Chapter 4

Category Guidance

☑IMPORTANT TIP… READ THIS FIRST…

Prioritize for leadership.

Chapter 4 of the *Guidance* is intended for organizations that have already conducted a **strategic analysis** that identifies procurement of a specific category of goods or services as a priority opportunity for improving the overall environmental, social, and/or economic performance of the organization's purchasing.

Use of the category-specific guidance in this chapter without conducting such an analysis is discouraged, since any performance gains achieved, while positive, could be statistically insignificant, relative to the overall improvement opportunities available.

In such cases, organizations risk the opportunity cost of dedicating resources to non-priority categories at the expense of higher priority categories of spending, missing an opportunity for leadership, and compromising the credibility of their sustainable purchasing program.

Chapter Overview

Purpose

The guidance within this chapter provides information relevant to a variety of purchasing categories, enabling teams to quickly identify the following:

- **clusters of significant environmental, social, and economic impacts** associated within purchasing categories that are likely to be some of their primary areas of spend,
- **best available actions** to address the identified impacts,
- **external and organizational benefits** associated with implementing specific actions,
- anticipated **challenges**
- **metrics and indicators** that teams can use to track progress toward achieving their objectives within individual purchasing categories,
- **policy and specification** language and resources to assist in implementing the proposed actions, and
- **undecided issues**, both within the broader industry and the Council's Technical Advisory Groups.

Benefits

- **Provides reliable information** based on the contributions from Technical Advisory Group members—representing a variety of perspectives within the industry—in a presentation consistent with how a cross-functional team operates within the context of this guide.
- **Can expedite the Strategy Planning** process outlined in Chapter 3 (depending on to what extent an organization's primary spending areas align with the categories discussed in this Chapter.

Functional Performance

There is a common perception that sustainability improvements may result in performance losses or cost increases. This *Guidance* suggests that leadership organizations should seek to avoid unnecessary compromise and ask the marketplace to deliver innovations that offer functional performance, environmental stewardship, social responsibility, and cost parity.

Leaders in sustainable purchasing are those organizations that request, of their suppliers, that functional performance not come at the expense of environmental damage, community costs, or worker safety. Likewise, advances in environmental or social performance should not come at the expense of functional performance or total cost of ownership.

There may still be times, however, when no existing market solution meets both technical performance requirements and sustainability objectives. In such cases, an organization may have to choose an appropriate compromise based on its own priorities. In these circumstances, SPLC's *Principles for Leadership in Sustainable Purchasing* ask leadership organizations to call on the marketplace to innovate and adopt better solutions in the future. This could mean providing suppliers and buyers with an incentive to innovate, joining a collaborative effort to raise standards, or other strategies developed by the purchaser.

Various sections within this Chapter discuss product performance considerations in more detail. It is recommended that for every purchase, organizations consider the performance attributes that are most important and ensure that those are communicated as part of an RFP.

Consider the following:

- What are the functional performance needs for individual products and services procured by an organization? How does this relate to the opportunities available to purchase products with improved environmental, social, or economic performance?
- Are there performance aspects of cleaning products important to an organization that are not available in products with improved environmental performance?
- Does an organization need a specific type of paper (e.g. thickness, brightness, etc.) that is not available with post-consumer recycled content?
- Is diet-specific (e.g. vegetarian, gluten-free, etc.) or culturally specific (e.g. Kosher, Halal) food available to meet the needs of the organization's target population that also have certifications verifying reduced environmental, social, or economic impacts?

Organizational Considerations

As your team considers the recommendations within this Chapter, consider the specific aspects of the organization that may influence which strategies may be most appropriate to recommend.

- *Existing organizational priorities* (e.g. strategic plan, guiding principles, regulations, policies, advancing brand leadership, existing reporting requirements,[1] existing rating/certification requirements,[2] improvements to business units, etc.)
- *Cost* (e.g. initial cost, return on investment, total cost of ownership, etc.),
- *Performance improvement potential* (e.g. tons of CO_{2e} reduced, gallons of water saved, improved indoor air quality, increased user satisfaction,[3] etc.),
- *Implementation logistics* (e.g. feasibility within an existing long-term contracts, opportunity to improve upon expiring contracts, scalability, transferability)
- *Organizational risk tolerance* (e.g. taking a temporarily conservative approach to new initiatives due to unforeseen market volatility, brand management, etc.)
- *Resource availability* (e.g. financial and human resources)

Recommended Actions

In most cases, several different types of solutions will be provided that go beyond the typical potential of a purchasing professional. This is possible because of the cross-functional approach to creating a Sustainable Purchasing Program recommended in this Guide.

