P178 RESOURCE PLANNING FOR ELECTRIC POWER SYSTEMS

KEY INSIGHTS

- Generic cost estimates may not sufficiently account for site-specific considerations, biasing generic costs lower than detailed studies for specific projects.
- Cost estimates using constant dollar analysis do not include the effect of inflation on capital-carrying charges, causing estimates to appear lower than those using current dollar analysis.
- During times of rapidly changing costs, estimates can quickly become out of date.
- Estimates can report costs at different levels of inclusiveness, for example, total plant cost versus total capital required.

Why are site-specific estimates often higher than generic cost estimates?

by Romey James

Site Specificity

Many factors can drive discrepancies between cost estimates available in reference material and those of real-world projects. Some of the most significant drivers relate to the inherent differences between generic estimates and site-specific studies, which typically result in higher site-specific cost estimates.

- **Project estimates for site-specific projects are more detailed** and include the costs of addressing unanticipated site conditions.
- Individual companies' **design bases vary**, for example, in the amount of equipment redundancy included for reliability. **Procurement strategy** can also affect costs.
- **Site-specific requirements** such as fuel delivery, transmission tie-in, and raw water requirements impact costs. More extensive civil works may be needed for an atypical site.
- **Labor market conditions** (availability, local wages, union agreements, etc.) vary by location.
- **Transmission system improvements** required to support large capacity additions or remote generation can often be significant.
- **Interest during construction** for specific projects is frequently greater due to the abovementioned factors increasing plant cost estimates.
- Discrepancies can emerge from differences in **analysis type** and **level of cost reported**, which are discussed on the following page.

Current versus Constant Dollars

Economic analyses can be conducted in current dollars (also referred to as *nominal dollars*) by **including the effect of inflation on capital-carrying charges** and operating costs or in constant dollars (also referred to as *real dollars*) by not including inflation in capital and operating projections.

Many generic cost estimates are presented in constant dollars to give a clearer picture of real cost trends and purchasing power differences, but current-dollar analysis more closely approximates future cash flows, which is important when utilities are reviewing estimates with regulatory authorities and securities analysts. Thus, proposed project costs often appear higher than generic costs. This effect is more pronounced for technologies with longer construction timelines, notably nuclear.

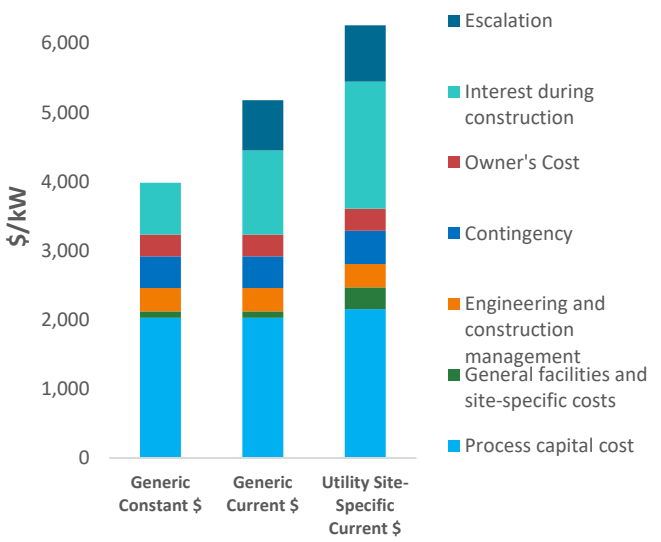

Figure 1: Effects of analysis type on cost estimate.

Equipment Price Volatility

During periods when equipment prices are changing rapidly, previously published cost estimates can quickly become outdated and non-indicative of a new project. In the wake of COVID-related supply chain disruptions, some materials and equipment needed for many types of power plant construction saw prices rise faster than inflation. In 2025, increased demand for baseload power drove longer wait times and higher prices for gas turbines. Newly developed cost estimates for a specific project during such a regime would be expected to be higher than cost estimates developed at an earlier time.

Cost Components Included

Costs may include different components. While many studies report **Total Plant Cost (TPC)**, sometimes referred to as *overnight construction cost*, this may understate the total investment required. **Total Capital Required (TCR)**, or *all-in costs*, includes TPC plus owner's costs, such as land, inventory capital, plant commissioning activities, and *interest expenses during construction*, also referred to as **Allowance for Funds Used During Construction (AFUDC)**. TCR better reflects the total cost of a project.

This research highlight is based on EPRI's *Generation Technology Options* reports, EPRI Product IDs 3002011806 and 3002029428

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