Team 2030 – Case Proposal

Case Name: Here Comes the Sun; Satisfying RPS with Solar

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Executive Summary

Springfield Power & Light (SP&L) has been tasked with generating 4% of its retail electric sales, or 320 gigawatt hours (GWh) per year, from solar power by 2023. The Solar Asset Management Team is proud to present this Renewable Portfolio Standard (RPS) Solar Carve-Out Fulfillment Plan, which will achieve the Solar Carve-Out in three phases.

In Phase I, SP&L will propose changes to its rate structure. SP&L proposes a move to time-of-use pricing, revenue decoupling, and the addition of a Public Benefit Fund charge to finance solar deployment.

In Phase II, SP&L will establish financial incentives and streamlined permitting procedures to unlock private investments in solar energy. SP&L will attack soft costs by cutting red tape and providing marketing assistance to solar developers. Additionally, SP&L's Finance Task Force will prepare financial products to reduce the cost of capital for utility-owned solar assets.

In Phase III, SP&L will develop utility-owned solar assets. SP&L will hold reverse auctions to build large utility-scale projects and commercial rooftop projects. In 2016, SP&L will package the debt from its completed projects and sell the securities through a specially created YieldCo. This will allow SP&L to secure low costs of capital. Inexpensive capital will allow SP&L to own and finance projects supplying 80% of the mandated annual 320 GWh of solar.

The other 20% of the 320 GWh carve out will be met through a combination of residential and community solar projects owned by third parties. SP&L will partner with local school districts to spur private development of community-based solar on school rooftops. SP&L will also work with its energy efficiency team to incentivize residential rooftop installations through a combined Demand Response/Solar Photovoltaic (PV) rebate for homeowners. Demand side management, along with increased solar penetration, will allow SP&L to avoid $5 million per year in summer peaking costs, and to channel these savings toward further solar development.

SP&L's RPS Fulfillment Plan will engage the public and the private sector, developing human capital and business expertise in the solar space that will last beyond 2023 and extend beyond the borders of SP&L's service territory. SP&L's strategic plans for project finance and development, and targeted programs to leverage private investment, justify a minimal rate increase. SP&L will meet its RPS target while continuing to supply safe, reliable and affordable power to its customers.

Introduction

Missouri's RPS requires that 18% of electric retail sales come from renewable sources by 2023, including a 4% solar carve-out. Currently, none of SP&L's 8,000 GWh of annual retail electric sales are supplied by solar assets. SP&L faces the challenge of developing a solar market from the ground up. As an added challenge, insolation and retail electricity prices in SP&L's service territory match the national average, limiting solar's ability to reach grid parity with conventional sources of electricity. The Federal Investment Tax credit, which helps solar projects achieve reasonable payback periods, is scheduled to expire at the end of 2016.

Despite these challenges, policy incentives such as the RPS, locational based marginal pricing (LBMP), net metering, and interconnection standards have attracted solar developers to Missouri. SP&L can achieve its RPS solar carve-out by tackling the barriers to entry that solar projects face, including: (1) lack of incentives in rate structures, (2) high cost of capital, and (3) high non-hardware costs. This memorandum presents a plan to align financial incentives, provide access to reasonably priced capital, and reduce soft costs to enable the production of 320 GWh/year of solar from residential, community-scale, commercial-scale, and utility-scale installations. The proposed Plan, and its annual costs, is summarized in Table 1 below:

Table 1: Summary of Solar Assets and Costs

Solar Asset Class	SP&L New Annual Costs	GWh/year (in 2023)	Percent of Solar Carve Out
Utility Scale- 7 x 22MW projects	$(7,215,405)	229.09	71.6%
Commercial Scale- 100 kW x 194 projects	$(1,912,032)	27.62	8.6%
Commercial Scale- 200 kW x 102 projects	$(2,526,557)	42.18	13.2%
Total Residential Solar Costs to SP&L- Net Metering and Residential Solar Rebates- $1000 x 150 Homes	$(932,957)	9.56	2.99%
Total Net Metering Costs of School-Top Program	$(490,638)	11.58	3.62%
Total Generation Costs/yr	**$(13,077,589)**	**320**	**100%**
Other Costs			
Annual Meter Budget	$(100,000)		
New staff (11 new staff at $100,000 each)	$(1,100,000)		
Savings from Peaking	$4,903,032		
Total New Costs/yr	**$(9,374,556)**		
Rate increase (dollars/kWh) across all users	**$0.001172**		

Phase I: Setting the Stage Through Rate Proceedings

Before SP&L can build or contract for the solar assets that will make up the 4% carve-out, SP&L proposes several changes to its rates. These changes will incentivize the development of the solar industry either directly through rate signals to consumers or indirectly by raising funds that SP&L can put towards solar incentive programs. SP&L will initiate a rate case proceeding with the Public Utility Commission (PUC) to institute the proposed changes. We anticipate that the rate case process will begin in April 2014 and reach completion in April 2015 (PA PUC 2012) (See Appendix A for a timeline).

Time-of-Use Pricing

SP&L proposes to move from its current flat-rate pricing system to a Time-of-Use (TOU) pricing scheme that allows retail rates to fluctuate temporally in keeping with shifts in wholesale prices. TOU pricing will serve as a complement to the existing policy of Locational Based Marginal Pricing (LBMP) within SP&L's service area, as both pricing systems send signals to consumers about where and when electricity is most expensive (and distributed generation thus most valuable). TOU pricing can be thought of as the temporal counterpart to LBMP pricing, because it dictates higher electricity rates at times when generation constraints make the marginal cost of electricity supply very high. The goal of a TOU program is to induce customers to shift some of their peak hour electricity use to off-peak times, thus reducing the aggregate peak load and the need for expensive peak generation. Studies have shown that TOU pricing schemes can lead to reduction in peak usage of about 2-6% (Faruqui & Sergici 2010). The TOU scheme that SP&L proposes is displayed in Table 2 below. We designed the scheme based on a combination of SP&L's demand curve and existing TOU schemes currently in place around the country (see Appendix C). Peak hours are 12:00 pm to 6:00 pm on weekdays year-round, and during peak hours the electricity rate is 60% higher than our current flat rate (which is equal to the national average price in each sector). During off-peak hours prices drop 20% below the current flat rate.

Table 2. Proposed SP&L Time of Use pricing schedules.

Sector	Time Period	Hours	Price ($/kWh)	Relation to national average flat rate
Residential	On-peak	12:00 pm - 6:00 pm	0.192	160%
Residential	Off-peak	6:01 pm - 11:59 am	0.096	80%
Commercial/Industrial	On-peak	12:00 pm - 6:00 pm	0.136	160%
Commercial/Industrial	On-peak	6:01 pm - 11:59 am	0.068	80%

Apart from easing the overall peak demand, TOU pricing will also help to incentivize solar development. A large portion of the electricity generated by solar PV is produced during peak hours, thus reducing the peak demand on the grid. Under our current flat-rate system the solar owner will be undercompensated for this benefit, because net metering at retail rates will fail to

account for the value of easing demand at the time when electricity supply is most expensive. Studies show that if this benefit is incorporated, the long-term valuation for solar assets is 29% - 48% higher than valuations that assume flat-rate pricing (Borenstein 2005). Since SP&L's current net metering policy compensates solar owners for excess generation at the retail rate, instituting a TOU pricing scheme will make solar more financially attractive by offering solar adopters a premium for production during peak hours.

