



# NAC Executive Insights

## Procurement and Supply Chain — Introduction

### Key Points:

1. Definition of procurement and supply chain
2. The importance of procurement and supply chain executive leadership
3. A world class procurement and supply chain organization
4. Global sourcing of engineered equipment, materials, and services
5. Early supplier engagement in project execution
6. Procurement and supply chain education in the capital project industry

### Introduction and Definition

This insight includes observations and experiences accumulated over forty years of working in the engineering and construction capital project industry as an engineer and procurement professional. The majority of the examples used in this paper are a result of executive procurement responsibility for two major *Fortune 500* companies and association with multiple owners, contractors and industry organizations.

In simple terms, procurement in the capital project industry is the acquisition of equipment, materials and subcontracted services required to engineer, construct, and operate a capital project facility. Supply chain, which is sometimes used interchangeably with the word procurement, is defined as a system of organizations, people, activities, information, and resources involved in delivering a product or service from the supplier to the end customer or end user. Whatever the name, procurement or supply chain is strategically important in order to complete capital project facilities on time and within budget.

While this Insight will not describe the “nuts and bolts” of managing these processes in individual organizations or on individual projects, it will focus on the above identified key points that are required for contractor and owner procurement and supply chain organizations to be a key part of their respective firms, contribute to the success of all new capital projects, and ensure that the current and future status of procurement and supply chain professionals in this industry are considered equal partners with their engineering and construction counterparts.

## **Procurement and Supply Chain Executive Leadership**

Procurement and supply chain leaders in both contractor and owner organizations must have an executive “seat at the table” when developing company philosophy and strategy as it relates to the acquisition of goods and services for their individual company as well as for capital project execution.

It is also important that the procurement and supply chain executive leading the organization report directly to the company CEO, or in larger companies perhaps one level down. This ensures executive buy-in across the company as well as demonstrates the importance of procurement and supply chain to all employees. Not having this clear executive-level support is detrimental to having a successful procurement and supply chain organization.

Regarding project execution, it is important that contractors and owners be totally aligned when developing a procurement and supply chain strategy for a capital project. On larger projects, the contractor and owner procurement and supply chain executives must be engaged in this effort. This must be done at the beginning of a project and involve the buy-in of other key project stakeholders, including engineering and project management.

## **World Class Organization**

While executive leadership, as stated above, is important to having a world class procurement and supply chain organization, it is also paramount that the procurement and supply chain executive leader have total global responsibility for all procurement and supply chain functions across the company. This will allow for the establishment of one “company face” to the supply base, will demonstrate a clear vision of procurement and supply chain philosophy and strategy, and will present the opportunity to leverage supplier relationships and apply that across the company as well as across multiple capital projects. While different firms will call sub-functions within a procurement and supply chain organization by different names, it is critical that *all* functions, i.e., sourcing, planning and material control, purchasing (of goods), contracting or subcontracting of services, expediting, supplier quality and inspection, logistics, and other related sub-functions, including systems and technologies, are included under the umbrella of procurement and supply chain.

Global sourcing teams, which are described in the next section, also are employed by the most forward-thinking companies and are included as part of the procurement and supply chain organization. It is also a best practice to have project-based procurement and supply chain groups be considered part of the company’s corporate organization regarding these functions, and an individual leading these functions on a project should report directly to the project manager and also directly or indirectly to the company procurement and supply chain executive.

## **Global Sourcing of Goods and Services**

On a typical capital project facility, the cost of the materials and subcontracted services can represent as much as 60-70 percent of the total installed cost of a project and directly influence achievement of cost and schedule objectives. This being the fact, it is important that materials and services be sourced globally and strategically to ensure costs are kept to a minimum without jeopardizing quality. The most cost-effective way to do this is to form various global sourcing teams within a company that are responsible for particular categories or product groups, i.e., civil material (structural steel, cement, rebar), mechanical equipment (rotating equipment, furnaces, material handling equipment, fabricated vessels), electrical, instrumentation, and other special categories that may be key to particular industry sectors such as oil and gas, chemicals, power, pharmaceuticals, mining, metals, heavy civil (bridges, dams), transportation, and commercial and institutional sectors, and others.

It is important that these product groups be charged with staying on top of the global market in their product areas, including identification of new suppliers, market price, and forecasted deliveries. They also should take the lead in leveraging (cross-project) spend volume with key suppliers and in establishing strategic supplier relationships and long-term pricing agreements that can be used by the company and capital project teams.

