Conflict in owner/contractor relationships on renewable energy projects

Course Title: Project Management
Course Number: ETM 545/645
Instructor: Dr. Dundar F. Kocaoglu
Term: Spring 2013

Team Members: Jejung Ha
Elizabeth Hardee
Rachanida Koosawangsri

Table of Contents

1. Abstract

Renewable energy has become more popular because fossil fuels are in continual decline, and their price is unstable and getting higher. Renewable energy is a great option for both government and the private sector to invest in green and sustainable energy. However, some types of green energy such as Bio and Geothermal need high investment. Thus, the private sector tends toward interest in putting their money in some kind of energy with cheaper funding and a faster return. Solar and Wind energy might be the right answer for them. Due to these kinds of technology needing experts to do the work; most private sector companies will usually outsource the work to contractors, who have experience in installing either solar panels or small wind turbines.

Because renewable energy is getting popular and more home owners and companies are willing to install the system to save costs of energy, the researchers studied types of conflict that occurred during installing the green energy system between the owner of the project and the contractor. In this project, a solar panel installation is focused on.

Trimet as the owner of the project hired REC, the contractor to installing the solar panel for the Jackson St. light rail terminus in downtown Portland. In this particular project, the project managers from both companies worked together throughout the project life cycle. For studying the conflicts that might occur during the project, this project was performed. An interview was conducted with the project owner, and a questionnaire sent out to ask 1) Trimet project manager, 2) REC manager and 3) Trimet assistant manager to prioritize the sources of conflict in order.

Our result found that though the particular project was a success, the three managers surveyed were in disagreement on the rankings of conflict sources at different points throughout the project. Thus, we conclude that under the best of circumstances, owner/contractor relationships must be managed carefully to avoid major disagreements leading to conflict that can derail the project.

2. Introduction

The price of fossil fuel is unpredictable and tends to continually increase. Moreover, it destroys the environment due to its process. People turn to other types of energy that is more sustainable and friendly for the environment. Renewables are one option that has become popular throughout the world. When talking about renewable energy, people usually mention Bio, Hydro, Geothermal, Solar and Wind energy. In the U.S., the consumption of renewable energy is around 9 percent when compared with other sources such as petroleum, natural gas and coal as shown in Figure 1. [1] Moreover, the trend of renewable energy tends to increase over the year because people awareness of fossil fuel price and environment issue.

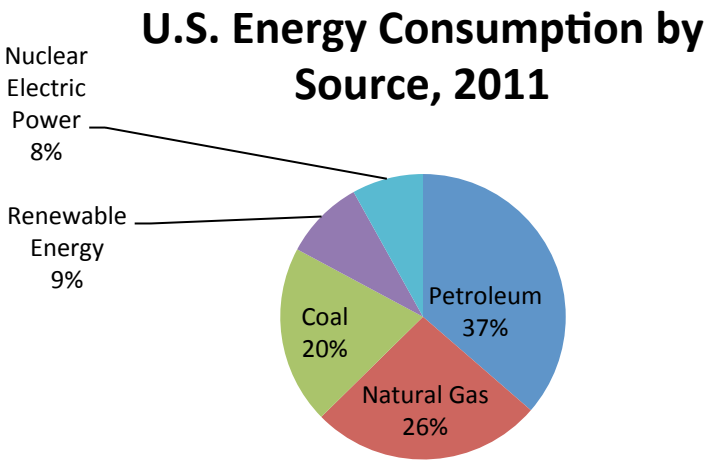

Figure 1 U.S. Energy Consumption by Source, 2011

Moreover, the investment in renewable energy is getting higher 32 percent or around $211 billion [2]. However, most of the projects in renewable energy need a lot of money to invest especially Bio and Geothermal. If private sector companies do not have a source of flow in their property, it is going to be hard to generate power from Hydro systems. Thus, most of the renewable energy project will be invested by the government. However, Wind and Solar are good options for the private sector to invest because cheaper installing cost, and period of return is shorter. They can install either at their home or on the roof tops of buildings. Because the cost of installation is affordable for them, private sector firms are more willing to invest in solar panels and small wind turbines than in other kinds of renewable energy [2]. As shown in Figure 2 below that the investment from private sector on the green energy has the higher portion in Solar and Wind more than other kinds.

