

Advantages of the Integrated Approach to Transformational Electromechanical Modernization Projects

This paper describes two approaches to transformational electromechanical modernization projects. In a nutshell, these projects are highly complex. The traditional approach called “design-bid-build” is fragmented and therefore does not adequately address the complexity. Another approach is now available, called the “integrated approach”, which does.

How do these two approaches compare? What are the advantages of the integrated approach over the traditional one?

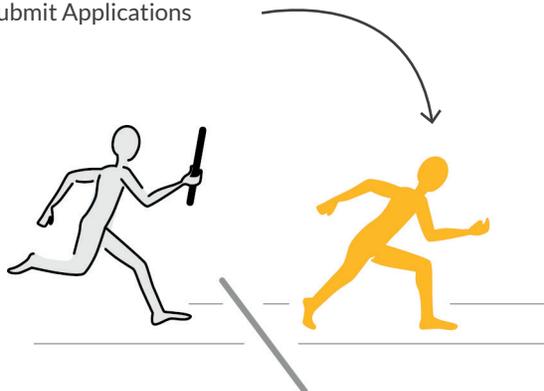
Summary of the Traditional Approach

In the traditional approach, the project is split into stages, with each performed by a different contractor. At the end of each stage, the contractor is paid, and their work handed off to the next participant. The usual project phases for a deep energy retrofit are scoping study, design, construction, and commissioning, performed in that order.

The process is similar to a relay race. Except that when each contractor reaches their finish line, they pass their results off to the building owner, who must then find the next participant.

In this traditional approach, each contractor’s scope of work is task based. If tasks must change to overcome unexpected challenges, then the building owner must pay extra, to change the scope of work.

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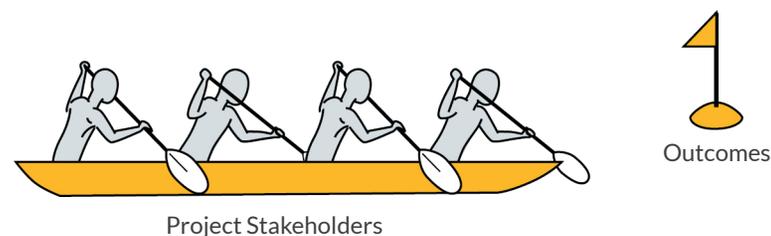
Summary of the Integrated Approach

In the integrated approach, a single partner (either a single contractor or a consortium) manages all phases of the project. This partner contractually agrees to achieve a set of project outcomes, for a fixed total project cost. If unexpected complications arise during the project, the partner is responsible for finding solutions. After project completion, these outcomes are measured and verified according to objective standards, to ensure they have been delivered.

Compared to the traditional approach, a greater amount of effort is invested in the scoping study. During this phase, the partner spends time with the owner to develop the project goals. The partner’s experts from all project phases are brought in and collaborate with the owner’s team, to better predict risks and develop more creative proposals.

In the commissioning and optimization phase, greater effort is spent making sure the system works and that it works as promised.

Overall, using the integrated approach, the scope of work is outcome based.



Advantages of the Integrated Approach over the Traditional Approach

The main advantages of the integrated approach stem from the fact that it minimizes risk to the owner. Responsibility for achieving project outcomes falls on the partner and there is a clear mechanism to hold the partner accountable. Here are the four key project dimensions where the integrated approach provides greater value.

1- Accountability

The complexity of deep energy retrofits means higher levels of project challenges. Each approach handles accountability differently, with the traditional approach tipping the balance away from the building owner and their desired project outcomes.

Traditional Approach

Integrated Approach

Project Accountability

Ultimately, accountability rests with the owner. The contractors are responsible for carrying out a set of tasks. The owner must ensure the tasks contribute to accomplishing the desired outcomes.

Accountability is assigned to the partner, who is responsible for carrying out all project phases, in line with the project outcomes.

Payment Method

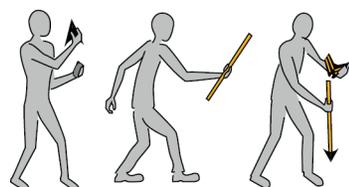
Each contractor is usually paid once they complete their stage of the project. If inadequacies in their work arise later on, the owner may have difficulty obtaining compensation. Often, the owner simply pays to fix the problem, since the fees and aggravation associated with legal proceedings are not worth it.

Part of the payment is held back until the measurement and verification period, after project completion. During this phase, project results are objectively verified and the partner receives payment once the outcomes have been delivered.