Policy Recommendations

Many categories recommend exploration of existing policies and finding ways to improve them. Potential adjustments to existing policies can be explored and tested within the context of the subunit of the organization (e.g. one hotel within a chain, a single hospital within a hospital system, or a particular department or agency within a larger organization), providing the ability to make more confident policy recommendations that could apply in a broader context. The policies could incorporate the process recommendations related to exploring how to buy less in certain categories. For example, what considerations could be made prior to choosing to invest in constructing a new building that could result in not needing to invest in a new building. The same inquiry could be applied across nearly all the purchasing categories. Institutionalizing this inquiry process could result in significant cost savings for the organization as well as a more strategic use of funds that are spent.

Operational Recommendations

Sometimes the largest opportunities for mitigating the environmental, social, and economic impacts associated with purchasing require leveraging operational changes. Operational changes often provide benefits for seemingly unrelated purchasing categories. For example, making an investment in high quality teleconference infrastructure—such as enhanced video and audio capabilities, among other improvements—can set the organization up for significant cost savings by setting the foundation for a more flexible work environment. Consider the following benefits of investing in high quality teleconference infrastructure:

- There is more flexibility for remote working or working in a variety of organizational locations. This allows an organization to consider leasing existing spaces in a few locations rather than building an entire new building to accommodate a full staff.
- If the investment allows more staff to work from home, the organization needs less infrastructure to operate. This included minimizing workstations—or setting up some hoteling workstations—and the potential to purchase less furniture and furnishings over time.
- This infrastructure investment—coupled with procuring from service providers who have made similar investments—can significantly reduce the amount of consultant travel on behalf of the organization procuring the services. This means that either less money can be spent on specific contracts, or that a higher percentage of similar sums of money are going toward creating deliverables.

The cost savings across all of these benefits will allow for not only a faster return on the investment, but also the potential to improve employee (and contractor) satisfaction from the increased flexibility.

Purchasing Recommendations

As expected, purchasing recommendations are provided that help to answer the question, "When the organization has to buy a product or service, how can we buy it better?" For example, is there a third-party certification that can verify improved environmental, social, and/or economic performance? If so, to what extent do individual certifications successfully address the most significant impacts within a category? If no certifications exist, are there qualities of a supplier or actions that they take to help an organization determine if they are improving the environmental, social, and economic performance of their purchasing. Generally, solutions are recommended in the following hierarchy to reflect the potential for each strategy type to improve environmental, social, and economic performance of an organization's purchasing.

DETAILED GUIDANCE

SOLUTION STRATEGIES TO CONSIDER

Strategy	*Description*	*Example*
Efficiency	*Reduced impact through reduced use*	Implementing a procure-to-pay IT system reduces impacts associated with printing and transporting paper documents.
Process change	*Design the impact out of a process*	Air pollution from medical waste incineration is reduced by switching to reusable surgical tools that are steam sterilized.
Behavior change	*Implement programs to shift attitudes and practices*	Voluntary "green office" competitions reduce energy and material consumption, while increasing recycling.
Combining Projects	*Combine multiple projects into a single positive ROI project*	An energy efficiency project is combined with a solar project. Energy savings offset the solar costs for a good overall ROI.
Supplier engagement & accountability	*Engage suppliers and hold accountable for a specific impact*	Some universities require apparel manufacturers to permit independent audits of factory conditions and provide retribution-free grievance and remedy processes.
Product substitution	*Choose a different product with lower ESE impacts*	Chemical costs and workers compensation insurance premiums reduced by switching to green cleaning products.
Supplier substitution	*Choose a supplier with lower ESE impacts*	Making evidence of bribery or extortion automatic grounds for suspension of business with a supplier.
Servicizing	*Convert a product acquisition to a long-term service*	Instead of owning copiers, establish a pay-per-copy service relationship so that the price of each copy reflects the true cost.
In-source	*In-source a function to better reduce impacts*	Hiring LEED expertise in-house to optimize and streamline green building across all of org's construction and renovations.
Out-source	*Outsource when an external party can better reduce impacts*	Contract out utility bill management to firms that leverage energy market expertise to cut energy and carbon costs.
Offsetting	*Pay for an impact reduction to offset impacts elsewhere*	Buying carbon offsets; paying to put land in permanent conservation to offset development of other land.

The above Solutions table can be downloaded as a worksheet that can be used with the Strategy Team here: https://www.sustainablepurchasing.org/public/SPLC_Worksheet_2014002_Solutions.pdf

IMPORTANT NOTE: This section of the Guidance is intended for organizations that have already identified Electricity as a priority based on a strategic analysis of overall spending.

Purchasing Category Guidance for

Electricity

Subcategories

- Electricity (onsite and purchased)

Technical Advisory Group

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Electricity

Scope

This guidance pertains to procurement of **electricity.**

Electricity is an important sustainable purchasing category because it is a product that nearly every business purchases, and it can represent a significant source of a company's environmental impact.

Executive Summary

Understanding

Why do we care?

- Greenhouse gas emissions
- Air pollution
- Land use change
- Water use and pollution

Action

How can we exercise leadership?