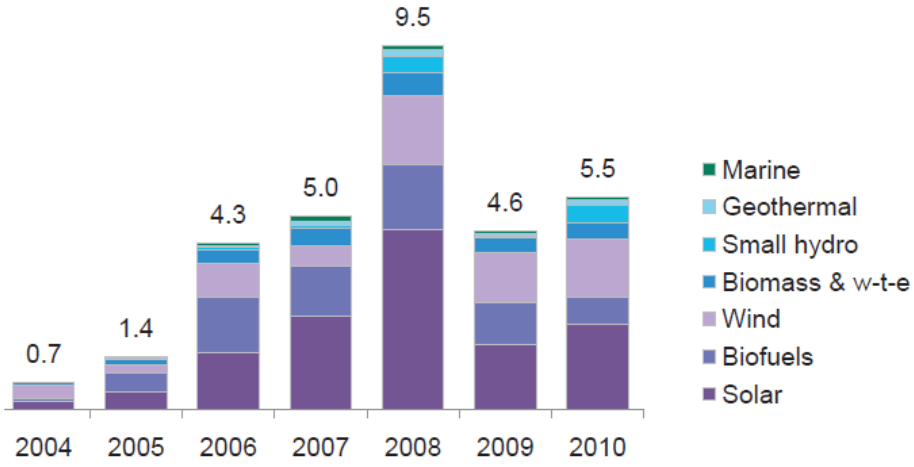

Figure 2 Venture Capital and Private Equity New Investment In Renewable Energy by Sector from 2004-2010, $BN [2]

There are many criteria for the business or home owner to consider when they want to install either solar panel or wind turbine. Moreover, there are many contractor companies who have lots of experiences in installing these two kinds of green energy. Therefore, most home owners or enterprises will outsource the work to third parties rather than installing by themselves [3].

When the relationship is formed, it might be between a home owner and a contractor or between business and business. Usually conflicts will occur within the relationship included budget, schedule, and performance factors- the three elements that the project managers from both sides will need to be concerned with. The owners usually want to pay less to get high performance within a certain time schedule, but for the third parties, they want to put the least amount of effort to the project and get the same amount of money or even higher [12].

The conflicts that happen during the project life cycle are not limited to these three elements only. There are other problems that can hinder the project progress such as personality differences, business process issues, and staffing. Therefore, in this project, the researchers studied the conflicts between two companies- Trimet and REC- over the project life cycle to gain insights into particular issues of conflict on renewable energy projects. The relationship was formed by Trimet, which had a solar installation project at the Jackson St light rail terminus near Portland State University. The installation was to generate power for using in their facilities located in the area. In this study, the researchers had an opportunity to interview the project manager from Trimet, and then a questionnaire was sent to the project managers at Trimet and REC, to prioritize the type of conflicts that occurred during each period of the project.

3. Literature review

We have been watching the current highly competitive business environment in renewable energy. For that reason, owner organizations developing capital projects have had to balance the demands for reduced costs and high profitability while delivering quality products and services. These effects have frequently been accompanied by: (i) downsizing; (ii) reducing or eliminating central project engineering organizations; (iii) shifting project responsibilities to business units or operating facilities; or (iv)outsourcing more work to contractors [4].

