



SERVICE PROVIDER GUIDE

Guidelines for Selecting an Electrical Engineer

Intent

This guide will help you learn more about electrical engineering and help you select the right electrical engineer for a green or high performance building project.

Background

Electrical engineering involves the necessary calculations to plan and design the electrical systems of a building, which can incorporate the lighting, power, security, communication and fire alarm systems. These systems can remain basic, but can also get very sophisticated through the technical control methods available today. Examples of more sophisticated systems include daylight harvesting, net metering, and building management systems. Some of the low voltage and communication systems may be subcontracted by the electrical engineering firm or by the owner directly.

Within the LEED™ framework, electrical engineering typically incorporates the following elements:

- ❖ Interior lighting and daylight harvesting through lighting controls (please see additional guidelines for selecting daylighting professionals)
- ❖ Exterior lighting techniques and exterior light pollution reduction
- ❖ Electrical usage performance calculations, in conjunction with energy modeling (please see separate guidelines for energy analysis professionals)
- ❖ Renewable energy technologies
- ❖ Measurement and verification
- ❖ Controllability of systems
- ❖ Commissioning

Electrical engineering can play as significant a role as desired by the engineer and owner in the course of a project seeking LEED certification. Depending on the qualifications and capabilities of the electrical engineering firm, they can develop designs to incorporate minimal aspects of electrical engineering such as lighting and power systems, or bring daylighting, lighting controls, and building management systems to the table. Whatever role the firm does play, it is important to incorporate the integrated design approach. Coordination between the mechanical and electrical design engineer is a critical part of the design process, as it can play a major role in saving the owner money upfront, as well as energy and economic savings over the life of the building. Control systems in high performance buildings can provide significant savings, but it is important to realize that not all budgets can handle the elite control systems available today. If the electrical engineering firm does not have the ability in-house, the electrical engineer may elect to hire or work with a daylighting consultant that has the ability to model or render daylighting conditions to properly coordinate the daylighting and the electrical lighting.

Questions to Ask

When selecting an electrical engineer, review the guidelines for selecting a green design professional. Then review the 10 questions specific to electrical engineering below. This guide will help you complete a more thorough selection process.

Q1: What photometric calculating programs is the firm experienced in using?

Typical lighting programs vary from simple point-to-point calculations, to full computer rendering. Not all projects require the cost and time of computer rendering, but may prove worthwhile in a highly daylight project. Energy analysis programs can also aid in daylight analysis, as these programs will take factors from the power usage and heat output of lighting systems, as well as available daylight contributions. At a minimum, the firm should be experienced in providing photometric layouts of the interior and exterior and be able to relate their lighting techniques to standards by the IES.

Q2: What types of lighting control systems has the firm utilized in the past and how successful are the installed systems performing?

There is a wide variety of lighting control systems available today that incorporate simple bi-level switching, to fully automated dimming systems with occupancy sensors. Not every project needs, nor has the finances available, for the most sophisticated control systems. Find out which systems the firm has worked with in the past, and which have worked well in similar building types. Take tours of these systems, and talk to the owner's of these systems to investigate the performance on a day-to-day basis.

Q3: What is the firm's experience with payback analysis?

The firm should demonstrate experience in different local jurisdictions in how to calculate electrical payback analysis. Different jurisdictions have different rate structures, which can have a major impact on the monthly electrical bills. 'Peak Demand', 'Coincident Peak Demand', 'Demand Side Management', and multiple rate structures are a few examples of how different utility companies calculate monthly bills or provide monthly savings. *Has the firm produced payback studies in this area in the past in your project's jurisdiction?*

Q4: Has the firm worked with the local jurisdiction in the past?

Familiarity with local codes and officials can help make a design and construction process more streamlined. This can be evident when looking at criteria for energy code compliance, exterior site calculations and fire alarm systems. Remember the local authority has jurisdiction and it is generally best to make sure there are open lines of communication through the course of a project, especially early on when changes do not impact the budget.

Q5: What type of design or construction process is the engineering firm familiar with?

There are many high performance and green projects demonstrating the value of an integrated design approach. It is important that the engineering firm is familiar with the integrated design approach and willing to listen to what other members of the design team have to contribute to this process. There are practices in the construction industry that lend themselves to embrace these techniques. A background in the design build approach can prove to be very valuable to a design team. Many high performance and green projects will require the engineers 'to think outside the box' and not provide designs 'like their father and grandfather used to'.

Q6: Does the firm have experience with power analysis tools?

Find out if the firm owns software to enable proper coordination of all the breakers in the building, which can be later verified during the commissioning process.

Q7: What type of energy saving techniques does the engineering firm suggest on a project-to-project basis?

There are many areas in which a project can save energy. There are also many people and products claiming to save energy. Find out which techniques the engineering firm is familiar with, and which techniques they have used with success in the past. Also, find out how knowledgeable they are in new technologies that are pushing the limit. *What techniques would they suggest for a project such as yours?*

Q8: Who will be the person(s) performing the electrical design and engineering?

Ask to get the personal resume for all people who will be involved in the design and engineering as well as description of each person's core skills and value added to the project. Meet these people if you will have direct communications with them during the project implementation process.

Q9: What is the firm's project management approach to insure quality of electrical installation?

Make sure that the electrical engineering firm has a procedure in place to inspecting or commissioning the electrical systems that are installed. All LEED Projects must commission their building, and it is beneficial to hire a firm that is familiar with this process. This can help save the owner time and money during the commissioning process. If you are working with an engineer separate from the contractor, make sure the contractor is experienced with the commissioning process of the electrical systems.

Q10: What is the firm's experience in renewable technologies?

Find out if the firm has experience with wind, solar or biomass renewable energy technologies and net metering. Not all projects are suited for onsite renewable energy production, but an experienced consultant should be able to advantages or disadvantages per your project. The firm should also be able to provide estimates on costs of purchasing green power through third parties.