Local Power.

To: Barbara Hale, Michael Campbell

CC: Ed Harrington

From: Local Power Inc.

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RE: CS-920R-B, Task 3, Subtask E, Initial Contracting Analysis

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Introduction

This Initial Contracting Analysis identifies and discusses different contracting approaches that could be used by the CleanPowerSF Program for the roll-out elements at an introductory level. It also provides foundational assumptions for structuring customer agreements for installations and collateral agreements with participating entities. As the technology portfolio and program financing become more developed, the contracting approaches appropriate for the acquisition of selected technologies will be further developed in consultation with SFPUC staff. The technology elements will be largely procured through technology equipment providers and commercial service contractors.

Contracting Strategy

There is a wide range of renewable energy generation and efficiency technology types currently under consideration for implementation through the CleanPowerSF Program. The technologies are being evaluated by the LPI team to develop a more comprehensive understanding of the factors relevant to implementation. These factors include functional characteristics, regulatory requirements, siting, asset ownership, risk and factors relating to financing the technology implementation.

Once a set of technology types have been determined by the CleanPowerSF Program to be acceptable from the functional, siting and financial perspectives, the next phase of the CleanPowerSF Program would include establishing the asset financing processes, conducting the technology acquisition procurement processes, and management and oversight during the implementation phase.

The Contracting Analysis assumes the following:

- The technology in question has been evaluated and determined to provide sufficient benefits to the CCA if not customer-sited.
- If customer-sited, the technology has been evaluated and determined to offer attractive benefits, such that a sufficient number of customers will be interested in installations, so that the benefits of economies of scale are realized during the acquisition process.
- The financial analysis indicates that the combination of capital cost, and either savings or power generation benefits for the technology are such that the technology products and installation can be effectively financed, through the CCA financing or otherwise. This analysis considers the acquisition process and contracting strategies that could be used to implement each set of technology installations, after committed funding has been identified.

- The technology installation(s) have been determined to be feasible from the regulatory perspective.
- The CleanPowerSF Program will perform the primary procurement functions for the acquisition of technology elements, however, other City entities may conduct elements of the program.
- With the exception of contracts including only component supply, it is assumed that all contracts will include all applicable SFPUC contracting terms, which will include minimum insurance coverage and bonding requirements.

Building on the basis of these assumptions, Section 2 of the analysis addresses the acquisition process for the selected technologies; which consists requesting competitive, public bids or proposals from suppliers through CleanPowerSF/SF PUC procurements, and then entering into contracts with the suppliers who provide the most advantageous bids or proposals.

Some of the technology assets will be acquired and ultimately owned by the CleanPowerSF Program. Other assets will be initially acquired through CleanPowerSF/SF PUC procurements to take advantage of economies of scale, and then transferred to CCA customer ownership through a variety of purchasing arrangements that depend on the nature of the eventual asset owner(s), and their election as to how they want to pay for the installation. There are a set of possible customer types relative to asset ownership, these range from homeowners to residential tenants to participants in community local power networks and commercial, institutional and industrial customers.

Section 3 of the analysis will address the different types of customer agreements needed for any assets acquired through the CleanPowerSF procurement process that are to be transferred to customer ownership. Section 4 of the analysis will address the collateral agreements with third parties that may be participating in a particular installation or set of installations.

Program Objectives Relative to Contracting

The acquisition work for the roll-out elements of the CleanPowerSF Program should reflect the priorities and constraints of the Program, and their impact on procurement. Some of the key goals of the program that can be addressed through successful acquisition efforts include:

- Emphasis on Value
- Accountability
- Community respect
- Asset ownership options for all customers
- Equitable treatment of all customers
- Customer satisfaction
- High quality installations
- Success of program
- Reputation of program; delivering quality results and resolving issues
- Use of contractual approaches that enable sound financial managementContracts with Suppliers

Contract types

The types of contracts with suppliers will vary, depending on the nature of the installations. There are three general types of supply arrangements likely to be used by CleanPowerSF:

1) for complex, larger value, site-specific installations, one or more suppliers (technology manufacturers, installation contractors) would likely bid as a combined team for the supply and installation (and possibly operation and/or maintenance) work on a project-by-project basis. These types of projects would likely be contracted using a 'turnkey' contracting approach; Design/Build, DBOM (design/build/operate/maintain) or Power Purchase Agreement (PPA) basis.

