

**Massachusetts Department of Energy Resources**

**MA RPS Solar Carve-Out**

**PRICE SUPPORT MECHANISM**

**PROGRAM DESIGN AND ANALYSIS DOCUMENT**

**October 23, 2009**

**Background**

The Massachusetts RPS Solar Carve-Out is designed to continue to expand solar PV development in the Commonwealth. The proposed mechanism will facilitate our achieving the Governor's goal of 250 MW by 2017 and continue to support solar PV beyond. The Carve-Out builds upon the successful Commonwealth Solar Rebate Program.

Successful development of solar PV will require sufficient rate of return for end users, as well as project investors, and sufficient revenue certainty to attract reasonable financing. Revenue certainty for the sale of Solar Renewable Energy Certificates (S-RECs) is particularly important for the solar market.

As has been accomplished in New Jersey, the long term value of S-RECs may be made certain by requiring utility companies to engage in long term contracts and other states have achieved, with substantial time and effort, this mechanism for their solar RPS programs. However, these contracts create a potential burden on utility companies.

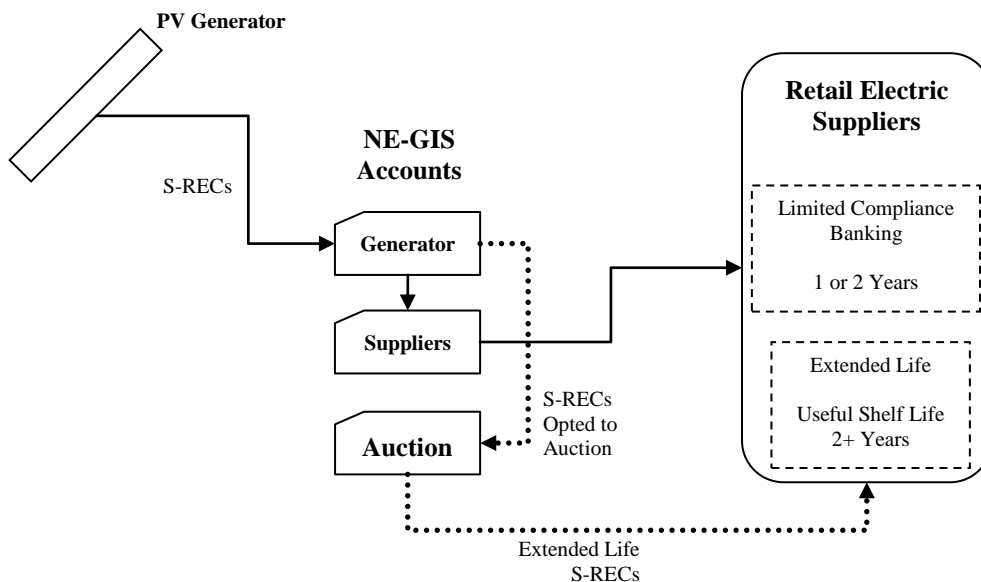
The Massachusetts Department of Energy Resources (DOER) is therefore proposing an alternative program design to accomplish sufficient S-REC revenue certainty to end users and project investors, without the need for contracts with utility companies.

To accomplish this end, the proposed DOER Price Support Mechanism program offers PV generators an option to deposit in a DOER account eligible excess S-RECs to be auctioned off for a fixed minimum price of a known term. This mechanism does not burden the Commonwealth with financial liability, and the program design maintains a transparent methodology to adjust the on-going Minimum Standard and PV price certainty incentive in a way that maintains balanced market growth.

**Key Design Element to Provide Minimum S-REC Price/Revenue Certainty**

The design is based on the establishment by DOER of an Auction Account on the New England Generation Information System (NE-GIS) to which eligible S-RECs can be deposited. As part of the Statement of Qualification for the RPS Carve-Out, each generator will be provided the option to deposit their S-RECs into the Auction Account for the Term of years that is applicable in the year the project is installed. This term is initially set at 10 years, but if the supply of S-RECs is sufficiently in excess (as

demonstrated by the volume of S-RECs opted to the Auction Account), the term is shortened to diminish the solar subsidy and slow the installation growth rate. S-RECs opted to the Auction Account are “re-minted” by the NE-GIS into Extended Life S-RECs with a Shelf Life to be eligible for compliance over the next two compliance periods. DOER will hold an auction soon after the compliance year to sell these Extended Life S-RECs. The auction will be for a fixed price of \$300 per S-REC (MWh). Utility and competitive retail electricity suppliers will bid in the auction for the volume they are willing to buy for this price. If insufficient volume is bid, the auction will be repeated with one additional year added to the Shelf Life of the Extended Life S-RECs. The auction is repeated as necessary until the volume bid is sufficient to clear the available Extended Life S-REC volume.