- Measure and benchmark electricity use
- Implement conservation measures
- Invest in green power
- Offset electricity use

Results

What are the benefits?

External
- Reduced carbon emissions
- Improved air quality
- Reduce land conversation for energy generation

Internal
- Reduce and stabilize costs for electricity

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UNDERSTANDING: Why do we care?

Electricity procurement has significant environmental, social, and economic impacts. Electricity is commonly purchased and consumed on a shared distribution grid ("the grid"), through which electricity is delivered from generators to consumers in a region, and on which electricity from all different sources is mixed together to electrify the grid. As a result, strategies have been developed for differentiating and delivering different types of electricity produced on the grid, tracking or allocating specified generation (and associated impacts) to individual grid consumers.

Electricity markets, products and purchasing options may differ from region to region and may depend on the regulatory environment, whether the market is regulated (with one regulated monopoly utility) or deregulated (with many competitive electricity providers), and whether electricity and generation attributes (e.g. instruments like renewable energy certificates) are traded separately. Even within a single region or market, different electricity customers may have different fuel mix and purchasing options, depending on their size and circumstances.

Electric generating capacity in the United States is made up of the following fuel sources: [22]

- 39% Coal (92% of coal use is for electricity)
- 27% Natural Gas (31% of natural gas use is for electricity)
- 19% Nuclear Electric Power (100% of nuclear energy use is for electricity
- 13% Renewable Energy (54% of renewable energy is for electricity)
- 1% Petroleum (1% of petroleum use is for electricity)

Climate Change from Greenhouse Gas Emissions

Electricity use is the largest contributor to greenhouse gas emissions in the United States (see Figure 1). Coal combustion is generally more carbon intensive than burning natural gas or petroleum for electricity. Although coal accounts for about 75 percent of CO_2 emissions from the sector, it represents almost 40 percent of the electricity generated in the United States. About 27 percent of electricity generated in 2012 was generated using natural gas, and this percentage has grown in recent years. Petroleum accounts for less than 1% of electricity generation. The remaining generation—which have far fewer or negligible greenhouse gas emissions—comes from nuclear and renewable sources, which includes hydroelectricity, biomass, wind, and solar.[23]

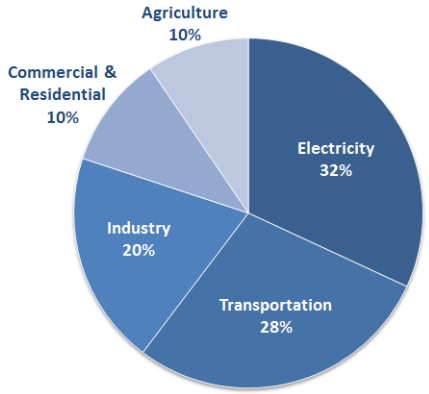

Figure 1: Total U.S. Greenhouse Gas Emissions by Economic Sector in 2012[24]

Air pollution.

When coal is burned, carbon dioxide, sulfur dioxide, nitrogen oxides, and mercury compounds are released. For that reason, coal-fired boilers are required to have control devices to reduce the amount of emissions that are released. The average emission rates in the United States from coal-fired generation are: 2,249 lbs/MWh of carbon dioxide, 13 lbs/MWh of sulfur dioxide, and 6 lbs/MWh of nitrogen oxides.[25] Mining, cleaning, and transporting coal to the power plant generate additional emissions. For example, methane, a potent greenhouse gas that is trapped in the coal, is often vented during these processes to increase safety.[26]

At the power plant, the burning of natural gas produces nitrogen oxides and carbon dioxide, but in lower quantities than burning coal or oil. Methane, a primary component of natural gas and a greenhouse gas, can also be emitted into the air when natural gas is not burned completely. Similarly, methane can be emitted as the result of leaks and losses during transportation. Emissions of sulfur dioxide and mercury compounds from burning natural gas are negligible.

The average emissions rates in the United States from natural gas-fired generation are: 1135 lbs/MWh of carbon dioxide, 0.1 lbs/MWh of sulfur dioxide, and 1.7 lbs/MWh of nitrogen oxides.1 Compared to the average air emissions from coal-fired generation, natural gas produces half as much carbon dioxide, less than a third as much nitrogen oxides, and one percent as much sulfur oxides at the power plant. In addition, the process of extraction, treatment, and transport of the natural gas to the power plant generates additional emissions.[27] Finally, studies suggest that emissions from natural gas leaks in the distribution infrastructure are so large that it makes natural gas equivalent to coal in terms of tCO_{2e}.[28]

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Land-use Change

Coal: Soil at coal-fired power plant sites can become contaminated with various pollutants from the coal and take a long time to recover, even after the power plant closes down. Coal mining and processing also have environmental impacts on land. Surface mining disturbs larger areas than underground mining. The extraction of natural gas and the construction of natural gas power plants can destroy natural habitat for animals and plants.

