

# PECO II® Cuts Costs, Installs Modular Product Architecture with Pro/ENGINEER® and PTC® Global Services

## PECO II, Galion, OH

Founded in 1934 as The Power Equipment Company, PECO II today is the world's largest independent, full-service provider of telecommunications power systems. PECO II supports the power infrastructure needs of communications service providers in local-exchange, long-distance, wireless, broadband, and Internet markets. PECO II power systems are designed with innumerable components, including rectifiers, converters, circuit boards, relays, meters, switches, fuses, monitors, control panels, pushbuttons, and alarms. A public company (NASDAQ: PIII), PECO II generated revenues of \$62.1 million in 2002.

### The Challenge: Hundreds of One-Offs to a Handful of Platforms

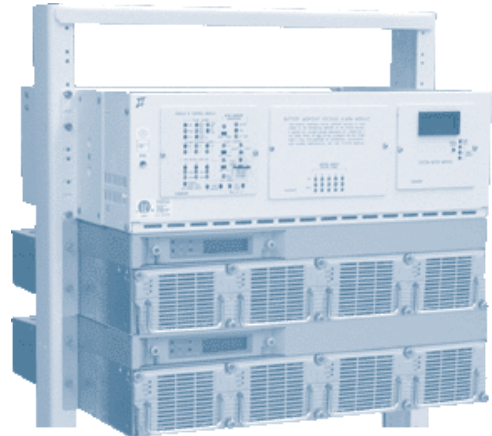
PECO II became a leader in telecom power systems by delivering highly customized products on a large number of product platforms. Recently, however, this 'one-off' approach has taken its toll, as costs in product development have skyrocketed and earnings have plummeted. To remain profitable, the company realized it must convert its product development practices from a highly customized approach to a modular, platform-based structure—fewer platforms with far more variants.

### The Solution: Modular Product Architecture

Since PECO II was already using Pro/ENGINEER, PTC's 3D product design solution, and Pro/INTRALINK® (for managing of Pro/ENGINEER data), the company's engineering management decided to consult with PTC's experts in product modularization to find a way to transform their product development. Guided by PTC's Product First® Roadmap—a blueprint that helps companies determine effective initiatives in product development—PECO II selected PTC's Modular Product Architecture Implementation, an affordable, multi-phased service engagement that has enjoyed measurable success for other companies seeking to overhaul their product development process.

### The Results: Product Development That's Built for the Future

By converting to a modular product architecture, and increasing the proficiency of its CAD engineers in their use of Pro/ENGINEER, PECO II has completely reconfigured its product development process. Now, instead of building hundreds of one-off products with virtually no part reuse, the company now offers four major product lines, and its new 162 Power System is achieving 90% part reuse. By reducing assembly test time by 60% to 70%, the company is seeing much faster time-to-market, and with a completely streamlined development process, PECO II is now able to turnaround customers' design proposals in days rather than weeks.



The 129 power system from PECO II supplies 50 to 400 Amps of -48VDC power in increments of 50 Amp rectifier modules in a compact design. The distribution and control assembly provides plant metering, alarms, status indicators, and 400 Amp internal bus work.

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—Tony McIntosh, VP of Engineering and Quality, PECO II

### Thousands of Customers, Thousands of Platforms

The story of PECO II is familiar to many discrete manufacturers struggling to improve bottom line performance. For decades, PECO II was able to go toe-to-toe with giant telecom competitors by building 100% customized products—relatively quickly, affordably, with high quality. In recent years, however, the telecom industry experienced a significant downturn. Customers disappeared, inventory soared, and PECO II's 'one-off' product development approach suddenly became financially unsound.

With little or no reuse of product designs and parts, every customer order was made from scratch, sending development costs through the roof. Minimal part reuse also meant that engineers were forced to repeat design work previously created, causing significant delays in meeting schedules.

Making matters worse, product stakeholders across the company were making multiple late-stage changes to the design. Exacerbated by an inefficient engineering change order (ECO) process, these late changes were driving up costs, jeopardizing quality, and delaying time-to-market. And with no up-front agreement on the product direction, product designs became moving targets, open to modification during every development stage.

PECO II's engineering management team could easily see that the company needed to overhaul its product development practices. The company needed a small number of common product platforms, which would reduce the number of parts and designs. Engineers needed to reduce the complexity of the product design, ensuring that parts and assemblies could be quickly and easily reused. To reduce late-stage changes, all product stakeholders had to agree from the outset on the design and specifications of the product. And just as important, the product development strategy had to include Design for Postponement, a process where late-stage changes can be made without serious negative consequences to time, cost, quality, and design.

### Maximizing Tools in Pro/ENGINEER

Although identifying the issues was quick and clear, solving them was another matter. After talking with representatives from PTC, PECO II found the solution in the PTC Modular Product Architecture Implementation program, a cost-effective, fast-implementation service from PTC's Global Services Team. For PECO II, achieving a modular architecture was simply a matter of applying the people, process, and Pro/ENGINEER and Pro/INTRALINK technology already in place in a more effective and efficient manner.

### Three-Phase Approach

For many engineering executives, the idea of completely transforming their product development processes raises a number of critical questions. What's the best process? How is our process deficient compared to industry best practices? How much will it cost? How can we ensure acceptance by our teams? What's the duration of the implementation? How disruptive will this be to our everyday activities? What are the metrics that will determine success?