The project owner is the entity identified as such on page one of this Contract, or its authorized representative, that is the owner of the property that is the site of the Project and is responsible for administering the Contract. The project contractor is the person or firm with whom the Owner has contracted to perform the construction for the Project [5]. Today's owners have adapted their engineering and management principles to reflect the changing environment of the construction industry. The owners, driven by changes in the global business environment, have downsized capital facility engineering capabilities and outsourced capital project functions in an effort to leverage contractor manpower and expertise, reduce costs, and improve their competitive advantage. The overall impact of this shift in owner-contractor organizational functions in design, construction management, internal core management functions, and procurement of goods and services has had a significant impact on the contractors that service this industry [6].

Success in completing construction projects depends mainly on proper coordination, cooperation, and communication among parties to a construction contract. These construction parties involve owners, designers, construction contractors, subcontractors, and maintenance contractors. A construction project traditionally involves two major professionals in the construction industry. These two professionals are the owner and the contractor. Communication for the effective coordination between these two parties is the key factor to be considered for the successful completion of a project. It is postulated that disagreements between these two parties have caused barriers in the design phase and construction process.

The construction process is influenced by highly changing variables and unpredictable factors that could result from different sources. These sources include the performance of construction parties, resource availability, environmental conditions, involvement of other parties, and contractual relations. As a consequence of these sources, the construction of a project may face problems which could cause delay in the project completion time.

If one were to seriously consider ways to reduce problems on site, an obvious place to begin is to focus on what the project team can do to eliminate these problems at the design phase. There is no "one size fits all" way of identifying the right design approach to a particular project. Conflict occurs throughout an organization, but conflicts between owner

and contractor are particularly important, because if poorly handled, they can disrupt an organization's labor relations and productivity [7].

Conflicts can be reduced by carefully adhering to procedures set out in the contract. These may include authorization requests granting approvals, reporting procedures, inspections, regular meetings, etc. A mutual lack of attention to procedures by the owner, consultant, and contractors can cause management problems. Eliminating the inconsistencies which exist can enable projects to be completed successfully. Inconsistencies at the interfaces between parties can either result in delay in project duration, compromise on quality, or increase in cost. Considering these disagreements which can ultimately affect any construction project, there is a need to institute better and comprehensive solutions to coordinate activities at the interface.

It is important to determine the potential causes of inconsistencies in the project life cycle. These potential causes of inconsistencies can hinder the progress of a building project substantially. In business relationships, it is very important that a company maintain good business relationships with all the people that it deals with. To do this, the company must build their trust and confidence to ensure continued patronage and a steady business.

One must follow a partnership rather than an adversarial relationship in business. An adversarial relationship is one where businesses treat each other and their clients as adversaries, treating them as enemies instead of as partners [8]. There is little or no trust between them and their means of communicating with each other is very formal. They do not have direct contact and no direct involvement in each other's activities. Instead of finding ways that are beneficial to both parties, they tend to blame each other when problems arise. A partnership relationship in business, on the other hand, makes both parties work closely together to ensure that everything that they do will benefit both companies [5]. The line of communication between both parties is open, and they cooperate with each other. It is a relationship based on trust and the belief that every action that each company takes is for the benefit of both. When problems arise, they solve them by acknowledging their mistakes and by finding solutions together. As compared with an adversarial relationship, a partnership relationship involves long-term business agreements instead of having individual transactions and short-term contracts.

While information is withheld from each other in an adversarial relationship; in a partnership relationship, it is shared to make problem solving easier. However, when the business is based in a place where there is conflict and a business environment that is not transparent and prone to corruption, most companies opt for an adversarial approach to lessen the risks to their business. Businesses often grab every opportunity they have to achieve instant benefits in a short period of time rather than opt for a long-term relationship which can cause losses for them. The most conventional business relationship in the right environment, though, is a partnership relationship.

4. Case Study

As mentioned before, the research team was interested in a real-life example of an owner/contractor partnership on a renewable energy project. The team chose a large-scale solar installation purchased by Trimet, and gathered information from the project managers from both Trimet and REC Solar, the contractor.

