Introduction

As you start working with vendors to create your automation systems design, you are probably wondering what the end price tag is going to be and how you can keep costs under control. This is why setting a budget is one of the first steps of the design process with most engineering companies. Budgets are often the first major obstacle and tend to be guiding light when it comes to project decisions and cost management along the way. The problem is: setting an finalized budget is hard to do when you haven’t even begun the engineering process.

Enter cost estimates. Cost estimates are used in almost every industry before a company takes on a new project. A cost estimate is a good way to set expectations, negotiate a relationship with your automation company, measure your progress, and stay on budget throughout the project. There are basic components of a cost estimate that you can expect to see when coming up with a rough budget for your automated systems design, and this whitepaper is intended to help you navigate the process.

Basic Inputs of a Cost Estimate

No matter your industry, automation engineers will rely on the following factors to establish a cost estimate:

Past Project Comparisons

A typical way to get a general scope of an incoming project is to compare it to similar past projects that the engineer has already completed. While this tactic can only be used in the beginning basic stages of project estimating, it is a useful way to set a general scope for the project before all of the details have been determined.
Expert Opinions

It is nearly impossible to complete a cost estimate without consulting the experts who will be involved with the project. As the manufacturer, you know what you need to get done (“I need to automate my assembly line for product X”) however you don’t know what it’s going to take to get there. Your engineer will consult with multiple experts in the automation field as a key step in creating your cost estimate.

Industry Specific Factors

Automation prices vary from industry to industry as there are unique challenges and benefits to automating processes in each. Automating assembly line processes for a plastic company is much different than automating an assembly line process for a textile company, and this will show in the numbers.

Specific examples that usually mean a higher price tag:

- Stringent sanitary requirements
- Required formal system validation or strict batch tracking requirements
- Highly corrosive/explosive/dangerous chemicals
- Etc.

Facility Contingencies

Just as there are industry specific considerations when determining costs, there are also location and facility specific contingencies as well. Your engineer will take a look at the space where the automation system will be installed to understand potential roadblocks and risks, and will incorporate these contingencies into the cost estimate.

Project Scope for Automation System Design

Developing automation cost estimates involves estimating efforts, equipment, and resources for the entire automation development process. Understanding scope and responsibilities of the different tasks involved in the automation systems design and engineering process will give your engineer an idea of all of the small costs to add up in order to get “the big number”.

A typical automation system design project outline is depicted. The first thing a cost estimate must establish is how much of this scope your automation vendor is completing vs. your in-house team? From there, details for each stage can be developed and cost estimated.

A question that often arises here: is a turnkey automation integrator better than an-house team managing the overall project with specific integrations completed by OEM suppliers or several vendors? The answer depends on your goals, but generally a turnkey automation integrator is better for larger projects where consistency of oversight, programming, and project management are key. Think of it like this: do you want to buy a pre-built car designed to work as a cohesive machine and delivered ready to drive or do you want to build/modify the car yourself?

7 Variables That Drive Automation Design Costs

There are seven variables that tend to greatly affect cost when specifically dealing with automation systems for manufacturing plants. These are the main things your engineer will look out for when creating your budget:
Size of System

The size affects the amount of building materials and hardware/software you’re going to need, it also usually is related to the overall complexity of the automation systems design. All of this will inform your pricing estimate. Automation engineers will want to quickly establish:

- What is the size of the equipment in the system?
- How many control panels are you going to need?
- What is the reach of the system?

Communication Network Style

Different network styles have varying costs. For example, an Ethernet connection working processor-to-processor will have lower costs than a network that uses analog instruments or that has different systems interacting and transmuting information.

Things to consider will be how many adapter cards you need, how many processors are communicating, and what the network is based on (ethernet, wireless, etc.)

总 I/O Count

Your I/O count is your input/output count, and it matters because every time you increase your I/O count, you are looking at more control systems, more hardware, and higher costs.

Number of Terminal Locations

Terminals require special installation and can be costly, so getting a count on how many terminal locations you expect to have throughout the system helps establish a realistic price point.

Data Logging Needs

Assimilating a new server, setting up new databases, and other data logging requirements add costs to automation systems design. Data logging is an extremely important part of automation, and the amount of frequency, storage, and integrations required to meet your regulatory and plant needs can drive up costs.