### S-REC Market Structure

Under this program design, the S-REC market will recognize two types of S-RECs – those that are generated within their term of eligibility to opt-in to the Auction Account, and those that are past their term and ineligible.

For those S-RECs that are within their term to opt into the Auction Account, the design provides a band of price certainty between the ACP Rate and the auction price of \$300/MWh (minus a nominal fee). This price band and the opt-in term offered in the year of installation provide the revenue certainty for project financing.

S-RECs generated after the generator’s opt-in term has expired will still find a market to sell their S-RECs either on a spot market or under short/medium term contracts as such S-RECs are still needed by the compliance entities to reach their obligation of the growing Minimum Standard. The market price for S-RECs ineligible for the Auction Account will remain below the ACP Rate, and could go below the fixed Auction price. Generators will be willing to sell below the fixed Auction price in a long market,

and in a short market compliance entities would be willing to pay more than the fixed Auction price to avoid compliance at the ACP Rate.

## **Design Triggers and Program Policy Adjustments**

While the Opt-In Auction Account provides price and revenue certainty for solar customers and investors, the program design includes important design triggers and policy adjustments to assure that the market for S-RECs and solar development opportunity remains robust but balanced. The program design will provide transparency so that retail electric suppliers and solar developers can adequately predict market conditions in the coming years.

The Solar Carve-Out program is begun with a DOER stated Minimum Standard for 2010, and an initial annual installation growth rate. The following design triggers and market adjustments then provide the feedback between the actual market conditions observed in a year and modifications to the program values in the subsequent year. The proposed numeric values for the triggers and adjustments are provided in the attached *Appendix: Design Structure and Parameters*.

*ACP Reliance (Short S-REC Market):* If in any year, compliance is met with a non-trivial amount of Alternative Compliance Payments, the market is short of S-RECs. To bring the market back into balance, the Minimum Standard growth rate is slowed, and solar development incentive is enhanced by setting the Auction Account opt-in term for new installations to its maximum value of 10 years.

*Auction Account Reliance (Long S-REC Market):* If in any year, generators access their opt-in rights to the Auction Account and deposit a non-trivial amount of S-RECs, the market is long of S-RECs. To bring the market back into balance, the Minimum Standard growth rate is increased, and solar development incentive is diminished by reducing the Auction Account opt-in term for new installations.

