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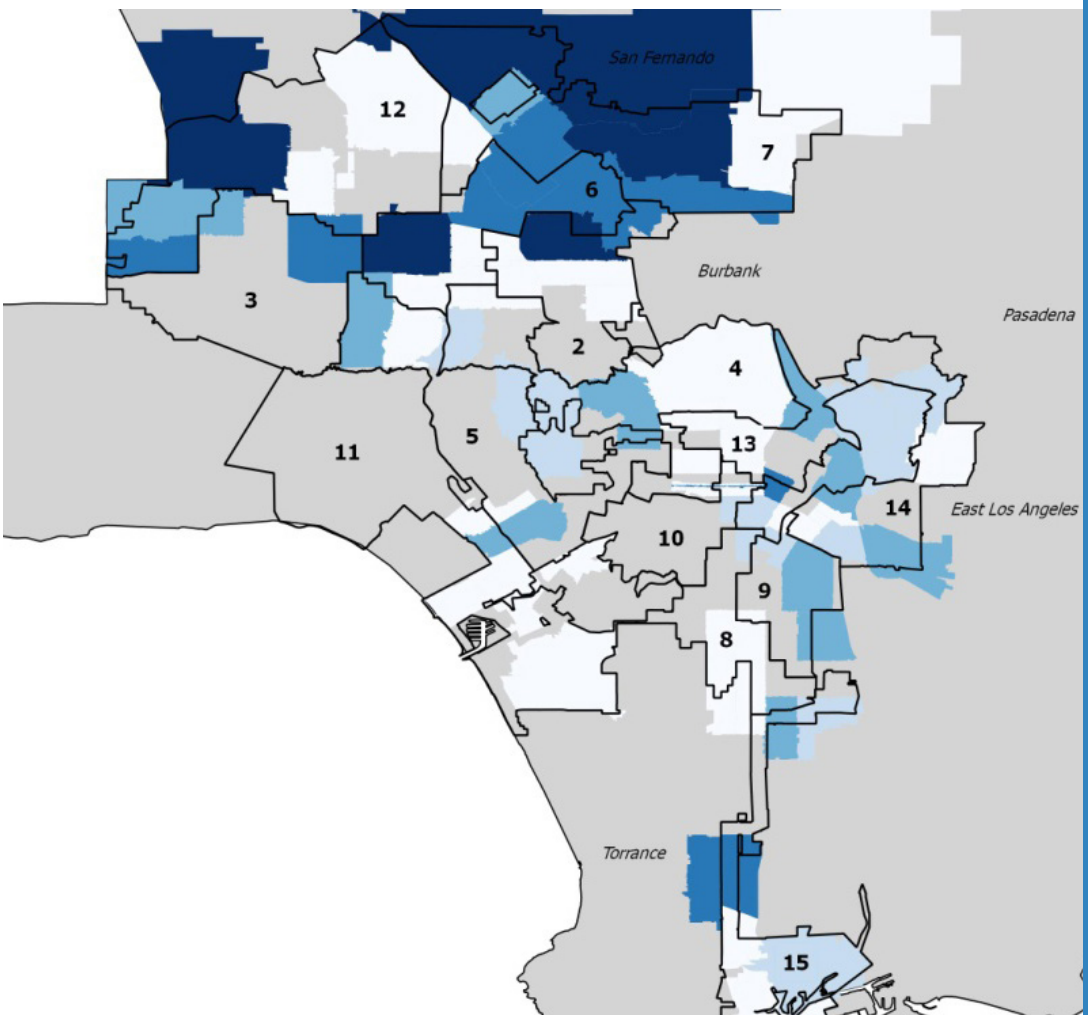
# FIT 100 in Los Angeles: *An Evaluation of Early Progress*

J.R. DeShazo
Alex Turek

February 2014



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February 18, 2014

Last year, after five years of extensive research and advocacy efforts, the Los Angeles Department of Water and Power embarked on a pioneering feed-in-tariff (FiT) program, designed to supply clean, renewable energy for Los Angeles while creating jobs and fueling private investment in our city. Supported by the Los Angeles Business Council and our CLEAN LA Coalition, the program—also known as CLEAN LA Solar— is the largest urban rooftop solar program in the U.S., and is already being hailed as a model for the nation.

We are excited to share the LABC Institute's evaluation of the 100-megawatt FiT program: *FIT 100 in Los Angeles: An Evaluation of Early Progress*. Authored by researchers at the UCLA Luskin Center for Innovation under the leadership of J.R. DeShazo and Alex Turek, the study is based on extensive interviews with program administrators, stakeholders and applicants involved with the program's first two tranches, which represent approximately 40 megawatts of solar power.

The report focuses on the social, economic and environmental benefits of the FiT program, which is drawing strong interest from applicants throughout the City of Los Angeles to bring cost-effective, in-basin solar power to DWP customers. The evaluation also concludes that the overall program design and application process are sound, and offers several specific recommendations to further enhance and refine the program for current and future applicants.

Importantly, *FIT 100 in Los Angeles: An Evaluation of Early Progress* determines that the FiT is on track to meeting its considerable economic and sustainability goals by 2015: to generate $300 million local economic investment, create more than 2,000 jobs, supply power for more than 21,000 homes and displace as many as 2.7 million tons of greenhouse gas from the atmosphere— all at a lower tariff rate than any comparable program in the United States.

**The results of this evaluation indicate that the FiT has achieved considerable success since its implementation, and is ready for a significant expansion.**

We would like to thank everyone who participated in this evaluation, as well as the members of the CLEAN LA Coalition and business and thought leaders who have greatly supported the program thus far.

Sincerely,

Mary Leslie
President

Jacob Lipa
LABC Chairman

Brad Cox
LABC Institute Chairman

# FIT 100 in Los Angeles:
# An Evaluation of Early Progress


## ABSTRACT

Beginning in 2013, the Los Angeles Department of Water and Power (LADWP), the nation's largest municipal utility, fittingly embarked on the nation's largest solar feed-in tariff (FIT) program. The unprecedented FIT 100 program aims to support the development of 100 MW of in-basin, rooftop solar within the utility's territory over a span of two and a half years.

With the first two tranches of the FIT 100 active, this study aims to evaluate the design and implementation of the program thus far. Through interviews with primary stakeholders including solar firms who took part in the first tranche of the program, the retrospective assessment provides LADWP with feedback and recommendations to improve the application process and ensure strong program demand in subsequent tranches.


## ABOUT

### UCLA Luskin Center for Innovation

The UCLA Luskin Center for Innovation translates world-class research into real-world policy and planning solutions. Based in the UCLA Luskin School of Public Affairs and organized around initiatives, the Luskin Center addresses pressing issues of energy, transportation and sustainability in collaboration with civic partners.


## ACKNOWLEDGEMENTS

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The authors would also like to thank the program applicants who participated in the survey and who provided the feedback that is the foundation of this report's evaluation.


## DISCLAIMER

The UCLA Luskin Center appreciates the contributions of the aforementioned individuals and their agencies and organizations. This document, however, does not necessarily reflect their views or anyone else other than those of the authors. Anyone other than the authors make no claims regarding the accuracy or completeness of the information in this report. Any errors are the responsibility of the primary authors.

## FOR MORE INFORMATION


innovation.luskin.ucla.edu J.R. DeShazo deshazo@ucla.edu

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# 1. Executive Summary

The Los Angeles Department of Water and Power (LADWP) implemented the FIT 100 program to stimulate a local market in rooftop solar that creates jobs and spurs economic development. [1] The program encourages distributed generation from renewable resources close to load centers, thereby avoiding costly transmission out of the basin and deferring the need for local system upgrades. It also improves system reliability by fostering geographic and technological diversity among generation resources. Finally, the program contributes to the LADWP's compliance with SB 1332 (successor to SB 32).

To accomplish LADWP's goals, the program must attract applicants through cost-effective pricing that allows a reasonable rate of return. The program should also have an application, technical review, interconnection and contracting process that is transparent, simple, fair and with costs as low as possible. Finally, because all prospective applicants will be new to this program, a successful implementation should offer educational support to applicants throughout the application process.

This review focuses on the initial two allocations of capacity representing approximately forty megawatts of the FIT 100's total capacity. In all, these first two allocations received a total of 256 applications – 136 for the first allocation and 120 for the second allocation. These applications enabled the LADWP to fill both its small and large project tranches within each allocation.

## 1.1 Expected benefits of the FIT 100

The initial two allocations will generate 862 job years, which will be part of 2,155 job years total once the entire FIT 100 program is implemented. These numbers will help bolster one of the U.S.'s fastest growing industries - a solar sector that experienced a 20% growth in 2013 with 24,000 new jobs.[2] When fully implemented, the FIT 100 will generate approximately 130,000 MWh annually, which if used to offset coal, will avoid over 5,383 million pounds of greenhouse gases. This is equivalent to powering 21,600 homes on local renewable energy annually. The FIT 100 program is expected to generate approximately $300 million of direct investment for the City of Los Angeles over the lifetime of the program.[3] With many projects sited in the San Fernando Valley and in South Los Angeles, the FIT 100 geographically complements the LADWP's existing net metering program which has sited many single-family solar systems in West Los Angeles. Additional benefits may include expanded transmission and distribution capacity, greater generation capacity, avoided grid services, avoided water and non-greenhouse gas emissions and avoided Renewable Performance Standard compliance.

1 "Feed-in Tariff Workshop and Networking Event LABC and Council District 15," presentation materials, Oct 29, 2013.

2 The Solar Foundation, "National Solar Jobs Census 2013"

3 Solar Energy Industries Association, "Solar Energy Facts: Q2 2013"

## 1.2 Progress to date

Our evaluation of the first two allocations is based on feedback gathered through extensive interviews with program administrators, stakeholders and applicants that represent over 60 percent of the allocated capacity. We find the FIT 100 program is working as designed thus far. LADWP has received an adequate number of applications for both large and small project categories, despite it having one of the lowest tariffs in the country. Applicants were especially appreciative of LADWP's supportive posture during the application phase as well as during the site visit and interconnection study phase. Exemplary LADWP staff effort was critical in accelerating these early stages of the application process.

Many applicants noticed a slowdown in the application process after the completion of the site visit and before the execution of the contract (e.g., SOPPA) and Interconnection Agreement. This is due to a combination of overly complex contracts, contract inexperience on the part of applicants and a shortage of LADWP technical staff. A few applicants also noted unexpected challenges securing building and safety approval just prior to completing construction. Nonetheless, approved applicants currently appear to be on track to bring local renewable energy online in Los Angeles.

## 1.3 Recommendations

While our overall assessment of the program thus far is positive, we have identified several additional areas of possible improvement.

1) **Refine future pricing policies.** A central reason for distinguishing small from larger projects is to recognize that smaller projects involve higher costs and should receive a higher FIT price. However, the current program offers projects of both sizes the same FIT price. An early indication that smaller projects may not be viable at lower FIT prices is demonstrated by a significantly lower ratio of proposed applicant capacity to allocated capacity when compared to larger projects during the first two tranches. A related concern is that if the market costs for solar components, capital or labor rise, the existing FIT pricing schedule may not attract enough viable capacity at lower prices. Furthermore, there is growing literature that indicates the value of energy acquired by a FIT is greater than what is reflected in LADWP's current pricing structure.[4] Therefore, we recommend that LADWP monitor market conditions and the flow of applications, and be willing to adjust FIT prices as needed to achieve its goals for the program.
2) **Create an applicant rollover option.** A central challenge for solar developers is attracting and retaining site hosts and financing once an allocation quota is filled and no longer accepting applications. We recommend that after LADWP has filled its quota for an allocation that it offer applicants in the queue the option of rolling their application over into the next (lower priced) allocation. This would enable solar developers to engage site hosts and finance for longer periods of time and increase their expected benefits.

4 Perez, Richard et al. 2013. "Why a Smart FIT is Smart Policy". Solar Today, February 2013.

3) **Longer-range plans for market expansion.** Although FIT 100 represents the largest municipal FIT program in the United States, it is a small and short program from the perspective of local firms as well as firms trying to decide whether to establish a permanent presence in Los Angeles. We recommend that Los Angeles' policymakers and the LADWP articulate a long-term plan for scaling local and out-of-basin solar so that firms can make longer-term workforce development and investment plans.

4) **Initial application.** While applicants rated the application process among one of the best aspects of the FIT program, many observed they would benefit from standardizing the form and timing of rejection/acceptance results. Quick fixes such as consolidating most frequently asked questions of the first two allocations into the FAQ resource would also reduce costs for future applicants.

5) **Interconnection study and costs.** The average interconnection cost was $46,000, with a high project cost of over $300,000. The interconnection costs represent a large source of uncertainty for the applicant, which is revealed late in the process, sometimes causing projects to become financially unviable for an applicant. Yet, the LADWP has the ability to predict reasonable estimates of average and total connection costs for an allocation based on its prior experience as well as the expected size and geographic distribution of projects for an upcoming allocation. We recommend that LADWP incorporate the anticipated interconnection costs for all projects in an allocation into the FIT price. This would eliminate the need to estimate costs on a project-by-project basis, ensuring more accepted projects are completed. If the LADWP chooses to continue to assign interconnection costs on a project-by-project basis, we recommend that it standardize the form and timing of cost notification. It should also keep this time period as short as possible; the average time-to-completion for an interconnection cost study is currently 52 days.

6) **Contracting (e.g., SOPPA) and the Interconnection Agreement.** Wherever possible, we recommend LADWP extend its FIT contracts from 20 to 25 years. This will benefit all parties involved. LADWP will secure an additional 5 years of renewable energy supply at costs well below future fossil fuel costs. Solar developers would be able to improve their terms for financing and site hosts. Second, applicants requested additional support for and the streamlining of the California Business Compliance Forms and related SOPPA forms. Addressing these concerns may require actions by the Los Angeles City Attorney. Third, LADWP should endeavor to shorten the execution period for the SOPPA and Interconnection Agreement in anyway feasible. Lastly, LADWP should advise applicants to begin the process of acquiring SOPPA and Interconnection Agreement supplemental materials before the 30-day window begins.

7) **Building and Safety.** Given the collective learning experience embodied in FIT 100, Building and Safety could provide a FAQ resource as well as a FIT-oriented guide to enable applicants to plan earlier and more effectively for compliance.

8) **Public relations and outreach.** The goals and benefits of the FIT 100 are poorly understood by the general public and particularly by site hosts. The program would be strengthened if LADWP and the City of Los Angeles administration could better publicize and incentivize site hosts for their participation.

# 2. Introduction

The Los Angeles Department of Water and Power (LADWP) implemented the FIT 100 program to stimulate a local market in rooftop solar that creates jobs and spurs economic development.[5] The program encourages distributed generation from renewable resources close to load centers, thereby avoiding costly transmission out of the basin and deferring the need for local system upgrades. It also improves system reliability by fostering geographic and technological diversity among generation resources. Finally, the program contributes to the LADWP's compliance with SB 1332 (successor to SB 32).

To accomplish LADWP's goals, the program must attract applicants through cost-effective pricing that allows a reasonable rate of return. The program should also have an application, technical review, interconnection and contracting process that is transparent, simple, fair and with costs as low as possible. Finally, because all prospective applicants will be new to this program, a successful implementation should offer educational support to applicants throughout the application process.

