



B Resource Guide:
Understanding Renewable Energy

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I. Definition: What is renewable energy?

Renewable energy is a general term used to describe energy derived from sources that can be infinitely replenished, such as energy from the sun, wind, and water. These resources are contrasted with fossil fuels, which primarily consist of oil, coal, and natural gas and are “non-renewable,” meaning there is a finite amount of these resources available.¹

Common types of renewable energy include: (A detailed explanation of the following is available on the National Renewable Energy Laboratory website¹).

Solar – Energy generated from the sun. Solar panels, solar thermal heaters, passive solar heating and cooling are just a few of the many technologies and techniques available to capture the energy of the sun.

Wind – Energy generated from wind currents. Interestingly, wind currents are actually generated from changes in temperature caused by the sun; in a sense, wind energy is really another variation of solar energy.¹ Wind turbines are the primary method by which energy is captured from the wind. Some of the largest wind turbine manufacturers include General Electric, Siemens, and Vestas. There are also micro turbine manufacturers for smaller scale projects of 100kW or less; a detailed list can be found at the American Wind Energy Association website (<http://www.awea.org/smallwind/smsyslst.html>).

Biomass – Essentially any organic matter can be considered biomass. Some of the more common types of biomass are corn, saw grass, and sugarcane which are used for creating various types of ethanol. There are also forms of biomass such as wood pellets, municipal waste, and animal waste that can be used for generating electricity.

Hydrogen – Hydrogen has the potential to be a great energy source. However, due to issues with storage, it has not established a very large presence in the energy generation space. Fuel cells are the most common way in which hydrogen is used to create energy. Essentially, an electrochemical reaction is induced to combine hydrogen and oxygen, which in turn creates an electric current, heat, and water.¹

¹ http://www.nrel.gov/learning/re_basics.html

Geothermal – The temperature of the earth just below the surface stays at a relatively constant temperature of 50-60°. Geothermal energy technology uses this constant heat source to either provide direct heating or cooling to residential or commercial buildings or generate electricity by creating steam and running a turbine.

Ocean – The various forms of ocean energy technologies attempt to capture the energy generated by different movements of water, including waves, currents, and tides.

Hydropower – Hydropower uses the flow of water to drive turbines that create electricity. In the U.S., hydropower has been a consistent, long-standing energy technology, accounting for 34% of all renewable energy generation in 2008 (See chart below).

II. Why purchase renewable energy?

- **Combating Climate Change** – Many renewable sources of energy emit far less carbon dioxide and other greenhouse gases (GHG) than fossil fuels, which make them very attractive when considering the potential impacts of climate change. As noted in the Intergovernmental Panel on Climate Change 2007 Assessment report, “continued greenhouse gas emissions at or above current rates will cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century.”² These changes noted in the report include glacier deterioration, temperature increases, and many other less understood phenomena. For information on GHG and how to take a carbon inventory please read the B Lab resources guide [“How to Calculate Greenhouse Gas Emissions.”](#)
- **National Security/Energy Independence** – Although this topic has become highly politicized, it is important to think about where our current energy supply is coming from. Some oil imports for the U.S. are sourced from politically volatile regions around the globe including Iraq, Saudi Arabia, Venezuela, and Kuwait.³ By investing in national sources of energy, we can have more control over our resources and reduce our dependence on other countries for our energy supply. Furthermore, the U.S. has considerable renewable energy resources; to see a visualization of U.S. solar, wind, and hydro supplies go to 3 Tier at www.3tier.com and look at the interactive maps.
- **Job Creation** – The renewable energy industry offers an opportunity to create job growth in the U.S. With investment from commercial businesses and well-designed policy incentives, some reports project that as many as 1 out of 4 jobs in the U.S. will be in the renewable energy and energy efficiency industries by 2030.⁴
- **Marketing Benefits** – Companies that invest in renewable energy can use this to distinguish their company or brand from others with a cool tagline like: “This product was made using 100% wind energy” and other innovative marketing campaigns.

