

***Should Owners Use—Or Break—  
the Electrical Equipment Supply Chain?***



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Electrical Design Library (EDL) publications are prepared for architects, consulting engineers, and qualified electrical contractors, as well as owners, developers, investors, and their electrical construction specifying personnel. Issued periodically by the National Electrical Contractors Association (NECA), the publications provide factual explanations of the increasing variety of sophisticated electrical systems and the economics of their installation by professional electrical contractors. They are distributed by the Association's chapters, located in all sections of the United States.

This EDL is the result of ongoing research being sponsored by The Electrical Contracting Foundation, Inc. into improving the procurement process in electrical construction. These ongoing research projects include *Procurement Strategies For Increased Profitability* by The University of Kansas and *Procurement Chain Management in the Construction Industry* by MCA, Inc.

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# Introduction

**A**n increasing portion of the construction dollar is being spent on electrical materials and equipment. Reasons for the increase include:

- ◆ the greater complexity and proliferation of power, communications, and control systems in modern commercial, industrial, and institutional (CII) facilities;
- ◆ the shift from hardwired systems to plug-and-play control systems;
- ◆ increased modularization of electrical equipment; and
- ◆ the introduction of labor-saving innovations.

What's more, project schedules and budgets are getting tighter. Owners seek ways to speed project completion and reduce direct construction costs. Since materials represent a large portion of the total construction budget and are sometimes on the project schedule's critical path, owners have begun procuring project materials and equipment for installation by specialty contractors.

Owner-furnished materials and equipment are either being procured by the owners themselves or through their representatives—including construction managers, architects, and engineers. This edition of NECA's Electrical Design Library will discuss owner-supplied electrical materials and equipment and provide recommendations to owners considering pre-purchasing electrical materials or equipment either themselves or through their representatives.



*Owners are seeking ways to speed project completion and reduce direct construction costs. One of their solutions has been to procure project materials and equipment for installation by specialty contractors. Such actions should not be taken lightly, because the apparent savings resulting from pre-purchasing electrical materials and equipment could disappear.*

# A Procurement ‘Bill of Rights’

**P**rocurement of materials needed for a construction project is a key part of the construction process. The ability to install any part of a construction project is dependent on the availability of the materials necessary to perform the work.

An electrical contractor can only meet planned production rates and schedules if sufficient materials are supplied on time—and at the required rate—to keep pace with field operations. Worse, installation quality and the completed facility’s ultimate performance will suffer if materials supplied do not meet project needs.

What should a procurement strategy attempt to achieve? This procurement “bill of rights” summarizes the goals:

- ✓ *Right Quality*
- ✓ *Right Supplier*
- ✓ *Right Quantity*
- ✓ *Right Time*
- ✓ *Right Price*

## Supply Chain

The electrical construction supply chain can be conceived as links that connect the manufacturer on one end to the construction site on the other. These links serve as the conduit not only for the exchange of the physical product and payment but also the flow of information and services.

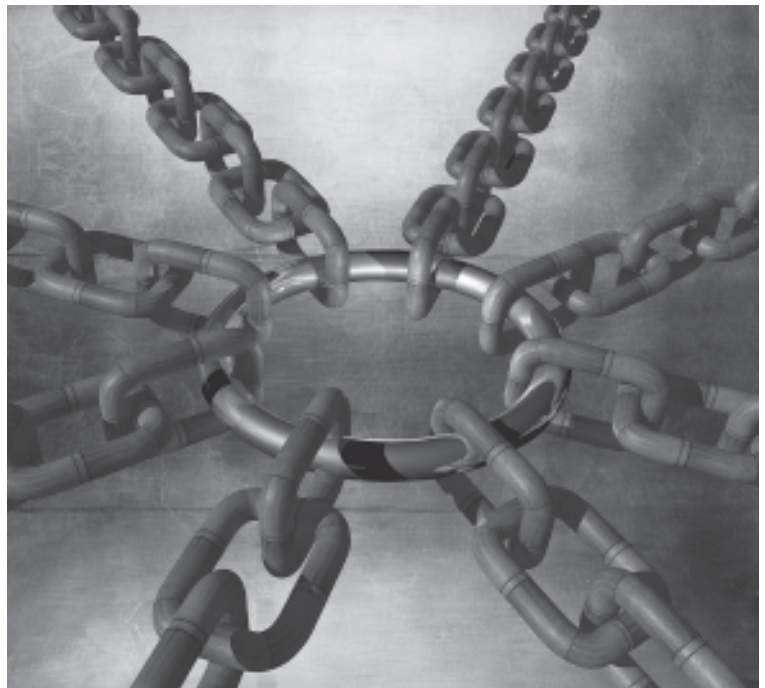
Project success depends on the flow of information and services as much as (or more than) the material and payment flow. Why? Product information and services include, among others:

- ◆ technical data;
- ◆ request for quotation (RFQ);
- ◆ quotation;
- ◆ purchase order;
- ◆ submittals, such as shop drawings;
- ◆ delivery schedule;
- ◆ invoicing and payment; and
- ◆ technical support during and after installation

Each supply chain link should add value. The procurement process determines the supply chain—which should be designed to efficiently and effectively achieve the procurement “bill of rights” for the construction project.