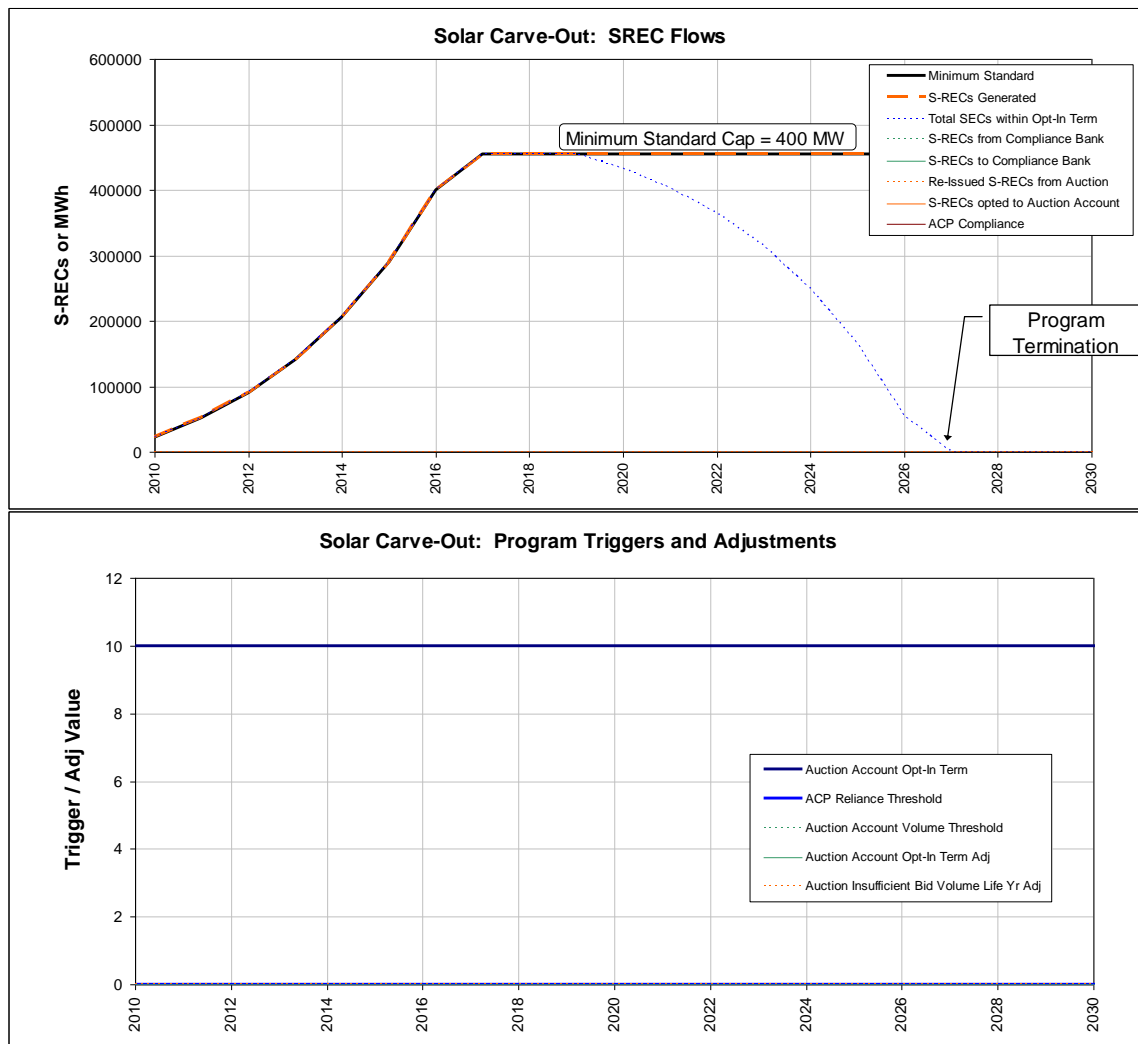
*Minimum Standard Cap (Policy Goal reached and Program Termination):* At the beginning of the program, DOER will establish a Minimum Standard cap at which time the carve-out program will have reached its goal and market conditions will have undoubtedly changed. When the cap is reached, the qualification of additional solar installations will be transferred to the RPS Class I program, and the Minimum Standard for the Solar Carve-Out will remain constant at the cap level. The Minimum Standard and Carve-Out program will remain in place until such time as the full terms of all S-RECs that have access to the Auction Account have expired and the remaining years of shelf life of the Extended Life S-RECs from the Auction have passed. After this time, the Carve-Out program will be eliminated and merged into the RPS Class I program.

## **Summary of Market Scenarios and Dynamics**

To better understand the program design, set policy parameters, and demonstrate market behavior, a spreadsheet model of the program has been prepared. While limited in its ability to capture certain aspects of market and auction behavior, the model does provide a useful means to analyze and expose market dynamics. A set of scenarios are reviewed and model results shown and interpreted in the following pages. All scenarios are run using the proposed policy parameters presented in the Appendix.