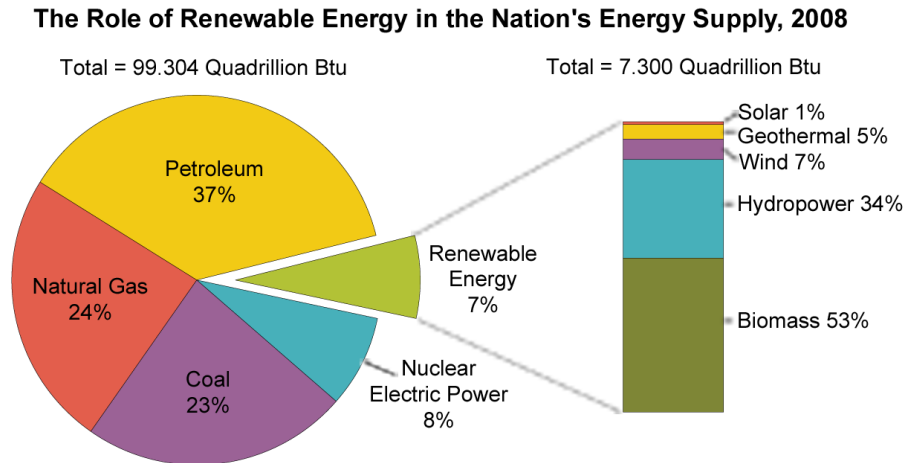
² http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch10s10-es.html

³ http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/company_level_imports/current/import.html

⁴ http://www.eesi.org/files/green_jobs_factsheet_102208.pdf

- **B Certification Points** – Companies that invest in renewable energy will score more points on the B Impact Assessment and help them reach the necessary 80 points to become certified.

Interesting Fact: Despite renewable energy’s critical potential to help reduce greenhouse gases, the majority of energy in the U.S. and in most other parts of the world is not generated from renewable energy. In the chart below from the U.S. Energy Information Administration, renewable energy accounted for just 7% of total energy generation in the U.S. According to the 2010 Annual Energy Outlook, total renewable energy generation is projected to be 11.5% by 2011.⁵



Note: Sum of components may not equal 100% due to independent rounding.
 Source: U.S. Energy Information Administration, *Annual Energy Review 2008*, Table 1.3, Primary Energy Consumption by Energy Source, 1949-2008 (June 2009).

III. As a business owner, how can you purchase renewable energy?

There are a number of ways one can “purchase” renewable energy. Here are three common methods:

- 1) **Buy the technology**– Solar Panels, Wind Turbine, Vegetable Oil Filter, etc.

Before purchasing renewable energy technology for on-site production, it is important to do a thorough analysis of your business’s energy usage, site potential for renewable energy, and financial position. A great resource for planning for a renewable energy purchase is the [Guide to Purchasing Green Power](#).

Certainly one of the biggest concerns any business will have when considering a renewable energy purchase is cost. There have been many policy efforts, both at the state and federal levels, to increase the amount of capital flowing towards renewable energy. Sifting through the web of different incentives can be daunting but one very valuable resource is www.dsireusa.org. DSIRE is the Database of State Incentives for Renewables & Efficiency and provides an interactive map that outlays all of the federal and state incentives by state. For example, here is

⁵ <http://www.eia.doe.gov/oiaf/forecasting.html>

the list of some of the incentives a company can take advantage of if it is incorporated in Pennsylvania:

- Small Business Advantage Grant Program – Covers up to 50% of a project with a maximum amount of \$7500. Eligible projects include wind and geothermal pumps, among many other energy efficiency projects.
- Pennsylvania Sunshine Solar Rebate Program – This program offers various rebates for different solar technologies including solar water heaters, solar space heat, and photovoltaics (PV solar panels). The rebates cover up to \$77,500 of PV installation costs for commercial purposes.
- U.S. Treasury Renewable Energy Grants – This is a federal incentive program that will cover up to 30% of the project costs for various technologies including solar and small wind turbines.