2) For more typical installations, such as smaller scale PV installations, or efficiency retrofits, suppliers/contractors could be pre-qualified to be part of a 'contractor pool'. The pool participants could be required to work within standardized cost and pricing restrictions for the repeatable elements of their work. Any unique site-specific installation cost elements would be estimated and validated independently. This contracting approach would be similar to the Job Order basis already in use at the SFPUC for solar installations.

3) For lower cost, stand-alone small devices (such as thermostats or lighting components), suppliers could compete on a standing order price basis. These suppliers would quote unit pricing valid for a set time period. Products would be ordered on a pace that follows installation schedule, to avoid having to inventory any products. The goal of this approach would be to achieve savings through economies of scale. As customer orders are collected, purchase orders for devices are placed, and a separate local installation firm would perform the installation work on a fixed price arrangement.

Larger Installations

Larger projects, such as a larger scale solar or wind power installations, cogeneration or wave or tidal power, are well suited to various types of 'turnkey' contracting. These types of projects usually require some design and engineering work, a combination of components and installation hardware. In a turnkey contract the contractor is required to take responsibility for all aspects of the installation, and to deliver a completed project that meets functional and quality requirements, for a fixed price. Some of the turnkey variations that could apply to the CleanPowerSF program include Design/Build, DBOM (design, build, operate, maintain) and PPA (power purchase agreement).

Design/Build

This type of fixed price contact combines the engineering and installation work under one contract. Usually, a combination of performance specifications and key technical requirements are used to define the contractor's scope of work. The contractor takes quality and schedule risk for meeting the functional requirements. A Design/Build contractor will typically be responsible for securing the some or all of the required construction permits. In the case of the City permits, the contractors would work within any cooperative arrangements that have been made to help expedite required approvals. Design/Build contracts can require a longer 'project-wide' warranty than likely to be available if components were to be sourced and installed under separate contracts. A major advantage in using a Design/Build approach for

many of the customer based projects is that the contractor team can work directly with the site owners from the outset to design the installation locations, and resolve installation issues.

Under some circumstances[1], it may be desirable to complete a project on a Design/Build basis, and then have operations and maintenance services performed under a separate contract, without using the design, build, operate maintain (DBOM) contracting approach described below.

DBOM

Under this model, longer-term (15 yr.+) fixed price operations and maintenance obligations are added to a Design/Build contract. For projects with a greater degree of mechanical complexity, this model can be beneficial, because it requires the contractor to conduct the design and construction work in view of their long-term, fixed price obligation to keep the project functioning properly. This is especially applicable if a technology has not been thoroughly service-tested; using a fixed-price DBOM contract prevents the CleanPowerSF Program from being exposed to cost overruns if additional work is required to achieve expected functionality, or if the installed equipment isn't sufficiently durable. Another benefit of the DBOM approach is that all inventory management and maintenance work for the contract term are included on a fixed price basis, and do not have to be addressed separately by the CleanPowerSF Program after the projects have been completed.

PPA

A PPA is similar to a DBOM contract, in that a single entity is responsible for completing the project, and making it function properly. However, instead of being paid for the work as the project advances, the PPA developer negotiates to sell the power from the project at a set price, and then secures financing for the project capital costs, and completes the project. The developer will be responsible for all permitting, final site acquisition agreements and the costs of implementation, operation and maintenance. The revenues secured from the power sales should be sufficient to repay the project capital cost, if the project developer has both correctly assessed the power output of the project, and kept the capital costs within budget.

Typical Smaller Projects

Job Order Contracts

For the type of CleanPowerSF projects that are similar and will be conducted fairly regularly, the use of a Job Order contracting approach is anticipated. This contracting method has been used successfully by the SF PUC for earlier solar installations. CleanPowerSF projects that would likely use this approach include smaller solar installations and efficiency retrofits., the Job Order contracting approach is best suited to projects just requiring basic contracting work (Physical installations, basic electrical and plumbing, etc.) In contrast, Design/Build is better suited to projects with more complexity; difficult installation challenges, systems integration, technologies that require functional optimization tuning on site, etc.