## 2.1 Study Scope

This study focuses on the initial two allocations of capacity representing approximately forty megawatts of the FIT 100's total capacity. In all, these first two allocations received a 226 in-basin applications — 107 for the first allocation and 119 for the second allocation. These applications enabled the LADWP to fill both its small and large project tranches within each allocation.

Our evaluation of the first two allocations is based on feedback gathered through extensive interviews with program administrators, stakeholders and applicants that represent over 60 percent of the allocated capacity. We find the FIT 100 program is working as designed thus far. LADWP has received an adequate number of applications for both large and small project categories, despite it having one of the lowest tariffs in the country. Applicants were especially appreciative of LADWP's supportive posture during the application phase as well as during the site visit and interconnection study phase. Exemplary LADWP staff effort was critical in accelerating these early stages of the application process.

## 2.2 Study Roadmap

Section 3 describes the current and projected social benefits that Los Angeles will receive by implementing the FIT 100. These include significant economic development benefits in the form of job years created and new direct investment as well as in avoided greenhouse gas emissions. Section 4 reviews the design of the FIT 100 program, focusing on the implication of project and program size requirements, pricing policies as well as the FIT contract length.

5 "Feed-in Tariff Workshop and Networking Event LABC and Council District 15," presentation materials, Oct 29, 2013.

Section 5 provides an overview of the FIT 100 application and selection process up to the final Interconnection Agreement for the applicant. This section is based on interviews with applicants and provides a detailed evaluation of the process thus far. In Section 6, we evaluate solar firm outreach and public and site owner awareness. In section 7, we describe the data collection methods that we have used to conduct this study.

## 2.3 Background on Feed-in Tariff Programs

Over the last two decades, feed-in tariffs have emerged as an effective strategy in the development of alternative energy systems. In 2010, 50 countries and 25 states or provinces had implemented FIT policies.[6] These programs offer incentive to third-party energy producers to construct alternative energy systems and sell the power generated back to the grid for a predetermined price. In many urban settings, the result has been an expansion of rooftop solar projects. In these cases, property owners with adequate rooftop space can construct a solar power plant atop their buildings and sell the energy harvested back to the local utility.

FIT programs offer a number of benefits for both participant and utility. In comparison with net metering programs, utilities benefit because they can:

1) Set prices that are more cost effective and adjust over time with market conditions.
2) Control the size and rate of growth of FIT solar capacity to meet local and state goals.
3) Influence the location of projects to maximize grid reliability and avoid costly upgrades.
4) Strategically engage specific customer classes to achieve equity and cost effectiveness goals.
5) Utilize the solar capacity of medium to large-size rooftops that net metering cannot incentivize.
6) Contribute to local and regional economic goals.

For participants, a central benefit of a FIT program is a contract with a pre-announced fixed price. This enables solar developers to:

1) Recruit and secure site hosts such as local businesses and multi-family housing.
2) Secure favorable financing terms.
3) Plan for and train a local workforce match to workflow.
4) Provide a reasonable and known rate of return on investment.

6 DeShazo, J.R. and Ryan Matulka. 2010. "Best Practices for Implementing a Feed-in Tariff Program". The Luskin Center for Innovation.

## 2.4 Background on LADWP FIT 100

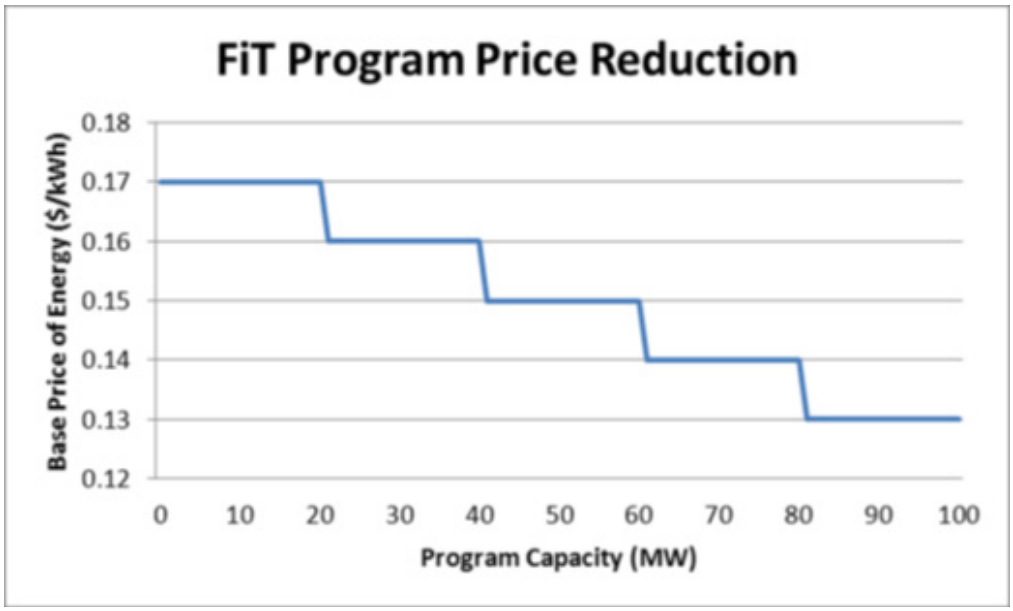
### 2.4.1 Program Dimensions

The 100 MW FiT Set Pricing Program is to be released in 20 MW tranches every six months starting February, 2013 and ending in 2016. For each 20 MW round, 16 MW will be reserved for large projects (150 kW to 3 MW) and 4 MW will be allocated to small projects (30 kW to 150 kW). Of the 100 MW total, 4 MW will be reserved for development in the Owens Valley. The remainder of projects must be within LADWP service territory.

### 2.4.2 Program Pricing

Eligible projects will be offered a standard 20-year contract that requires LADWP to purchase the solar power at a set price. This base price of energy is set for $0.17 in the opening round of the program with a price decrease of $0.01 in each subsequent round. Time-of-delivery multipliers will be multiplied to the base price to reflect specific seasons and peaks. The price includes the transfer of all energy, capacity rights, and environmental attributes (e.g. renewable energy credits) associated with the project. [7]

Figure 2-1: FIT 100 Tiered Pricing per Tranche




### 2.4.3 State and Local Energy Milestones

The decision for LADWP to implement a FIT is driven in large part by a series of state legislation. This includes SB 32 and its successor SB 1332 requiring LADWP to offer at least a 75 MW feed-in tariff program, and the California Renewable Energy Resource Act (SB 2) mandating utilities to upgrade their energy portfolios to 33% renewables by 2020.

7 LADWP "FIT Set Pricing Program Guidelines"

As for LADWP's own stated goals, the utility has achieved its previously specified milestone of generating 20 percent of electric energy from renewable energy sources by 2010, an increase from 3 percent in 2003, and continues to take aim at the state mandated 33% renewable mark.[8]

### 2.4.4 Application Lottery

Applications are accepted on a first come, first serve basis. However, applications submitted during the first five business days of the application period will be placed into a lottery. This lottery drawing will determine the applicant's ranking on the FIT Review Priority list and projects will be selected sequentially until the 20 MW allocation is filled over the 6-month period. [9]

Applicants not selected during the lottery process will be placed on a waiting list, arranged by the date and time of application submission. This waiting list will remain active for the remainder of the current allocation. If an application is not selected over the 6-month time period, the application and associated fees will be returned to the applicant.

8 LADWP "FIT Set Pricing Program Guidelines"
9 LADWP "FIT Set Pricing Program Guidelines"

# 3. Social benefits from FIT 100

As a result of successful implementation, the City of Los Angeles can expect to enjoy a number of benefits from the FIT 100 program. The construction and operation of 100 MW of rooftop solar energy will drive regional job growth and encourage direct investment into the city. The production of clean energy in lieu of more traditional energy sources will also provide the city with a number of environmental benefits, not least of which is a substantial avoidance of greenhouse gas emissions. The following section details these expected economic and environmental benefits of the FIT 100 program.

## 3.1 Job Years Created

Table 3-1 represents the number of in-basin job years that the City of Los Angeles can expect over the duration of the FIT 100 program. One job year simply means one job for one year (two job years can be two jobs for one year or one job for two years, and so on). In total, the FIT 100 program is estimated to create over 2,000 job years – this includes 1,370 job years directly related to the FIT 100 and 785 job years indirectly associated with the program.

Table 3-1: Direct and Indirect Job Years for the FIT 100 Program

| | | Direct Job Years | | Indirect Job Years | | Total Job Years | |
|---|---|---|---|---|---|---|---|
| Tranche | Capacity (MW) | Incremental | Cumulative | Incremental | Cumulative | Incremental | Cumulative |
| 1 | 20 | 274 | 274 | 157 | 157 | 431 | 431 |
| 2 | 20 | 274 | 548 | 157 | 314 | 431 | 862 |
| 3 | 20 | 274 | 822 | 157 | 471 | 431 | 1,293 |
| 4 | 20 | 274 | 1,096 | 157 | 628 | 431 | 1,724 |
| 5 | 20 | 274 | 1,370 | 157 | 785 | 431 | 2,155 |

Source: Navigant, 2008

To calculate the in-basin job year numbers, we use the most credible existing studies and recalibrate and transfer these estimates to better reflect the local conditions of the Los Angeles region. The calculation includes the following job creation metrics:

- Balance of system components: This includes all components of the solar system other than the photovoltaic cells themselves such as wiring and support racks.
- System integration: This includes all of the work required for connecting a power system to a utility's grid.
- Installation: This includes the work involved with installing the solar system on the property.
- Annual operation and management: This includes the annual upkeep required to maintain peak solar system performance.
- Utility network upgrade and program administration: This includes the utility based job creation associated with administering a feed-in tariff program and the work required to

upgrade the utility grid structure in preparation of an expanded distributed generation network.

It is worth noting that wafer, cell, and module job creation estimates are not included in the calculation as these would inflate our in-basin only job year numbers.

## 3.2 Direct Investment

Table 3-2: Direct Investment for the FIT 100 Program (in $ millions)

| | | Low (in $ millions) | | High (in $ millions) | |
|---|---|---|---|---|---|
| Tranche | Capacity (MW) | Incremental | Cumulative | Incremental | Cumulative |
| 1 | 20 | 51 | 51 | 71 | 71 |
| 2 | 20 | 51 | 102 | 71 | 142 |
| 3 | 20 | 51 | 153 | 71 | 213 |
| 4 | 20 | 51 | 204 | 71 | 284 |
| 5 | 20 | 51 | 255 | 71 | 355 |

Source: Solar Energy Industries Association, 2013

Direct investment is the total sum of money invested into the City of Los Angeles by those solar firms participating in the FIT. For the solar industry, direct investment is expressed in terms of the average cost per watt of solar installed.

Based on recent publications, the cost of installed solar per watt is approximately $3.05. Table 3-2 bounds this approximation with a low of $2.55/watt and a high of $3.55/watt. As we can observe, the FIT 100 program is expected to encourage approximately $300 million in direct investment for the City of Los Angeles.

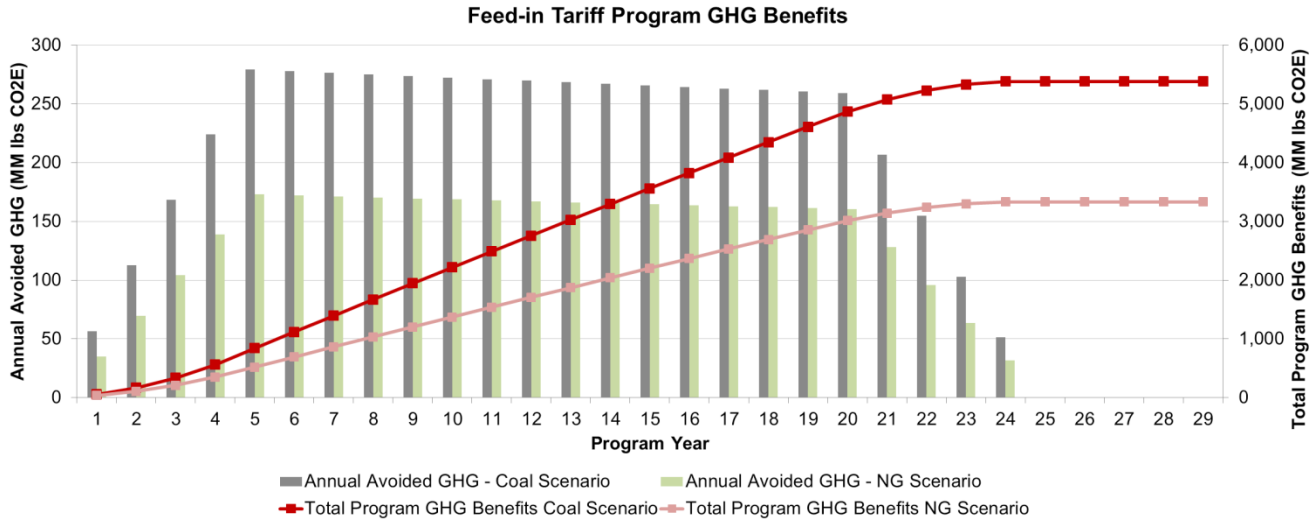
## 3.3 Avoided Greenhouse Gas Emissions

Figure 3-1 exhibits the expected greenhouse gas emission benefits of the FIT 100 program. We assume these environmental benefits to span only the lifetime of the 20-year SOPPA contract. Therefore, the total amount of greenhouse gases avoided may increase significantly if the projects remain online once the SOPPA is terminated.

To calculate the avoided greenhouse gas emissions, we compared the environmental impact of the FIT 100 program with the expected emissions of a coal generated power plant as well as a natural gas-fired power plant. If the production capacity of each generation source were the same, that is, 130,000 MWh per year as is the case when the FIT 100 program is fully up and running, the FIT 100 would save 5,383 million pounds of $CO_2$ equivalent when compared to a coal generated power plant and 3,333 million pounds of $CO_2$ equivalent when compared to a natural gas-fired power plant. To put this in perspective, the amount of GHG avoided when compared to a coal fired plant would be equivalent to removing over a half million cars from Los Angeles's roadways.[10]

10 Environmental Protection Agency,

Figure 3-1: Greenhouse Gas Benefits of the FIT 100 Program




## 3.4 Homes Powered

Considering the solar energy that is produced will be interconnected back into LADWP's grid, the FIT 100 will be providing Los Angeles residents with clean energy for consumption. In total, the 100 MW produced by the FIT program will power approximately 21,600 homes annually.[11]

Although survey participants were hesitant to divulge specific financial and hiring information, a number of firms did substantiate the multipliers used in the previous analysis.

# 4. Performance of the Program Design

## 4.1 Overview

This section reviews the critical features of the design of the FIT 100. These features include pricing policies, participation rates and trends, the geographic distribution of FIT projects, contract duration, application rollover and the future scaling of this initial program.

## 4.2 Pricing

Selecting the initial FIT prices, and adjusting subsequent FIT prices, requires LADWP to balance several factors. If LADWP sets a target for its program size, then it set prices high enough to attract just enough capacity (and qualified applicants). This approach also establishes prices that are low enough to ensure that the program is cost effectively designed and therefore minimizes ratepayer impacts. This process of setting, and then adjusting subsequent prices, to induce cost

11 Solar Energy Industries Association

effective participation is likely to require actively learning on the part of the utility.