4.1 Case context:

Trimet is a public agency which was created by the Oregon state legislature in 1969[9]. It is charged with providing mass transit to the greater Portland metropolitan area, and operates bus and light rail lines throughout the city. Its first major solar project was dubbed "The Elegant Wrapper", a parabolic-shaped, large scale installation at its Jackson St. light rail terminus in downtown Portland. The solar installation was to power two small buildings which housed light rail communications equipment, and if successful provide a blueprint from which future Trimet solar projects (including those powering the rail line itself) might proceed[10].

Unlike similar commercial-scale projects on buildings, for which the leasing of the building itself might act as a deterrant to up-front investment, Trimet understood this to be a long-term investment, of which they would be owners for 25 years or more. Therefore, the balancing act of project resources (money, time and performance) in this case was such that the agency was able to use time to its advantage, lowering the cost of the project while enhancing its final performance parameters[10].

In 2009, talks began with potential project contractors, and in early summer of 2010, REC Solar was selected as the contract partner, with negotiations proceeding throughout the year as funding issues were resolved. An important solar incentive, the Business Energy Tax Credit or BETC, was repealed early in the project planning stages; Trimet compensated by receiving credits from the Energy Trust of Oregon and Portland General Electric. The final cost of the installation was $366,000, with $263,151 being offset by these credits. Other donations were made by participating organizations such as Portland State University, and Trimet's share of the cost was under $5000 [13]. REC was officially contracted in November of 2011, and construction on the project spanned the last month of 2011 to February of 2012[10].

Our project team set out to answer the following key questions about conflict on this project:

1. How would the owner/manager rank the various potential conflict areas for the project at different points across the product life cycle?
2. How would this compare to the exact same ranking produced by the contractor/manager?

3. How would it compare to the exact same ranking produced by a close associate from within the company (owner/assistant manager)?
4. How would any of these responses compare to the sources of conflict expected over the course of the project lifecycle, according to our text?
5. From this case study, do any "best practices" emerge for similar situations of owner/contractor relationships on solar projects?

4.2 Research Method

In order to produce the side-by-side ranking comparisons we needed to answer our key research questions, the team drafted a questionnaire based upon the factors with the highest potential for conflict as determined by the research of Jeff Busch [11]. The following question was repeated six times, each time with a modification for the portion of the project life cycle under consideration:

Please rank the amount of conflict arising from the following factors during [phase of project], where #1 is the factor causing the most conflict and #8 is the factor causing the least conflict.
Scheduling Concerns
Staffing Concerns
Project Goals and Objectives
Project Priorities
Business Process Issues
Budgetary Issues
Project Performance Concerns
Personality Differences with Other Project Manager

The final question in the form asked each manager to comment on their overall impressions of their relationship to the other manager on the project.

Participants in this research were Bob Hastings (Trimet owner/manager), Scott Robertson (Trimet owner/assistant manager) and Andy Noel (REC Solar contractor/manager). What follows is the product of this research, our side-by-side comparisons of the rankings each manager contributed:

Project Stage	Bob, Trimet	Scott, Trimet	Andy, REC Solar
Initiation of owner/ contractor relationship (Summer 2010)	Budgetary Issues Business Process Issues Project Priorities Project Goals and Objectives Scheduling Concerns Staffing Concerns Project Performance Concerns Personality Differences	Budgetary Issues Business Process Issues Project Priorities Scheduling Concerns Project Goals and Objectives Staffing Concerns Project Performance Concerns Personality Differences	Budgetary Issues Scheduling Concerns Project Goals and Objectives Project Priorities Business Process Issues Project Performance Concerns Personality Differences Staffing Concerns
Contract Negotiations (November 2010)	Business Process Issues Budgetary Issues Project Priorities Project Goals and Objectives	Business Process Issues Budgetary Issues Project Priorities Scheduling Concerns	Scheduling Concerns Business Process Issues Budgetary Issues Project Performance Concerns