The Job Order contracting approach would involve a pre-selection process conducted by the CleanPowerSF Program. Interested contractors would have to demonstrate that they had the

[1] This scenario is currently not anticipated, and therefore, not further addressed in the analysis.

required skills, experience and equipment to participate in the Job Order project work. They would also have to have required levels of liability insurance, and bonding, and have a good customer record. The Job Order Contractors would have a performance and quality incentive from their interest in securing additional, ongoing work through the program.

The CleanPowerSF Program would negotiate standard 'rate sheets'; with installers, covering all general costs for each installation. When a project ready for construction, the CleanPowerSF manager puts together a scope of work and asks for prices from the contractor pool; if the low price is within the acceptable cost range for the project, the SFPUC proceeds. The Job Order Contractors price out of a catalogue and cannot increase pricing above the need a predetermined margin. If a measure is approved in the catalogue then the approval is done. Oversight and contract administration is the SFPUC role. The project is compared with previous base case of the project to determine actual savings.

The Job Order projects would typically be of smaller value, and relatively short installation duration. For the technology elements sourced through the CleanPowerSF Program Suppliers, see the item 2.4 on Supply Contracting, below. Job Order Contractors would not be allowed to put markups on elements sourced through the Supply Contracts.

If there were unique elements for a particular installation, the Job Order Contractor would have to review the conditions with the CleanEnergy project management team in advance of performing the installation work, and have any additional costs approved. For all projects with customer site installations, the Job Order installers will provide a long-term installation integrity warranty, against leaks or other failures and damage.

The Job Order contracting method could also be used for any maintenance work that the CleanPowerSF Program is responsible for, using a similar set of pre-negotiated costs for work assignments.

Supply Contracts

For small-scale devices and products that may be made available through the CleanPowerSF program, economies of scale may be possible through volume purchasing. For example, efficient lighting technologies or advanced thermostats could be acquired this way. In many instances, it is expected that a customer installation would include a 'packaged solution', comprising a set of technologies and other efficiency measures appropriate for the location. It is expected that these types of installations would be conducted using the Job Order contracting approach described above.

The CleanPowerSF Program could conduct a rolling procurement process as follows: Supplier price bids would be requested for set price validity periods – say six months. Suppliers would be requested to provide quotes using a tiered, volume band discount mechanism. For example, if the actual number of orders placed during the pricing period were <500, the price would be $X, from 501 to 999, the price would be lower, and lower again if >1,000. A final price adjustment would be made at the end of the pricing term to reconcile accounts based on actual volume purchased.

The more effective the CleanPowerSF is in promoting the products and installations, and in processing orders and completing installations on a timely basis, the greater the savings that will be realized. Use of volume ordering would allow the products to be passed on to

customers at the lowest cost. In instances where capital and financing costs affect the overall financial and economic performance of the program, the lower the base price for each unit, the better. To maintain optimal levels of competition, the pricing should be openly re-competed on a cycle of price validity periods.

Contracting Approaches for Portfolio Model Elements

The following Table indicates the possible contracting approaches for each of the types of projects and technologies covered in the LPI Portfolio Model, and the set of specific projects under consideration:

Project/Technology		Design/ Build	DBOM	PPA	Job Order	Supply Contract
Residential or Small Commercial PV		X	X	X	X	
Large PV arrays		X	X	X		
Community Solar		X	X			
Regional Wind Farm		X	X	X		
In City Wind	Large	X	X	X		
	Small	X	X	X	X	X
Over the Fence RE and Capacity Balancing Microgrids		X	X			
Large Commercial or Multi-family cogen Microgrid		X	X			
Capacity Balancing						
NRG Cogeneration Wholesale		X	X			
Steam Loops		X	X			
Ocean Transmission Line		X	X			
Ground-Source Heat Pumps		X	X		X	
Compressed Air						

Project/Technology		Design/ Build	DBOM	PPA	Job Order	Supply Contract
HAN Gateways, Appliances, and Software						X
Energy Efficiency Measures					X	
OpenADR Servers, Control Systems, and Software						X
Thermal Storage						
Solar Hot Water		X	X		X	
Fuel Cells		X	X		X	X
Microturbines		X	X	X		
Combined Heat and Power (CHP) – Boiler Retrofits		X	X			
Absorption Chillers (for Tri-Gen)		X	X			
Reciprocating Engines		X	X			
Battery Storage		X	X			
Wave Power		X	X			
Tidal Power		X	X			
Electric Vehicles, Vehicle to Building Charging		Small Scale				X
Electric Vehicles, Vehicle to Building Charging	Fleet	X	X			X
Energy Efficiency Retrofits				X		
Efficiency Technologies					X	X

Strategic Issues by Contracting Approach

Once a contracting approach has been selected for a technology or project, to optimize the results, the contracts should address potential issues. An initial set of potential issues to be addressed under each of the contracting approaches is provided below.