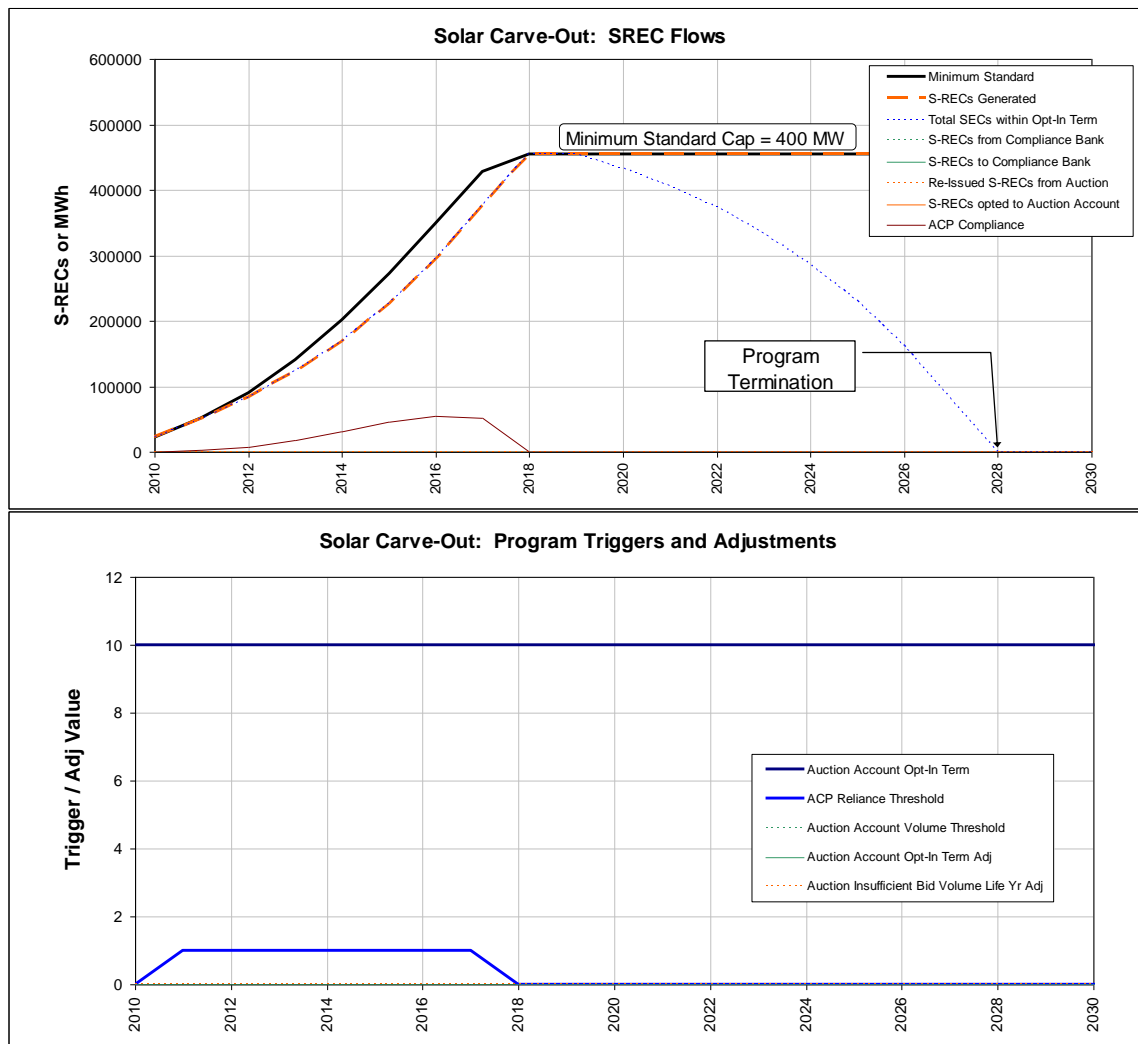
### Perfect Market Balance

With the Minimum Standard started at 20 MW and policy design targeted at a 30% per year growth rate in solar installations, the model is run with the input that the PV market does in fact install 20 MW in 2010 and grows at exactly 30% per year. In this case, solar installation exactly meets the Minimum Standard over time, resulting in no adjustments or triggers for ACP or Auction Account reliance. The Minimum Standard cap is met in 2017 at which time new solar installations are qualified under the RPS Class I. Through 2017, solar installations were offered the 10 year opt-in term for the Auction Account, so the Minimum Standard remains until 2027 at which time the program is terminated and all solar generators are merged into the RPS Class I program.