	Scheduling Concerns Staffing Concerns Project Performance Concerns Personality Differences	Project Goals and Objectives Staffing Concerns Project Performance Concerns Personality Differences	Project Goals and Objectives Project Priorities Staffing Concerns Personality Differences
Final stage of project engineering (Early to mid-2011)	Business Process Issues Project Performance Concerns Budgetary Issues Project Priorities Scheduling Concerns Staffing Concerns Project Goals and Objectives Personality Differences	Project Performance Concerns Project Goals and Objectives Project Priorities Scheduling Concerns Staffing Concerns Budgetary Issues Business Process Issues Personality Differences	Budgetary Issues Project Performance Concerns Project Goals and Objectives Business Process Issues Project Priorities Scheduling Concerns Staffing Concerns Personality Differences
Beginning of installation (Late 2011)	Scheduling Concerns Business Process Issues Project Performance Concerns Staffing Concerns Project Goals and Objectives Project Priorities Budgetary Issues Personality Differences	Project Priorities Scheduling Concerns Project Performance Concerns Project Goals and Objectives Staffing Concerns Budgetary Issues Business Process Issues Personality Differences	Business Process Issues Scheduling Concerns Staffing Concerns Project Priorities Project Goals and Objectives Project Performance Concerns Budgetary Issues Personality Differences
Midpoint of installation (Late 2011/Early 2012)	Business Process Issues Scheduling Concerns Project Performance Concerns Project Priorities Budgetary Issues Staffing Concerns Project Goals and Objectives Personality Differences	Project Priorities Project Performance Concerns Project Goals and Objectives Scheduling Concerns Budgetary Issues Staffing Concerns Business Process Issues Personality Differences	Business Process Issues Staffing Concerns Project Goals and Objectives Project Priorities Project Performance Concerns Scheduling Concerns Budgetary Issues Personality Differences
Project Termination (February 2012)	Business Process Issues Project Performance Concerns Project Goals and Objectives Project Priorities Budgetary Issues Scheduling Concerns Staffing Concerns Personality Differences	Project Performance Concerns Project Goals and Objectives Project Priorities Business Process Issues Staffing Concerns Budgetary Issues Scheduling Concerns Personality Differences	Project Goals and Objectives Project Priorities Business Process Issues Project Performance Concerns Budgetary Issues Staffing Concerns Scheduling Concerns Personality Differences

4.3 Analysis:

Comparison of Owner/manager (OM) and Contractor/manager (CM):

During initiation of the project relationship, both OM and CM seemed to be in agreement that the #1 concern for each was budgetary issues. This continued to be a top concern for both moving into contract negotiations, at #2 for OM and #3 for CM. Business process issues became apparent at this point to both as well, at #1 for OM and #2 for CM. During the final engineering stage of the project, perhaps unsurprisingly, project performance concerns were particularly crucial, with both ranking this factor at #2. Also during this stage, budgetary issues were still important, #3 for OM and #1 for CM. At the beginning of installation, scheduling and business process issues ranked highest. Scheduling was #1 for OM and #2 for CM, and business process issues were #2 for OM and #1 for CM. At the midpoint of installation, business process issues ranked #1 for both. At

project termination, this was still #1 for OM but #3 for CM, while project goals and objectives were #3 for OM and #1 for CM. Interestingly, for all participants in the questionnaire, only once was personality differences ranked higher than #8: the CM ranked it at #7 at the very beginning of the relationship.

Comparison of Owner/manager (OM) and Owner/assistant manager (OAM):

Fascinatingly, the OM and OAM were in perfect sync (that is, their top 3 rankings were the same) until the final stages of project engineering. Both began with being most concerned about the budget, business process issues and the project priorities. This makes sense from the owner perspective, as they would be attempting to ensure a successful project at low cost from the beginning. After that, the OM remained primarily concerned with business process issues, while the OAM's concern was primarily about project priorities. During the installation process, the OM and CM seemed to be more in agreement about the project's conflict areas than were the OM and OAM. One area where the OM and OAM did seem to agree during installation was on project performance concerns (which were in the top 3 for both for the entire installation process). This makes sense from the owners perspective; both OM and OAM wanted to ensure that the project performed to its promised capacity.