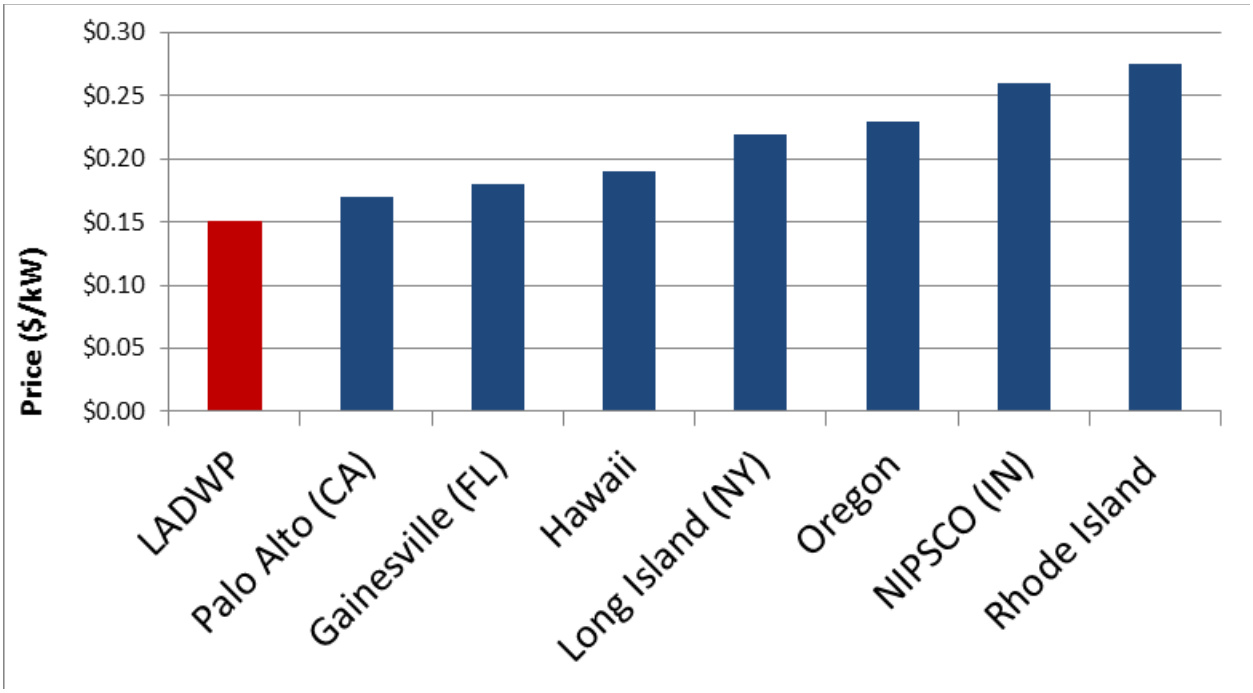
As we discussed earlier, LADWP has chosen to announce a step-down schedule of prices for each allocation or tranche of FIT applications that it will accept. This suggests that LADWP has estimated how solar developers' total cost of installation will vary over the next two years. This step-down feature of the price schedule ensures that the anticipated lower total installation costs will be shared, in part, with rate payers. Based on what LADWP learns about participation rates, it may want to adjust this schedule to meet its goals of cost effective yet fully-subscribed program as we discuss below.

If LADWP adheres to the schedule of prices, the average price per kWh purchased by LADWP for the FIT 100 will be $0.15 per kWh. To evaluate how the FIT 100 compares in terms in of cost effectiveness, it is important to compare it to programs with projects of comparable size. Table 1 describes how FIT prices and project sizes vary across seven similar programs within the U.S.. Figure 1 reveals that among these recently implemented and comparable programs, the Los Angeles FIT 100 offers the lowest average price per kWh in the nation.

Table 4-1: FIT Programs with Similar Project Sizes

| Locality | Project Size (kW) | Pricing ($/kWh) |
|---|---|---|
| Gainesville (FL) | < 10<br>10 – 300 | 0.21<br>0.18 |
| Hawaii | < 20<br>20 – 500<br>500 - 5,000 | 0.22<br>0.19<br>0.20 |
| Long Island (NY) | 50 – 500 | 0.22 |
| NIPSCO (IN) | < 10<br>10 - 2,000 | 0.30<br>0.26 |
| Oregon | < 10<br>10 – 100 | 0.39<br>0.23 |
| Palo Alto | < 2,000 | 0.17 |
| Rhode Island | 50 – 100<br>101 – 250<br>251 – 499<br>500 - 5,000 | 0.30<br>0.29<br>0.28<br>0.25 |

Figure 4-1: Comparable North American FIT Program Prices




Note: Some prices averaged over price categories similar to LADWP
Source: Database of State Incentives for Renewables and Efficiency

## 4.3 Early Participation Rates and Trends

Thus far, the LADWP has implemented the first two tranches of the FIT 100. With the commencement of Tranche 1 on February 1, 2013, and Tranche 2 on August 1, 2013, these two application periods represent 40 MW of solar capacity. The following section analyzes the performance of the initial two tranches of the FIT 100 program.

Table 4-2: Summary of Small and Large Applications for Tranche 1 and 2

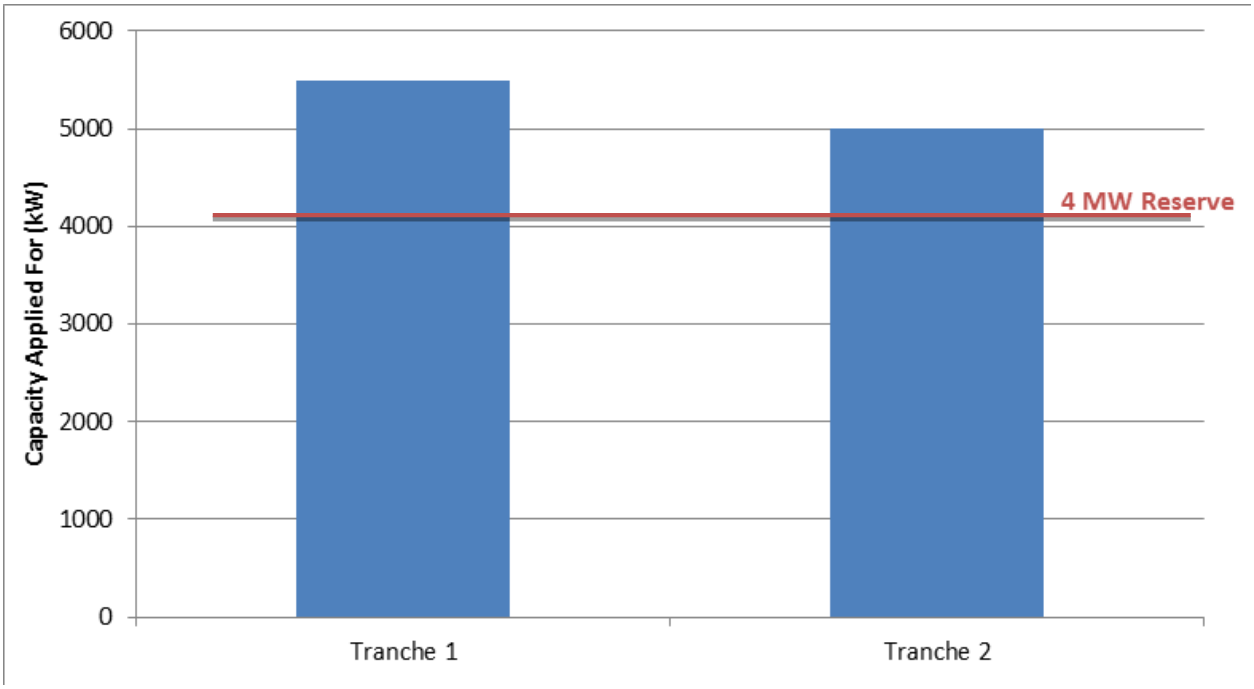
| | Project Size | Tranche 1 | Tranche 2 |
|---|---|---|---|
| Number of Applications | Small | 50 | 55 |
| | Large | 57 | 64 |
| Total Applied Capacity (kW) | Small | 5,489 | 5,008 |
| | Large | 44,325 | 66,380 |
| Average Applied Project Size (kW) | Small | 110 | 91 |
| | Large | 778 | 1,037 |

In total, Tranche 1 received 107 in-basin[12] applications. This includes 50 applications for the small category of projects and 57 applications for the large category. Within the small project category, a total capacity of 5,489 kW was applied for with an average project size of 110 kW. For the large project category, the total capacity applied for was 44,325 kW with an average project size of 778 kW.

Tranche 2 experienced an increase in applications submitted with a total of 119 in-basin applications including 55 applications for the small project category and 64 applications for the large project category. Although the small project category witnessed an increase in the total number of applications, the capacity applied for diminished by 481 kW.

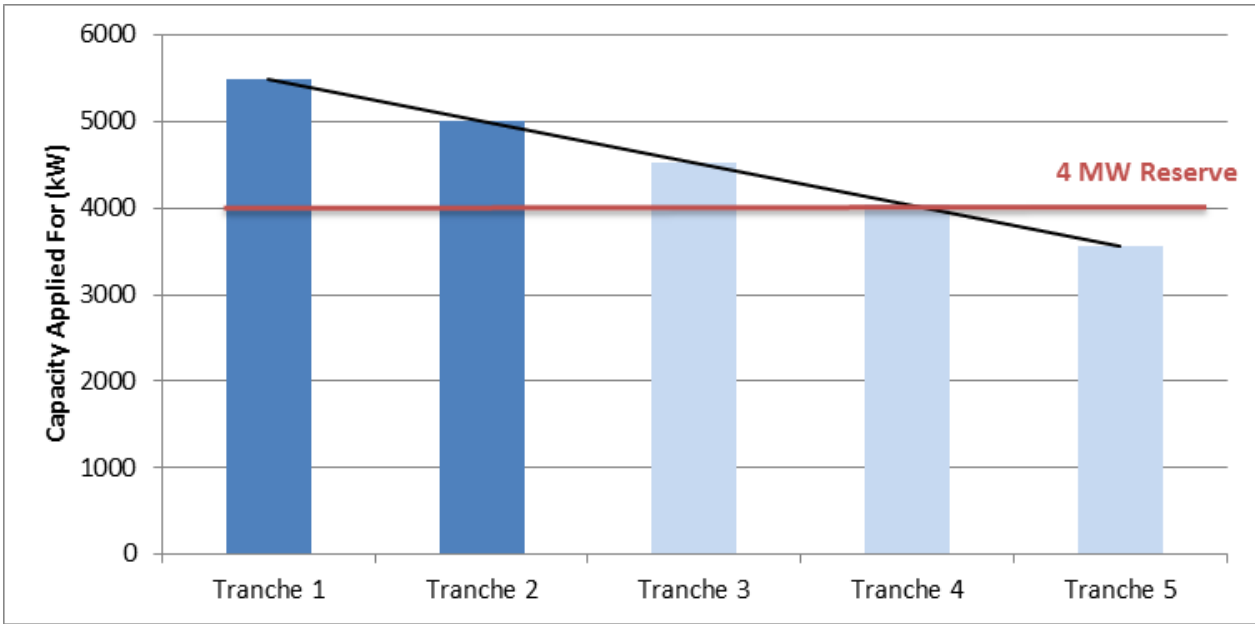
12 excludes Owens Valley applications

Figure 4-2: Applied Capacity for Small Projects for Tranche 1 and 2



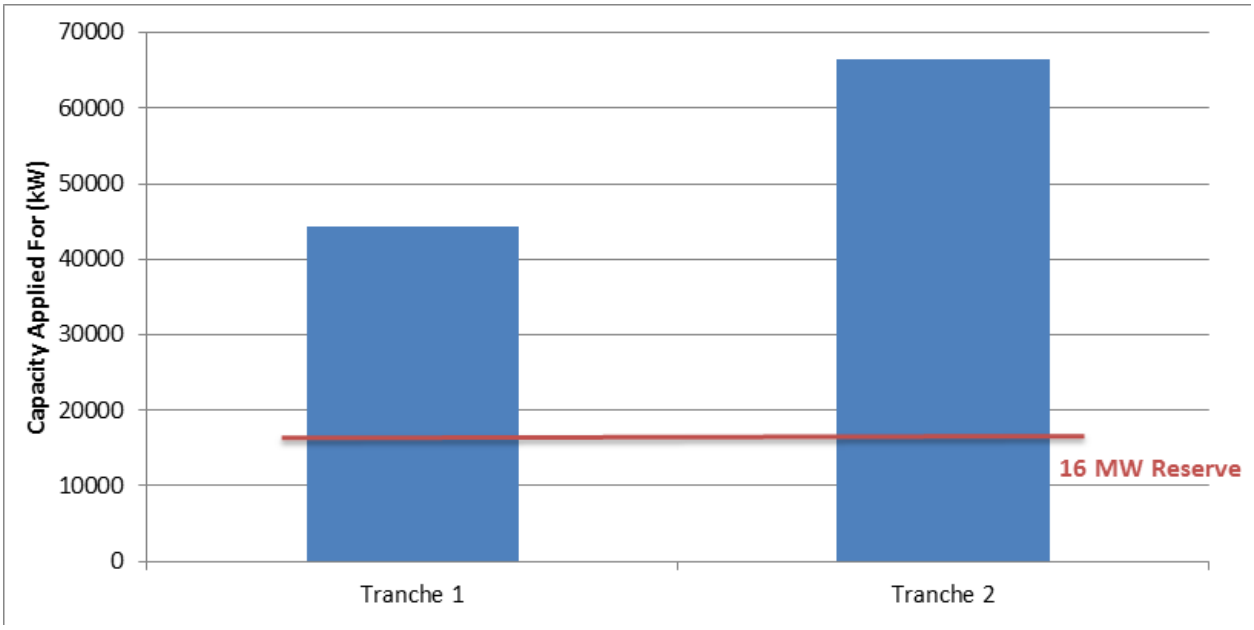

This 8.8% decrease in capacity applied for small projects may be cause for alarm as it appears applicants are growing concerned about the feasibility of the small project category at a price that continues to decrease by one cent per tranche. If the current application trend continues, LADWP may find it difficult to fulfill the capacity reserve for small projects in the upcoming tranches (Figure 4-3).

Figure 4-3: Projected Small Project Capacity Demand




For the large project category, Tranche 2 not only observed an increase in the number of applications received, but also in the capacity applied for large projects as exhibited in Figure 4-4.

Figure 4-4: Applied Capacity for Large Projects for Tranche 1 and 2




The increase in the capacity applied for large projects may reflect two distinct possibilities. First, the initial potential applicants may have viewed Tranche 1 as a test run, and felt it was in their best interest to take a "wait and see" approach. A second and more likely possibility that was

hinted at by applicants throughout the survey may be the realization that the one cent decrease in price per kWh requires a larger project size for a project to "pencil out" at the diminished price. This may have resulted in applicants fleeing the small project category in favor of the large project category.

Throughout the interview process, interviewees mentioned a project size threshold influenced entirely by the price they would receive per kWh. At $0.17 per kWh, a number of smaller projects could be deemed feasible and economically viable. As the price decreases in each subsequent round, applicants expressed concern about the need for the project size/price threshold to be raised; that is, for a project to be economically feasible at a lowered price, it would have to be large enough to produce the necessary energy.