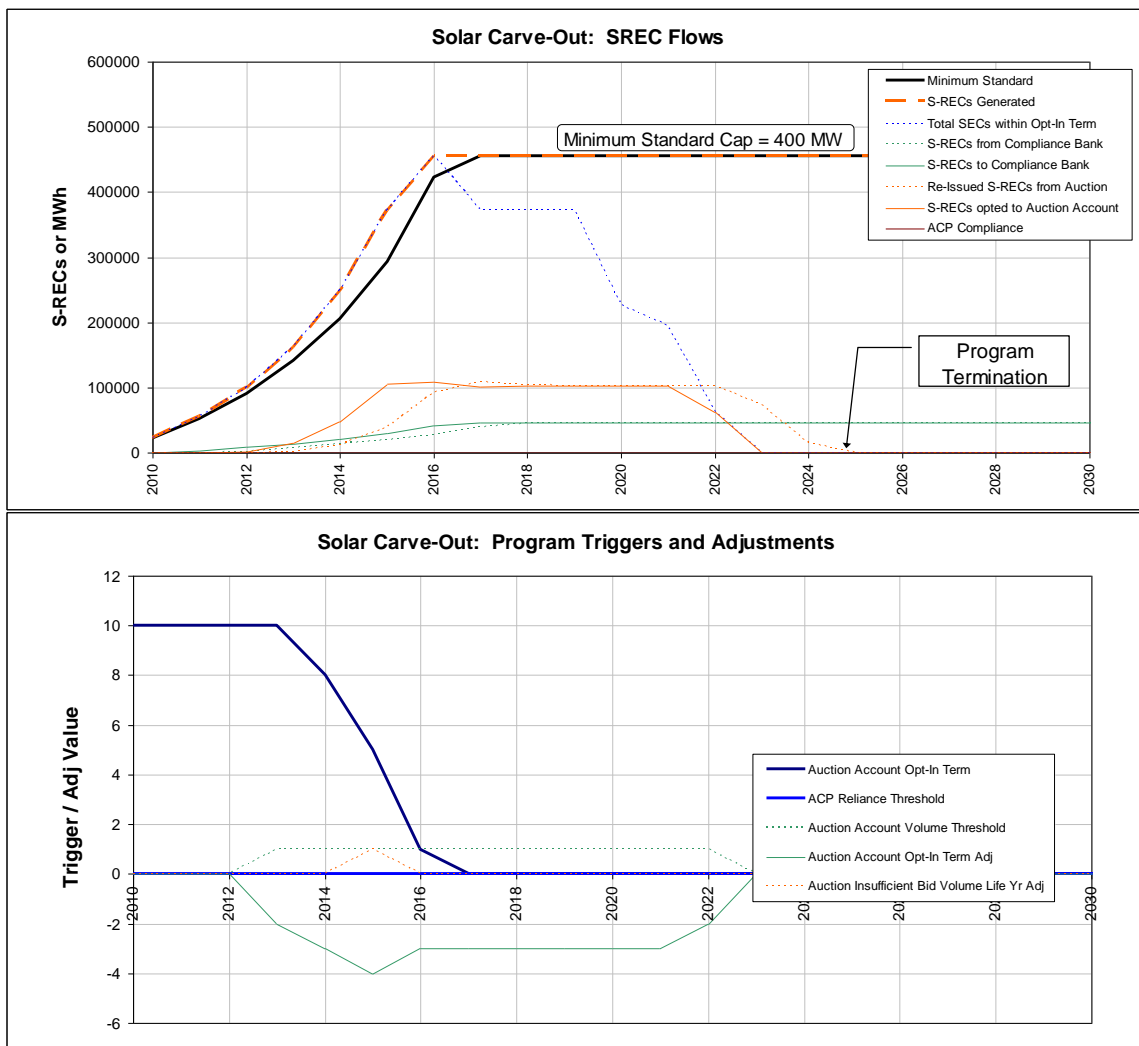
Slow PV Installation Growth – Fixed at 20%/year

If annual solar installation growth is fixed at 20% (unaffected by market conditions), the S-REC market will be short and compliance will rely on the ACP mechanism. This reliance will slow the annual growth of the Minimum Standard below the targeted 30%. Under modeled design parameters, the solar installation growth never catches the increasing Minimum Standard and diminishing ACP reliance continues until the program reaches its cap in 2018. Under this scenario, the Auction Account is never utilized and the ten year opt-in term remains available to all installations until the cap is reached. Hence, the program is operated until 2028 when all the opt-in terms expire and the program is merged with the RPS Class I.