Nuclear: Every 18 to 24 months, nuclear power plants must shut down to remove and replace the "spent" uranium fuel.[2] This spent fuel has released most of its energy as a result of the fission process and has become radioactive waste, and will remain radioactive for thousands of years. Currently, the spent fuel is stored at the nuclear plants at which it is generated, either in steel-lined, concrete vaults filled with water or in above ground steel or steel-reinforced concrete containers with steel inner canisters. Recommending the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel. Enrichment of uranium ore into fuel and the operation of nuclear power plants generate wastes that contain low-levels of radioactivity. These wastes are shipped to a few specially designed and licensed disposal sites. When a nuclear power plant is closed, some equipment and structural materials become radioactive wastes. This type of radioactive waste is currently being stored at the closed plants until an appropriate disposal site is opened.[29]

Water Use and Pollution

Large quantities of water are frequently needed to remove impurities from coal at the mine. In addition, coal-fired power plants use large quantities of water for producing steam and for cooling. When coal-fired power plants remove water from a lake or river, fish and other aquatic life can be affected, as well as animals and people who depend on these aquatic resources. Mountaintop removal for coal extraction can result in stream and ponds being completely filled with solid waste and also leads to erosion, loss of soil productivity, and landslides.

Pollutants build up in the water used in the power plant boiler and cooling system. If the water used in the power plant is discharged to a lake or river, the pollutants in the water can harm fish and plants. Further, if rain falls on coal stored in piles outside the power plant, the water that runs off these piles can flush heavy metals from the coal, such as arsenic and lead, into nearby bodies of water. Coal mining can also contaminate bodies of water with heavy metals when the water used to clean the coal is discharged back into the environment. This discharge usually requires a permit and is monitored.[30]

Nuclear power plants use large quantities of water for steam production and for cooling. Some nuclear power plants remove large quantities of water from a lake or river, which could affect fish and other aquatic life. Heavy metals and salts build up in the water used in all power plant systems, including nuclear ones. These water pollutants, as well as the higher temperature of the water discharged from the power plant, can negatively affect water quality and aquatic life. Nuclear power plants sometimes discharge small amounts of tritium and other radioactive elements as allowed by their individual wastewater permits.

Waste generated from uranium mining operations and rainwater runoff can contaminate groundwater and surface water resources with heavy metals and traces of radioactive uranium.[31]

Economic Impacts

Competition

Regulated markets are state-sanctioned monopolies. Need reference that lists states that are de/regulated.[32]

Price Instability

Fossil fuel markets are notoriously unstable and therefore purchasers can have a hard time planning budgets for what is often a very large percentage of their operating budgets.

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ACTION & RESULTS: What makes a difference?

Though the guidance in this chapter is geared primarily toward addressing the electricity product that is purchased—what kind of electricity you are buying and what else you could buy to reduce your impact—reducing consumption through energy efficiency and managing where and when it is consumed is always a smart first choice. Where you consume electricity determines the mix of resources delivered as a part of the standard or default mix on that regional grid. That is, if you do not or cannot specify the type of electricity you want (for example, renewable energy), then the electricity you consume will depend to a large extent on where you are and what is being produced near you. Depending on the amount of information available to you and the support mechanisms in place to help consumers manage their electricity use and demand, consumers may also be able to change the timing of electricity consumption to lower their impacts.

Electricity consumers should develop an overarching energy strategy, which can include metering and benchmarking the sources and types of energy used; reducing those sources of consumption through conservation and efficiency efforts that can include both behavioral changes as well as technical improvements; and replacing fossil fuels with clean, renewable sources of electricity.

Create a comprehensive energy strategy, inclusive of electricity and fuel consumption and energy generation.

Consider developing an overarching energy strategy, which can include metering and benchmarking the sources and types of energy used; reducing consumption through conservation and efficiency that can include both behavioral changes as well as technical improvements; and replacing fossil fuels with clean, renewable sources of electricity. Additionally, consider the accounting and reporting of energy. The World Resources Institute has developed Scope 2 Guidance that "…standardizes how corporations measure emissions from purchased or acquired electricity, steam, heat, and cooling (called "Scope 2 emissions")." This Guidance is available at: *http://www.ghgprotocol.org/scope_2_guidance*.

Additionally, WRI's Greenhouse Gas Protocol provides various accounting tools for Scope 1-3 emissions. See *http://www.ghgprotocol.org/*, which will be valuable for the accounting and reporting components of a comprehensive energy strategy.

Measure current electricity usage

Understanding an organization's current electricity usage is critical to identifying the best ways to reduce its overall impact. Consider the following strategies to collect data on current electricity usage.

- Install whole building and sub-meters, as possible[33]
- Audit Energy Use (e.g. ASHRAE Level I or ASHRAE Level II Audit)

Benchmark performance

Use one of the following tools to track initial and benchmark future usage. These tools will allow organizations to track performance over time and provide a variety of metrics on which an organization can report.

