

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**



**FILED**

6-06-16  
04:59 PM

Order Instituting Rulemaking Regarding  
Policies Procedures and Rules for the  
California Solar Initiative, the Self-Generation  
Incentive Program and Other Distributed  
Generation Issues.

Rulemaking 12-11-005  
(Filed November 8, 2012)

**TESLA MOTORS, INC.'S COMMENTS ON THE PROPOSED DECISION REVISING  
THE SELF-GENERATION INCENTIVE PROGRAM**

Mateo Jaramillo

Vice President of Tesla Energy  
Products & Programs  
TESLA MOTORS, INC.

3500 Deer Creek Road  
Palo Alto, CA 94304  
E-mail: [mjaramillo@tesla.com](mailto:mjaramillo@tesla.com)

Dated: **June 6, 2016**

**CONTENTS**

I. Tesla Supports a Majority of the Proposed Program Changes in the Proposed Decision..... 2

II. The Commission Should Adjust the Incentive Levels for Energy Storage Projects Based on Their Duration ..... 3

    A. The Commission Should Implement a Six Hour Duration Incentive Limit to Maximize the Value of SGIP Projects..... 4

    B. The Commission Should Develop a Declining Scale for Energy Storage Incentives Based on the Duration of the System ..... 5

        1. The Marginal Usefulness of a Storage System Declines with Duration ..... 6

        2. The Average \$/kWh Cost of a Storage System Declines with Duration ..... 6

        3. Tesla Proposes a Storage Duration Incentive Decline ..... 7

III. The Commission Should Clarify How It Will Apply the Updated Operating Requirements for Storage ..... 8

    A. Consistent with the Proposed Decision’s Concept for Storage Operating Requirements, the Commission Should Require 130 Hours of Annual Discharge for Each Hour of Energy Storage Duration ..... 8

    B. The Updated Operating Requirements for Energy Storage Should Apply to Projects Installed Under the Prior SGIP Rules ..... 9

IV. The Commission Should Establish Regularly Occurring Stakeholder Meetings for SGIP Implementation and Allow the Program Administrators to Make Implementation Decisions Through That Public Forum..... 10

V. Conclusion ..... 11

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking Regarding Policies Procedures and Rules for the California Solar Initiative, the Self-Generation Incentive Program and Other Distributed Generation Issues.

Rulemaking 12-11-005  
(Filed November 8, 2012)

**TESLA MOTORS, INC.’S COMMENTS ON THE PROPOSED DECISION REVISING  
THE SELF-GENERATION INCENTIVE PROGRAM**

Pursuant to Rule 14.3 of the California Public Utility Commission’s (“Commission’s”) Rules of Practice and Procedure, Tesla Motors, Inc. (“Tesla”) hereby submits comments on the Proposed Decision Revising the Self-Generation Incentive Program Pursuant to Senate Bill 861, Assembly Bill 1478, and Implementing Other Changes (“Proposed Decision”), filed on May 16, 2016. As discussed herein, Tesla commends the Commission’s actions to improve the SGIP program and appreciates the Proposed Decision’s comprehensive changes to the Self-Generation Incentive Program (“SGIP”). However, Tesla suggests a few additional modifications to the Proposed Decision including:

- the Commission should implement a six hour duration incentive limit for energy storage projects and develop a declining scale for energy storage incentives based on the duration of the projects;

- the Commission should clarify how it will apply the updated operating requirements for storage and apply the new requirements to previously installed storage projects; and
- the Commission should establish regularly occurring stakeholder meetings for SGIP implementation and allow the Program Administrators to make implementation decisions through that public forum.

**I. TESLA SUPPORTS A MAJORITY OF THE PROPOSED PROGRAM CHANGES IN THE PROPOSED DECISION**

Tesla appreciates that the Proposed Decision suggests many changes to enhance SGIP including:

- reducing incentive levels to maximize the amount of resources developed through SGIP;<sup>1</sup>
- developing two distinct funding buckets for “generation” and “energy storage” given the different characteristics and stages of development of the two types of resources;<sup>2</sup>
- replacing the manufacturer cap with a developer cap to remove inefficiencies and more equitably distribute SGIP funds across project applicants/developers;<sup>3</sup>
- updating operational requirements for storage to ensure the efficient use of the resources;<sup>4</sup>

---

<sup>1</sup> Proposed Decision at p. 23-28.

<sup>2</sup> Proposed Decision at p. 21-23.

<sup>3</sup> Proposed Decision at p. 32-34.

<sup>4</sup> Proposed Decision at p. 38-39.

- removing the outmoded “minimum customer investment” provision thereby incentivizing efficiency and decreasing program costs;<sup>5</sup>
- raising application fees to help ensure viable project applications;<sup>6</sup> and
- specifying that that the size of energy storage projects shall only be limited by the size of customer load as to not penalize customers that have already installed other distributed energy resources.<sup>7</sup>

These many changes will make SGIP more efficient and allow the state to develop more customer-sited energy resources that reduce greenhouse gas and criteria pollutant emissions, increase grid efficiency and resiliency, and help transform the market for new energy technologies. For that reason, Tesla very much supports the adoption of the Proposed Decision, and suggests only a few adjustments as detailed in the following sections.

## **II. THE COMMISSION SHOULD ADJUST THE INCENTIVE LEVELS FOR ENERGY STORAGE PROJECTS BASED ON THEIR DURATION**

The Proposed Decision changes the incentive mechanism for energy storage resources from a dollars per watt (\$/W) of installed capacity incentive to a dollars per watt-hour (\$/Wh) of installed capacity incentive.<sup>8</sup> Tesla generally agrees with the proposed change to allocate funds based on installed watt-hours of energy storage but suggests some additional provisions given that the efficacy of a storage device to support the grid and integrate renewables is a function of both the power (i.e. watts) and energy (i.e. watt-hours) of a storage device. Specifically, Tesla suggests that the Commission (1) limit the duration of energy storage that is eligible for

---

<sup>5</sup> Proposed Decision at p. 45.