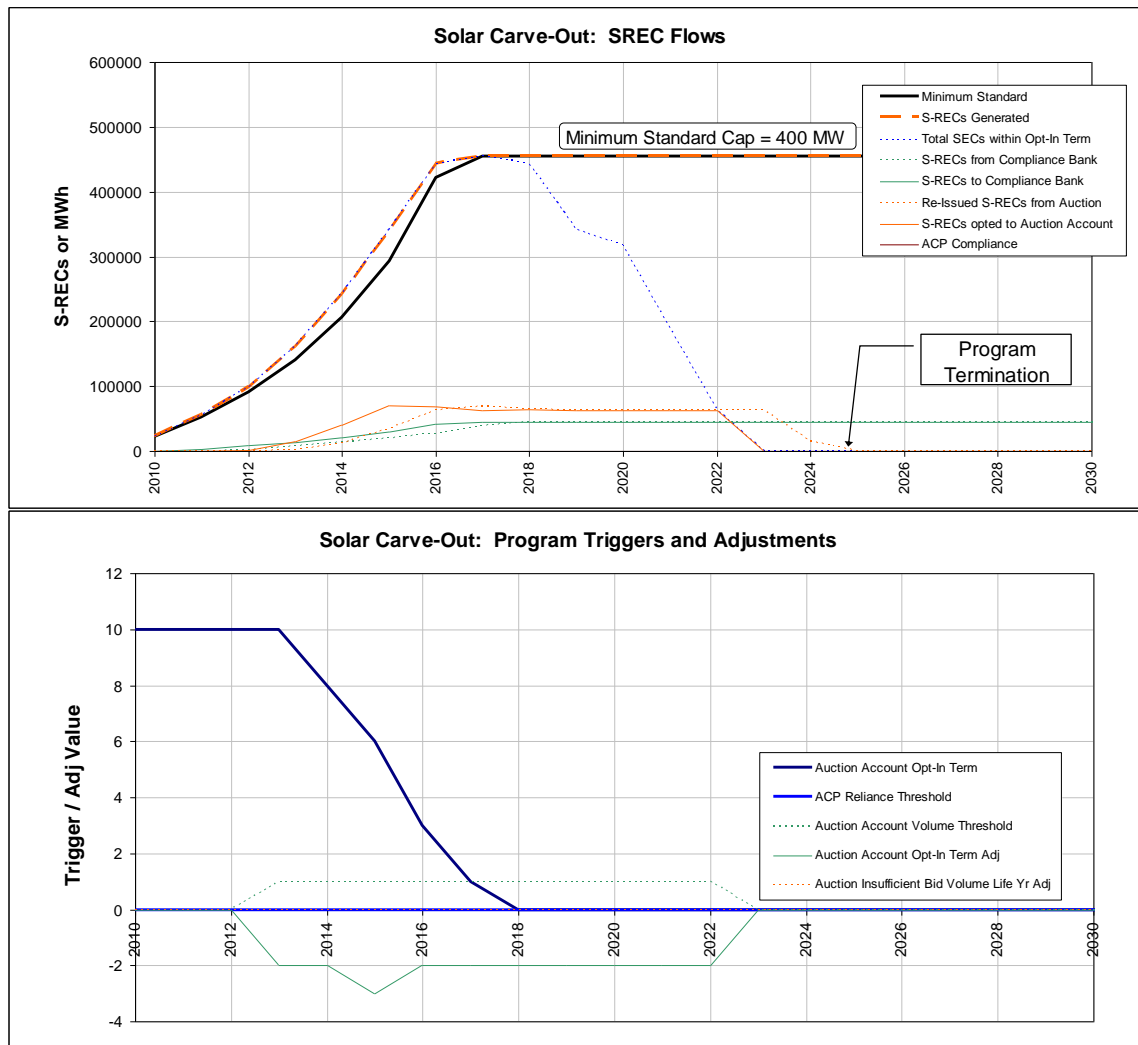
Fast PV Installation Growth – Fixed at 40%/year

Under a scenario where solar installation growth is fixed at 40% per year and exceeds policy expectations, the Auction Account is utilized after the full capacity of compliance banking is tapped. Reliance on the Auction Account increases the growth of the Minimum Standard but insufficiently to absorb all the solar installation growth. The sustained Auction Account reliance also substantially reduces the opt-in term available to new solar installations, which would expect to reduce solar installation growth but in this case the growth scenario is fixed (as might be the case if solar grid parity is reached so that financial reliance on S-REC revenue is not an issue). In this scenario, the program cap is reached in 2016, and the program continues through 2025 to expire all opt-in terms and Shelf Life years.



*Fast PV Installation Growth – Initially at 40%/year, Diminished by Market Conditions*

Similar to the previous scenario, solar installation growth begins at 40% per year above policy expectations. However, in this scenario, the solar market growth rate slows (by 5% for each year of the opt-in term below ten years). This scenario may roughly approximate the response of the market to this policy adjustment. In this case, the initial over supply of S-RECs and reliance on the Auction Account is slowly diminished as the Minimum Standard growth rate is slowed and the solar development is slowed, bringing the market near balance in 2016 before it reaches its cap in 2018. In this case, the program continues through 2025 to expire all opt-in terms and Shelf Life years.