RPS Charge

In order to finance the incentives for solar assets that will be discussed later in this report, SP&L will in our rate case filing a request for permission to raise a Public Benefit Fund through a surcharge of $0.0017/kWh on our ratepayers' electricity bills. Note that this RPS charge is designed only to make the costs associated with developing our new solar assets revenue-neutral. The charge will not provide for a rate of return on the new assets to SP&L's shareholders. This is because rate of return is procedurally a very different issue that needs to be set and approved by the PUC in a separate section of the rate case filing. We therefore consider rate of return outside the jurisdiction of SP&L's Solar Acquisition Team, and assume that any necessary rate of return on SP&L's new solar assets will added to the rate case filing by a different SP&L office

Implementation

The TOU scheme will be rolled out with the approval of the rate case in 2015. Since the residential component will be perpetually voluntary, that option will become available as soon as the rate case is approved. Residential customers will be notified of this option through a direct mailing to ratepayers, the printing of which will be funded by the RPS charge. Advertisements for the program will also appear on printed electricity bills and as a notification in ratepayers' online accounts. The commercial and industrial component will also become available immediately as a voluntary program, but, as many utilities currently require, will eventually become mandatory ("Time-Varying Pricing," n.d.). All C&I customers in SP&L's service territory will be required to switch to TOU pricing by December 31, 2016. SP&L will cover the cost of installing 15-minute smart meters for all customers who join the TOU program, and our RPS charge is designed to provide $100,000/year towards the cost of these meters.

Revenue Decoupling

SP&L proposes that the PUC impose a revenue decoupling mechanism. Decoupling mechanisms protect utilities from the loss of rate base that comes from efficiency improvements. They ensure sufficient revenue to cover costs and provide a reasonable rate of return regardless of the quantity of electricity sold; decoupling can also partially protect utilities from the loss of rate base associated with widespread net metered distributed generation (Millar 2013). Both expanded distributed generation and efficiency improvements are proposed in this RPS fulfillment plan. A decoupling mechanism will not create an incentive for SP&L to push for efficiency improvements and distributed generation: this incentive comes from the RPS. Instead, decoupling will break the utility's *disincentive*, allowing for an alignment of company incentives

internally and with state policy goals (Bourgeois 2011).

Phase II: Reducing Financial and Soft Cost Barriers

Two of the biggest challenges facing the solar industry are the relatively high cost of capital and the persistence of high soft costs. Due to the young age of the solar industry and uncertainty about the financial risks associated with solar capital investments, the industry has thus far been largely restricted to tax equity financing and short term debt. Gaining access to cheaper public capital vehicles will have a huge impact on the Levelized Cost of Electricity (LCOE) of solar, especially given that access to tax equity will decrease significantly with the expiration of the Federal Solar Investment Tax Credit at the end of 2016. Therefore, in addition to changes to rate structure, SP&L has developed a plan to bring down its cost of capital for construction of the projects that will fulfill the solar carve-out. SP&L will also implement a suite of measures to reduce the soft (i.e. non-hardware) costs of solar, which will lower the LCOE and incentivize the portion of the carve-out that will be developed by third parties rather than by SP&L directly.

Finance Task Force and Investment Plan

SP&L will develop asset-backed financial products to reduce the cost of developing utility-owned solar projects. Solar investment costs typically range from $1.91/watt for large projects to over $3.00/watt for smaller projects, not including transmission constraint issues (NREL SAM). If SP&L were to pay for over 200 MW of new solar projects outright, the overall cost could easily exceed $500 million. SP&L seeks to avoid placing this large capital outlay on the backs of its ratepayers. To this end, SP&L has developed a capital-light program that best utilizes the company's limited resources to attract investment and cheap capital. SP&L plans to form a Finance Task Force with its finance team and bank partners to structure a YieldCo or a securitized bond offering. These financial products will secure a low cost of capital for investment in SP&L-owned generation projects across the state.

Over a nine year period, SP&L will develop both utility and commercial-scale projects that are fully owned by SP&L (see "Project Implementation" section for details). At first, SP&L will finance these projects with a combination of funds from the Public Benefit Fund and short-term construction debt. By 2016, SP&L will have developed 50 GW of generation capacity at a cost of $175 million. After these projects are built and operational, and thus significantly de-risked, they will be ripe for the development of financial products. The Finance Task Force will sell asset-backed securities from the completed projects into the secondary market. This revenue stream will fund construction of the remainder of the projects, and will allow SP&L to pay back its debt on projects at a low interest rate, lowering SP&L's long-term cost of capital.

When the aforementioned asset-backed securities are sold into the market, SP&L will over-collateralize them by 10%, or $38.76 million by 2023, to cover potential defaults and liabilities. In other words, SP&L will build $387.6 million of generating assets, but only $348.84 million

will be sold as securities, with the remaining 10% held on SP&L's balance sheet. Events that affect cash flows from projects, such as commercial rooftop arrays needing repair due to catastrophic weather events, real estate companies going out of business, etc., will therefore not affect the interest payments made on the pooled group of asset-backed securities; if needed, SP&L will dip into the overcollateralization fund to make interest payments.

The overcollateralization fund, along with SP&L's strong position as a well-established utility selling electricity to over 290,000 homes and businesses, will further de-risk utility-backed bonds and securities for potential investors, allowing for lower interest rates. SP&L expects dividend returns of 5-6 percent paid annually to its shareholders, funded with cash flows from solar generating assets. This cost of capital is well below the rates demanded by tax equity investors, which typically hover at or above 10–15 percent (Horwitz & Graves 2014). The main market for shares in the new YieldCo will be large institutional investors looking for secure, long-term investments with steady returns.

After consultation with SP&L's internal Finance Task Force, the company will issue either utility-back bonds with 15-20 year maturity or securitized bonds on its generation assets. Either approach will offer: (1) a diversified portfolio of financial assets including both utility-scale and commercial-scale projects, and (2) overcollateralization to reduce the risk associated with defaults.

The $38.76 million Overcollateralization Fund will be maintained in part by the $0.00117/kWh Public Benefit Fund surcharge on ratepayers' bills. This process for collecting an Overcollateralization Fund is similar to the Connecticut Clean Energy Finance and Investment Authority (CEFIA) model, which raised $27 million via a $0.001/kWh charge on ratepayer bills to create a credit enhancement in the form of a Loan Loss Reserve fund (Kennan 2014). Additionally, the Overcollateralization Fund will draw on cost savings from SP&L's coupled DR-solar programs, discussed below, which will reduce the cost of meeting peak demand on summer days.