Design/Build

a. Contractor Stability – Given the importance of as successful roll-out from the customer satisfaction and publicity perspectives, it will be important to ensure that all contractors are financially stable and can sustain the projects they contract for. Contractors will need to provide appropriate professional liability and installation insurance, and for larger value projects, be able to provide performance bonds.

b. Over-extension – The SFPUC program may at times have many open project bidding opportunities. This can lead to contractor over-extension, where a firm commits to more work than they can complete on a timely basis, which in turn can result in delayed and incomplete project work, and unhappy customers. To address this exposure, it will be important to use a completion cycle for limiting the amount of new work a contractor can take on, any given contractor

c. Performance and Quality Requirements - For the successful implementation, a combination of well developed performance specifications and quality standards will need to be developed, in order to avoid functionality issues after project completion. Especially for technology installations where power generation, or savings projections are tied to financing, performance failures can negatively impact CleanPowerSF's Program's financial performance.

d. Program Reputation – Contractors that work on projects with customer and community interface play an informal role as representatives of the CleanPowerSF Program and the City. In these instances, it will be important that contractors working directly with City customers are diligent in getting their projects done, addressing customer concerns during implementation, and represent the Program well overall.

e. Warranties – In order to provide its customers with effective technology solutions and installations, a priority should be placed on requiring long-term warranties wherever possible. The SFPUC solar program required a 25 year roof warranty, and equipment warranties should be longer than one year if possible.

DBOM

a. Performance and Quality Requirements - For the successful implementation, a combination of well developed performance specifications and quality standards will need to be developed, in order to avoid functionality issues after project completion. Especially for technology installations where power generation, or savings projections are tied to financing, performance failures can negatively impact CleanPowerSF's Program's financial performance. In a DBOM Project, the Contractor is responsible for keeping the installed equipment functioning at contractual levels over the contract term (usually 15+ years). Performance failures result in deductions from the O&M payments.

b. Warranty – in a DBOM project, the long term operation and maintenance obligations replace warranty obligations from the owner's perspective, but it is still important for the success of the projects that the contractor obtain and enforce warranties for components it outsourced.

c. Program Reputation - Because of the longer term operation responsibilities, in some situation, such as the microgrids or community Solar installations, the Contractor takes more of a visible role as a representative of the CleanPowerSF Program and the City. So, in these instances, it will be important that contractors working directly with City customers are diligent in getting their projects done, addressing customer concerns during implementation, and represent the Program well overall during the operations phase

d. Contractor Stability – Same as Design/Build

e. Over-extension – Same as Design/Build

PPA

a. Accountability - A PPA is very advantageous for a municipal energy program, because the developer takes all cost, permitting and quality risks associated with the asset, and has to conduct all required maintenance over the PPA term. However, the PPA arrangement is an 'arms-length' transaction from the CleanPowerSF Program perspective, and it allows very little control over the Developer. Comparing two PPA installation scenarios for clean energy assets under the CleanPowerSF Program; if a developer already owns some industrial property, and offers to install a solar array on a PPA basis, the lack of Program control or accountability shouldn't be that much of an issue. In contrast, if a developer offered to build a Community Solar array involving a dozen or so residential buildings and commercial buildings, any failures in communication and coordination with the customers, or problems with installation, or the CleanPowerSF Program could become involved in resolving the problems.

b. Abandonment – As with the first issue, the PPA places the developer in full control of the asset, and simply commits to deliver power at a set price. The key to a successful PPA from the developer's perspective is that margins are achieved; the capital and operating costs have to be kept within range to allow the developer to recover their investment through power sales over time. In the context of the CleanPowerSF Program, if a developer determined that a project they had begun construction on was going to encounter a cost overrun that would erode their margin, there would be a temptation to abandon the project. So, for any PPA projects with community or customer interface, it would be important to require a PPA developer to post bonds or otherwise provide security for the completion of the project, to avoid having the repercussions of an abandonment come back to the CleanPowerSF Program.