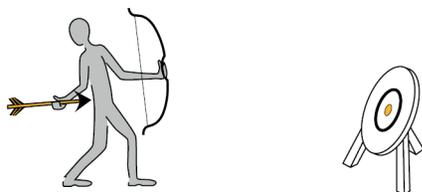
Alignment of Interests

Interests are misaligned between the different contractors, and between the contractors and the owner. The payment method does not clearly incentivize the contractors to work towards a common goal established by the owner. This makes the owner vulnerable to opportunistic behavior on the part of the contractors.

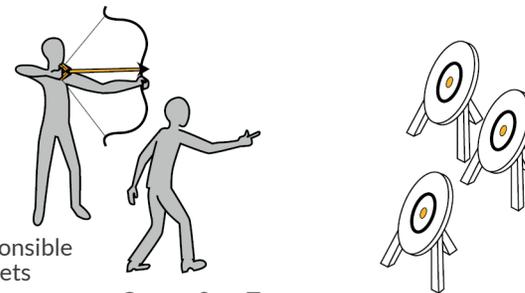
The partner's interests are firmly aligned with the owner's through the payment method. Both are motivated to achieve the project outcomes, forming a strong basis for trust and collaboration. Alignment of interests is a defining characteristic of the integrated approach.



Contractors Responsible for Building Their Section of Arrow



Owner Ensures Arrow is Appropriate for Hitting Target



Partner is Responsible for Hitting Targets

Owner Sets Targets

2- Addressing the Unexpected

In a complex project, there are a large number of variables – some easy to predict, others difficult, and some impossible to determine up front. The greater the number of variables, the higher the chance that unexpected challenges will arise.

There are two ways to mitigate challenges, both fully incorporated in the integrated approach:

- 1- Minimize the number of unexpected challenges, by predicting and addressing them up front.
- 2- Minimize the impact of unexpected challenges when they do occur.

Traditional Approach

Integrated Approach

Collaboration

The different contractors rarely have a chance to speak with each other, let alone collaborate. Because construction experts have little to no role in the design process, designs often do not take constructability into account.

One partner manages all stages of the project. Experts in different project phases can come together at the start to discuss and walk through the project, along with the owner's team, in a methodical manner. They can jointly identify challenges and propose strategies to address them, before beginning the work.

Problem Solving

There is less clarity over who is responsible for finding solutions. Because each contractor's scope of work is task based, if the tasks must change to overcome unexpected challenges, the scope of work must also change. Since responsibility for increased costs and time delays falls on the owner, the contractor has less incentive to address issues quickly and efficiently.

As the party who carries the project risk, the partner has clear responsibility for solving problems that arise. As a result, the partner is highly motivated to find solutions promptly and efficiently.

The process of modifying the design during the construction phase is also difficult. This is due to lack of collaboration between the design and construction contractors.

If unexpected challenges do occur, greater collaboration can also reduce their impact. The design team is involved during the construction phase, so the design can quickly be modified if needed.

Commissioning Phase

A commissioning phase is included. However, the contractor performing this phase is solely responsible for getting the system up and running – not necessarily for getting it to run efficiently. In other words, this phase contains no optimization aspect.

The partner spends greater effort on commissioning and optimization. Even if the system does not immediately work as expected, the partner's experts will fix problems and optimize the system until it does. In a complex system, this commissioning and optimization step is critical.

In addition, the contractor that performs the commissioning is unlikely to have been involved in the design and construction phases. Thus, they may not fully understand how the system should work.

3- Complexity of Outcomes and Measures

With accountability for outcomes, project goals can become more ambitious. Likewise, with methods to more effectively predict and address challenges, highly complex measures to achieve those goals can be successfully implemented.

Traditional Approach

Integrated Approach

Owner's Goals and Expectations

The owner must limit their expectations for what the project can accomplish, as there is no guarantee that the project goals will be achieved. The contractors are merely responsible for their set of tasks, while the owner is responsible for ensuring the tasks match the project outcomes.

The partner's overall project accountability allows the owner to set more ambitious goals. The partner works with the owner to develop these goals, advising on which objectives can be grouped together and accomplished cost effectively, versus which ones will add costs.

The owner must also spend significant effort making sure the system works, period. This limits the owner's ability to set and ensure the success of more ambitious goals. However, these more ambitious goals may be critical to the successful operation of the facility. A system may work, at a basic level, but ignore occupant comfort, cost a lot to operate, and lack resiliency.