Reducing Soft Costs of Distributed Generation

In addition to developing utility-owned solar assets, SP&L also hopes to incentivize third-party development of distributed generation. By streamlining permitting and interconnection procedures and reducing customer acquisition costs, SP&L will significantly reduce the soft costs that lead to slow payback periods and inhibit private investment in distributed generation. Soft costs make up 50-70% of solar costs in the United States, but significantly less in other countries – most notably Germany – demonstrating that they are tractable (Calhoun & Morris 2013). Soft costs include installation labor, installer profit, financing costs, customer acquisition costs, and permitting fees, among other expenses.

SP&L will focus on addressing the soft costs that it has the power to influence: customer

acquisition, permitting, and interconnection. Customer acquisition costs can be a major hindrance to solar developers. SP&L will help to connect solar installers to customers, thus reducing these costs, by pre-approving installers and aiding these installers with marketing efforts and fast-track permitting processes. In this endeavor, we will emulate CEFIA, which operates an online database of approved installers (Energize CT). To obtain approval, installers must offer high-quality, reliable equipment and meet Missouri's certification requirements.

SP&L will create a publicly accessible online database, and will feature contact information for affordable, high quality installers on our website. SP&L will most prominently feature installers who perform software assessments, a less expensive, easier option for screening potential customers than in-person assessments (Self & Morris 2013). We will advertise our database of solar installers, and solar more broadly, through direct mailings enclosed in customers' utility bills. SP&L staffers will also table at community events, such as county fairs and farmers markets, educating citizens about solar. They will invite active community members, such as members of local environmental organizations to join in these outreach efforts, introducing an element of peer-to-peer marketing. Additionally, the SP&L Account Managers who work with large commercial and industrial clients will contact their customers via email and telephone to discuss the cost-saving potential of solar installations. This outreach effort will be carried out using existing internal resources, at negligible added cost. Marketing and outreach to large energy users will also be paired with energy efficiency and demand response programs, as discussed below.

In addition to minimizing customer acquisition costs, SP&L will design a system to ensure that regulatory soft costs are well below the national average. Despite their relatively low dollar value, permitting and related soft costs have been shown to deter project completion and development efforts significantly, especially for residential distributed generation customers. Onerous requirements prevent over a third of solar installers from operating in certain jurisdictions (Friedman 2013). Jurisdictions with streamlined processes, however, have bureaucratic soft costs that are a tenth or less of those in more onerous jurisdictions (Id). SP&L will take advantage of the clean slate in Missouri's solar market, initiating a collaborative efforts among state and local regulators to create streamlined permitting and interconnection processes. We will create a single-form, online permitting and interconnection system, similar to the process that Vermont allows for PV installations <5 kW (Olson 2011). SP&L will allow installers for all sizes of system to complete a single online form, which will go to the relevant local building department and to SP&L for approval or denial within one week. SP&L web developers will design and host the website for form submission, thus allowing small towns with limited technological resources to benefit from online permitting. As is the case in Connecticut, SP&L will only charge interconnection fees to cover costs for studies and inspections that are necessary to ensure system safety and reliability (Olson 2011). We will waive even these fees for the first 1,000 kw of distributed generation installed in the SP&L service territory, benefitting early movers and creating a class of customers who can spread the word about the ease and cost-

savings of going solar. SP&L estimates that this effort will establish permitting, interconnection, and inspection costs for all customer classes that are half of the national average.

Unlocking Residential Distributed Generation

In conjunction with LBMP, TOU pricing, and net metering, soft cost reductions will allow residential distributed generation to penetrate 0.5% of the residential market in SP&L's service territory. Cumulatively, the 25-year NPV of this investment from the perspective of households will be $3,709,629. Because of net metering, SP&L will lose revenue from these customers on the order of $737,472 per year (see Appendix D). Additionally, as discussed below, SP&L will offer a $1,000 rebate per residential installation for solar adopters who participate in demand response.

Phase III: Project Implementation

The changes to rate structure and the financing and soft cost measures will cumulatively incentivize the entire spectrum of solar assets, from residential distributed generation up to utility-scale projects. In this section we lay out in greater detail our plans for building out specific classes of assets, including opportunities for complementarity between SP&L's solar initiatives and its efforts to advance energy efficiency.

Utility and Commercial-Scale Projects

From 2014 to 2016, prior to the expiration of the ITC, SP&L will construct three utility-scale projects of 22MW each, at a total cost of $127.2 million (see Appendix G). SP&L will operate a reverse auction bidding process to secure the lowest price per watt of installed capacity. SP&L will own these projects and finance them initially with short-term construction loans and later on through YieldCo securities (See Appendices E, F G & K for details).

Also from 2014 to 2016, SP&L will bid out the construction of a 185 commercial-scale projects of 100 kW and 200 kW, at a total cost of $55.2 million (see Appendices E and F). These projects will also be owned by SP&L and financed similarly to the utility-scale installations. The commercial-scale systems, ranging from 15,000 to 30,000 sq ft, will be built on rooftops of local well-established businesses such as grocery stores and big box stores. SP&L will work directly with owner-occupied buildings (e.g. Wal-Mart) as well as with Real Estate Investment Trusts (REITs) that manage properties in its jurisdiction. Depending on the building ownership structure, SP&L will offer long-term discounts on electricity or direct payments in exchange for leasing rooftop space. Either arrangement will cost SP&L an estimated $3.00/kW of installed capacity per month. SP&L will work to secure low lease rates from building owners by offering use of its "Certified Clean Energy Provider" logo (see Appendix J) which can be placed on companies' marketing materials (e.g. grocery store mailers, print ads).

After financial products created in 2016 free up capital, SP&L will spend the period from 2017

to 2023 developing an additional four 22 MW utility-scale projects at a cost of $169.6 million and 16.8 MW of commercial- scale projects at a cost of $35.6 million. In total, the SP&L-owned commercial and utility-scale projects will produce over 258 GWh per year by 2023, meeting 80% of the 320 GWh solar carve out.

Community-Scale Projects

SP&L proposes to implement a Community Shared Solar program, the Solar Power Network, to expand access to solar power for renters, those with shaded roofs, and those who choose not to install an on-site system for financial or aesthetic reasons (US DOE 2012). Community-scale solar will provide: reduced up-front costs to participants, improved economies of scale compared to residential arrays, public understanding of solar energy, local job growth; and improved models of marketing, project financing and service delivery (IREC 2013)

Under a program called the Solar Power Network, eligible private developers will be able to submit proposals for community-scale projects that, once approved by SP&L, will receive administrative support, streamlined permitting and interconnection, and access to industry experts to assist with technical aspects of project design. SP&L customers may purchase subscriptions to a community solar project until the program is fully subscribed. Participants will receive a monthly bill credit proportional to their subscription size (NREL 2012).