c. Contractor Stability – Same as Design/Build

Job Order

a. Cost Control – Over time, various factors can erode an agency's ability to maintain cost control when using multiple Job Order contractors. If the pace of project work is such that agency oversight and cost estimation falls behind, there can be a tendency to 'rubber-stamp' cost proposals from Job Order Contractors who are generally doing a good job, keeping up with schedule, etc. If it becomes clear to the contractors in the Job Order pool that their costs are not being as carefully validated in advance of work authorizations, cost inflation may occur.

b. Management – In parallel to the above issues of cost control vulnerability, general management of Job Order contractors can become difficult if the pace of work exceeds the management team's ability to keep current on paperwork, payments, complaint resolution, etc. Once management efforts fall behind, it can be hard to recover. This in turn makes the program more vulnerable to a range of commercial difficulties, such as payment disputes, installation mis-communications and so on, all of which can result in bad publicity and damage to the program's reputation. A strong initial effort to assess the levels of required management efforts, and to ensure that sufficient and appropriately skilled staffing resources are in place will help reduce the chances of management-related issues.

c. Quality and Warranties – Although occasional construction and quality issues are inevitable when numerous projects are conducted on a Job Order basis, it will be very important for the success and ongoing reputation of the CleanPowerSF Program that the great majority of projects are completed at a high quality level. Job Order contracting does not provide the same internal contractual quality incentives as the Design/Build and DBOM or PPA approaches. If quality problems become widespread, this will likely result in bad publicity, and a ripple effect, where more and more customers become wary of participating in installations. The nature of the CleanPowerSF program provides a general incentive for Job Order contractors to conduct high quality work, they will only be able to secure additional work. However, this could be supplemented with more direct measures, such as retainage or various forms of project security, to strengthen the quality inducement leverage of the CleanPowerSF Program.

d. Over-extension – Same as Design/Build

e. Contractor Stability – Same as Design/Build

f. Program Reputation – Same as Design/Build

Supply Contracting

a. Management – Given the goal of ordering in larger quantities to achieve economies of scale, the CleanPowerSF Program is likely to be the single 'purchaser' of technology products, which will then be routed through a set of installers for customer installations. This supply order acquisition effort will require careful management and tracking to avoid inefficiency, financial losses and waste. For each type of supplier products, after the initial set of site evaluations have been conducted, the CleanPowerSF team will be placing a series of product orders, to follow installation timing. Ideally there will be a 100% correlation in the project records of initial sales orders, delivery to the installation contractors, installation confirmation, and payment to the supplier. In reality, things will inevitably change between the time orders are placed, and final installation – projects calling for a particular product may need to be cancelled if a problem is identified at a site, or midway through a project, it may be clear that instead of needing three product units, a project installation may actually need five product units.

The CleanPowerSF Program could be tracking thousands of orders over the course of the implementation phase, and significant exposures can occur if the management processes are insufficient to keep accurate track of all transactions and physical inventory and distribution of the products. This can occur at two levels, the first being inefficiency and waste, and the second being abuses. Inefficiencies and waste can occur in many ways if poor management leads to

disconnects in the ordering process. For example, if contractors are in the middle of projects, and are delayed while waiting for products, or if duplication results in over-ordering, eventually leaving a stockpile of products that may not be needed.

Abuse can occur if it becomes clear that there is a significant lack of control over the supply chain, as involved parties can begin to see ways to game the system. There are numerous negative scenarios that can occur, for example, installers claiming that they had paid for equipment not received, and then installing and charging for it, and keeping the difference. In designing the management practices necessary to keep an accurate picture of the set of supply-to-installation information, the range of negative scenarios will need to be considered, to avoid vulnerability to abuses.

b. Warranties – In order to provide its customers with effective technology solutions and installations, a priority should be placed on requiring long-term warranties wherever possible. The SFPUC solar program required a 25 year roof warranty, and equipment warranties should be longer than one year if possible.