Hardware Needs

Will the panel be fabricated or prefabricated? What components do you need? Understanding what kind of hardware you need will outline required custom orders, fabricated products, and pre-ordered component costs. When working with EPIC, you are connected to vetted manufacturers and component experts with established relationships, allowing you to leverage their expertise and access the right hardware.

EPIC is brand agnostic and maintains relationships with many vendors. If you have a specific brand,

“AUTOMATION IS AN INVESTMENT, NOT SIMPLY AN EXPENSE ITEM.”
platform, or hardware requirement is standard in your plant, you can maintain that with our flexible sourcing. If you prefer we recommend the best options from a cost, fit, and ROI standpoint, we are also able to do that without bringing “preferred vendor” bias into it.

Programming Platforms & Functional Software Design Preferences

The software preferences and programming design requirements you have will affect your costs, and this is an area where you have some flexibility. If you need to go the most cost-effective route possible for your automation systems design, you can do that. If you want to play around a little to make it exactly how you need it to be, the options are out there. Upfront engineering and design reviews are the time where you can communicate your brand preferences, personalization preferences and assess what everything is going to cost.

Estimate ROI (Return-On-Investment), Not Just Basic Costs

Automation is an investment, not simply an expense item. You should expect improvements that provide long-term financial return from an automation project. I/O count, data processing needs, and the other factors above give you a rough estimate of the magnitude of the job and how much money it will take to “get the job done.” They are not an actual indicator of the overall cost of an automation design project or the profits you will reap in the long run.

Taking a look at the automation systems design to assess what your overall ROI is going to be with this system is an even more important step in understanding your financial situation. To determine your ROI for the project, start by determining the following:

Motivation for Automation

Why you are automating in the first place? Looking at the system you will be replacing, what costs are associated with it, and what pain points this automation will solve will help you to establish an idea of the ROI for this project.
Equally as important, having a clear vision of why you are investing in automation will help you, project stakeholders, and your boss prioritize what is important on the project. Successful projects have a clear idea of what success looks like because everyone involved understands why the project is happening.

For a specific guide on determining which automation investments should be prioritized based on potential ROI, check out this article on determining when to invest in automation.

**Increased Production Output**

Most manufacturers choose to automate processes because the end result is faster output with less downtime. Setting the expectation for what your increased output will be with the help of a knowledgeable engineer will help you to have a realistic idea of how much you will be increasing your profits with the automatic process.

To do this successfully, it is recommended you consult with several different people. First, make sure you talk to your line operators or manufacturing plant operations and see what real-production rates are at the moment. Going off “ideal numbers” or “should be” answers does you no good here. Often what’s actually happening on the line is different than what is said to be happening on paper.

Secondly, find either an automation integrator or another expert that has in-plant experience and can give you a realistic idea of the improvements you can see with upgrades. Internet research doesn’t cut it here; it’s a starting point but experts can tell you what will most likely work in terms of compatibility with your existing systems and your specific manufacturing situation.

**Comparing Run Time and Down Time**

Automating systems means you have a machine that is running faster and more efficiently than a human, but you also need to consider the negative impact of working with a machine that needs to be properly programmed, maintained, and serviced. Your engineer or automation integrators can help you get a realistic idea of maintenance costs, what slowdowns in production you can expect due to installation, maintenance, and updates, and other issues that are going to have a negative impact on your ROI.

**Learning Curve**

Implementing an automated system into the ecosystem of your existing manufacturing plant always comes with a learning curve. It is going to take your team time to learn how to use the system and get comfortable with the automated processes. You need to consider how this change will affect your output in the beginning of the transition, and account for that in your overall ROI.

Determining an estimated ROI is important in that it gives you a compelling way to present the project to upper management and stakeholders. Remember this is still an estimated ROI though, so think of it as a goal the project is aiming for, not something you have to get absolutely perfect up-front to move forward with. You can also bring in your integrator partners or equipment vendors to help determine part of the ROI, which can add a layer of experience and vetting to the process.
Obtaining a ROM with EPIC

As described above, there are a lot of factors that you need to consider when coming up with a budget for your automation systems design, and it is typically required in any form of project management to seek an expert opinion on pricing before confirming an estimate.

EPIC offers services to help you establish your automation systems design costs and ROI from the beginning by getting you an estimate that will consider exactly what the requirements are for your system. We work with a wide scope of industries and have the experience and knowledge to give you a thorough estimate that considers factors of engineering, design, and implementation from all sides.

Contact us today or call 314-310-1549.