The partner gains a deep understanding of the building owner's concerns, which helps to avoid misunderstandings during project implementation.

Complexity of Tasks

Tasks and measures must be kept relatively simple, since no contractor can guarantee the system will work.

The partner is incentivized to reduce the unexpected and address challenges quickly. By employing strategies to accomplish this, the partner becomes capable of completing highly complex tasks.

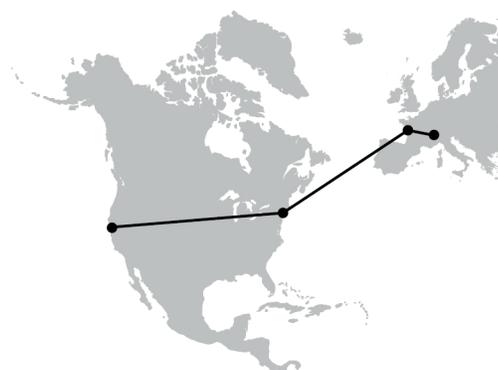
Analogy – Freight Forwarding:

An analogous example of how a partner, who provides guarantees, can add greater value by successfully navigating complexity

Traditional Approach**Coordinating Shipping Yourself**

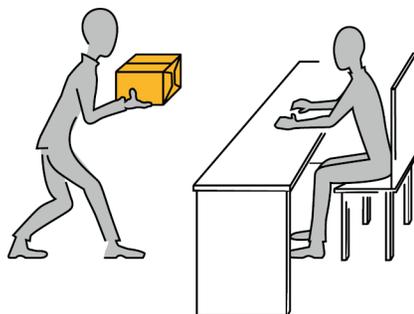
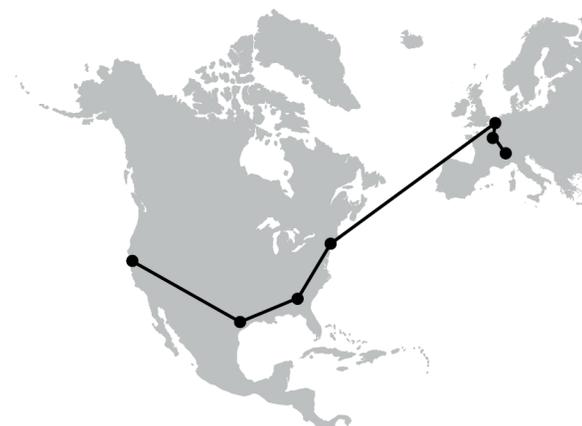
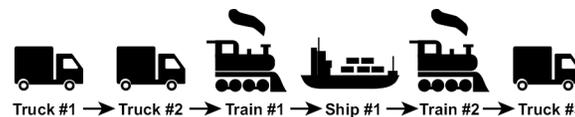
Outcomes:

- The Package Takes 2 Months to Arrive
- It's Partially Damaged
- \$250 Total Price, Customs Included

**Shipping Path: Simple****Integrated Approach****Shipping with Freight Forwarding Company**

Guaranteed Outcomes:

- Your Package Will Get There, Undamaged
- 15 Business Day Delivery
- If Recipient Is Unavailable for Pickup, Package Is Held for Them at Nearby Facility
- \$60 Total Price, Customs Included

**Shipping Path: Complex**

4- Project Timelines

By definition, project phases in the traditional approach are sequential. This imposes timeline rigidity, as follows:

Traditional Approach

Integrated Approach

Order of Phases

Phases are performed sequentially. Delays arise between stages, as new contractors bid on the opportunity to perform the next phase. If design changes become necessary during construction, these changes may be time consuming to implement. This is because the original design firm (or a different design firm) must be reengaged, brought up to speed about the issues, and then required to collaborate with the construction firm to address them.

Project timelines can be compressed. Since one partner manages all aspects of the project, activities can be performed in parallel, across project phases.

Summary

The integrated approach is better adapted for the complexity of deep energy retrofits. A single partner manages all project phases, with an outcome-based scope of work. The partner contractually commits to the project outcomes, at a fixed cost.

Since the partner carries accountability for achieving the outcomes, they must find ways to minimize unexpected challenges. They must also spend more time making sure the system works as promised. Project tasks and measures can thus take on greater complexity and still be successfully executed.

Project timelines can also be compressed. Tasks, across stages, can be performed in parallel. Unexpected challenges can be addressed more quickly, reducing delays.

Overall, being accountable for project outcomes aligns the partner's interests with those of the building owner. Both are highly motivated to successfully achieve the project outcomes.