Solar Power Network Program

SP&L will begin accepting applications to the Solar Power Network Program in early 2014, and will accept projects until our 20 MW goal for installed community solar is met (See Appendix D). Community, commercial, industrial and government entities may submit project proposals for projects that are developed and financed entirely by a third-party installer, although some projects may qualify for SP&L support. Private development is beneficial because it allows participants to benefit from tax credits. Normalization accounting rules require regulated utilities to spread the benefits of the ITC throughout the useful life of the project in the ratemaking process, while private developers have the flexibility to pass on tax benefits to ratepayers much sooner (Morrigan 2010). Though SP&L will not fund community projects, we will provide assistance, including due diligence to ensure that credits on electric bills or other participant benefits do not violate securities regulations or fall within state Blue Sky Laws (US DOE 2012).

Stakeholder Engagement

During the design phase of the Solar Power Network Program, we will develop a detailed stakeholder engagement plan in order to bring forward relevant interests, expectations, and concerns. Stakeholders may include local governments, regulators, solar industry companies, trade associations, business and labor groups, the PUC and the public (SEIA; Xcel 2013). Stakeholder engagement will be prioritized early in the development process in the form of public and private meetings, customer surveys, community solar roundtables or other forms of communication so that we may incorporate such comments into our final product.

Participation

SP&L will purchase all energy generated by the community solar project from the operator and will deliver participant benefits in the form of on-bill credits. SP&L and the project operator will enter into a long-term PPA and, in the spirit of streamlining project approval, will establish a full retail rate at which the Operator sells solar energy to SP&L for the entire contract term. SP&L can make solar more accessible by decreasing the amount of purchase required to participate and by enabling customers to purchase solar in monthly increments.

Springfield School-Top Solar

In light of SP&L's long-standing commitment to community and tradition of partnership with local municipalities, we plan to launch a Solar Power Network program in partnership with the Springfield Public School District and local third-party developers. Thirty sites will be selected from among Springfield public school locations based on the potential for savings, operating costs, rooftop structural integrity and insolation. SP&L will partner with pre-screened private solar developers to initiate community-scale projects on area school tops. SP&L will co-sponsor events and town hall-style meetings at local schools to inform citizens about the opportunity to participate in community projects, and the benefits of solar.

By sponsoring informational events, SP&L will lend credibility to privately-developed community projects. SP&L can explain issues related to long-term power contracts and the ability to save money in the long-term. The school-top solar program benefits from the availability of large roofs of local schools, as well as the built-in, captive audience of parents and staff that can participate in community projects on their school's roof. For example, SP&L will design educational materials to market the School-Top program to parents of Springfield school children to be used at SP&L sponsored town-hall meetings and PTA meetings (Appendix H). School children will also learn about the benefits of clean energy, as the installations could potentially be integrated into hands-on science curricula.

Through an active promotion campaign, SP&L anticipates that 14 projects will be completed by 2016 to capture the 30% ITC and 16 projects will be completed between 2017 and 2023, eventually meeting 3.6% of SP&L's 320GWh carve out (See Appendix D). Two hundred and fifty kilowatt systems, requiring around 36,000 square feet per project, will be installed on either school rooftops or as ground-mounts, depending on site conditions (NREL SAM). Under this partnership, the school district will agree to allow third-party developers access to these spaces in exchange for long-term PPAs. In exchange for school district participation, SP&L will work with municipalities to streamline the permitting process, negotiate long-term lease agreements with the school district, and offer a 1 cent/kWh incentive and free lighting retrofits. The solar acquisition team will collaborate with SP&L's Energy Efficiency department to market these efficiency upgrades and to share costs.

Energy Efficiency and Demand Response

The Solar Acquisition Team and Energy Efficiency (EE) Team will coordinate to pair incentives for solar with incentives for EE and demand response (DR). SP&L will offer a custom energy audit/retrofit incentive program and a residential demand response option, both of which will include incentives designed to spur solar development. These programs will complement the ongoing development of solar resources and improve the value proposition of both solar and efficiency improvements for SP&L's customer base.

SP&L's custom energy audit and retrofit program will target existing buildings and new construction with the potential for cost effective efficiency improvements. SP&L will contract with an outside auditing company to provide free energy audits to customers, and will incentivize energy efficient upgrades recommended by the auditors up to a certain percentage of the equipment price. The incentive program's price list will be progressively structured, meaning that SP&L will subsidize the cost of improvements for low income homeowners at a higher percentage. On average, SP&L will subsidize thermal improvements at $0.30/kWh and electrical or lighting improvements at $0.20/kWh (Puget Sound Energy). To address concerns of equity, these rates will be 150-200 percent higher for low-income customers. The no-cost energy audit will be an important opportunity for SP&L to market solar to potential distributed generation adopters. Where shading is not an issue, auditors will recommend solar among the suite of efficiency upgrades that they suggest. Their recommendations will include rough calculations of payback periods and provide contact information for local approved installers.

SP&L will also institute a program for residential demand response coupled with solar adoption to reduce utility expenditure during summer peak demand times. SP&L will offer a $1,000 rebate for solar installations for homeowners who enroll in an air conditioning (A/C) demand response program (PECO). Customers who sign up for the program will effectively enable SP&L to manage their A/C unit's "cycling," allowing SP&L to turn off their A/C units for 15 minutes every half hour during peak demand hours. The Energy Efficiency and Solar Acquisition departments at SP&L will share the costs of the $1,000 customer rebate.

Conclusion

SP&L regards the development of the solar energy sector as a critical step forward for the energy industry, and applauds the Public Utilities Commission for its commitment to solar development through the RPS. Nevertheless, delivering reliable, high-quality, and affordable power to our ratepayers remains our top priority. With this plan we strike a balance between the two concerns; this roadmap for meeting our solar obligations minimizes rate increases while also engaging communities and private sector developers in the solar development effort. We look forward to supplying our ratepayers with cleaner, more sustainable electricity as a result of the actions in this plan, and we welcome comments and input from our community as we move forward with this initiative.