## **Early Supplier Engagement**

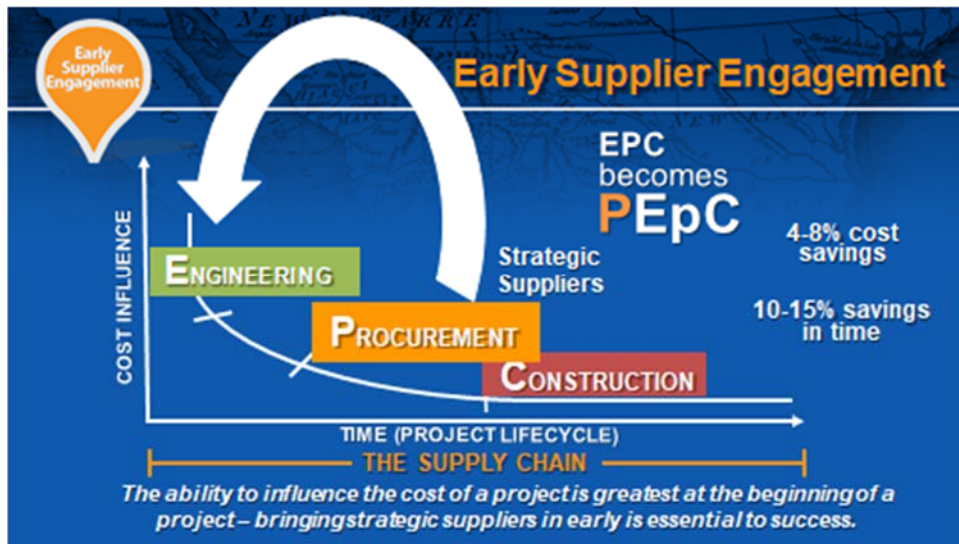
In the engineering, procurement, and construction (EPC) industry, the purchasing of materials and engineered equipment from suppliers is traditionally started following the completion of design engineering. While this is a safe way of ensuring technical compliance, it has been proven that this extends the project completion cycle for a variety of reasons, including the need to study various proposed supplier solutions during the traditional procurement phase of a project while waiting to start construction. Further, once a particular supplier is selected, design deliverables must then be updated to incorporate the selected supplier's component design details.

In the late 1990s, the Construction Industry Institute (CII) established a research team charged with studying the early engagement of suppliers in the capital project cycle. The research was carried out by a 15-person team made up of supply and engineering leaders from various contractor, owner, and supplier organizations. The research team explored the potential for changing the traditional relationships among owners, contractors, and suppliers in order to utilize more effectively the contributions and competencies of the supply base in the engineering and construction of a capital project.

The optimized Cost Influence Curve shown graphically below, which resulted from the CII study, illustrates that although the ability to influence the cost of a project is greatest during the early design engineering stage of a project (the "E" in the graphic below), months go by before critical equipment

and materials are traditionally procured (the “P” stage), allowing only then for construction (the “C”) to begin.

After studying many project examples, the research team determined early supplier engagement and commitment on a typical EPC project could produce cost savings of four to eight percent and time savings of 10-15 percent across the life of the project by modifying this traditional process. Therefore, moving the “big P” in front of the “big E” and adding a “little p” (the balance of the items to be procured), reconfigures the traditional EPC project model to PEpC. The research team nicknamed this new configuration the “PEpC” (pronounced Pepsi) process.



*The CII Cost Influence Curve*

Although developed over 20 years ago and used by many leading edge contractors and owners on specific projects, the PEpC process has not been institutionalized fully in the industry. Nonetheless, it is worthy of being included in this NAC Executive Insights document for consideration in future procurement and supply chain project planning.

## **Procurement and Supply Chain Education**

Supply chain management, although a named bachelor and/or master degree program offered in many major universities today, remains in the academic setting highly focused on the manufacturing industry and its particular needs. Although few universities touch on capital project supply chain, we as an industry need to pay more attention to procurement and supply chain education and help universities establish curricula that can be of benefit to students who want to pursue a procurement and supply chain career in the construction industry in general.

## **Reference**

*Reforming Owner, Contractor, Supplier Relationships: A Project Delivery System to Optimize Supplier Roles in EPC Projects*, Research Summary 130-1, Construction Industry Institute, June 1998.

## **About the Author**

Jim Scotti was elected to the National Academy of Construction in 2012. He is a retired senior vice president and was chief procurement officer for Fluor Corporation. He is a graduate civil engineer and PE who spent the majority of his 40-year career as a procurement professional for three major engineering and construction firms. In 2008, he led Fluor's initiative to fund a Fluor Endowed Chair in Supply Chain at Clemson University and the concurrent establishment of a master of engineering degree program in capital project supply chain management. He currently serves on the Clemson University College of Engineering Advisory Board.