***Recommendations***

1) To counter this moving goalpost and to maintain demand for small projects, it may be wise to reevaluate the price offered for small projects and differentiate the prices received for the small and large project categories.
2) Another potential solution may be to increase the range of small projects from 150 kW upwards. Again, the goal here would be to combat potential undersubscription of the small project allocation.

## 4.4 Geographic Distribution

A stated goal for LADWP is to "balance (LADWP's) renewable portfolio for reliability via geographic and technology diversity."[13] With a net metering program already well-established predominantly in the residential segments of the coastal cities, LADWP is hoping the multi-family, commercial and industrial focus of the FIT 100 will act as a complementary expansion of solar for the remainder of Los Angeles.

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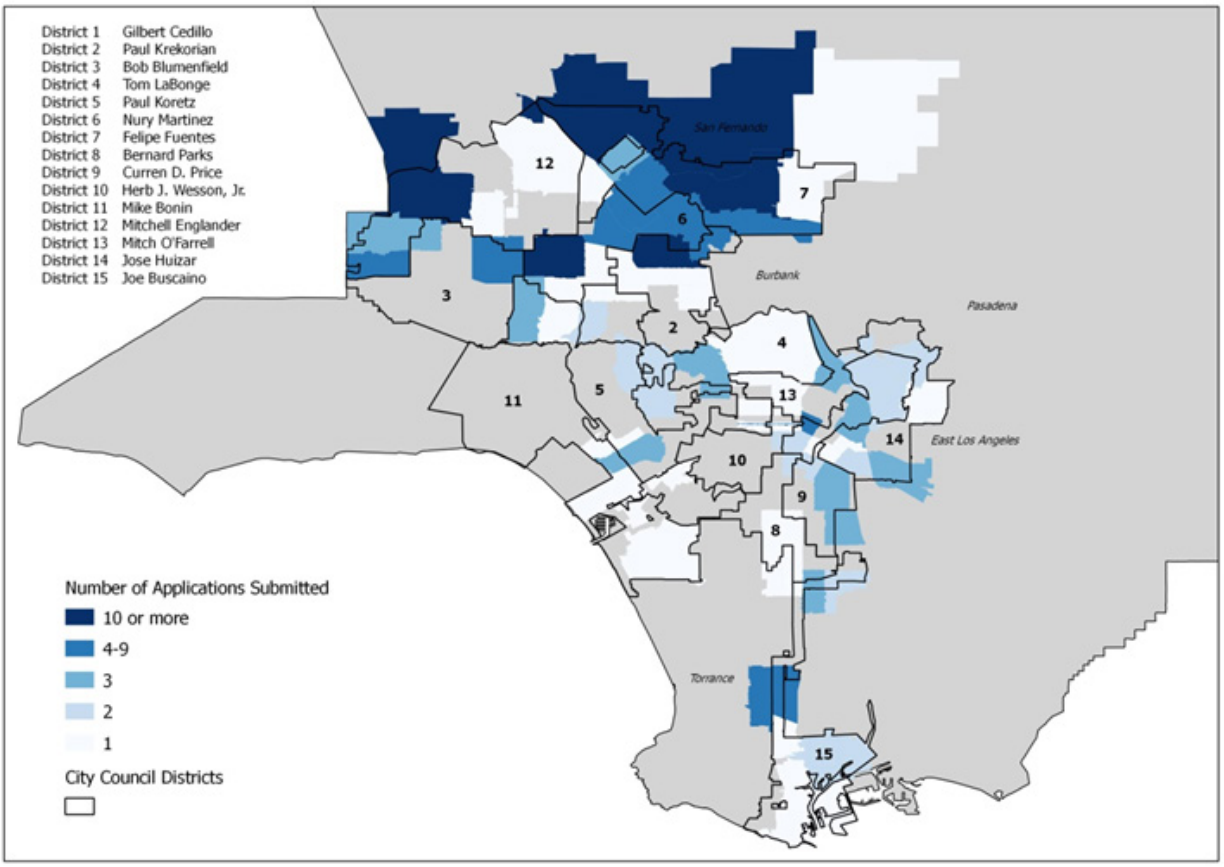
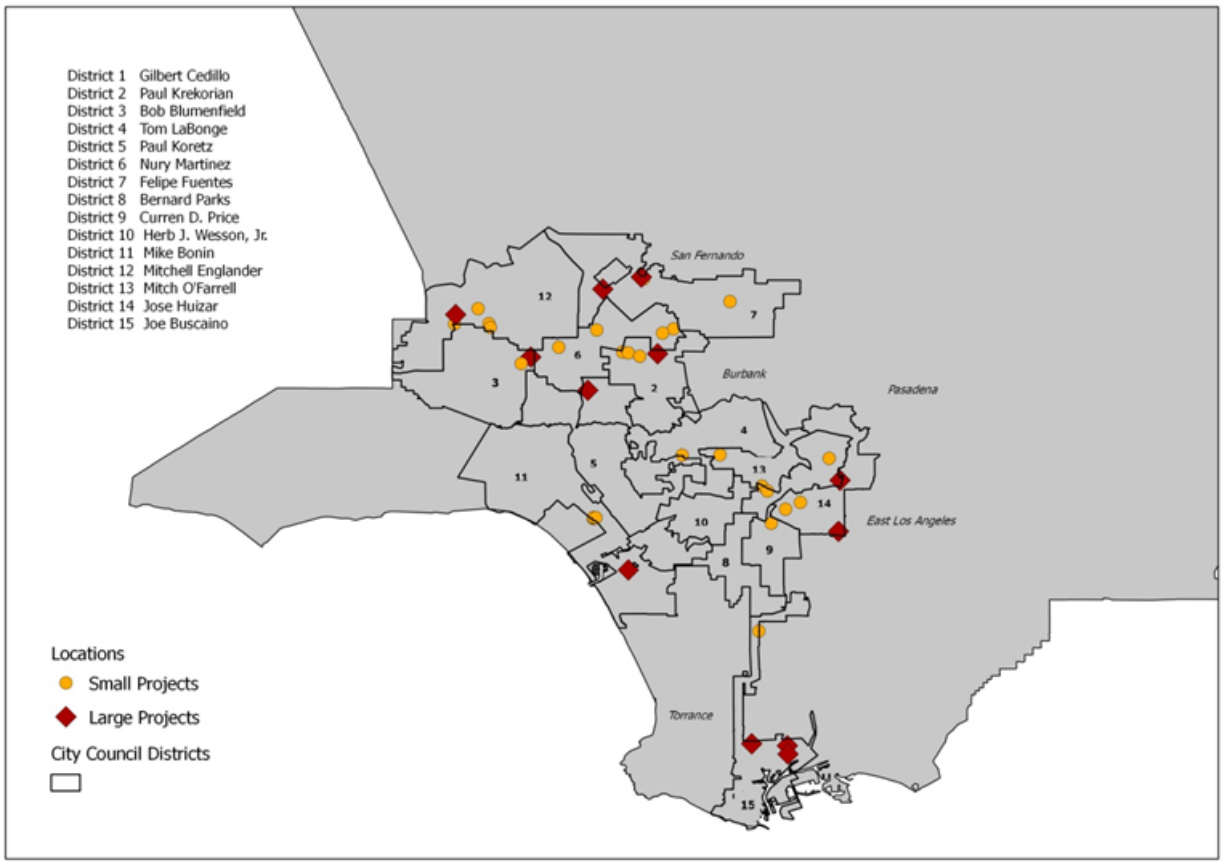
Figure 4-5: Applications Submitted for Tranche 1 and 2 per Council District




Source: LA County GIS Data Portal
Source: LADWP Review Priority List

From Figure 4-5, we observe the complementary nature of the FIT 100 program. As expected, due to roof space and roof leasing prices, and high annual insolation, the San Fernando Valley shows the largest number of submitted applications during the first two tranches. Even so, demand was evident throughout the city as a zip code in each city council district fielded applications for the FIT 100.

Figure 4-6: Location of Survey Respondents Small and Large Projects during Tranche 1 and 2

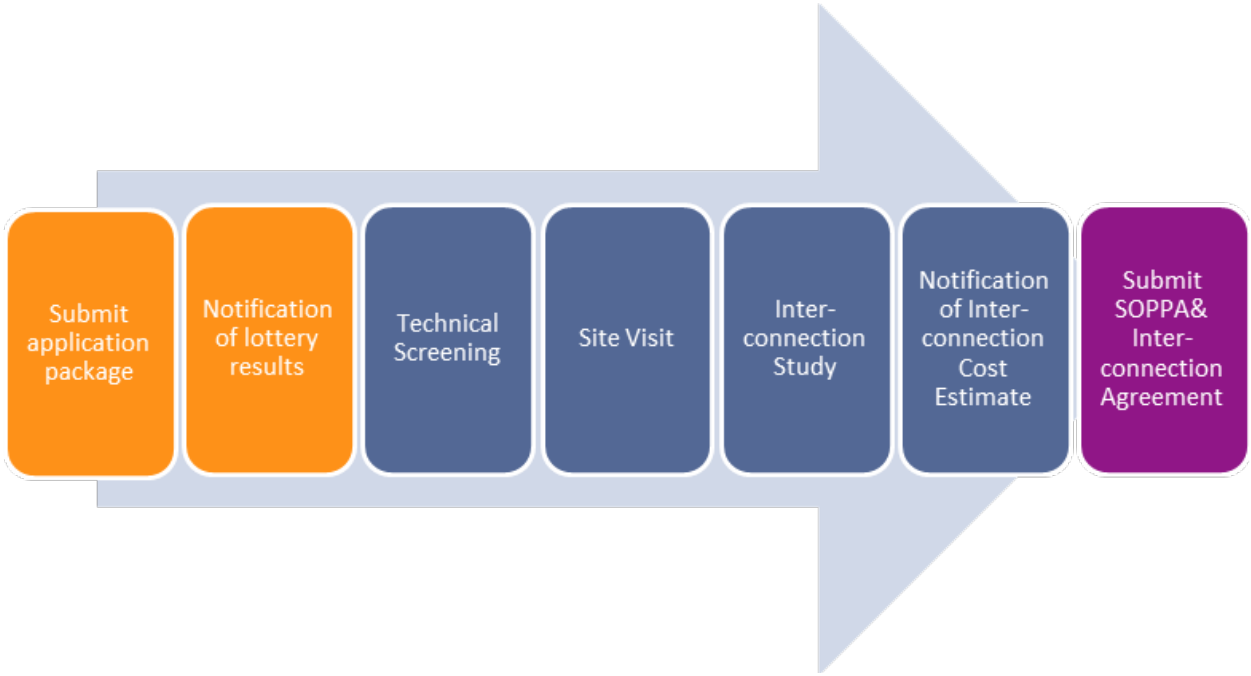



Source: LA County GIS Data Portal

From Figure 4-6, we observe the distribution of accepted applications during the first two tranches of the FIT 100. Included are only those project locations shared by willing survey respondents. Again, although we see a concentration of small and large projects in the San Fernando Valley, the overall dispersion of projects reflects a successful geographic distribution of solar.

# 5. FIT Process Evaluation

Figure 5-1: FIT Application Process




To be considered for FIT 100 participation, applicants are required to provide LADWP with a sufficient amount of applicant and project review information. The review period can be broken down into three primary stages:

- **Section 5.1**: Application Package
- **Section 5.2**: Interconnection Cost Estimate
- **Section 5.3**: SOPPA and Interconnection Agreement Package

## 5.1 Application Package

The application package bundles all necessary evaluation materials for LADWP to effectively assess a proposed solar project. Along with the application form itself, the required supplemental materials allow LADWP to evaluate both the feasibility of the proposed project and the impact the project will have on the utility's power structure. As throughout the evaluation phase, it is important for LADWP to strike a balance between requesting a sufficient amount of review material while, at the same time, not burdening the applicant with excessively onerous requirements. The LADWP FIT application package includes an application form, a proof of site control form, a series of facility diagrams, an energy production profile, application and interconnection study fee, and finally, a series of state and city forms.

### 5.1.1 Application Package Requirements

| Application Package Requirements |
|---|
| Application Form |
| Proof of Site Control Form |
| Facility Diagrams |
| Energy Production Profile |
| Application & Interconnection Study Fee |
| Miscellaneous State & City Forms |

***Application Form***

The application form is a standard, one-page document that gives general information about the applicant and the proposed project. This background information includes:

- Applicant Information
  This section includes background information of the organization that is applying.
  - Organization name
  - Parent company name
  - State of organization
  - Federal Tax ID number
  - Contract length
- Facility and Site Control
  This section includes project dimensions and property ownership information.
  - Project Address
  - Technology type
  - Total Project Cost
  - Total Nameplate Capacity
  - Proposed Commercial Operation Date
  - Building type
  - Type of Site Control

*From applicant response, the application form was reasonable and succinct in its requirements. The requested information was general in nature and did not take firms longer than 2 to 3 hours to complete.*

### *Proof of Site Control Form*

Prior to submitting the application package, site control is required. Types of site control may include:

- title rights to the property,
- an executed contract for the purchase of the property,
- an executed contract for the lease of the property,
- a purchase option or
- a lease option.

By way of submission, the proof of site control form indicates the applicant has "obtained a sufficient level of the right to enter and construct a facility at the proposed site."[14] The form requires only background information of site owner and project dimensions and an indication by check mark of the type of site control as mentioned above. A more formal executed proof of site control is required later at the time of the Interconnection Agreement.

*This requirement proved to be the most time consuming for a number of applicants. Firms who did not own title rights to a property needed to contact property owners or tap into their respective client pipeline. Although site control did take the most time, it was a necessary requirement to avoid the potential for underdeveloped project proposals.*

### *Facility Diagrams*

A set of facility diagrams must include:

- a site plan showing the layout of the proposed facility including the equipment layout and the proposed point of interconnection,
- a one-line diagram showing the power flow of the system and
- an itemized equipment layout specifying the type of equipment that will be used for the proposed facility

Facility diagrams represent a standard requirement for solar project proposals. Each diagram necessitates the expertise of an electrical engineer, but for any person with experience, this requirement does not present a significant time constraint.

*There was no applicant feedback for the facility diagram requirement.*

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### *Energy Production Profile*

The energy production profile forecasts the amount of expected energy generated by the proposed facility. To hedge against an abnormally productive solar year, LADWP will not purchase energy in excess of 115% of each energy hour as predicted by the energy production profile. LADWP provides a sample spreadsheet to firms, and the calculations and estimations can be fairly general.

*A potential issue raised by applicants is the 115% non-purchase clause. Although this protects the utility against annual production anomalies and allows for more accurate energy and cost projections, the rule creates an incentive for firms to overestimate their energy production to counter the utility's intentions and ensure full revenue during abnormally productive years.*

### *Application and Interconnection Study Fee*

Separate checks for the application fee and interconnection study fee payable to LADWP are required from the applicant. For small projects (30-150 kW), the application fee is $500. For large projects (150-3,000 kW), the application fee is $1,000. In the event that the project is not selected, the application fee will be refunded to the applicant.

In addition to the application fee, the applicant must also submit an interconnection study fee. For small projects between 30 kW and 150 kW, the non-refundable application fee is $750. For large projects between 151 kW and 3 MW, the non-refundable application fee is $1,500. If the project is selected, this payment will be used by LADWP's interconnection team to estimate the cost of connecting the proposed project to the utility's grid.