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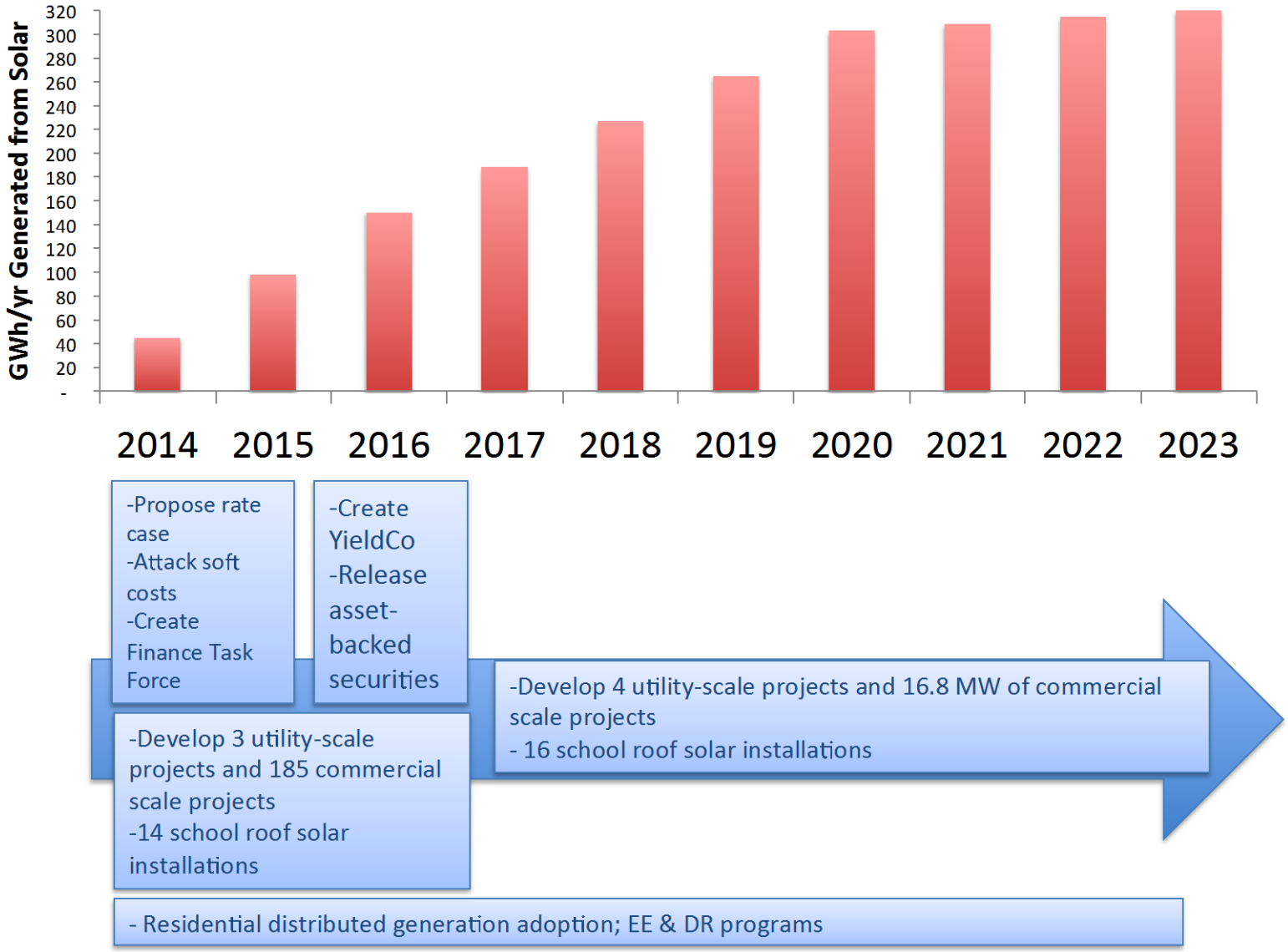
Appendix A: Timeline of Solar Carve-Out Fulfillment Plan



Appendix B: Assumptions

Given
Calculated
From Source
SAM Assumption

Assumptions	Figure	Unit	Source
Renewable portfolio standard (RPS)	18%		
Solar carve-out	4%		
Current year	2013		
RPS Goal Year	2023		
Utility's generating capacity	3	GW	
Baseline retail sales	8,000	GWh	
Annual retails sales	8,000	GWh	Assuming economic growth and population increase are offset by increases in efficiency and that GWh demand remains constant over 10 year period.
Length to project approval	<= 1	year	
Solar carve-out generation	320	GWh	
Solar Renewable Energy Credit (SREC) price	$ 200	$/GWh/yr	
Alternative Compliance Payment (ACP)	$ 400	$/GWh/yr	
Summer Avg Wholesale Rate	$ 45.49	$/MWh	http://www.eia.gov/electricity/annual/html/epa_01_01.html
% of Summer days, demand>capacity hours 12-5	35%		
Summer days	91		
Hours with unmet capacity	160		
Price premium to fulfill excess demand	50%	% above local price	
Avg demand on peak days/capacity	115%		
Federal investment tax credit	30%		
Excess Summer Demand	72	GWh	
Cost of Excess Summer Demand	$ 4,903,032		
Net metering buyback rate & avg. cost of electricity			
Residential	$ 0.12	$/kWh	http://www.eia.gov/electricity/data/browser/#/topic/7?agg=0,1&geo=vvvvvvvvvvo&endsec=vg&linechart=ELEC.PRICE.TX
Commerical	$ 0.10	$/kWh	http://www.eia.gov/electricity/data/browser/#/topic/7?agg=0,1&geo=vvvvvvvvvvo&endsec=vg&linechart=ELEC.PRICE.TX
Industrial	$ 0.07	$/kWh	http://www.eia.gov/electricity/data/browser/#/topic/7?agg=0,1&geo=vvvvvvvvvvo&endsec=vg&linechart=ELEC.PRICE.TX
Sector share of total energy use			
Residential	37%		http://www.eia.gov/electricity/annual/html/epa_01_01.html
Commercial	36%		http://www.eia.gov/electricity/annual/html/epa_01_01.html
Industrial	27%		http://www.eia.gov/electricity/annual/html/epa_01_01.html
Sector Annual Energy Use			
Residential	$ 2,976.23	GWh	
Commercial	$ 2,873.56	GWh	
Industrial	$ 2,134.36	GWh	

SAM Assumptions			
Average US Solar Insolation	1,654	kWh/m2	Direct Normal Insolation- Calculated average with GIS data from continental US data set: http://www.nrel.gov/gis/images/map_csp_us_10km_annual_feb2009.jpg
Town Chosen	Springfield, MO		http://www.nrel.gov/gis/solar.html
Insolation of Springfield, MO	1,613	kWh/m2	Conservative to use Springfield, MO, as it is below the US average insolation
Debt Fraction	80%		
Interest rate	6%		due to low cost of capital from YieldCo
IRR optimization	based on PPA function in model		PPA set price varies by project type
PPA escalation	0.50%		
ITC 2014-2106	30%		
ITC 2017-2023	10%		
Commercial rooftop lease price per month	$3.00/kW		http://antaresgroupinc.com/solar-power-rooftop-leasing/
Land Purchase for utility-scale 22 MW project	$2372/acre		Based on price of pasture land in Missouri. http://agfax.com/2013/08/17/farm land-values-rise-cash-rent-av-182-acre-federal-reserve/
Depreciation	5 Year MACRS 2014-2023		
Module Efficiency	18.71%		
Year-to-Year Decline of Panels	0.50%		

Monthly Electricity Rates	All Sectors Retail* (cents/kWh)	Wholesale ** ($/MWh)
January	9.66	$ 44.27
February	9.79	$ 49.05
March	9.71	$ 43.45
April	9.67	$ 41.27
May	9.95	$ 44.03
June	10.47	$ 41.98
July	10.7	$ 52.87
August	10.59	$ 41.61
September	10.43	$ 41.82
October	10.01	$ 38.61
November	9.83	$ 40.81
December	9.64	$ 39.14

*http://www.eia.gov/electricity/data/browser/#/topic/7?agg=0,1&geo=vvvvvvvvvvo&endsec=vg&linechart=ELEC.PRICE.TX