Comparison to expected conflict areas cited by Meredith and Mantel:

According to Meredith and Mantel [12], the biggest sources of conflict for different points in the project life cycle are:

- Project formation: Goals and Objectives, Priorities, Resources (Staffing, scheduling, budget)
- Project Buildup: Goals and Objectives, Priorities, Resources (Staffing, scheduling, budget), Personality Differences
- Main Program: Scheduling, Budget, Performance Concerns
- Project Phase-out: Scheduling, Budget, Personality Differences

The connection between these predicted sources of conflict and those indicated by our example project is as follows:

Budgetary concerns were the #1 priority for all involved managers at project formation; the project owner wanted a low cost, high performance system while the contractor wanted the most money for their work. During buildup, managers each had different rankings for sources of conflict, however the sources listed above at this stage each featured prominently in our example. For the main program, scheduling, budget and performance concerns are predicted to take precedence. We can see from our result that for our example, budgetary concerns had largely fallen away by this point due to large outside subsidies to the project. However scheduling remained a top concern for all three, and project performance a top concern for both owner/manager and owner/assistant manager. During project phase-out, performance was a top priority for the owners while goals and objectives became the top priority for the contractor; presumably the contractor wished to ensure that each objective outlined at the project's formation had been met or exceeded.

4.4 Reflections on nature of relationships:

One final question asked respondents to reflect on their overall impressions of how it felt to work with the other manager. The comments from this question were:

Andy, REC Solar:
"overall good relationship. Solar is typically new for PM's, so there was a learning curve on what we're doing and how we do it. Process can typically be slow with a public agency, so dealing with that can be challenging from a fast pace private sector company. Managing expectations is also key which can be challenged when a PM tries to compare a process for something different than solar to solar."

Bob, Trimet:
"Very little problems with project management. Chief issues were budget, funding, legal logistics, regulatory approvals, and constantly shifting state requirements and funding."

Scott, Trimet:
"The relationship between myself (owner's representative) and the other project manager (installation contractor) was always very good. There were never any conflicts and the contractor was very responsive to the owner's needs at all times."

Interestingly, none of our managers expressed concern over the level of conflict at any point in the project, and instead spoke about the project from their own perspectives. According to our literature review, we believe this project showed a high level of the Partnership relationship style, as all involved, while not always in agreement about the project's biggest concerns, were able to work together effectively throughout.

5. Analysis of the relation between case study and literature

From the literature review, its emphasis on that the conflicts will occur when the owner and the subcontractor have an adversarial relationship; that when the problems arise, they blame each other more than finding the way to resolve the problem together. Moreover, the literature also states that the relationship will be long-term and strong when both parties are in a partnership relationship. Obviously, the relationship between Trimet and REC is in a good shape. It is easily seen from the survey result that the personality differences issue is not a big concern for them.

However, as usual for the project either from the owner's perspective or the contractor's perspective, budget, schedule and performance are the subjects that both project managers from Trimet and REC were most concerned throughout the project life cycle. Some issues might not be so important in the beginning of the project. However, when the project is going to the mid-point or to the final stage before termination, it can arise for the project managers to be concerned either from both companies, or from one of them.

Moreover, the literature also mentioned that when one company takes any action, it will benefit both organizations if there is a trust and belief in their relationship. In the relationship of Trimet and REC, their relation is continued even though the project for installing the solar panels was finished. It is really shows that their relationship is gone beyond an owner and a contractor. Thus, when the problem arose during the project, they trusted and believed in each other expertise and role. Installing the solar panel project was completed and met their goals especially in the context of budget, schedule, and performance.