*Applicants did not mention these costs as being overly burdensome.*

## 5.1.2 Utility Support

During the application process, LADWP instructs applicants with inquiries to contact the utility via e-mail or telephone. These support resources provide applicants the opportunity to ask clarifying questions about the application package and to receive feedback in a timely fashion. The utility also supplies applicants a number of web resources including a Frequently Asked Question document that is promised to be "consistently updated on the FIT website based on correspondence between FIT applicant and LADWP staff."[15] This update does not appear to be taking place as the most recent edit came January 18, 2013.

15 LADWP "FIT Set Pricing Program Guidelines"

*Applicants praised LADWP for their "responsive"[16] and "prompt"[17] answers to all application questions. The most frequent inquiries were instruction clarifications concerning the supplemental application materials – primarily about site control and nameplate capacity calculations. The timely response from LADWP prevented applicant delays and application errors.*

### 5.1.3 Notification of Application Results

After the submission of application package materials, LADWP will select applications from the first five submission days and place them into a lottery process. The order of the lottery selections will be recorded on the FIT priority list and the applied projects will then be sequentially evaluated by a tech screening. During this stage, LADWP evaluates the feasibility of the proposed project and assesses the impact of the individual project on the utility's grid. If LADWP deems the project acceptable, the site and project information will be passed along to the utility's interconnection team to initiate the process of the interconnection study. If the project does not pass the tech screening, the application will be rejected and returned to the applicant.

LADWP states the staff "will notify Applicants of a confirmed allocation reservation by e-mail."[18] The lottery results and the FIT Review Priority List will also be made available on the LADWP FIT website.

For applicants, the period between submitting the application package materials and being notified of application results represents a time of high anxiety for the firm. Therefore, it is important for LADWP to respond to applicants – those who were rewarded and also those who were not – in a timely manner.

*With the significance of this notification stage in mind, the applicants revealed a range of responses. A handful of firms stated the waiting period was "not that long,"[19] ranging from 7 to 14 days. Others expressed disappointment in the lack of any notification from LADWP. A specific firm mentioned how "they were put into the lottery and then there was nothing, which was really disappointing."[20] Multiple firms expressed skepticism in the punctuality of lottery result online updates, instead resorting to calling the utility for more up-to-date results.*

*A number of firms, especially those who were not rewarded a reservation, voiced a desire for a "more*

16 August 8, 2013 11:00am; August 19, 2013 2:00pm; August 22, 2013 11:00am
17 August 8, 2013 11:00am; August 19, 2013 2:00pm
18 LADWP "FIT Set Pricing Program Guidelines"
19 August 6, 2013 10:00am
20 August 8, 2013 2:00pm

*official"*[21] *lottery result notification. The primary reason for this request was to have an official lottery result document to present to their clients. A large firm mentioned a client becoming incredulous to the fact that the firm even applied, and a lack of official proof made it difficult for this firm to deny the claim.*

*Finally, firms who were not selected in the lottery process expressed difficulty in convincing the property owner to resubmit the same project in the subsequent tranche when the payment would drop by $0.01 per kWh. A large firm described "selling the property owner on the original price" as "difficult enough" and when this same firm attempted to resell the project, the client grew "upset" and "unwilling to accept the lower payment."*[22] *In the event that firms were able to convince clients to resubmit a project in Tranche 2, multiple firms viewed the resubmission protocol as overly tedious. After already gathering the required application materials, it seemed unnecessary to reassemble and resubmit the exact same documents.*

### 5.1.4 Overall Application Package Evaluation

In total, the application package period ranged in time due mostly to the acquirement of site control. If all necessary site information was prepared, the application materials did not take longer than 2 to 3 days to complete.

*Overall feedback for the pre-application submission process was favorable. LADWP provided the necessary application materials, these materials were not overly onerous and any questions concerning these materials were answered in a prompt manner. Overall, no firms voiced strong complaints about the requirements of the application package, and one firm, with previous FIT experience, described the process as "very thorough". From this, it appears as though the balance between demanding practical requirements while still collecting sufficient project review material has been met.*

*The issues that did arise were during the post-submission process, specifically the lack of notification for some firms. As this period represents a time of high anxiety for the firm, it is important that LADWP work to improve both the speed and quality of the lottery result feedback with an official standard letter of rejection or acceptance and a more regularly updated website. Also, LADWP should reconsider the application resubmission protocol to make it easier for firms with clients who still want to take part in the program even at a lowered price. Multiple firms expressed uncertainty in the rules dealing with tranche queue management. LADWP must clarify these rules and explicitly state protocol for all queue and tranche applicant movement scenarios.*

*Overall, when asked to rate applicant experience from very satisfied (5) to very unsatisfied (1), participants in the survey graded LADWP's FIT application package a* ***4.17*** *with the lowest grade a 3.5, indicating a mostly satisfying application experience.*

21 August 8, 2013 2:00pm
22 August 6, 2013 3:00pm

***Recommendations***

1) Continue to maintain responsive communication during the pre-application submission stage.
   - o Improve communication during the notification of application results stage.
   - o Update online lottery results with greater regularity.
2) Allow those who want to resubmit exact projects to automatically be considered in the subsequent tranche without the need to reassemble the application package requirements.
3) Clarify the applicant movement rules both for within a queue and also between tranches.
4) Create a standard letter of rejection/acceptance for lottery results.
5) Consolidate most frequently asked questions from the first two allocations and add them to the FAQ resource.
6) Be aware of firm's inclination to overstate annual production in the energy production profiles.

## 5.2 Interconnection Cost Estimate

After evaluating the project dimensions and applicant information on paper, LADWP proceeds to the physical site evaluation. For those projects that successfully pass the tech screening, a service planning engineer will contact the applicant to schedule a site visit. The primary goal with the initial site visit is to determine the direct point of connection between the solar project and the utility's grid, and to record any site attributes that may influence the cost of interconnection.

With the newly acquired site information, LADWP can now thoroughly conduct the interconnection study. This comprehensive assessment will evaluate the dynamics of connecting the solar power system to the utility grid through an integration feasibility study, and together with the information gathered on site, will ultimately inform the estimated interconnection cost. If the cost estimates or project requirements prove to be unfeasible for the project, the participant may withdraw their application at this point in the process. Likewise, LADWP may deny the participant's interconnection if the point of interconnection is deemed inadequate.

The interconnection cost estimate stage can vary for applicants in two significant ways:

1) Costs estimated for interconnection.
2) Time between the tech screening and receiving interconnection cost estimate.

### 5.2.1 Interconnection Estimate Costs

Interconnection represents a significant portion of a project's total cost with a number of factors contributing to what can be a wide range of interconnection costs. These factors include roof dimensions, project size, project location and quality of the interconnection point.

*A majority of applicants were satisfied with the estimates received and described costs as expected, or "on par."[23] Still, there were a number of instances that resulted in what the applicants felt to be a more expensive estimate than anticipated, and on one occasion, less expensive. The reasons for these deviations in estimates include:*

### *High Interconnection Cost Estimates*

- Location of interconnection point –
  A large firm described their interconnection cost estimate as "way too high."[24] This was due to the interconnection point being across the road.
- Quality of inverter –
  A small firm felt the interconnection cost assessment to be "exorbitant"[25] for a project of the proposed size. The reason for the cost escalation was the need to interconnect to an in-service lower voltage inverter, even though there was a new, higher quality inverter also available on the same property. LADWP simply "did not want emergency workers or anyone else worried about electricity coming from two different locations."[26]
- Metering setup –
  A large firm needed to downgrade the size of their proposed project because there were "some issues with how the parcels were metered."[27]
- One interconnection point per parcel requirement –
  LADWP stipulates that "applicants may not aggregate several renewable generators from other parcels to make up the Facility."[28] In situations when a firm is proposing multiple projects on adjacent tax parcels, it may be more cost effective to join these projects at a single interconnection point. A larger firm argued for a single connection point in a situation similar to this and the utility and applicant "agreed to one point."[29]

  This was not the case for all applicants. Another large firm encountered a case of one contiguous rooftop being inexplicably split across three separate parcels. LADWP requested the applicant revise the layout so it fit within one parcel, thereby greatly reducing the size of the project or requiring the site owner to apply for three different projects.

23 August 11, 2013 11:00am
24 August 15, 2013 4:00pm
25 July 31, 2013 10:30am
26 July 31, 2013 10:30am
27 August 22, 2013 11:00am
28 LADWP "FIT Set Pricing Program Guidelines"
29 August 19, 2013 2:00pm

### *Low Interconnection Cost Estimates*

- Presence of an existing transformer –
  A small firm received a lower than anticipated interconnection cost estimate due to the proposed project being "tied in to an existing transformer."[30]

Table 5-1: Summary of More Expensive and Less Expensive Interconnection Cost Estimates

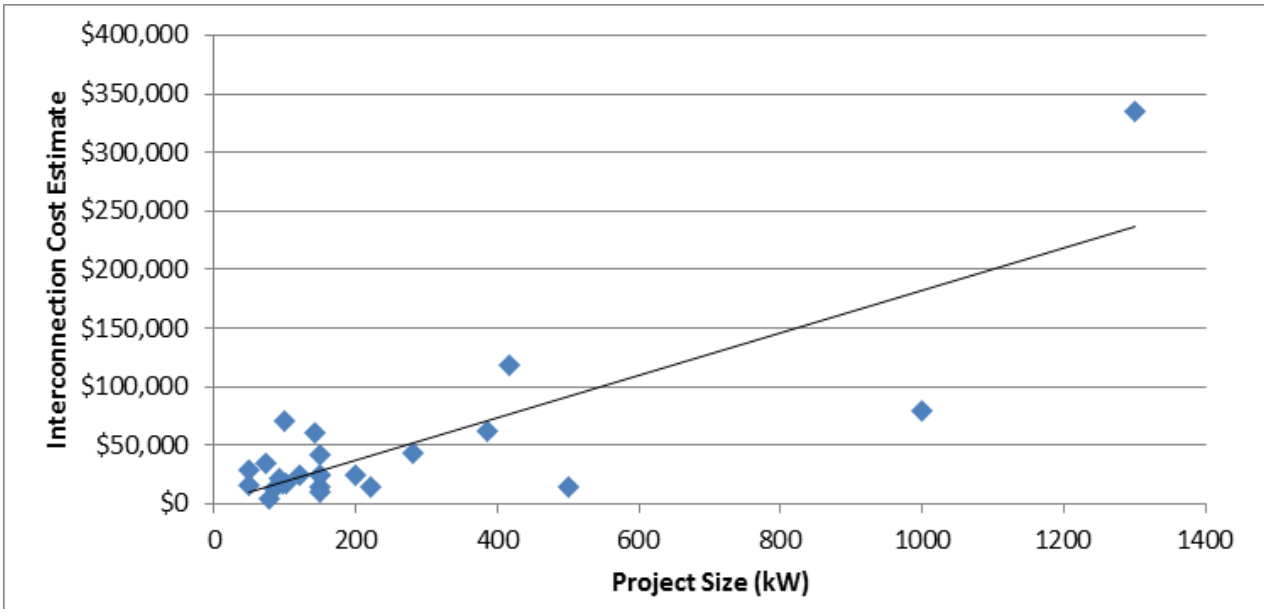
| More Expensive | Less Expensive |
|---|---|
| Interconnection point across the road | Presence of existing transformer |
| Selection of lower quality interconnection point | |
| Metering setup | |
| One interconnection point per parcel | |

### *Additional Interconnection Cost Variables*

Other factors that can influence the estimated cost of interconnection include the size of the proposed project, the voltage level of interconnection and the age of the building. From data obtained from LADWP[31] and the Los Angeles County Office of the Assessor,[32] the following analyzes these variable's effects on the interconnection cost estimates.

## Project Size

Figure 5-2: Interconnection Cost Estimate vs. Project Size

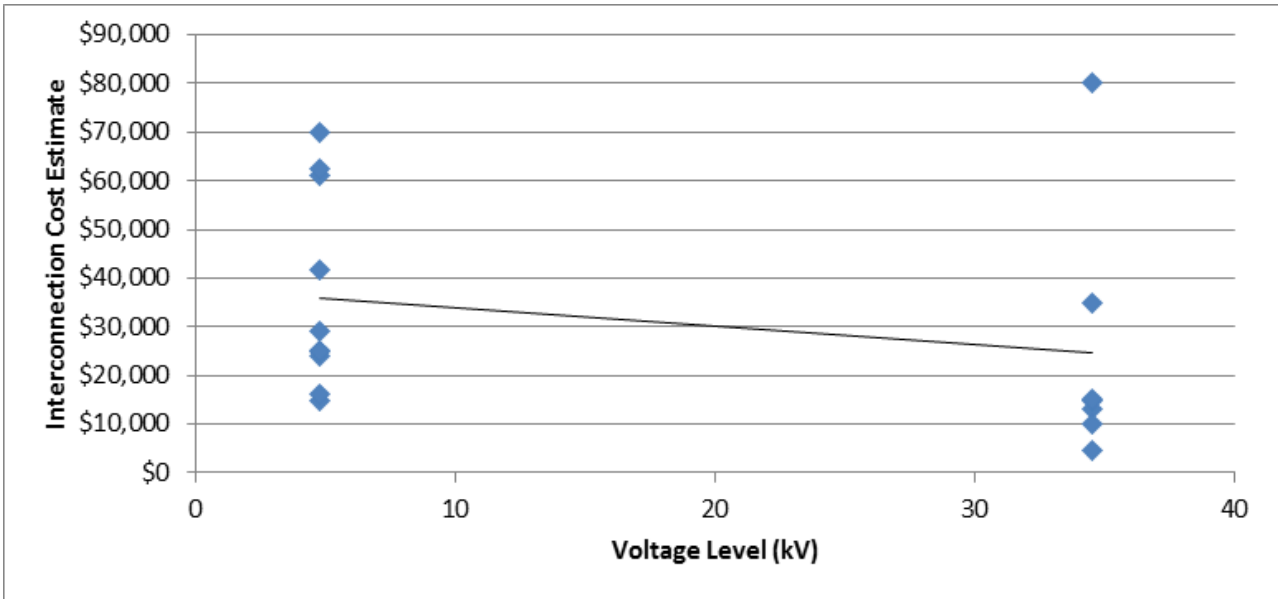



30 August 8, 2013 11:00am
31 LADWP "Review Priority List"
32 LA County Office of the Assessor Property Search

From Figure 5-2, we see a positive relationship between the size of the solar project and the estimated interconnection cost. The biggest contributor to the strength of this relationship is a 1.3 MW project estimated to cost nearly $350,000 to interconnect. Because the estimate was still under negotiation, the applicant did not divulge case specifics but did mention the sheer size and complexity of the project played a role in the expensive estimate. Also, as alluded to at the end of this section, with the project over 1 MW in size, it requires the owner or developer to purchase a Vista Switch - an interconnection piece of equipment that can total as much as $300,000.