**http://www.eia.gov/electricity/wholesale/

Appendix C: Examples of currently operating TOU schemes

Utility Name	Season	Peak Hours (weekdays)	Peak Price*	Off-peak Price*	Peak-to-Off-Peak Price Ratio
Commercial/Industrial Examples					
Pacific Gas and Electric Co.	Summer	12:00 pm - 6:00 pm**	$0.236	$0.202	1.168
	Winter	8:30 am - 9:30 pm	$0.159	$0.141	1.128
Baltimore Gas and Electric	Summer	10:00 am - 8:00 pm**	$0.103	$0.064	1.612
	Winter	7-11:00 am and 5-9:00 pm**	$0.105	$0.075	1.400
Excel Energy Minnesota	Summer	9:00 am - 9:00 pm	$0.143	$0.027	5.275
	Winter	9:00 am - 9:00 pm	$0.117	$0.027	4.285
Oklahoma Gas and Electric Co.	Summer	2:00 pm - 7:00 pm	$0.223	$0.027	8.259
Residential Examples					
Tucson Electric Power	Summer	2:00 pm - 8:00 pm	$0.117	$0.078	1.497
	Winter	6:00 - 10:00 am and 5:00-9:00 pm	$0.090	$0.069	1.302
United Illuminating	Summer	12:00 pm - 8:00 pm	$0.317	$0.147	2.150
	Winter	12:00 pm - 8:00 pm	$0.290	$0.147	1.968
Central Maine Power	Year-round	7:00 am - 12:00 pm and 4:00 - 8:00 pm	$0.105	$0.046	2.289
Duke Energy	Summer	1:00 pm - 6:00 pm**	$0.239	$0.066	3.605
Georgia Power	Summer	2:00 - 7:00 pm	$0.203	$0.046	4.423
We Energies	Year-round	12 hours starting at 7, 8, 9, or 10:00 am (choice)	$0.277	$0.058	4.763

* These rates cover generation costs and in some cases delivery, but no other rates and fees (irrelevant here because they do not vary by peak/off-peak schedule).
These rate are thus lower than full rates paid by the customer.
** This schedule also includes a partial-peak shoulder period, omitted here to conserve space.

SP&L's proposed TOU schedule (as put forth in the main text) is based on these existing schemes. We choose to set a peak-to-off-peak price ratio of 2, which falls in the middle of the range for both sectors.

Appendix D: Private Non-Utility Owned Generation

Residential Distributed Generation			**Assumptions**
Total Households		297,623	10,000 kWh/year per household
Anticipated Solar Adoption Rate		0.5%	Within range of other states w/ net metering (conservative bc costs will continue to decline through 2023*)
Solar Households		1,488	
Annual kwh per household array		6,428	SAM model output assuming average insolation (Springfield, MO)
Total Annual kWh of Residential DG		**9,564,864**	
Retail Residential Electric Rate	$	0.12	Dec2012-Jan2013 US Avg*
Wholesale Electric Rate	$	0.04	2012 US Avg**
Lost revenue for SP&L	**$**	**782,957**	Revenue per customer= retail rate-wholesale rate
NPV Per Household (including $1000 rebate)	$	2,493	SAM model output, assuming low soft costs, typical hard costs, 5 kw systems
Aggregate NPV for Households	**$**	**3,709,629**	

* http://www.eia.gov/electricity/annual/html/epa_01_01.html

**http://www.eia.gov/electricity/wholesale/

School Top/Community-Scale Projects			**Assumptions**
Schools		32	
Annual kwh per household array		216,384	SAM model output assuming average insolation (Springfield, MO), 150KW array
Total Annual GWh of School-Top Generation by 20		**6,924,288**	
Retail "Commerical" Electric Rate	$	0.11	Dec2012-Jan2013 US Avg*
Wholesale Electric Rate	$	0.04	2012 US Avg**
Lost revenue for SP&L	**$**	**490,638**	Revenue per customer= retail rate-wholesale rate
NPV per School	**$**	**10,655**	
Aggregate NPV for School-Tops	**$**	**340,967**	

* http://www.eia.gov/electricity/annual/html/epa_01_01.html

**http://www.eia.gov/electricity/wholesale/

Appendix E: Commercial Scale 200kW

Pre 2016 - 30% ITC- Commercial Scale			**Assumptions**
Capacity per project (kW)		200	
Total Systems by 2023		66	
kWh/year per system		360,547	SAM model output, assuming Springfield, MO, 18.7% Panel Efficiency
Total Kwh per year by 2023		23,796,102	
Real LCOE ($/kWH)		0.099	SAM model output, assuming 6% Cost of Capital, $7200/yr Roof Lease
Wholesale Electric Rate	$	0.040	2012 US Avg*
Total Cost to SP&L		2,345,252	LCOE x kWh in year 2023
Total Pre-Solar Cost to SP&L wholesale	**$**	**951,844**	2012 US Avg*
Additional Cost for SP&L per year	**$**	**1,393,408**	Difference between pre-solar avg wholesale rate, and new solar rate
Additional for SP&L per kWH per year	**$**	**0.059**	
NPV Per System	$	36	SAM model output, assuming low soft costs, typical hard costs, 200 kW systems
Aggregate NPV for all 200kW arrays	**$**	**2,389**	

*http://www.eia.gov/electricity/wholesale/

Post 2017 - 10% ITC- Commercial Scale			**Assumptions**
Capacity per project (kW)		200	
Total Systems by 2023		36	
kWh/year per system		360,547	SAM model output, assuming Springfield, MO, 18.7% Panel Efficiency
Total Kwh per year by 2023		12,979,692	
Real LCOE ($/kWH)		0.1273	SAM model output, assuming 6% Cost of Capital, $7200/yr Roof Lease
Wholesale Electric Rate	$	0.040	2012 US Avg*
Total Cost to SP&L		1,652,337	LCOE x kWh in year 2023
Total Pre-Solar Cost to SP&L wholesale	**$**	**519,188**	2012 US Avg*
Additional Cost for SP&L per year	**$**	**1,133,149**	Difference between pre-solar avg wholesale rate, and new solar rate
Additional for SP&L per kWH per year	**$**	**0.087**	
NPV Per System	$	2,817	SAM model output, assuming low soft costs, typical hard costs, 200 kW systems
Aggregate NPV for all 22kW arrays	**$**	**101,412**	

*http://www.eia.gov/electricity/wholesale/

Appendix F: Commercial Scale 100kW

Pre 2016 - 30% ITC- Commercial Scale			**Assumptions**
Capacity per project (kW)		100	
Total Systems by 2023		110	
kWh/year per system		142,374	SAM model output, assuming Springfield, MO, 18.7% Panel Efficiency
Total Kwh per year by 2023		15,661,140	
Real LCOE ($/kWH)		0.099	SAM model output, assuming 6% Cost of Capital, $3600/yr Roof Lease
Wholesale Electric Rate	$	0.040	2012 US Avg*
Total Cost to SP&L		1,543,506	LCOE x kWh in year 2023
Total Pre-Solar Cost to SP&L wholesale	**$**	**626,446**	2012 US Avg*
Additional Cost for SP&L per year	**$**	**917,061**	Difference between pre-solar avg wholesale rate, and new solar rate
Additional for SP&L per kWH per year	**$**	**0.059**	
NPV Per System	$	1,604	SAM model output, assuming low soft costs, typical hard costs, 100 kW systems
Aggregate NPV for all 100kW arrays	**$**	**176,440**	