6. Conclusion

The solar installation project completed by Trimet and REC Solar is now over one year old, and is performing beyond the expectations of either company. Due to its shape and alignment, the array has been able to capture sunlight throughout most of each day. Originally engineered to produce 65000kW hours of energy per year, the project has exceeded this number in its first year. Excess energy from the project is sold to the Portland General Electric grid, and due to the low initial cost to Trimet it expects to earn at least 25 times this initial investment in savings on its energy bills [13]. Clearly, this project ended successfully and this is likely in part due to the Partner style relationship developed between Trimet and REC's managers.

7. Lesson Learned

It is important that the relationship between an owner and a contractor should be in a way of partnering to increase the project's performance and control the project's budget and schedule. Obviously, because the owner wants to pay less to get the higher quality and on time project, but the third party does not want more work load with high standard and also in a limited budget. If both organizations do not seek for the conclusion and have the same final goal of the project, the conflicts will surely arise throughout the project life cycle. The adversarial relationship will be performed instead of the partnering relationship. The project will be delay, over-cost, and might be in a low quality.

Not only partnering relationship is important to the owner and the contractor relationship, trust and belief in expertise and experience of each other project managers also help the project move forward to the project's objective easier and faster. Moreover, when the problems arise during the project, the project managers from each organization should be easily to reach out to have a conversation about the problems together. Also, what each project manager concerned should not be kept from the other project manager because it will help when the expert know the problem earlier.

8. Recommendation

The scope of this project was focused on identifying the factors that create conflicts between project owner and contractor. We used the method that project managers ranked the factors we suggested. Under this situation, it had limitation to find the unrevealed elements that were associated with each industrial field. Moreover, we can assume that the

results will vary in terms of the priority. Future research might include the typical characteristics of conflict in different industrial areas. We could come up with various factors and crucial issues that are specialized in a certain region. This study will bring the significant solutions to manage conflicts more efficiently on the project.

9. References

[1] U.S. Department of Energy (DOE), "Annual Energy Review 2011," U.S. Department of Energy (DOE), 2012.

[2] UNEP's Division of Technology, Industry and Economic (DTIE) and Frankfurt School-UNEP Collaborating Centre for Climate & Sustainable Energy, "Global Trend In Renewable Energy 2011," Bloomberg New Energy Finance, 2011.

[3] energy.gov, "Installing and Maintaining a Home Solar Electric System," 2 July 2012. [Online]. Available: http://energy.gov/energysaver/articles/installing-and-maintaining-home-solar-electric-system. [Accessed 23 May 2013].

[4] A. D. K. B. J. G. G. R. F. a. G. T. Davis-Blake, "Owner/Contractor organizational changes," 1999.

[5] [Online]. Available: http://www.massschoolbuildings.org/sites/default/files/edit-contentfile/Guidelines_Forms/Contracts_Forms/Green%20Repair%20Program%20-%20OPM%20and%20Des%20Contracts%20Revised%203_15_11/Green%20Repair%20-%20OPM%20Contract%20POSTED%203_15_11.pdf.

[6] C. Geertsema, "Emerging Trends of the Owner-Contractor Relationship for Capital Facility Projects," 2003.

[7] D. a. L. C. C. Tjosvold, "Conflict between managers and workers: The role of cooperation and competition".

[8] [Online]. Available: http://www.differencebetween.net/business/difference-between-adversarial-and-partnership-relationship-in-business/#ixzz2UE1BYOgq.

[9] [Online]. Available: http://en.wikipedia.org/wiki/TriMet

[10] Hastings, Bob. Personal Communication, April 2013

[11] Busch, Jeff. Guest lecture, April 2013

[12] Meredith, Jack R and Mantel Jr, Samuel J. *Project Management: A Managerial Approach.* John Wiley & Sons, 2012. pp 148-153.

[13] [Online]. Available: http://trimet.org/news/releases/feb21-solar.htm