As displayed in Figure 1, a number of supply chains will get materials and equipment from manufacturer to job site. Solid lines connecting manufacturer and electrical contractor represent the traditional supply chain and the links that comprise it.

In the traditional procurement process, the specialty contractor includes the cost of material procurement in its price to the owner, takes responsibility for procuring the needed materials, and provides single-point responsibility for installation **and** performance of materials and equipment.



*Each supply chain link should add value. The procurement process determines the supply chain—which should be designed to efficiently and effectively achieve the procurement “bill of rights” for the construction project.*



Dashed lines in Figure 1 connecting the manufacturer with the contractor's field forces represent the non-traditional supply chains, including supply of materials by owner or representative.

### *Which Is 'The Right' Chain?*

Not one of these supply chains is right for all projects or all materials. Different markets have unique requirements; as do specific projects; as do varying kinds of materials and equipment. All of these differences may dictate different supply chains.

If and when project owners consider supplying electrical materials directly to a project, they need to determine what the most advantageous supply chain will be. Factors in making such a determination should include the value added by each link in the chain (which would be eliminated by a direct purchase), the owner's in-house capabilities, and the capabilities of its consultants or agents.

One might glance at the figure and quickly conclude that the least expensive supply chain—strictly in terms of purchase price—would be the direct link between manufacturer and job site...with the owner or owner's representative only involved in submitting the material order to the manufacturer. An owner working directly with the manufacturer eliminates all of markups of intermediaries, theoretically obtaining the best price.

However, this very simplistic view of the electrical procurement process ignores the value-added services—including the flow of information that those eliminated links routinely provide. In the process of reducing the additional markup on materials via direct purchase, the owner may end up absorbing much higher additional costs as a result of schedule slippages and additional material and installation costs resulting from the wrong material being provided.



*No one supply chain is right for all markets, projects, or materials. When project owners consider supply electrical materials directly to a project, they need to determine what the most advantageous supply chain will be. Sometimes breaking the traditional supply chain is the answer.*

# Goal: Minimize the ‘All-In’ Cost— Not the Purchase Price

**W**hy do owners purchase material directly, then? The most often cited reason is lower construction costs. A direct purchase shortens the supply chain and reduces intermediary markups.

However, there is an error in such reasoning. The answer equates “lower construction costs” with lower material price—and the two are not the same. Price is only one aspect of the total installed cost of electrical materials. If one assumes the owner’s true goal—the goal of any procurement strategy—is to minimize the total installation cost, minimizing the purchase price is not the answer.

Instead, let’s assume the procurement strategy’s goal is to minimize the “all-in-cost.” The “all-in” cost includes the 10 factors in the box at the right. Each of these 10 contributes to total installation cost; they must be considered when purchasing electrical materials.

Yes, there are savings available in lowering the purchase price—but those savings can quickly vanish thanks to the other nine factors. This can be the case on the job site; it can be the case in advance, if one carefully considers all 10 factors in the purchase decision.

Most owners and owner’s representatives do not have the expertise to differentiate between competing products and suppliers based on all 10 factors. Consider two examples:

**The construction manager** may have procurement expertise in buying bulk building materials (concrete and steel). Typically, a CM will not have the expertise to purchase specialized or built-to-order electrical materials and equipment.

**The architect/engineer** has the expertise to **specify** the electrical equipment based on installed system performance. Most often, one finds the A/E does not have expertise in detailed installation of electrical materials and equipment—which greatly increase installation costs (due to field modifications, schedule delays, and lost productivity).

Without experience, specific knowledge of the products and players, and electrical expertise, frequently the owner-direct decision on which products to buy will **not** be based on the “all-in” cost. Instead, the purchase decision ends up based on price alone.

## Factors Contributing to ‘All-In’ Installation Costs

- Purchase Price
- Incoming Transportation
- Storage & Handling
- Installation Preparation
- Ease & Efficiency of Installation
- Material Waste & Scrap
- After-Installation Finish Work
- Excess Material Restocking or Inventory Charges
- Inspection & Testing
- Warranty & Product Support

# Problems Owners Buy With Direct-Purchased Materials

**O**ne motivation for owners to supply electrical materials is to reduce construction time by pre-ordering. Some items must be ordered with long lead times to maintain a schedule.

Certainly, such pre-ordering will be necessary to meet an aggressive completion schedule. But can what is being ordered be installed efficiently? Will it perform properly? Involving the electrical contractor the procurement process as soon as possible will help ensure that the proper items are ordered.

Another reason owners cite for such pre-ordering is the belief that they save on intermediary mark-ups (those of electrical contractors and distributors). This second reason concerns many contractors, because owners don't always understand the problems that can occur for the project and themselves.

Simply stated, owners are not in the electrical construction industry and not in the business of procuring electrical materials. Contractors are; buying materials efficiently and cost-effectively is how their companies stay in business!

Procurement is a core competency of electrical contractors. Owners typically haven't built electrical buying expertise. This is true even if the owner has an in-house engineering group or consulting engineer on the project.