c. Durability and Functionality – while some technologies appropriate for the CleanPowerSF Program have been market-tested, others may have had less opportunity for long-term functionality observation, and implementation of design revisions or other corrective processes. For any products that have less service history, the supply contracts could use contractual terms beyond normal warranty provisions to address scenarios where there are systemic post-installation functional issues that need to be addressed through re-design of the unit, or swapping out a sub-element. Contractual provisions could be structured to withhold partial payment for the first 'test order', and require the supplier to agree to conduct any corrective work or unit replacements at no additional cost, releasing the remaining payment amount only when a set time-period has passes where the 'test order' units function trouble-free. Also, the overall roll-out implementation plan could be structured to ramp-up orders of new technologies only after they have been demonstrated to be reliable. This way, the CleanPowerSF Program on one hand is giving new technology developers an opportunity to strengthen their products and gain market share, but at the same time, taking measures to avoid the more catastrophic results that would follow if thousands of a particular device were ordered and installed, and then failed.

Customer Agreements

It is anticipated that any customers wishing to participate in the CleanPowerSF Program technology acquisition would first have to become CleanPowerSF electricity customers. The customer agreements beyond the basic electricity customer agreement that will be necessary to enable many of the installations will have to accomplish two main objectives:

- Providing attractive terms and sufficient commitment and backing from the CleanPowerSF Program to make installations attractive and low-risk from the customers' perspectives
- Containing appropriate financial metrics that a) support the asset financing, and b) provide sufficient financial benefits and incentives over the longer term to the customer.

Customer Groups

The types of customers anticipated to acquire (or participate in) ownership in one or more CleanPowerSF assets are:

- Single customer on-site owners: individual installations at customer owned sites, where the customers agree to financing the installation through the CleanPowerSF Program.
- Multiple off-site homeowners and renters: larger-scale facilities located at third party sites (private or City-owned), in which the power generated goes to the host customer load(s), and participating customers receive a virtual 'pooled' or 'spread' benefit through a credit mechanism, as well as ownership shares based upon H Bond repayment, from the installation.
- Multiple onsite larger-scale community installations at customer-owned sites, where the assets are owned by a set of participating customers, who agree to financing the installation through the CleanPowerSF Program.
- Non-H Bond customers in the residential, commercial, institutional, industrial sectors, that elect to acquire technology assets through the CleanPowerSF Program, and either pay for them upon delivery, or finance them through their own means, or through any collaborating programs. These customers would elect to acquire the assets from the CleanEnergy Program in order to benefit from low asset prices achieved through economies of scale. However, they would have determined that financing the asset through the CleanPowerSF Program (H Bond), was less advantageous than either paying for the assets outright, or through their own choice of financing method.

General Agreement Factors

The customer agreements associated with asset implementation would fall into two groupings; those agreements with persons or entities with control over the site where the installation would be located (owners or tenants), and those agreements with customers who will own an indirect share in a community installation, but will not have any assets located on their property (whether rented or owned).

In general, the on-site customer agreements would cover:

- Access for installation
- Customers roles and rights during any design processes, and installation
- The customer's rights to asset benefits
- The expected cost of the assets (capital and ongoing maintenance if applicable) and any CleanPowerSF financing methods to be used to repay installation costs. This would include conditions applicable to the rights to use of power, shared savings, and billing rates associated with the financing of the assets
- Remedies for any customer default; such as repossession, or activation of any security measures involved in the transaction.

The shared asset (Off-site) customer agreements would include:

- The customer's rights to asset benefits
- The customer's ownership and transfer rights to a share in the asset
- The expected cost of the assets (capital and ongoing maintenance if applicable) and any CleanPowerSF financing methods to be used to repay installation costs. This would include billing rates associated with the financing of the assets.

Collateral Agreements

In addition to supply/install and customer agreements, for some projects, there may be a need for Collateral Agreements. These would be for arrangements with a required project participant that is neither a customer nor a supplier. This could be an community solar host site property owner where access is needed, or an owner of a multi-residential building in which the unit occupants have signed up to be 'Own Your Power' customers. Although each such agreement would be specific to the parties involved, a few key issues are important relative to the other supply/install and customer agreements involved in the project.

Most important is the clarity of roles of the respective parties under all of the agreements – making sure that the roles dovetail, with no gaps and no contradictions. Another key area is liability definition and limitation, which may also include reference to insurance limits. The overall goal of the collateral agreements is to accurately assess the potential for any negative reactions from involved parties, and address them in the agreements, to avoid costly disputes that can delay or in a worst-case scenario, require cancellation of the project in question.