*http://www.eia.gov/electricity/wholesale/

Post 2016 - 10% ITC- Commercial Scale			**Assumptions**
Capacity per project (kW)		100	
Total Systems by 2023		84	
kWh/year per system		142,374	SAM model output, assuming Springfield, MO, 18.7% Panel Efficiency
Total Kwh per year by 2023		11,959,416	
Real LCOE ($/kWH)		0.1232	SAM model output, assuming 6% Cost of Capital, $3600/yr Roof Lease
Wholesale Electric Rate	$	0.040	2012 US Avg*
Total Cost to SP&L		1,473,347	LCOE x kWh in year 2023
Total Pre-Solar Cost to SP&L wholesale	**$**	**478,377**	2012 US Avg*
Additional Cost for SP&L per year	**$**	**994,971**	Difference between pre-solar avg wholesale rate, and new solar rate
Additional for SP&L per kWH per year	**$**	**0.083**	
NPV Per System	$	3,275	SAM model output, assuming low soft costs, typical hard costs, 100 kW systems
Aggregate NPV for all 100kW arrays	**$**	**275,100**	

Appendix G: Utility Scale Generation

Pre 2016 - 30% ITC- Utility Scale Generation		**Assumptions**
Capacity per project (MW)	22	
Total Systems by 2023	3	
kWh/year per system	32,727,168	SAM model output, assuming Springfield, MO, 18.7% Panel Efficiency
Total Kwh per year by 2023	98,181,504	
Real LCOE ($/kWH)	$ 0.055	SAM model output, assuming 6% Cost of Capital, $2372/ac Land Purchase
Wholesale Electric Rate	$ 0.040	2012 US Avg*
Total Cost to SP&L	5,367,911	LCOE x kWh in year 2023
Total Pre-Solar Cost to SP&L wholesale	**$ 3,927,260**	2012 US Avg*
Additional Cost for SP&L per year	**$ 1,440,651**	Difference between pre-solar avg wholesale rate, and new solar rate
Additional for SP&L per kWH per year	**$ 0.015**	
NPV Per System	$ 1,530,003	SAM model output, assuming low soft costs, typical hard costs, 2MW system
Aggregate NPV for all 22MW arrays	**$ 4,590,008**	

*http://www.eia.gov/electricity/wholesale/

Post 2016 - 10% ITC- Utility Scale Generation		**Assumptions**
Capacity per project (MW)	22	
Total Systems by 2023	4	
kWh/year per system	32,727,168	SAM model output, assuming Springfield, MO, 18.7% Panel Efficiency
Total Kwh per year by 2023	130,908,672	
Real LCOE ($/kWH)	$ 0.084	SAM model output, assuming 6% Cost of Capital, $2372/ac Land Purchase
Wholesale Electric Rate	$ 0.040	2012 US Avg*
Total Cost to SP&L	11,011,101	LCOE x kWh in year 2023
Total Pre-Solar Cost to SP&L wholesale	**$ 5,236,347**	2012 US Avg*
Additional Cost for SP&L per year	**$ 5,774,754**	Difference between pre-solar avg wholesale rate, and new solar rate
Additional for SP&L per kWH per year	**$ 0.044**	
NPV Per System	$ 2,070,095	SAM model output, assuming low soft costs, typical hard costs, 2MW system
Aggregate NPV for all 22MW arrays	**$ 8,280,381**	

*http://www.eia.gov/electricity/wholesale/

Appendix H: Springfield Power Network Brochure (page 1 of 2)

SP&L

2023 Cherry Lane
Springfield, MO 12345
417.543.5432 ph
417.543.5433 fax
www.SPL bright.com

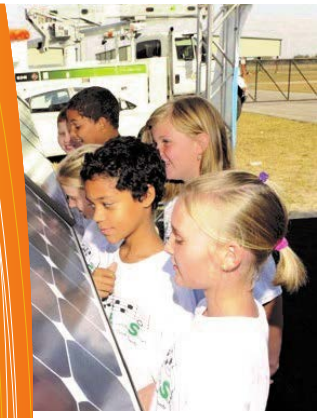
The Future i Bright

with Springfield Power and Light

SP&L

Springfield Public Schools

Appendix H: Springfield Power Network Brochure (page 2 of 2)



onmental stewardship into
hands-on science curricula.

Springfield Elementary

A COMMUNITY PARTNERSHIP

In order to meet the rising demand for renewable energy options, SP&L, Springfield Public School District and third party developer Solarize, Inc. are partnering to offer low-cost solar options to Springfield families and residents . This year we are launching a 250 kW "school-top" solar project at Springfield Elementary School, representing our commitment to provide clean and affordable energy that benefits our community and local economy.

Springfield Solar Power Network

Powering. Connecting. Inspiring.

WHY COMMUNITY SOLAR?

Shared solar generation unlocks access to solar energy options to customers that wish to benefit from renewable energy. This new community option expands access to solar power for:

- Renters
- Customers with shaded rooftops or inadequate roof design
- Customers who wish to buy solar but choose not to install a residential system for financial reasons
- Customers that wish to bring solar options into their own community

COMMUNITY SOLAR STATS!

22-27%

Percentage of residential rooftop suitable to install on-site photovoltaic (PV) systems

LEARN MORE

Community Solar Representative
417-234-6792
www.SPLbright.com

Appendix I: Stakeholder Analysis

Analysis of Proposed Actions Against Stakeholder Concerns	**Ratepayers**		**Springfield Power & Light**			**Public Utility Commission**		
	Affordable Rates	*Potential for Cost-Saving*	*Cost*	*Potential for New Revenue Streams*	*Ease of Implementation*	*Reliable Service*	*Safety*	*Environmental Impacts*
Time-of-Use Pricing	Neutral	Good	Neutral	Bad	Bad	Neutral	Neutral	Good
Revenue Decoupling	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Good
Steamlined Permitting/Interconnection	Neutral	Good	Bad	Bad	Neutral	Neutral	Neutral	Good
Demand Response/Residential DG Incentive	Neutral	Good	Bad	Bad	Bad	Neutral	Neutral	Good
Community-Scale Solar (community owned)	Neutral	Good	Good	Bad	Neutral	Neutral	Neutral	Good
Commercial-Scale Solar (SPL owned)	Bad	Neutral	Bad	Good	Good	Neutral	Neutral	Good
Utility-Scale Solar (SPL owned)	Bad	Neutral	Neutral	Good	Good	Neutral	Neutral	Good

	Good
	Neutral
	Bad

Appendix J: Certified Clean Energy Provider Logo

Appendix K: Detailed Project Implementation Plan

		ITC at 30%			ITC at 10%						
Year		**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
ITC (Y/N)		Y	Y	Y	N	N	N	N	N	N	N
MACRS (Y/N)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cost of Capital (SP&L Owned Only)		6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Solar Carve Out by 2023 (kWH)	320,000,000										