- ENERGY STAR Portfolio Manager
- Labs 21 *http://tinyurl.com/nec6rdn*

Explore financing options

Various actions—requiring varying levels of funding—can provide organizations significant opportunities to reduce the impacts associated with their electricity purchasing. In order to determine which types of actions are most appropriate, financing must be considered. For example, self-financing efficiency retrofits and renewable energy sources may be the most attractive options, whereas third party financing might be more appropriate in capital-constrained circumstances. (See Chapter 3 for additional financing options)

- Operating Expenses
- Capital Investments
- Leasing
- Performance Contracting
- Power Purchase Agreements

☑TIP

Note for Property Tenants

These strategies apply to both property owners and to tenants. But some of the strategies may be difficult if they are not in the direct control of a property tenant. Conservation and efficiency measures may still be possible even if metering and supplier choice are excluded by lease terms. Moreover, tenants may be able to negotiate for electricity metering over their occupied space so that they can pay for actual electricity use, rather than having electricity included in rental payments. It may also be possible to negotiate for control over the choice of electricity suppliers. These strategies can help tenants enjoy the financial rewards of energy conservation and efficiency while providing the ability to select a green source of power.

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Implement Conservation Measures

Depending on the results of the energy usage audit, consider various conservation measures that can reduce the organization's overall electricity demand. Figures 2 and 3 common commercial and residential end uses for electricity. Additionally, reviewing other purchasing category areas within Chapter 4 may be useful to address electricity impacts. Conservation measures are likely to be found in some of the following places:

- Lighting
- HVAC (e.g. space heating and cooling, ventilation, water heating).
- Appliances and electronics
- Refrigeration

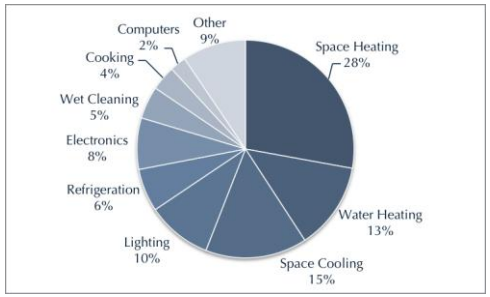

Figure 2: Residential Buildings Primary Energy End Use Splits (2010)[34]

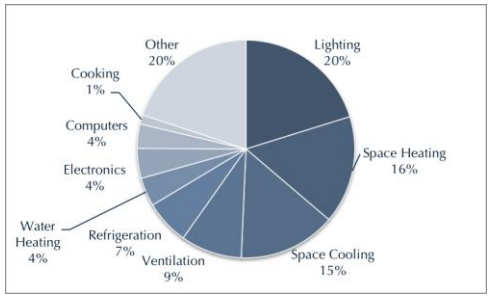

Figure 3: Commercial Buildings Primary Energy End Use Splits (2010)[35]

Procure Green Power

A number of electricity markets globally now offer cleaner ways of producing power, and afford many consumers the ability to choose how their power is generated. While no form of electric power generation is completely benign, electricity generated from renewable power resources have proved to be environmentally preferable to electricity generated from conventional sources such as coal, oil, natural gas, and nuclear.[36] In addition, by using renewable electricity, organizations can realize many benefits, including energy security, price stability, and improved stakeholder relations. There are a variety of renewable energy technologies, including the following:[37]

- Biomass
- Cogeneration[38]
- Geothermal
- Hydro
- Hydrothermal
- Solar (photovoltaic and thermal)
- Wave/Tidal
- Wind

In the U.S., Canada, and Europe purchasing and using renewable electricity has been made relatively straightforward through the development of a voluntary renewable electricity market. In these markets, certification (e.g. Green-e or equivalent) is recommended to ensure that purchases of green power embody environmental and consumer protection standards (e.g. no double counting or double selling). The Green-e Directory provides information on those products that meet consumer protection and environmental standards in the U.S. and Canada. See *http://www.green-e.org/gogreene.shtml.*

There are four broad green power purchasing options discussed within this Guidance.

- Onsite green power – obtain the electricity produced from an onsite or owned renewable energy system and retain attributes (i.e. RECs in the U.S. or GOs in Europe; the remainder of the document will refer to RECs to cover all various names and abbreviations used globally);
- Offsite green power via unbundled attributes – obtain generation attributes (RECs) separately from electricity;
- Offsite green power via bundled electricity – obtain both electricity and generation attributes (RECs) from an electricity supplier;
- Offsite green power via direct contracts – enter into a power purchase agreement with a specified renewable energy generator that includes the generation attributes (RECs).