## Voltage Level

Figure 5-3: Interconnection Cost Estimate vs. Voltage Level of Interconnection

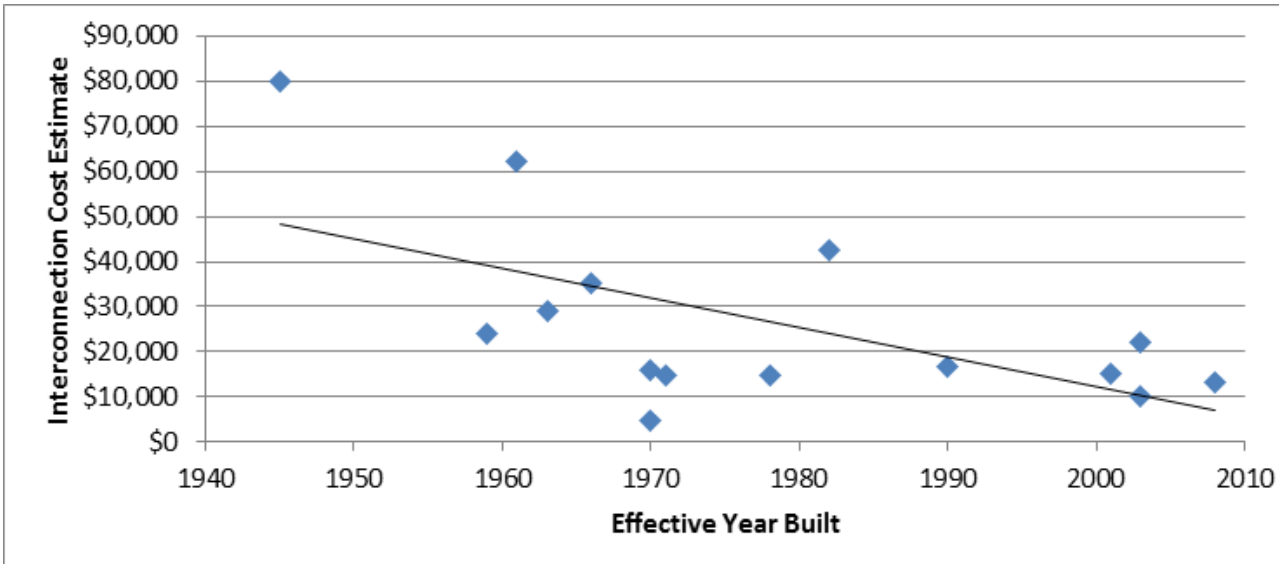



LADWP stipulates that participants "shall interconnect to the LADWP distribution grid at either 4.8kV or 34.5kV voltage level."[33] There does not appear to be a relationship between these voltage levels of interconnection and the cost of interconnection.

33 LADWP "FIT Set Pricing Program Guidelines"

**Building Age**

Figure 5-4: Interconnection Cost Estimate vs. Building Age

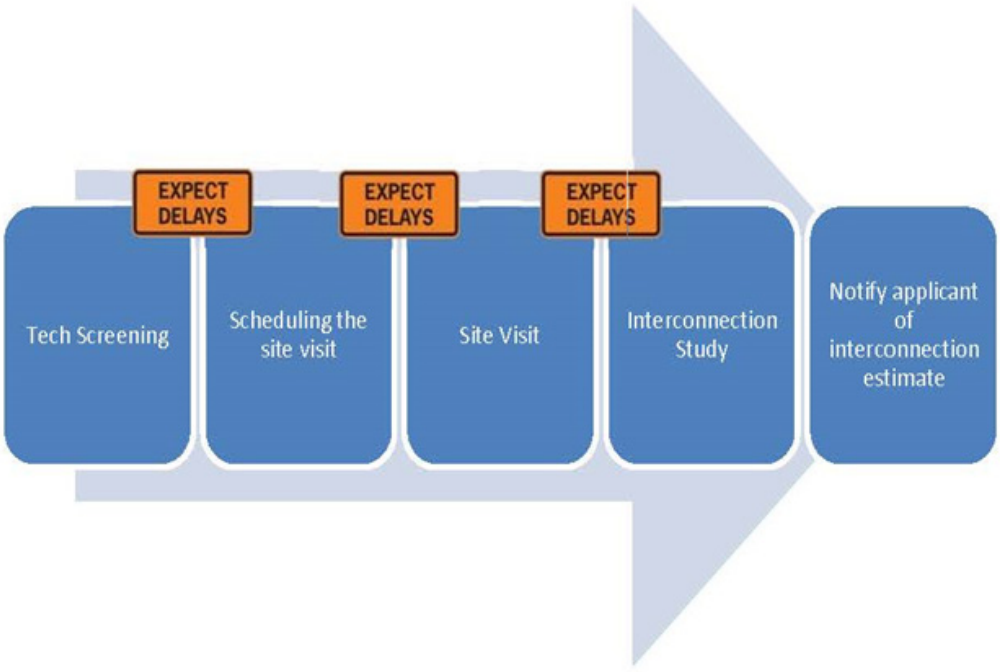



Using the property's effective year built of the latest improvement, we see a positive relationship between the age of the building and the cost of interconnection estimate. It appears that older buildings and therefore older rooftops require greater investment for a project to be interconnected into the grid.

## 5.2.2 Time to Complete Interconnection Estimate

Estimating the cost of interconnection may take a significant amount of time with three possible points of delay. From the onset, there is the potential for a delay in the utility engineer's initial contact of the applicant when scheduling the site visit. From here, the time it takes between scheduling the site visit and the site visit itself may lead to a lag in the process. Finally, a delay may occur when the utility conducts the interconnection study, thereby prolonging the notification of interconnection estimate. Setbacks during these three intervals may be due to a lack of utility staff resources, a strong demand for interconnection studies or other scheduling and staff conflicts.

Figure 5-5: Potential Delays during Interconnection Estimate Stage




Interconnection cost estimate delays can prolong the amount of time it takes for a firm to learn a significant cost for their proposed project. Again, this wait represents a time of high anxiety for the firm as there is uncertainty in the total cost of the project and to when the project will be able to begin commercial operation, potentially jeopardizing a firm's revenue schedules.

### *Scheduling a Site Visit and the Site Visit*

*Following the tech screening, an LADWP Service Planning engineer is to contact the applicant to schedule a site meeting. In scheduling this site visit, applicants were mostly satisfied with LADWP's contact time. A large firm applicant commented on how LADWP "set up site visits in a timely manner,"[34] while another large firm echoed how the utility was "very prompt with the site visit."[35] In finding a time that worked for both parties, a third large firm mentioned how "the engineers were flexible"[36] in their scheduling.*

*One large firm questioned the efficiency of assigning one engineer to one project indiscriminately. The large firm brought up the fact that they had been "contacted by four different engineers for four of [their] projects and these four engineers have no idea what's going on with any project other than the*

34 August 22, 2013 11:00am
35 August 19, 2013 2:00pm
36 August 15, 2013 4:00pm

*one they were assigned to."*[37] *Additionally, the large firm felt "it would be great if there was one central person that scheduled site visits for all of the projects and if there was an engineering team dedicated to FiT site visits."*[38]

### *Interconnection Study and Notification of Interconnection Estimate*

*After all required evaluation materials are obtained by LADWP, they are able to conduct the interconnection study. When complete, the utility will forward the official interconnection cost estimate to the applicant via physical mail. Although a number of firms interviewed were satisfied with the amount of time this evaluation took, others viewed this period of notification as the first time in the entire application and evaluation process when questions arose concerning the utility's ability to keep up with an ever growing applicant queue. A small firm noticed how "all these jobs get shoved on the utility engineers" and that "they don't have the proper resources to process them."*[39] *A large firm commented on "delays in sending the official estimate"*[40] *due to the estimate being sent to the wrong address. This firm proceeded to describe LADWP's delivery methods as "very old school" in a time of electronic communication.*

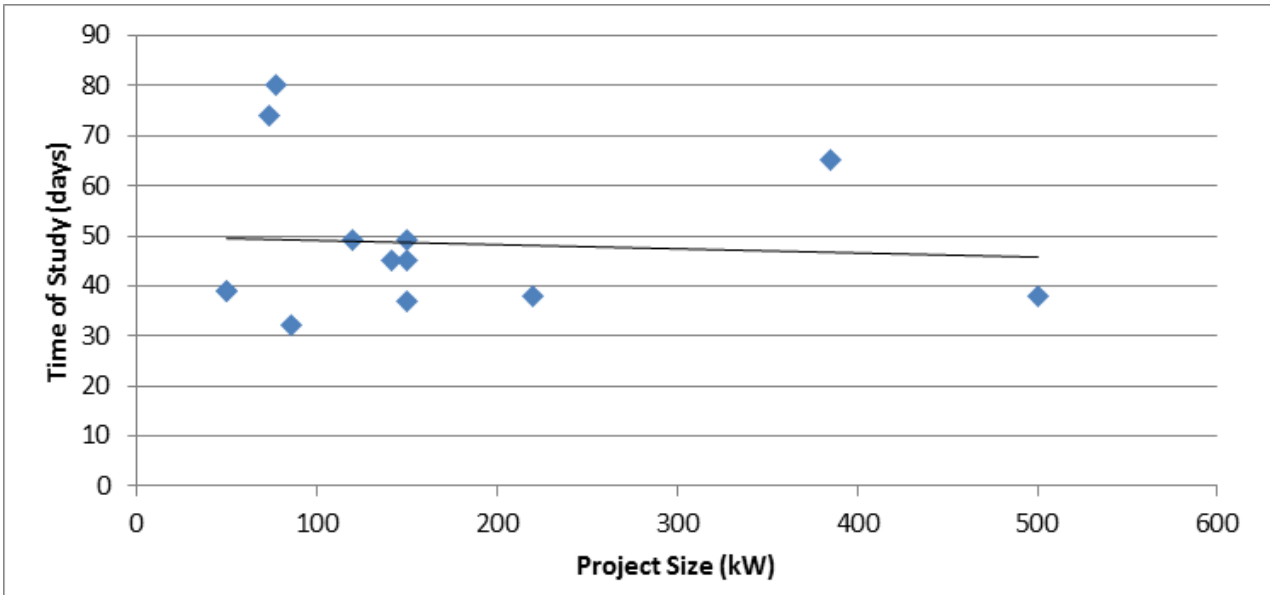
### *Additional Interconnection Time Variables*

In addition to utility sourced time constraints, there can be a number of project or site specific attributes that potentially give cause to delay. Similar to the cost analysis above, the following examines potential factors that may prolong the interconnection cost estimate period including project size, voltage level and building age. To conclude the interconnection time and cost analysis, the duration of the study will also be compared to the estimated cost of interconnection.

37 January 16, 2014
38 January 16, 2014
39 July 31, 2013 10:30am
40 August 19, 2013 2:00pm

## Project Size

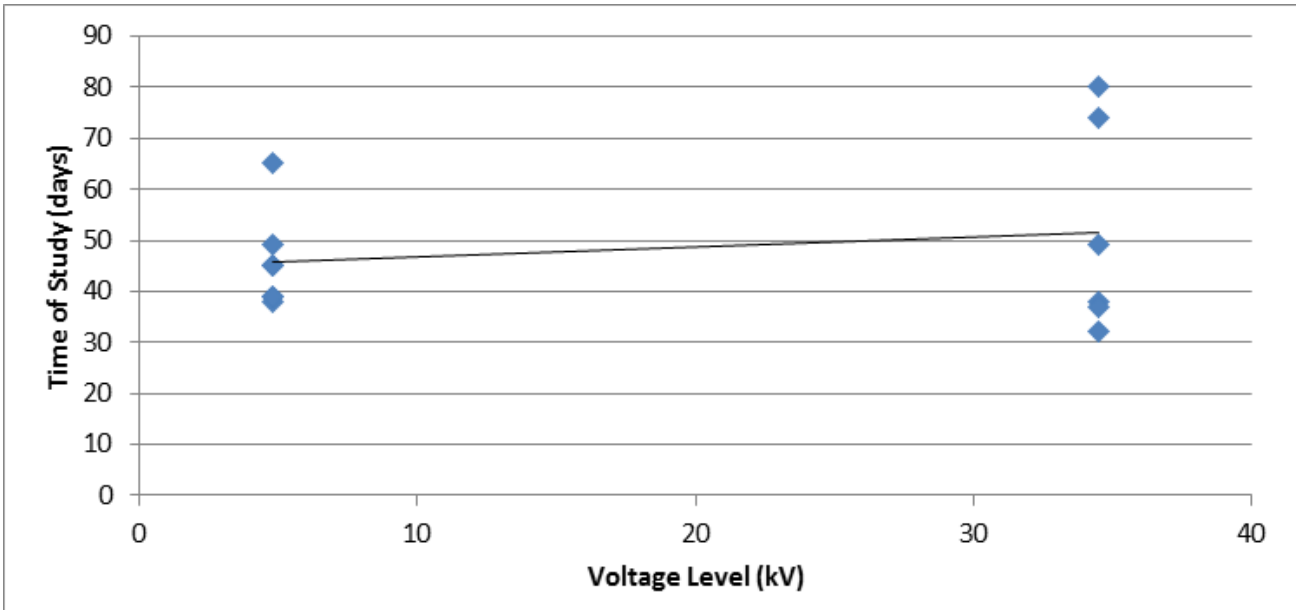
Figure 5-6: Time of Study vs. Project Size




There does not appear to be a relationship between the size of the project and the time required to complete the interconnection study.

## Voltage Level

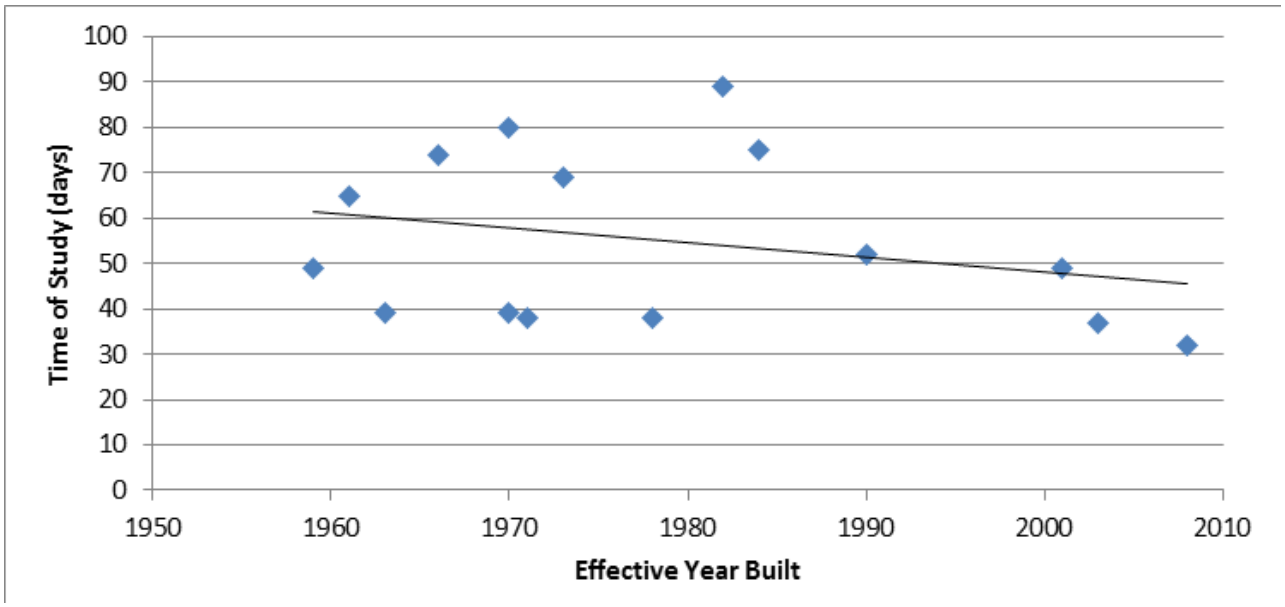
Figure 5-7: Time of Study vs. Voltage Level of Interconnection




There does not appear to be a relationship between the voltage level proposed and the duration of the interconnection study.