Because of its experience with modular product development, PTC's Global Services had answers for every question. The process established by PTC, described briefly below, was structured in three simple steps and helped address PECO II's questions:



PECO II is now achieving unprecedented part and assembly re-use, including 90% part re-use in the new 162 Power System, shown here.

- **Phase One: Two-Day Education Workshop**  
Phase one involved bringing the PECO II product development team together and educating all cross-functional groups on the essential new product development tools such as the architecture schematic and interface matrix to be used going forward. Here, a commitment is made to assigning ownership and control of the new architecture/system level.
- **Phase Two: Pilot Project on Existing Product**  
Next, the plan called for launching a five-day "process pilot" using the new tools, so team members could adopt—and adapt—the new process by testing it with an existing product.
- **Phase Three: Pilot Project on New Product Line**  
The final step was to apply the new process on a new product, and to identify exactly where the real-world benefits would be realized.

### Total Transformation in a Matter of Weeks

According to PECO II management, the results of the PTC engagement have been very positive. Today, PECO II enjoys a far more efficient product development process, far fewer product platforms with a greater number of variants, fewer late-stage change orders that are now managed much more efficiently, and significantly greater part reuse. “If you look at the design that came out of the modular architecture compared to the previous way, it’s absolutely amazing—night and day,” says Tony McIntosh, VP of Engineering and Quality, PECO II. “The way [the product] goes through the design, the way it will go through manufacturing, the ease of wiring in the field—it’s quite impressive.”

PECO II is now turning the ship around, responding much faster to customer requests and proposals with higher quality products at lower cost. Not only has PECO II transformed its development process, but there’s a new energy and commitment to great product design.

### Tapping into the Power of Pro/ENGINEER

Part of the excitement that now pervades PECO II product design comes from a more proficient use of Pro/ENGINEER, which recently supplanted AutoCAD® as the lead CAD tool at PECO II. The associative nature of Pro/ENGINEER—where each change to the model instantly updates all other aspects of the design—along with the pervasive visuals of model features, enables PECO II engineers to work faster and more efficiently. McIntosh explains: “The greatest benefit we’ve seen using Pro/ENGINEER over AutoCAD is we can see everything. We’re able to see things as a solid model in proof of concept within the computer which is a great benefit,” says McIntosh. “[With Pro/ENGINEER] it’s so much easier to make a change in one place and it ripples through by itself; you don’t have to change and manipulate things in three or four different views.

### Formal Process Locks-in Design—Locks Out Changes

Perhaps the single most important process factor that has helped transform product development at PECO II is that the development team—marketing, engineering, sales, support, et al—agrees on the product direction and design upfront, long before the design begins. By implementing a formal signoff process, product development stays on the fast track, without derailment by random changes. “In the past we’d dive in and just start designing things and add things along the way,” says McIntosh, “Now, knowing ahead where we are going, what we want, has made a big difference. Modularization helped us to lay the product roadmap out upfront. It was the first time we had a formal process.”

According to McIntosh, by gaining consensus from the outset, the process of getting a proposal in front of a customer now takes days instead of weeks.

### Part Reuse: From Minimal to 90%

Another significant factor in the transformation of PECO II’s product development is the proliferation of part reuse. Before the modularization program, PECO II applied minimal part reuse. Today, with far fewer product platforms, part reuse is significant—a remarkable 90% in one major product line. For McIntosh and his team, the difference in speed and ease of design is truly remarkable.

“We had a customer that wanted to add a new feature—two battery disconnects—to the product,” explains McIntosh. “We did the design work in a day and a half, and in another day and a half the customer approved it. Within one week we had it in production. In the past, that process would take weeks. Being able to respond to customers like that,—not just in our industry, but everything in our microwave society—is critical to capturing market share,” concludes McIntosh.

The significant reuse of parts and assemblies has also shortened assembly test time, since existing parts and modules have already been tested in prior projects. That reduction in test time means faster time to market with higher quality products. McIntosh explains: “The ability to test modules during the manufacturing process—test in assembly—was easily reduced by 60% to 70%. The old product family had to be fully tested in final assembly. The new product family can be tested in process, so final assembly test time has been greatly reduced.”

### Industry Following PECO II’s Example

PECO II is not alone today in implementing a modular product architecture. Many companies are now moving away from customized product development in an effort to reduce product customization, cut costs, streamline development, and get better products to market faster. Explains Kevin O’Marah, analyst with AMR: “Product lifecycle profitability depends on such powerful product development disciplines as reuse [parts, designs, tooling, and such], product platform strategies, and design for postponement. From aircraft to apparel, these strategies are being converted from idea to reality.”

With a modular product development process, the PECO II engineering team is now delivering lower-cost products to market faster. PTC, with its Product First Roadmap and Product Lifecycle Management (PLM) solutions, are likely to play an important role in helping PECO II return to the growth and profitability it has enjoyed consistently since 1934.

“The modularization program will fundamentally change how we interface with the world,” states McIntosh, “and Pro/ENGINEER has become a critical part of our company’s future.”

For PECO II engineers, modularisation means they can focus on what they enjoy most—creating great products—and having fun. “The fun comes from a sense of accomplishment. Using your engineering degree, as opposed to just dragging a bunch of lines around a screen,” explains McIntosh. “All these guys like to make new stuff, and from that, they can make more new stuff. Finish one and move on to the next thing. That’s what they like to do.”

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