2) Buy Renewable Energy Credits (RECs)

Renewable Energy Credits (RECs) are tradable instruments that represent the environmental benefits/value of renewable energy generation. As stated on the EPA's website, "a REC represents the property rights to the environmental, social, and other non-power qualities of renewable electricity generation."⁶ A REC is created for every one megawatt-hour (MWh) of electricity generated by a renewable energy source. Once created, the RECs can be sold separate from the actual electricity generated by the renewable energy source to a customer that may not have access to local renewable energy generation. RECs are a great way for businesses to support renewable energy generation if they cannot afford on-site generation or their local utility does not have a green power purchasing program.

An important note about RECs is that if a REC is sold to a customer that is different from the customer actually receiving electricity from the wind farm or solar array that produced it, the electricity can no longer be considered "renewable." As noted earlier, this is because the REC now possesses the inherent qualities/benefits of renewable energy and can only be owned by one customer. This has created a need for verification and REC tracking to ensure RECs are not double counted. A great resource for picking a REC seller is www.green-e.org, which is an organization that developed a certification process to identify legitimate REC sellers. More information about RECs can also be found in the [Guide to Purchasing Green Power](#).

3) Opt-In to a utility sponsored renewable energy purchase plan

Many electric utilities, both regulated and unregulated, have some kind of "green power" purchase option. These purchase plans are a way to help utilities fund renewable energy projects by charging customers (those who voluntarily opt-in) a premium for electricity. There are many variations of these plans and pricing varies depending on your region, however three common types are (list compiled from the [Guide to Purchasing Green Power](#)):

⁶ http://www.epa.gov/greenpower/gpmarket/rec.htm#rec_chart

- Fixed energy quantity block – this is a designated quantity of renewable energy, often 100 kWh that is priced above the conventional price of electricity.
- Percentage of monthly use – this plan allows customers to choose a percentage of their energy use to come from green power. This is usually priced per kWh.
- Long-term fixed price contracts – for larger purchases, customers can purchase a fixed amount of electricity from a particular renewable energy project. This helps the energy generator secure financing and allows the customer to fix a price for the electricity.

Check with your local utility to see if it has a green power purchasing program or visit www.green-e.org, which has lists of certified renewable electricity providers.

B Corporations setting an example:

Buying renewable energy technology



"As a B Corporation it is important to be a leader and help demonstrate how renewable energy technology can address the hidden environmental and social costs of fossil fuels. To start, assess your current energy usage, then work to try and reduce the amount of energy your business consumes. At that point, start planning to invest in renewable energy technologies to serve your remaining energy needs. At T.S. Designs, we have two solar arrays, a micro wind turbine, a retail biodiesel station, and a biomass methane digester. Our investment in these technologies has not only helped the environment but has also been like a billboard to our customer base, showing that we walk the talk." – Eric Henry, President of T.S. Designs

Purchasing RECs



IceStone purchases enough RECs to offset 100% of its energy usage, helping fund wind power generation.

Opting in to a utility sponsored renewable energy purchasing plan



Yikes participates in a utility green power purchasing program and buys 100% of its energy from cooperatives producing wind energy.

V. Helpful Websites & Resources

- Guide to Purchasing Green Power – (Excellent document that details all aspects of renewable energy) http://www.epa.gov/greenpower/documents/purchasing_guide_for_web.pdf
- 3 Tier (Mapping of Solar, Wind, and Hydro Resources) – www.3tier.com
- American Council on Renewable Energy – www.acore.org
- American Wind Energy Association – www.awea.org
- Database of State Incentives for Renewables & Efficiency (DSIRE) – www.dsireusa.org
- Intergovernmental Panel on Climate Change – www.ipcc.ch
- International Energy Agency – www.iea.org
- National Renewable Energy Laboratory – www.nrel.gov
- Solar Energy Industries Association – www.seia.org
- U.S. Department of Energy: Energy Efficiency & Renewable Energy - <http://www.eere.energy.gov/>
- U.S. Energy Information Administration – www.eia.gov