Buying materials is only the start (as seen in our list of 10 contributing factors). Will the right materials be delivered to the right place at the right time and in the right quantity? There's much more involved here than a good technical specification.

A technical specification is necessary. But it is just the starting point for the electrical contractor's job. To deliver an on-time, on-budget installation, the contractor must be concerned about items such as:

- ✓ installation hardware;
- ✓ equipment configuration;
- ✓ maximum weight limits and dimensions when moving equipment through existing spaces;
- ✓ delivery and storage schedule and logistics;
- ✓ inspection, adjustment, and commissioning; and
- ✓ standard purchasing terms and conditions.

## *Additional Factor: RISK*

In purchasing materials for an electrical installation, the project owner must understand that it is assuming a great deal of risk.

As this responsibility has been removed from the contractor's hands, it is the owner that will be responsible for delays or lost productivity that occur. The contractor may lose time or end up with crews working inefficiently if the owner fails to provide the right materials, at the right place, and at the right time. Normally, with control over both materials and installation, this is the contractor's responsibility.

Such problems can multiply. The owner may also be responsible for delays and lost productivity experienced by follow-on specialty contractors resulting from the electrical contractor's inability to perform due to problems with owner-supplied materials and equipment.

Problems can continue after installation. The owner that buys direct ends up—indirectly—with the responsibility for any after-installation problems with electrical materials and equipment. After-installation problems are not always easily diagnosed and fixed; substandard system performance can have several causes.

Troubleshooting and correcting these problems may require the owner to work with a variety of electrical manufacturers and suppliers—which can be frustrating and time-consuming. In jobs in which the electrical contractor has single-point responsibility, any problems with the installation and/or equipment are the contractor's responsibility.

Owners, architects, and engineers need to understand the additional risk that the owner assumes when pre-purchasing electrical materials for a project.

## *CM-Supplied Materials*

Construction managers (CM) are beginning to purchase electrical materials and equipment for projects. They seem to see profit potential in the mark-up of the electrical materials—they can, theoretically, increase the fee charged to an owner (adding this service) while reducing the owner's cost (via direct purchase).

Again, there is risk in such an approach. To convert the traditional supply chain's intermediary mark-ups into profit,

the CM either assumes additional risk—or passes that risk on to the owner (if the owner is contracting directly with the electrical contractor for installation).

In substituting for the traditional supply chain, the CM takes on the job of those intermediaries: It must provide the right materials, at the right place, and in the right quantity. If the CM fails at this “sideline,” it will be liable to the electrical contractor for delays or lost productivity caused by its failure to perform. And, as above, the CM will also be responsible to any follow-on subcontractors for problems caused by its failure to perform.

Further, supply of electrical materials and equipment makes the construction manager responsible for the *suitability of the materials* beyond the electrical contractor’s installation along with *material warranties*.

In the end, the owner is likely to find all-in costs much higher and after-installation problems that suddenly are much worse if CM-supplied materials and equipment do not meet project requirements. Those projected savings from pre-purchasing can turn black to red on a profit-and-loss statement.

### When Owner Buying Works

Are there cases when pre-purchase of electrical materials by the owner (or its representative) are warranted and can produce real savings? Yes.

Example: Owner-furnished equipment makes sense on a compressed-time project when long-lead, built-to-order electrical equipment (such as switchgear) is on the project’s critical path. In such cases, the owner will be well-served to select the electrical contractor as soon as possible.

Why? The contractor can review the material technical specifications and shop drawings before the manufacturer begins fabrication. This reduces the owner’s risk and increases the chances that the schedule can be maintained, especially important on a compressed-time project. The contractor’s review and comments on the long-lead-time equipment should help avoid costly changes and installation delays on down the line.



Additionally, owners sometimes pre-purchase standard light fixtures as part of a “package.” This makes sense when a project follows a prototype—in which design, procurement, and installation of the power, communication, and control systems have been proven. Restaurant chains and other franchises where the owner and manufacturer develop a standardized “package” for each installation are examples.

In such cases, it is that standardization—and the owner’s ongoing relationship with the electrical manufacturer—that reduces the owner’s pre-purchase risk in both material supply and installation.

### Recommendations to Owners

Owners should be aware that the apparent savings resulting from owner-furnished electrical materials and equipment could be elusive—or even non-existent. Additional risk is assumed by owners who pre-purchase electrical materials and equipment for a project. Owners should weigh those real risks against anticipated.

Owners might also find construction managers and design professionals offering material pre-purchase as a service. In considering taking control of the electrical supply chain through project representatives, owners must acknowledge that they not only receive the potential benefits, but they also assume the risks associated with the supply of electrical materials and equipment.

Procurement of electrical materials and equipment is a core competency of the electrical contractor and its partner, the electrical distributor. In traditional arrangements, the contractor includes that core competency in its single-point responsibility for the installation and performance of the power, communications, and control systems.

If one adds a true calculation of the “all-in” installation cost to owner peace of mind, making the electrical contractor responsible for material procurement and installation outweighs any possible savings from direct-purchased electrical materials and equipment for the owner.

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