also other details such as the type of fuel or resource used to generate the electricity, air emissions created during generation, generator capacity, location and year the generator began operation, month or quarter when the electricity on which the REC is based was generated, and other characteristics associated with the generator and generation. These descriptive characteristics are usually referred to as “attributes,” and are important to documenting environmental claims and determining eligibility for programs or financial incentives.

In addition to being essential to substantiate environmental claims, RECs help avoid double counting and claiming of the same generation attributes by more than one party. RECs must include all relevant information on the generation of their underlying green power including location, fuel type and month or quarter of generation. They must be tied to 1 MWh of actual green power generation no matter how large or small the facility is or where the facility is located relative to the consumer.

If the generator is not registered with a REC tracking system, and therefore RECs are not formally issued within a tracking system, the generator nevertheless creates RECs or energy attributes with every megawatt-hour generated. These RECs or energy attributes may be conveyed to another party by way of a contract. Generation must still be measured and generator attributes verified. Without benefit of a tracking system, verification of ownership would be proven through an independent chain-of-custody contract audit.<sup>1</sup>

## What is a REC?

A renewable energy certificate (REC) is a tradable market instrument that represents the generation of 1 megawatt-hour (MWh) of electricity from a renewable energy source.

This Chapter introduces the REC and its role as the tracking and accounting instrument for generation and use of renewable energy.

Chapter 4 reviews RECs and green power product options. The Chapter identifies that RECs are a core instrument to all green power supply options as well as a stand alone supply option unto itself.”

---

<sup>1</sup> This is also true in the case of self-generation where the consumer of the energy owns the generator that is not registered with a REC tracking system. The consumer-owner of the generator may make green power usage claims based on the attributes of the generator, but the records of the generator and its output should be documented and verifiable.

## Introduction to the Voluntary Market

The voluntary market provides consumer choices, particularly the ability to choose green power. States can set their own renewable energy goals and may mandate that utilities supply a specified percentage of their electricity to customers from renewable energy resources. Utility customers in these markets purchase and receive renewable energy as part of their standard electricity service without any proactive measures on their part. This buying and selling of renewable electricity that simply meets a mandate and occurs because of mandated utility purchases is known as the “compliance market.” In contrast, consumers who choose to purchase renewable electricity above and beyond any minimum amounts that their state requires, as well as above and beyond what is available through their standard electricity service in states that do not have renewable energy mandates, participate in what is known as the “voluntary market.”

When consumers choose to purchase green power above and beyond what is required or otherwise available, they do so because they want to make a difference that goes beyond what would have otherwise occurred through a mandate or as part of business as usual. These voluntary actions help increase the aggregate demand for renewable electricity, and over time influence the way electricity is generated.

In the United States, RECs are the instrument used in compliance markets to verify that utilities are procuring and delivering renewable energy in compliance with the state mandate and in the voluntary market to verify that voluntary purchasers are using green power in excess of the renewable electricity that otherwise would have been used to meet state mandates. Voluntary and mandatory markets work alongside each other to create demand for renewable energy. Renewable energy generation represented by RECs that is sold to a regulated entity to meet a mandate should not also be claimed as a voluntary purchase, as this would double count the use and aggregated impact of the renewable electricity.

## Certification and Verification

The voluntary green power market is shaped by the dynamics of supply and demand with little regulatory oversight. As a result, one major concern is ensuring that green power purchasers receive what they paid for and that RECs are not claimed by more than one customer or buyer. It also can be difficult for consumers alone to substantiate claims made about the quality and characteristics of green power products. To address these concerns, a best practice is for consumers to purchase green power products that are certified and verified by an independent third party.

Third-party certification programs set minimum quality standards for green power products and can provide credibility and confirmation of the product’s environmental value. Certification allows customers to confidently state that the purchased green power product has met the specific environmental and consumer protection standards adopted by the certifying organization. A key aspect of certification is verification. Verification helps ensure that there is a traceable pathway back to a known generator and that no other consumers can lay claim to the attributes from the same megawatt-hour of generation. The verification process includes an audit to ensure that claims regarding environmental and non-energy benefits associated with the purchase are accurate.

### Helping Consumers Identify Green Power

**Case Study:** The Green-e program, administered by the nonprofit Center for Resource Solutions, uses its stakeholder-driven eligibility criteria to certify and verify renewable energy products. Green-e has coordinated the development of market-based, consensus definitions for environmentally preferable renewable electricity and RECs. Further details about third-party certification are available in Chapter 10.

## Tracking Systems

Certificate tracking systems account for RECs and ensure that RECs are only held by one organization. These tracking systems issue RECs based on verified generation, track ownership as RECs are sold and purchased, and track REC retirements as the RECs are claimed or used by the organizations that own them. Tracking systems assign a unique identification number to each REC to ensure that only one REC is issued for each megawatt-hour of generation reported, thereby minimizing double issuance. In this way, REC tracking systems, together with certification, facilitate and simplify the verification of green power purchases and claims for consumers.

While not all green power purchases are processed through certificate tracking systems (e.g. RECs can also be created and transacted in bilateral contracts without benefit of a tracking system), consumers may wish to purchase green power substantiated with RECs that are specifically issued and tracked in such systems to gain confidence in the standardization, enforceability and transparency of their green power purchases. The transfer of renewable attributes through bilateral contracts can be verified and traced based on attestations that accompany the contracted attributes. Attestations help ensure that only a single entity can legally claim the renewable attributes at a time. For more details about third-party certification and verification, and certificate tracking systems, see Chapters 6 and 10.