## APPENDIX: DESIGN STRUCTURE AND PARAMETERS

**XX** = Design values/parameters subject to further analysis.

### **Program Design Components**

Minimum Standard; Minimum Standard Growth Rate	Minimum Standard is initially set at <b>20</b> MW in 2010 with annual installations growing at <b>30%</b> annually. Minimum Standard Growth Rate adjusted up by Auction Account Volume trigger, or down by the ACP Reliance trigger. Minimum Standard is capped at <b>400</b> MW.
ACP Rate	<b>\$600</b> /MWh in 2010, with DOER discretion to reduce by no more than 10% in any year.
Compliance Banking Allowance	Retail Electric Suppliers obliged to comply with the RPS Solar Carve-Out program are allowed to bank S-RECs purchased in excess of their current year obligation and use those banked S-RECs over the next two years of compliance. In the Class I RPS program, the banking limit is 30% of the current year obligation. For the Solar Carve-Out, this limit is reduced to <b>10%</b> to allow S-REC market conditions to be recognized more quickly and adjustments made with sufficient swiftness to maintain balance.
Auction Account	DOER (or its authorized agent) will establish an Auction Account on the NE-GIS system. During the last <b>30</b> days of the annual trading period, the Auction Account will accept any S-RECs opted to the Account by generators.
Extended Life S-RECs	The S-RECs deposited in the Auction Account will be retired and be re-minted by the NE-GIS System as Extended Life S-RECs with the applicable Shelf Life over which they can be used for Compliance.
Auction Fixed Minimum Price	<b>\$300</b> /MWh, fixed over time. This price will be the fixed auction price at which the Auction Account will offer Extended Life S-RECs.
Auction Account Opt-In Term	Initially set at <b>10</b> years, this Term provides the number of years a generator is entitled to opt its S-RECs into the Auction Account. The Term is set each year for all generators qualified for the program in that year. Opt-In Term may be adjusted downward by Auction Account Volume trigger, and re-set to <b>10</b> years by the ACP Reliance Trigger.
Extended Life S-REC Shelf Life	Initially set at <b>2</b> years, the Shelf Life is the period of



	time over which the Extended Life S-RECs can be used for compliance. Additional years can be added if adjusted by the Auction Insufficient Bid Volume trigger. If adjusted, the Shelf Life is re-set to 2 years for the following year's auction.
Extended Life S-REC Auction	Within 30 days of the end of the annual S-REC trading period, DOER (or its authorized agent) will hold an auction for all Extended Life S-RECs. Auction will be fixed price at the Auction Fixed Minimum Price and will clear only if sufficient bids are entered to meet the full volume. If the auction results in insufficient bid volume, the Auction Insufficient Bid Volume trigger is pulled, increasing the Shelf Life by one year, and the auction occurs again within 10 days. The auction proceeds (minus the Auction Fee) are distributed (per S-REC deposited) to the generators that deposited S-RECs to the Auction Account.
Auction Fee	5%, or \$15/MWh

### **Program Design Triggers**

ACP Reliance Trigger	<p>If in any compliance year the ACP Payments account for more than 2% of the compliance obligation, then:</p> <ol style="list-style-type: none"> <li>1) the Minimum Standard Growth Rate is reduced by ½% for each 1% of compliance met with ACP Payments (e.g., if the Growth Rate is at 30% annually and the ACP Payments account for 10% of compliance obligation, then the Growth Rate is slowed to 25% annually), and</li> <li>2) the Auction Account Opt-In Term is reset to 10 years.</li> </ol>
Auction Account Volume Trigger	<p>If in any compliance year the S-REC volume deposited into the Auction Account exceeds 2% of the compliance obligation, then:</p> <ol style="list-style-type: none"> <li>1) the Minimum Standard Growth Rate is increased by ½% for each 1% of compliance obligation represented by the S-REC volume deposited in the Auction Account, and</li> <li>2) the Auction Account Opt-In Term (for new project development) is reduced by 1 year for each 10% of compliance obligation</li> </ol>

	represented by the S-REC volume deposited in the Auction Account.
Auction Insufficient Bid Volume Trigger	If an Extended Life S-REC Auction results in a bid volume insufficient to clear the full volume of Extended Life S-RECs offered, then the Extended Life S-REC Shelf Life is increased by one year and the auction is repeated within 10 days. (Cycle is repeated, as necessary, until bid volume is sufficient to clear the full volume of Extended Life S-RECs.)