Not all of these options may be available to all consumers, depending on the electricity market in which you are operating. These options also differ in terms of their cost. For example, options like onsite renewable energy development and direct power purchase agreements with renewable facilities allow a company to have a direct impact on the mix of resources on the local grid and to tell a more compelling story about the local impact of their individual purchase. All of these options affect demand-side change on the grid, and any of the options above can be pursued on a long-term basis in order to increase the impact of the purchase.

It is also important to note that in markets where renewable energy attributes are traded separately and required to make a renewable energy usage claim, such as the United States; the renewable energy certificate (REC) or equivalent instrument is required (i.e. must be owned by, delivered to, or retired on behalf of the purchaser) in all of the options above.

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Onsite Green Power

Companies may obtain the electricity produced from an onsite renewable energy system as the system owner or system host (in which case a third-party owns the generation equipment but sells the customer electricity).

There are a variety of factors that must be considered when investing in onsite renewable energy technologies, such as feasibility based on loca availability of the resource, scale, and technology. The consequences associated with each renewable energy technology that must be considered and balanced alongside an organization's current electricity sources.

Whatever the particular arrangement is for onsite generation, the critical criterion for the user to make a renewable electricity usage claim in the U.S. and Canada is ownership of the renewable electricity attributes (e.g. REC). If the title to the renewable electricity attributes or a claim to usage of generation from the system are retained by the system installer or lessor, sold to a third party, or are counted by a utility in its default electricity sales, the customer receiving electricity from the system may not claim to be using renewable electricity from the system. See Appendix II for a detailed introduction to Renewable Energy.

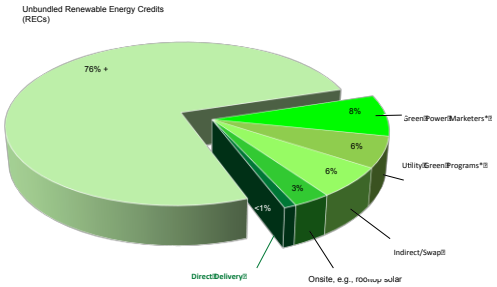

Figure 4:
How Large Electricity Users Access Renewables[39]

Offsite Green Power Purchasing Options

In many situations, onsite renewable energy is not practical, economically efficient, or technically feasible. As a result, an offsite renewable energy purchasing market has emerged and matured in many regions. Figure 4 demonstrates the various approaches used by large purchasers to access renewables.

The selection of green power options requires organizations to evaluate purchasing priorities, such as technology, scale, cost, grid impact and marketing claims. Across all options, in the U.S. and Canada, the instrument used to demonstrate ownership and use of renewable electricity is the renewable energy certificate (REC). The Green-e Directory provides information on those products that meet consumer protection and environmental standards. See *http://www.green-e.org/gogreene.shtml.*

In Europe, the functional equivalent of a REC is a Guarantee of Origin (GO). Other markets and countries may also use RECs or REC-like attribute instruments. Outside the U.S. and Europe, it may be more difficult to find credible energy attribute certificate instruments that meet quality criteria (see WRI Scope 2 Guidance for more information).

For all of the options listed below, it is important that the product or purchase be independently, certified to ensure accurate, exclusive delivery of renewable energy to prevent double selling and double claiming. Certification programs like Green-e in North America certify both onsite consumption and direct purchases as well as retail bundled renewable electricity and unbundled REC products. The key will be for purchasers to be transparent about their strategies and the portions of their electricity consumption from the various sources of power described above.

Any of the options above can be pursued on a long-term basis in order to increase the impact of the purchase.

DETAILED GUIDANCE

RENEWABLE ENERGY ATTRIBUTES (CERTIFICATES)

A renewable energy certificate (REC) represents the property rights to the environmental, social, and other nonpower qualities of one megawatt hour (MWh) of renewable electricity generation6. RECs are tradable instruments that can either be used to substantiate voluntary renewable electricity purchase and use, or meet compliance requirements for renewable electricity delivery. RECs represent the exclusive right to claim the environmental attributes associated with renewable electricity generation, such as direct emissions (e.g. a wind farm has zero emissions of CO2) and can be traded separately from the underlying electricity. RECs are required for renewable electricity usage claims in the U.S., including onsite claims7. RECs are essential to any renewable electricity usage claim in the U.S., regardless of whether renewable electricity is purchased from an electricity provider or directly from a generation facility. Selling a REC in the U.S., whether bundled or unbundled with underlying electricity, effectively transfers ownership rights over all of the attributes of the associated renewable electricity generation to the REC purchaser.

☑TIP

Project ownership and generation is also a viable option for offsite green power.

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DETAILED GUIDANCE

OFFSITE GREEN POWER OPTION: POWER PURCHASE AGREEMENTS (PPAs) / DIRECT CONTRACTS

Offsite green power purchase agreements are contracts entered into directly with a renewable energy generator. In the U.S., an organization usually has the option to purchase:

- only the power from the developer,
- only the RECs, or
- both the power output and renewable electricity attributes from the facility.