## Building Age

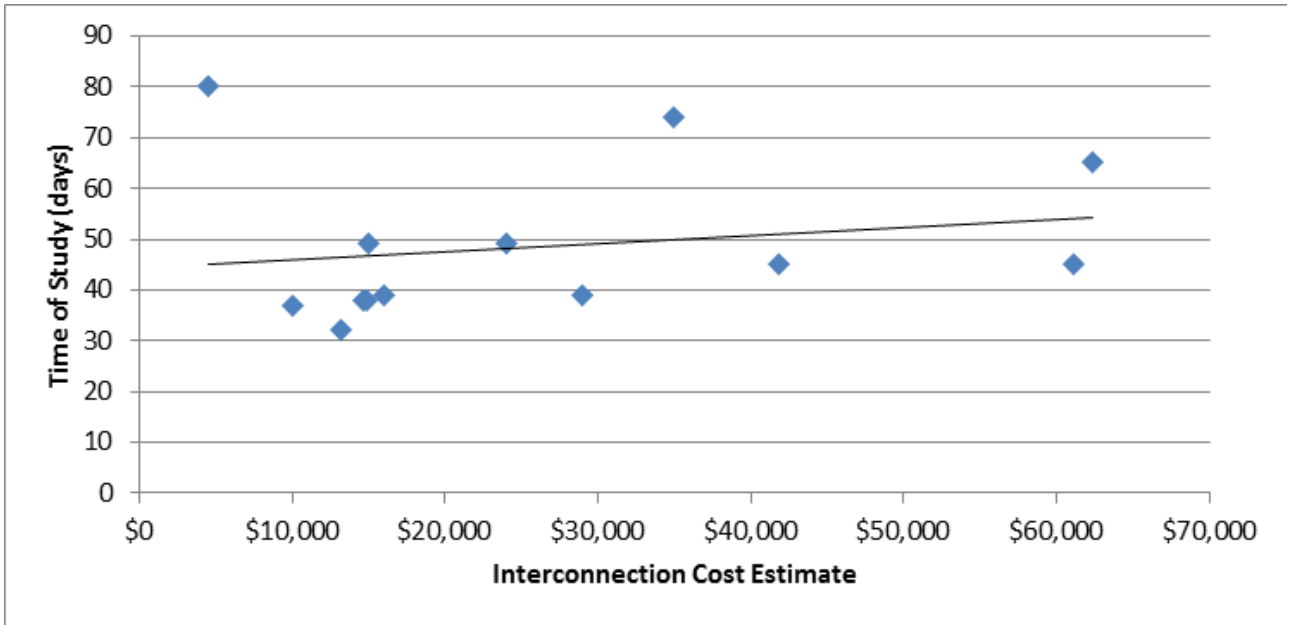
Figure 5-8: Time of Study vs. Building Age




Again, there does not appear to be a relationship between the age of the building and the duration of the interconnection study.

## Interconnection Cost

Figure 5-9: Time of Study vs. Interconnection Cost Estimate



Finally, the estimated cost of interconnection does not appear to influence the duration of interconnection study. It may seem logical that a more expensive interconnection cost estimate due to any number of variables would demand a longer time of study, but this assumption appears invalidated by the available data.

### 5.2.3 Utility Support

The primary mode of applicant support is telephone and e-mail, while the initial site visit also gives the applicant and utility an opportunity to speak in person. Applicants can use these contact resources to ask clarifying questions about the interconnection cost estimate period and receive feedback in a timely manner.

*As with the application package stage, applicants described LADWP's support as "responsive"[41] and "prompt."[42] A large firm specifically praised the utility for being "good at returning phone calls and answering questions."[43] This same firm noticed "when things needed to be escalated to (upper level staff), they were."*

Utility-applicant communication is particularly important during the interconnection cost estimate stage because often times a series of revisions must take place in order to achieve an interconnection cost both parties can approve. In many cases, the utility requires project alterations to allow for a proposed project to be interconnected to the grid yet still must maintain some discretion about sensitive utility grid information. This limits the instruction that can be directly shared by the utility, increasing the need for clear yet occasionally implicit communication even more.

*Firms specifically spoke to the complexity and importance of utility-applicant communication and observed there to be "a back and forth"[44] between the two parties. A large firm described the conversations over interconnection costs to be "very productive."[45] There were no negative comments from applicants regarding the utility's communication during the interconnection cost estimate stage.*

41 August 8, 2013 11:00am; August 20, 2013 11:00am
42 August 20, 2013 11:00am; August 22, 2013 11:00am
43 August 19, 2013 2:00pm
44 August 8, 2013 11:00am; August 19, 2013 2:00pm; August 22, 2013 11:00am
45 August 19, 2013 2:00pm

Table 5-2: A Tale of Two Interconnection Cost Estimates

| A Tale of Two Interconnection Cost Estimates | | |
|---|---|---|
| Background | A large firm[a] submitted a campus project with multiple tax parcels that were adjacent to one another. | A small firm[b] submitted a commercial rooftop project with both a 480 volt and a 240 volt interconnection point. |
| Utility's take | Individual meters for each parcel | Citing safety concerns, the firm had to use the already in service 240 volt interconnection point |
| Firm's take | A single meter for all parcels | "A higher voltage will make things easier for everybody." |
| Outcome | "(LADWP) agreed to one drop point. I thought our conversations were very productive." | "Brought it up at the first site meeting and they said no and that was it. I don't want to sit there and argue with an inspector. In the end, they hold all the cards." |

[a] August 19, 2013 2:00 pm
[b] July 31, 2013 10:30 am

### 5.2.4 Overall Interconnection Cost Estimate Evaluation

In total, the interconnection cost estimate stage – from tech screening to the conclusion of the interconnection study – averaged just over 52 days to complete, ranging in total from 9 to 100 days. Estimated costs of those applicants surveyed averaged $46,595 with a minimum estimate of $4,540 and a maximum of $334,985. The wide ranges of both the time and costs of the interconnection cost estimates indicate the unpredictability of this stage and its site-by-site and project-by-project nature.

*General feedback for the interconnection cost estimate stage was more often than not, positive. Site visits were scheduled in a timely manner, applicants were made aware of the estimates relatively soon after the site visit and the applicant-utility communication that is so vital to the interconnection cost estimate stage was observed.*

*Still, this stage of the process was the first instance where LADWP's resources were called into question. A small firm detected this to be the time when the process grew "expensive and slow,"[46] and a number of firms acknowledged this sentiment. As costs are primarily a reflection of site and project attributes*

46 July 31, 2013 10:30am

*and out of utility hands, LADWP must work on limiting the manageable delays that occur during the interconnection study. This will help quell the firm anxiety present during the interconnection cost estimate stage.*

*Finally, LADWP requires projects of 1 MW or above to install a Vista Switch for "telemetry and remote shutoff capabilities. This switch costs $330,000 to $400,000 extra and is paid for by the developer or owner of the project."*[47] *A number of firms believe this cost burden should not fall squarely on the developer's or owner's shoulders. To spread costs and to allow for maximization of project size, a large firm suggested that LADWP use the net nameplate rating of the inverter rather than the CEC-AC rating "to calculate the 1 MW capacity that triggers the Vista Switch requirement."*[48] *The argument being that "the AC interconnected load that should trigger any interconnection requirement, including the Vista, is determined by the manufacturer's specified maximum output of the inverters"*[49] *and not the panels.*

*Overall, when asked to rate applicant experience from very satisfied (5) to very unsatisfied (1), participants in the survey graded LADWP's interconnection cost estimate process a* ***3.50*** *with the lowest grade a 1, indicating a neutral to somewhat satisfying experience.*

***Recommendations***

1) Upgrade the interconnection cost estimate to electronic delivery or notify applicants by e-mail when cost estimate has been sent.
2) Maintain level of communication during the cost estimate stage.
3) Reword "one interconnection point per one tax parcel" language to allow for unique circumstances such as contiguous rooftops or adjacent parking lots.
4) Use the net nameplate rating to determine the requirement of the Vista Switch instead of the CEC-AC rating.
5) Designate one central site visit scheduling agent.
6) Dedicate a group of engineers solely to FIT site visits.
7) Limit time between site visit and notification of cost estimate.

47 January 11, 3:30pm
48 January 11, 3:30pm
49 January 11, 3:30pm

## 5.3 Standard Offer Power Purchase Agreement (SOPPA) and Interconnection Agreement Package

### 5.3.1 SOPPA and Interconnection Agreement Requirements

| SOPPA & Interconnection Agreement Requirements |
|---|
| SOPPA |
| Interconnection Agreement |
| Executed Site Control |
| Initial Payment of Interconnection Cost Estimate |
| Development Security Deposit |
| Miscellaneous State & City Forms |

Following the receipt of the interconnection cost estimate, the applicant will have 30 days to obtain and submit the second and final round of required materials. At this stage in the process, LADWP has completed the necessary due diligence on project and firm qualifications, and this final bundle of requirements mostly finalizes and executes previously informal understandings between applicant and utility, achieved primarily by signed contracts and the transfer of significant monetary deposits. In all, the SOPPA and Interconnection Agreement package includes the SOPPA and Interconnection Agreement themselves, a formal proof of site control through ownership or lease documentation, the initial payment of the interconnection cost estimate and the development security deposit, and a series of state and city compliance and tax forms.

***Standard Offer Purchase Power Agreement (SOPPA)***

The SOPPA is the legal contract between the purchaser (LADWP) and the seller (applicant), stipulating the agreed upon requirements for the sale of energy. This extensive 50-page document includes:

- Effective Date, Term and Early Termination –
  This section sets the timelines associated with the applied project's commercial operation and sets forth guidelines of early termination.
- Development of the Facility –
  This section discusses the legal requirements for the project including all necessary permits and the California Environmental Quality Act (CEQA) responsibilities. Also detailed is the certification of two time milestones including the "date on which the seller has either obtained the permit or permits required to construct the Facility, or has submitted to Buyer in writing proof of solar panel procurement for the rated Capacity

of the Facility,"[50] and the date in which the project will begin commercial operation. Applicants will have 6 months from the execution of the SOPPA to provide proof of proper permitting and 18 months to achieve commercial operation. Applicants may request a 6-month extension of the planned commercial operation date if there is to be reasonable cause of delay. Finally, this section reviews the development security deposit which amounts to "$50 for each kilowatt of the nominal nameplate Capacity"[51] of the proposed project.

- Operation and Maintenance of the Facility –
  This section outlines general operational requirements including compliances with the Prudent Utility Practices, inspection and repair practices, and guidelines during unforeseen outages.
- Compliance during Construction and Operation Period –
  This section grants the buyer (LADWP) the right to inspect the project and site before the commercial operation date. To ensure quality and safety of the project, the applicant must also provide LADWP with an inspection and maintenance report "prior to the end of the third full month of the second Contract Year, the fourth Contract Year and every second Contract Year thereafter."[52] Finally, this section reviews the insurance requirements for the project and states that insurance is required 30 days prior to commercial operation.
- Purchase and Sale of Power; Capacity Rights –
  This section reviews all details of the sale of energy from seller (applicant) to buyer (LADWP) including the point of delivery and the exclusivity of LADWP's right to purchase the entirety of the project's power production.
- Title and Risk of Loss –
  This section stipulates that all responsibility for any costs or charges is borne by the seller before the point of delivery and by the buyer after the point of delivery.
- Environmental Attributes; EPS and RPS Compliance –
  This section explains the transfer of environmental attributes from seller (applicant) to buyer (LADWP). The SOPPA defines environmental attributes as "any and all current or future fuel, emissions, air quality, or other environmental characteristics, credits, benefits, reductions, offsets, or allowances."[53] The project must also be both RPS and EPS compliant. RPS compliant means the project will be "eligible to be credited against the Renewables Portfolio Standard", and EPS compliant means the project "satisfies the greenhouse gas emissions performance standard(s)."[54] Applicants must certify the project as RPS compliant within 90 days of commercial operation.

50 LADWP SOPPA
51 LADWP SOPPA
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54 LADWP SOPPA

- Billing; Payment; Audits; Metering; Policies –
  This section describes the calculation of energy delivered and the payment procedure including when payment is due and what happens in the case of a disputed statement. Also described is the electric metering device that will be used measure energy.
- Representations; Warranties; Seller's Covenants –
  This section reviews specific legal requirements associated with the ownership of a solar project and the sale of power in the state of California.
- Default; Termination and Remedies –
  This section outlines the circumstances that would result in a default by the responsible party, and the remedy or termination guidelines that would follow such a situation.

The appendices of the document include all necessary forms and additional insurance resources.

*In terms of the SOPPA document itself, some applicants felt the document could be shortened and explained in a more straightforward manner. A small firm believed there was "not enough clarity and proper detail in the SOPPA documentation and guideline book."*[55]

*As for specific issues within the document, a second small firm mentioned having difficulties obtaining the proper insurance requirements. This applicant felt these terms "could be spelled out more clearly."*[56] *LADWP did provide applicants with examples of what type of insurance is required, but when the applicant sent this to insurance brokers, "they would come back with something not even close to what LADWP wanted." The applicant did admit much of this had to do with "insurance providers who were just not familiar with the world of solar," but still felt LADWP could help streamline the process of matching applicant with insurance provider.*

*A second issue within the document was sourced to the permitting requirements. In several instances, firms needed to pay the Los Angeles Department of Building and Safety an expedited fee to achieve the time milestone as stipulated by the SOPPA. Even with this "expensive" service, it still "took six weeks to pull the permit."*[57] *Between the insurance providers and the Department of Building and Safety, two external stakeholders, a small firm noticed there being "a lot of confusion about this program."*[58]

*Finally, there was specific language within the legal document that applicants felt were intentionally vague or unnecessary altogether. This language primarily dealt with circumstances of potential termination. Specifically, Section 6.1 entitled "Purchases to Buyer" states that the "Buyer shall not be required to purchase and receive any Facility Energy if receiving such Facility Energy would cause or contribute to any adverse effects to Buyer's operation of a reliable and efficient electric grid as*

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57 July 31, 2013 10:30am
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*determined in Buyer's sole discretion."[59] A large firm expressed concern about the ability to terminate with the buyer's (i.e. LADWP's) "sole discretion". This firm hoped for more clarifying language such as to allow this termination only during "an emergency, as defined by LADWP interconnection rules."[60] Other complaints about SOPPA termination language were aimed at Section 2.4(d) and Section 11.2. Section 2.4(d) allows for early termination "if electric output from the Facility ceases for twelve (12) consecutive months."[61] A large firm felt it reasonable to "provide an extension for Force Majeure"[62] to protect against any unforeseen incidences that would cause long-term shutdowns. Section 11.2 entitled "Default Remedy" includes "no termination payment remedy that specifically covers lost revenue for remainder of term, tax and incentive recapture."[63]Therefore, a non-defaulting seller receives zero compensation in the case of LADWP defaulting on the contract — a reality multiple firms deemed unfair. The termination language throughout the SOPPA should be clarified to help create revenue and credit certainty for investors.*

### *Interconnection Agreement*

The Interconnection Agreement finalizes the results of the interconnection study and subsequent interconnection cost estimate. This 30-page document includes:

- Responsibilities of both the applicant and LADWP
- Metering requirements
- Billing and payment procedures
- Disconnection guidelines
- Insurance requirements
- Authorized Representative designation
- Default circumstances and procedures

The appendices of the document include all necessary forms.