Utility Scale 22MW		**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
kWh Output per year per project=	32,727,168										
Number of Projects		1	1	1	1	1	1	1	0	0	0
Capacity per project (MW)		22	22	22	22	22	22	22	22	22	22
Total capacity installed (MW)		22	22	22	22	22	22	22	0	0	0
Cumulative capacity installed (MW)		22	44	66	88	110	132	154	154	154	154
kWH Output per year		32,727,168	32,727,168	32,727,168	32,727,168	32,727,168	32,727,168	32,727,168	-	-	-
Cumulative kWH Output per year		32,727,168	65,454,336	98,181,504	130,908,672	163,635,840	196,363,008	229,090,176	229,090,176	229,090,176	229,090,176
Total upfront cost per project*		$ 42,404,868	$ 42,404,868	$ 42,404,868	$ 42,404,868	$ 42,404,868	$ 42,404,868	$ 42,404,868	$ -	$ -	$ -
LCOE (real) per project (cents/kWh)		12.96	12.96	12.96	12.96	12.96	12.96	12.96	0.00	0.00	0.00
NPV per Project		$ 22,554,389	$ 22,554,389	$ 22,554,389	$ 12,988,178	$ 12,988,178	$ 12,988,178	$ 12,988,178	$ -	$ -	$ -
Upfront Cost Subtotal		$ 42,404,868	$ 42,404,868	$ 42,404,868	$ 42,404,868	$ 42,404,868	$ 42,404,868	$ 42,404,868	$ -	$ -	$ -
Average additional cost per kWh (LCOE x Kwh generated)											
Percentage of Solar Carve Out											72%

Commerical Scale 100KW		**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
kWh Output per year per project=	142,374										
Number of Projects		35	40	35	12	12	12	12	12	12	12
Capacity per project (KW)		100	100	100	100	100	100	100	100	100	100
Total capacity installed per year (kW)		3500	4000	3500	1200	1200	1200	1200	1200	1200	1200
Cumulative installed capacity (kW)		3500	7500	11000	12200	13400	14600	15800	17000	18200	19400
kWH Output per year		4,983,090	5,694,960	4,983,090	1,708,488	1,708,488	1,708,488	1,708,488	1,708,488	1,708,488	1,708,488
Cumulative kWH Output per year		4,983,090	10,678,050	15,661,140	17,369,628	19,078,116	20,786,604	22,495,092	24,203,580	25,912,068	27,620,556
Total upfront cost per project**		$210,020	$210,020	$210,020	$210,020	$210,020	$210,020	$210,020	$210,020	$210,020	$210,020
LCOE (real) per project (cents/kWh)		12.27	12.27	12.27	12.91	12.91	12.91	12.91	12.91	12.91	12.91
NPV per project		$ 49,763	$ 49,763	$ 49,763	$ 9,091	$ 9,091	$ 9,092	$ 9,093	$ 9,094	$ 9,095	$ 9,096
Upfront Cost Subtotal		7,350,701.05	8,400,801.20	7,350,701.05	2,520,240.36	2,520,240.36	2,520,240.36	2,520,240.36	2,520,240.36	2,520,240.36	2,520,240.36
Percentage of Solar Carve Out											8.63%

Commerical Scale 200KW		**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
kWh Output per year per project=	360,547										
Number of Projects		15	30	30	6	6	6	6	6	6	6
Capacity per project (KW)		200	200	200	200	200	200	200	200	200	200
Total capacity installed (kW)		3000	6000	6000	1200	1200	1200	1200	1200	1200	1200
Cumulative capacity installed (kW)		3000	9000	15000	16200	17400	18600	19800	21000	22200	23400
kWH Output per year		5,408,205	10,816,410	10,816,410	2,163,282	2,163,282	2,163,282	2,163,282	2,163,282	2,163,282	2,163,282
Cumulative kWH Output per year		5,408,205	16,224,615	27,041,025	29,204,307	31,367,589	33,530,871	35,694,153	37,857,435	40,020,717	42,183,999
Total upfront cost per project**		$ 428,237	$ 428,237	$ 428,237	$ 428,237	$ 428,237	$ 428,237	$ 428,237	$ 428,237	$ 428,237	$ 428,237
LCOE (real) per project (cents/kWh)		12.27	12.27	12.27	12.73	12.73	12.73	12.73	12.73	12.73	12.73
NPV per project		$ 97,707	$ 97,707	$ 97,707	$ 86,360	$ 86,360	$ 86,360	$ 86,360	$ 86,360	$ 86,360	$ 86,360
Upfront Cost Subtotal		6,423,552.15	12,847,104.30	12,847,104.30	2,569,420.86	2,569,420.86	2,569,420.86	2,569,420.86	2,569,420.86	2,569,420.86	2,569,420.86
Percentage of Solar Carve Out											13.2%

Total SP&L Upfront Cost (All SP&L System Installs)	$ 56,179,121	$ 63,652,774	$ 62,602,673	$ 47,494,529	$ 47,494,529	$ 47,494,529	$ 47,494,529	$ 5,089,661	$ 5,089,661	$ 5,089,661

School-Top Community PV Program		**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
kWh Output per year per project=	361,908										
Number of Projects (estimated)		2	8	8	2	2	2	2	2	2	2
Capacity per project (kW)		250	250	250	250	250	250	250	250	250	250
Total capacity installed (kW)		500	2000	2000	500	500	500	500	500	500	500
Cumulative capacity installed (kW)		500	2500	4500	5000	5500	6000	6500	7000	7500	8000
kWH Output per year		723,816	2,895,264	2,895,264	723,816	723,816	723,816	723,816	723,816	723,816	723,816
Cumulative kWH Output per year		723,816	3,619,080	6,514,344	7,238,160	7,961,976	8,685,792	9,409,608	10,133,424	10,857,240	11,581,056
Cost of Promotional Materials		$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000
Total cost		$ 30,000	$ 120,000	$ 120,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000
Percentage of Solar Carve Out											3.62%

Residential PV Rebates (for participation in DR program)		**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
kWh Output per year per project=	6428										
Number of Projects (estimated)		150	150	150	150	140	150	150	150	149	149
Capacity per project (kW)		5	5	5	5	5	5	5	5	5	5
Total capacity installed (kW)		750	750	750	750	700	750	750	750	745	745
Cumulative capacity installed (kW)		750	1500	2250	3000	3700	4450	5200	5950	6695	7440
kWH Output per year		964,200	964,200	964,200	964,200	899,920	964,200	964,200	964,200	957,772	957,772
Cumulative kWH Output per year		964,200	1,928,400	2,892,600	3,856,800	4,756,720	5,720,920	6,685,120	7,649,320	8,607,092	9,564,864
Rebate (per customer)		$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
Total cost		$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 140,000	$ 150,000	$ 150,000	$ 150,000	$ 149,000	$ 149,000
Percentage of Solar Carve Out											2.99%
										Total:	100.01%