DETAILED GUIDANCE

OFFSITE GREEN POWER OPTION: BUNDLED ELECTRICITY

Offsite green power purchased through bundled electricity means the energy and the RECs are sold together (i.e., bundled). In this case, the offsite green power cannot be called green power unless the REC is also held. Throughout the U.S. and Europe there exist opportunities to purchase renewable electricity directly through electricity service providers. In these scenarios, companies often elect enrollment in a "green power program" and can receive the electricity service provider's specific renewable electricity offerings. In the U.S., Canada, and Europe, this means that the service provider procures and retires the certificates for the generation, such as RECs, on the customers' behalf.

DETAILED GUIDANCE

OFFSITE GREEN POWER OPTION: UNBUNDLED ATTRIBUTES

Purchasing green power via unbundled attributes means the energy and the RECs are sold separately (i.e., unbundled). An organization only has the "green" power from the source of the certificate. All other power is simply grid, grey, or brown mix. It is important to recognize, however, that at minimum this green power should be from sources within the functional electricity market for which the company operates (e.g. U.S. RECs for U.S. operations, GOs for European operations).

DETAILED GUIDANCE

APPROPRIATE USE OF CARBON OFFSETS

Where local electricity markets have no offsite green power options and onsite renewable energy is not practical, procurement of certified carbon offsets is recommended.

In the U.S., Canada, and Europe, there are established green power markets for which onsite and offsite green power products can be procured. In electricity markets where there are no viable green power products available, certified carbon offsets can be procured to mitigate the carbon emissions associated with Scope 2 emissions of electricity consumption. Some organizations may find it preferable to source offsets from renewable energy projects in order to offset emissions associated with electricity consumption to stimulate renewable energy development on the local grid.

It is important to note that in any setting, regardless of location, the carbon claim from offsets can come from any valid (i.e., certified) source of carbon offsets, which includes projects such as renewable energy but also many other types of projects that reduce or sequester GHGs For example, offsets can also be from non-energy projects, such as afforestation, reforestation, avoided deforestation, landfill methane capture, forestry, transportation, and others. Any non-renewable electricity reductions are less credible, although they still offset (compensate) the environmental impacts of the consumption.

Retail level certification (e.g. Green-e Climate or equivalent) of carbon offsets provides quality assurances covering the entire chain of custody of the emissions reduction, and requiring the use of robust GHG project standards (e.g. VCS, Gold Standard, CAR, ACR, CDM). The Green-e Directory provides information on those products that meet consumer protection and environmental standards.

See *https://www.green-e.org/offsets*.

IMPORTANT NOTE: This section of the Guidance is intended for organizations that have already identified Electricity as a priority based on a strategic analysis of overall spending.

DETAILED GUIDANCE

RECs and GOs vs OFFSETS: WHAT'S THE DIFFERENCE?

Renewable Energy Certificates (RECs), Guarantees of Origin (GOs) and other electricity attribute certificates should not be confused with carbon offsets, as they are two distinct commodities used for distinct purposes.

RECs and GOs are described above as representing all of the environmental and social attributes of renewable energy generation for the purpose of enabling consumers to claim use or delivery of renewable electricity generation from new and existing renewable generation sources on the grid, serving as the currency for renewable energy claims in both compliance and voluntary markets.

Carbon offsets, on the other hand, represent a quantity of GHG emissions reductions, measured in metric tons of carbon dioxide–equivalent (CO_2e), that occur as a result of a project activity that has reduced emissions. The emissions reductions from that project can be sold to enable the purchaser/owner to claim those GHG reductions as their own. These reductions can then be used to reduce, or offset, any GHG emissions for which the purchaser is responsible, including electricity.

DETAILED GUIDANCE

INTRODUCTION TO THE EUROPEAN RENEWABLE ENERGY MARKET

Each European country has its own energy market rules, and renewable energy support system. However, with the agreement of the 2001 Renewable Directive, the Guarantee of Origin was created, a standardized proof of renewable energy generation was created.. The GO is the ultimate proof that a MWh has been produced from renewable sources, and must be used for fuel mix disclosure to end users. A similar GO system is also in place for highly efficient combined heat & power (CHP).

The Directive mandates that each Member State – and that extends to several non-EU countries too – needed to institute a national GO certificate system. 15 countries have established an efficient national GO certificate system that is linked through the European Energy Certificate System, run by the national issuing bodies, which allows for registry transfers, including across borders. Other countries have more or less advanced stand-alone registry systems in place. In total, GOs exist in more than 30 European countries.

GOs are the guarantee of where, how and when a MWh was generated, the ultimate proof that the generating source was renewable. However, this is not the same as a certification system, which implies a quality judgment. There are some quality certifications operating on a national or European-wide level, but it's mostly supplier-specific products that are being offered. Some specific products aim to support new installations, others specific technologies.