*There was neither critique nor praise for the Interconnection Agreement document.*

### *Executed Site Control*

Unlike the initial round of proving site control, the SOPPA and Interconnection Agreement package requires documentation of site control through official ownership or lease. While the first proof of site control required only site information and type of site control as indicated by checkmark, the executed site control includes the burden of actual documentation and because of this, may take more time in obtaining.

59 LADWP SOPPA
60 November 11, 2013 1:30pm
61 LADWP SOPPA
62 November 11, 2013 1:30pm
63 November 11, 2013 1:30pm

*No firm felt the executed site control to be overly burdensome, but one small firm did question the need to deliver site control in both the application package and the SOPPA and Interconnection Agreement package. This firm was unaware of the formal/informal discrepancy between the two submissions.*

### *Initial Payment of Interconnection Cost Estimate*

The SOPPA and Interconnection Agreement package also requires the initial payment of the interconnection cost estimate. This is the cost estimated during the previous stage of LADWP's evaluation.

*All applicant opinion regarding interconnection cost can be found in the Interconnection Cost Estimate section of this report.*

### *Development Security Deposit*

The development security deposit amounts to $50 per kW of project capacity. This is to help ensure the construction and operation of the proposed project. For small projects (30-150 kW), the development security deposit ranges from $1,500 to $7,500. For large projects (150-3,000 kW), the development security deposit ranges from $7,500 to $150,000.

*Although no firm mentioned the development security deposit to be unreasonable, a large firm did express irritation at the requirement for two separate checks for both the development security deposit and the initial payment of the interconnection cost estimate. Miscommunication within the firm in trying to get two checks cut led the applicant to describe the requirement as "just a pain."*[64]

### *Miscellaneous State and City Forms*

A number of miscellaneous forms were needed to complete the SOPPA and Interconnection Agreement package. This includes all remaining City of Los Angeles Business Compliance Forms and registration with the California Secretary of State.

*One large firm understood the need for the Business Compliance Forms but identified these to be a "little bit of a pain, especially with such a large company with such a large legal department."*[65] *Citing this to be a primary reason, the applicant, who had direct experience with other FIT programs, described the SOPPA and Interconnection Agreement package as "not the most friendly."*

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65 August 22, 2013 11:00am

### 5.3.2 Utility Support

As throughout the application process, LADWP provides a telephone hotline and e-mail contact as a resource to ask clarifying questions and receive feedback in a timely manner.

*A small firm did not view the utility support at this stage as "unresponsive or unclear," but felt the staff "weren't really given clear directions on how to tell developers how to fill out the form correctly."*[66]

After applicants submit the SOPPA and Interconnection Agreement package, LADWP will review the materials and execute the contracts barring any inconsistencies or missing materials. LADWP will then send copies of the executed contracts back to the applicants, who are now considered participants in the FIT program.

As with previous periods of uncertainty following the submission of required materials, this stage again represents a time of high anxiety for the firm. Now even further along in the process, these firms are fully invested in the development of their proposed projects. It is because of this that a quick turnaround is crucial to assuage uneasiness. At the very least, the utility should strive to keep applicants abreast of their current status.

*A majority of firms identified the time period between sending in the SOPPA and Interconnection Agreement package and receiving an executed copy of the contracts from LADWP as taking far too long. A large firm noticed how "it just took a very long time to get agreements executed from LADWP."*[67] *A small firm agreed with this assessment and described the execution of the SOPPA and Interconnection Agreement as "a little on the slow side."*[68] *Another large firm recognized the SOPPA and Interconnection Agreement package as a utility bottleneck and from a firm standpoint, "the timeline issue we had in the process."*[69]

*Firms also expressed concern about receiving timely updates from LADWP and as a result, feeling "lost" in the process. A large firm applicant noticed "a period where I didn't know if the SOPPA was being processed or not. It just wasn't clear what was going on or what the holdup was."*[70]

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67 August 22, 2013 11:00am
68 August 8, 2013 11:00am
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70 August 22, 2013 11:00am

### 5.3.3 Overall SOPPA and Interconnection Agreement Package Evaluation

The SOPPA and Interconnection Agreement package represents the first time in the process where there seemed to be consensus in criticism. The reasons appear to be two-fold: first, the documents and supplemental requirements were excessively time consuming and second, LADWP was slow in the processing and execution of both the SOPPA and the Interconnection Agreement. In most instances, the SOPPA and Interconnection Agreement package period lasted a lengthy 4 to 6 months.

*Firms specifically identified the required city and state forms to take a significant amount of time, but also mentioned the specificity by which LADWP required the forms to be filled out as a reason for delays. A small firm experienced a setback when the utility asked for materials to be resubmitted even though "it wasn't really any additional documents they were looking for, but rather the format and how they were filled out."[71] A second small firm recommended the utility to specify "what exactly the forms need to entail and what needs to be matched up with what."[72] The material requirements for this stage made a number of firms nervous about the likelihood of obtaining all required materials before the 30-day window expired. As a time saving strategy, one large firm recognized that LADWP made the requirements "known from the start so even though you had 30 days, you really had from the beginning."[73]*

*There was also a clear consensus on the excessive amount of time it took for LADWP to execute the SOPPA and the Interconnection Agreement. Applicants viewed the slow processing time as a possible result of LADWP being "overwhelmed"[74] or "understaffed."[75] The delay of contract execution has led some firms to "move on" from their applied projects as extended periods of uncertainty over cost and time are disrupting firm's budget schedules. LADWP must do everything in its power to bridge this time gap and retain perpetual applicant interest, especially in the nascent stages of the FIT program.*

*Overall, when asked to rate applicant experience from very satisfied (5) to very unsatisfied (1), participants in the survey graded LADWP's SOPPA and Interconnection Agreement process a* ***3.26*** *with the lowest grade a 1, indicating a more neutral experience.*

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72 July 31, 2013 10:30am
73 August 19, 2013 2:00pm
74 August 22, 2013 11:00am
75 July 31, 2013 10:30am; August 8, 2013 11:00am

***Recommendations***

1) Clarify directions for stated requirements in Guideline Book.
2) Create a resource for applicants to more efficiently find the required insurance.
3) Clarify the termination language in the SOPPA and allow for the continued revenue payment by LADWP in case of default.
4) Create a resource for California Business Compliance Forms, especially for out of state applicants.
5) If possible, require only a single check for both SOPPA and Interconnection Agreement.
6) Train staff to effectively instruct applicants on how to fill out required forms.
7) Improve communication with applicants requesting updates for SOPPA and Interconnection Agreement status.
8) Shorten the amount of time it takes to execute the SOPPA and Interconnection Agreement.
9) Advise applicants to begin process of acquiring SOPPA and Interconnection Agreement supplemental materials before the 30-day window begins.

To view LADWP's FIT 100 application and contract materials including the SOPPA and the Interconnection Agreement, please visit www.ladwp.com/fit.

# 6. FIT Program Evaluation

## 6.1 Solar Firm Outreach

FITs necessitate a relationship between solar firm and site host. In many instances, a solar firm will pursue sites from previously established relationships, and other times, a solar firm will need to conduct outreach to potential site owners in a sort of "cold calling" sales strategy.

In total, there are two primary relationships that can result from these outreach strategies:

1) The solar firm constructs the solar system for a fee and the site owner receives the FIT revenue
2) The solar firm leases the rooftop from the site owner and receives the FIT revenue.

The most common relationship between site owner and solar firm is the second of these scenarios – a solar firm leasing a site owner's rooftop space. For low-hanging fruit properties -that is, those sites with large, suitable rooftops with high insolation - site owners will often have experience in determining a rooftop lease price whether from prior solar opportunities or other rooftop uses such as billboards. This creates a mostly straightforward negotiation between the solar firm and site owner.

For other types of properties, site owners will not have experience in setting a rooftop lease price and will often times become discouraged when learning of the proposed lease revenue. This may result in non-participation or a significant delay in negotiation. Many site owners will view the prospect of locking down their rooftops to a 20-year contract (the standard SOPPA contract length) without any termination agreement as a high risk proposition that simply is not justified by the lease revenue. The most common concern site owners have is the possibility of restricting the future development of their property.

*Firms that were surveyed mentioned site owner hesitance to lease rooftop space as a significant hurdle in developing FIT projects. In terms of bidding on rooftop space, a large firm observed their "bids weren't attracting too much attention" because "they were dealing with multi-billion dollar buildings and they were offering them a small lease rate on top of that."[76] As a result, this firm has "had to bid a little bit higher for our leases" compared to previous FIT experience. Another large firm mentioned the lease pricing they were offering site owners, "especially the smaller ones, just wasn't enough money to make it worth their time."[77]*

*If site owner hesitance did not remove the property from consideration entirely, the resulting lengthy negotiation period led to some firms growing anxious over obtaining site control by the application*

76 August 19, 2013 2:00pm
77 August 22, 2013 11:00am

*package deadline. A large firm mentioned "negotiating a lease may take longer than expected depending on the client themselves and how much legal work will have to go into it especially when dealing with large real estate groups."*[78]

*Finally, a common trait to FITs and the resulting scattered, "cold calling"-like outreach is the potential for a small handful of firms to race out into the marketplace and try to "lock up" as many site owners as possible. Many times, this is achieved by promising unrealistic lease figures. This concern was raised by a large firm with previous FIT experience mentioning this program was no different and it was evident that a small number of firms "were running around the city and promising the moon"*[79] *in rooftop lease prices. The same firm explained "this dishonesty with building owners" restricts project opportunities for other firms and ultimately harms the program, as often times these projects will not proceed past the application stage and site owners will therefore be discouraged from participating in future tranches.*

***Recommendations***

1) Design creative strategies to incentivize site owners to supplement lease revenues.
   - o Lobby plaque for participating in program.
   - o Web site displaying all participating businesses.
2) Create resource to inform site owners of realistic roof leasing options.

## 6.2 Public and Site Owner Awareness

As with most newly enrolled large-scale programs, stakeholder education and awareness is a vital component to a smooth and successful implementation. By generating awareness and instilling confidence in the program, LADWP can help solar firms as they attempt to partner with willing site hosts.

Promotional events and program marketing can minimize the amount of time it will take to close clients and drive interest from the site owner rather than from the solar firm. The publicity from these types of outreach strategies create not only greater property owner awareness, but also greater public awareness, thereby providing additional incentive for site hosts to participate in hope of gaining an "environmentally conscious" reputation.

*Based on applicant response, the high-demand sites, the so-called low-hanging fruit properties, were made aware of the program mostly by word of mouth and by consistent outreach from a bevy of inquiring solar firms. It is the other types of properties, those sites that are strong candidates for the small project category, that require a greater effort to be made aware of the program. There was evidence throughout the survey that many of these types of property owners were unaware of the FIT program and the onus of education fell squarely on an individual solar firm.*

78 August 22, 2013 11:00am
79 August 19, 2013 2:00pm

*A surveyed property owner affirmed that "property owners are unaware of the program" and that "more people should know about this." A small solar firm mentioned "closing clients would be a whole lot easier if (LADWP) could help educate or help market the program." Echoing both of these sentiments, a larger solar firm admitted "we had to educate (property owners)."*

***Recommendations***

1) Create promotional events to act as incentive for property owners
   - o "Switch-flipping" events
   - o Press releases
2) Market the program to generate public awareness

# 7. Study Methodology

Based on the extensive feedback received, we achieved a comprehensive overview of the applicant experience during the first tranche of the FIT 100. In total, we interviewed 14 applicants who were responsible for submitting 66 applications with over 30,000 kW of capacity applied. Of these 66 applications, 40 were selected in the lottery and were currently, at the very least, underway in the interconnection stage of the process. In all, those who were interviewed totaled over 10 MW of the accepted applied capacity of the first round.

The evaluation of the FIT 100 applicant process was accomplished predominantly via in-depth interviews with program administrators, stakeholders and those who took part in the first tranche of the FIT 100. With the help of those who have experience with FITs and additional solar stakeholders, we crafted a survey that was broken down into seven survey sections:

- Applicant background: this section included basic information about the applicant and his or her firm
- Application process: this section included questions about the applicant's experience during the application package segment of the process
- Project dimensions: this section included specific information about the project being applied for
- Economic development impacts: this section included anticipated economic impacts such as job creation
- Interconnection and SOPPA process: this section included feedback about the applicant experience with the interconnection cost estimate stage and the SOPPA and Interconnection Agreement stage
- Appropriateness of pricing structure: this section gauged applicant opinion for the pricing of the FIT 100 program
- Overall assessment and future considerations: this section included the applicant's overall opinion of the FIT 100 program and allowed the applicant to provide recommendations on how to improve both the application process and the program as a whole

This report marks yet another chapter in the partnership between UCLA Luskin Center for Innovation and the Los Angeles Business Council. With previous reports that include "Best Practices for Implementing a Feed-in Tariff Program" (2009) and "Bringing Solar Energy to Los Angeles: An Assessment of the Feasibility and Impacts on an In-Basin Solar Feed-in-Tariff Program" (2010), the research accumulated throughout the years allowed for unique insight into the evaluation of the FIT 100 program structure. Also assisting in the evaluation of the FIT 100 program were interviews with program administrators, stakeholders and program applicants.

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LABC | Institute
Los Angeles Business Council

## ABOUT THE LABC INSTITUTE

The LABC Institute is the 501 (c) 3 designated research and educational arm of the LA Business Council. The LABC Institute produces cutting-edge research to strengthen the sustainable economy of the Los Angeles region. Founded in 2010, the LABC Institute provides a bridge between LA's business, government, and environmental communities to develop and promote effective, forward-thinking public policy.

In its brief history, the LABC Institute has produced ground-breaking studies on the economic, energy and workforce potential of an in-basin rooftop solar program in Los Angeles. This has led to the CLEAN LA Solar, a groundbreaking new energy program that supplies zero-carbon renewable energy for Los Angeles while creating jobs and fueling private investment in our city. Launched in 2013, it is the largest urban rooftop solar program in the U.S. – and is already being hailed as a model for the nation.

The LABC Institute capitalizes on the renowned scholars and academic expertise present in the Los Angeles area. Partners have included many of the region's leading research institutions, including the University of Southern California; University of California, Los Angeles; Loyola Marymount University, and California Institute of Technology. Continued collaborators include the California Governor's Office, the Los Angeles Mayor's Office, the California Air Resources Board, and the California Public Utilities Commission.

Funders include the Rockefeller Brothers Fund, the William and Flora Hewlett Foundation, the 11th Hour Project, the Rosalinde and Arthur Gilbert Foundation, JPMorgan Chase & Co., and many others.

The LABC Institute's goal is to facilitate new ideas that lead to policies and programs that advance the environmental and economic sustainability for the City of LA.

Visit our website at www.labcinstitute.org to learn more about our work and research.

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**3323 SCHOOL OF PUBLIC AFFAIRS**
**BOX 951656, LOS ANGELES, CA 90095-1656**
**310-267-5435 TEL • 310-267-5443 FAX**

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