Challenges

Distinguishing the electricity purchased

While it may be hard to know exactly where the electricity that you draw off the grid came from and what impacts were associated with its generation, this is less important (both from the standpoint of assessing your impact as well as making change in terms of how electricity gets produced) than discovering what electricity product you are paying for and the impacts of that generation. The physical electricity that you use and the generation that you pay for may be different because all electricity is identical and indistinguishable once placed on the grid. Sustainable purchasing of electricity therefore depends largely on what generation you pay for or that gets delivered to you. Around the world, different electricity markets have enabled purchasing from specified sources of electricity and delivery of differentiated electricity products using contractual instruments that represent or convey the "attributes" of generation at a specific generator to grid consumers. Where available, these purchasing options identify the resources used and can be tracked from generator to consumer. The purchase decisions of individual electricity consumers can add up to have an aggregate, demand-side effect on supply of the product (given sufficient demand), in this case, what kind of electricity generation resources get developed and dispatched.

Varying impacts by source

There are several different types of fuel sources, technologies, or resources used for generating electricity, and different types of electricity generation have different impacts. For example, electricity sourced from coal has a very high carbon footprint, whereas nuclear does not. That being said, land use and hazardous waste issues associated with producing nuclear energy are significant. Therefore, it is important to determine—to

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the best extent possible—what type of electricity an organization purchases. This helps the organization ensure whether the intended impact is realized through different purchasing decisions.

Distribution

Electricity cannot yet be stored in large quantities cost-effectively. Until that changes, electricity generation from different sources must be scheduled to serve electricity load or demand in real time. Which resources get dispatched (and therefore which impacts get created) depends on the operating costs of the resource and grid constraints. For example, renewable resources like wind and solar have very low operating costs, but are intermittent (meaning they do not operate all the time, only when the wind is blowing and the sun is shining). Resources like natural gas can be "ramped" up and down relatively easily, while resources like coal and nuclear cannot cost-effectively be turned off or ramped down and must operate all the time. But which resources get dispatched also depends on contracts that are in place for delivery of electricity from certain generators (i.e. the market for electricity, who purchases what), as well as load—the amount of electricity demand that needs to be satisfied.

Long-term commitments to green power purchasing

A long-term commitment to purchasing green power and/or carbon offsets helps to promote the strength and stability of those markets. However, many companies are unwilling to engage in contracts over for more than 2-5 years, which leads to market volatility. On the other hand, the availability of long-term contracts is also seen as a benefit by many buyers since it is not available in the conventional power markets. Long-term green power contracts can reduce risk associated with price volatility by fixing rates for 15-25 years.

Metrics

In addition to the metrics listed below, it should be noted that using benchmarking tools such as ENERGY STAR Portfolio Manager provide the infrastructure to organize the data and will note additional reporting metrics. The World Resources Institute's Scope 2 Guidance will also provide additional, standardized metrics for tracking, reporting, and measuring progress in this purchasing area.

- Direct emissions from electricity usage
- Amount of electricity sources purchased (by percent and cost)
- Amount of electricity covered by REC/guarantee of origin/alternative proof of renewable energy generation
- Amount/percent of electricity usage covered by onsite or new sources, etc.

Indicators

- Number of years purchasing green power
- Number of long-term (greater than 5 years) agreements to purchase green power
- Number of projects directly financed

Case Studies

The following organizations have demonstrated leadership in their approach to purchasing of local delivery services:

- American University Power Purchase Agreement: http://www.american.edu/finance/sustainability/AU-To-Source-50-Percent-Power-From-Solar.cfm
- Harvard University Power Purchase Agreement: http://news.harvard.edu/gazette/story/2009/11/harvard-to-become-largest-institutional-buyer-of-wind-power-in-new-england/
- Mars Power Purchase Agreement: http://www.windpowermonthly.com/article/1292941/mars-moves-large-scale-wind
- Organizations using Green-e Certified Electricity and Offsets: http://www.green-e.org/getcert_bus_participants.shtml
- World Resources Institute Scope 2 Guidance Case Studies: http://ghgprotocol.org/files/ghgp/Scope%202%20Guidance%20case%20studies_0.pdf

Resources

- The Guide to Purchasing Green Power (WRI, EPA, CRS, DOE): http://www.epa.gov/greenpower/documents/purchasing_guide_for_web.pdf
- Center for Resource Solutions "The Legal Basis for Renewable Energy Certificates" http://www.resource-solutions.org/pub_pdfs/The%20Legal%20Basis%20for%20RECs.pdf
- World Resources Institute Scope 2 Guidance: *http://www.ghgprotocol.org/scope_2_guidance.*
- US Department of Energy Buying Green Power - http://apps3.eere.energy.gov/greenpower/buying/
- Local Gov't Green Power Procurement AFLEET Tool: *http://tinyurl.com/ndsqefv*