<sup>6</sup> Proposed Decision at p. 43-44.

<sup>7</sup> Proposed Decision at p. 29.

<sup>8</sup> Proposed Decision at p. 4.

incentives to six hours, and (2) develop a declining scale for energy storage incentives based on the duration of the projects.<sup>9</sup>

**A. The Commission Should Implement a Six Hour Duration Incentive Limit to Maximize the Value of SGIP Projects**

While the Proposed Decision's change to providing incentives by watt-hour is largely sensible, it is necessary to set some maximum duration of energy storage that is eligible for the SGIP incentive in order to conserve SGIP funds for projects that more fully support the grid and reduce emissions. Without a limitation on the maximum duration of energy storage eligible to receive SGIP incentives, long duration energy storage projects could take up a significant portion of the SGIP funds without optimally supporting the program goals. For example, a storage project with a 24 hour duration could, under the Proposed Decision's program design, apply for and receive a significant amount of SGIP funds while providing proportionately little peak reduction, system efficiency increase, renewable integration value, or emissions reduction.

The maximum allowable duration of energy storage that can receive SGIP incentives should be based on the ability of storage to meet the stated program goals of reducing emissions and supporting the grid. While there is not a perfect way to determine a maximum allowable duration based on this parameter, six hours is approximately the greatest duration of storage that is useful for shifting on-grid electricity consumption. For example, peak periods are often defined as six hour periods in utilities' time-of-use rates.<sup>10</sup> Further, the California Independent

---

<sup>9</sup> The "duration" of an energy storage device is the length of time that a storage device can discharge at its full power rating. The duration is equal to the energy of a device (watt-hours) divided by the power of a device (watts). For example, a 100 kW / 400 kWh energy storage device has a duration of 4 hours.

<sup>10</sup> See, e.g., Southern California Edison's residential time-of-use rates, *available at* <https://www.sce.com/wps/portal/home/residential/rates/Time-Of-Use-Residential-Rate-Plans/>.

System Operator (“CAISO”) determined that Flexible Resource Adequacy Base Ramping Resources should be capable of providing energy for a minimum of six hours.<sup>11</sup> Finally, energy shifting of non-peak wind or solar production to peak times would rarely require storage with a duration greater than six hours.

Further, based on Tesla’s experience from deploying over 40 projects through SGIP, energy storage with two hours of duration is typically the optimal size storage system to reduce a customers’ peak demand. Too little duration (e.g. one hour) and the storage device is not able to reduce customers’ peaks sufficiently, and too much duration (e.g. six hours) and the energy storage is underutilized. Of course, the appropriate duration of a storage system to reduce peak demand is dependent on the particular customer’s load profile, which is another reason that it is appropriate to provide some flexibility for the duration of SGIP projects, but there is no justification for allocating SGIP funds to support greater than 6 hours of energy storage duration.

**B. The Commission Should Develop a Declining Scale for Energy Storage Incentives Based on the Duration of the System**

To avoid inappropriate bias towards longer duration energy storage projects in SGIP, the Commission should adopt a declining incentive structure based on storage project duration. Such a structure would be more reflective of both the cost and usefulness of energy storage projects with varying durations, as detailed in the following three sections.

---

<sup>11</sup> CAISO Fifth Replacement FERC Electric Tariff, Section 40.10.3.2 “Flexible Capacity Category – Base Ramping Resources,” April 25, 2016, [https://www.caiso.com/Documents/ConformedTariff\\_asof\\_Apr25\\_2016\\_v2.pdf](https://www.caiso.com/Documents/ConformedTariff_asof_Apr25_2016_v2.pdf).

## **1. The Marginal Usefulness of a Storage System Declines with Duration**

The usefulness of an energy storage project in supporting the grid is dependent on both the power rating of the device (watts) and the energy rating of the device (watt-hours), but the Proposed Decision's dollar per watt-hours incentive only accounts for the energy rating of storage devices. For example, under the proposed incentive structure, a 200 kW / 400 kWh storage device would receive the same incentive as a 100 kW / 400 kWh device yet the 200 kW device, which has twice as much power, could provide twice the amount of peak reduction. Given that systems with shorter durations (e.g. two hour durations) are somewhat more useful for supporting the grid than are systems with longer durations (e.g. six hour durations), shorter duration systems should receive somewhat higher incentives.

## **2. The Average \$/kWh Cost of a Storage System Declines with Duration**

Longer duration energy storage projects are less expensive on a \$ / kWh basis than are shorter duration energy storage projects because the project's fixed costs and inverter costs can be spread across a larger number of kWh. For example, a 1 MW / 2 MWh system, which has a 2 hour duration, costs about \$1.2 million or \$600 / kWh while a 1 MW / 4 MWh system, which has a 4 hour duration, costs approximately \$2.2 million or \$540 / kWh.<sup>12</sup> Said another way, the cost of doubling the energy for this type of system increases the by roughly 80%, not 100%. Thus, to avoid biasing the development of longer duration projects, the \$ / Wh incentive for longer duration projects in SGIP should be slightly lower than for shorter duration projects.

---

<sup>12</sup> Indicative pricing from Tesla Energy's Design Your Powerpack System website, *available at* <https://www.teslamotors.com/powerpack/design#/>.



### 3. Tesla Proposes a Storage Duration Incentive Decline

Given the aforementioned reasons, Tesla suggests the Commission adopt a storage “duration incentive decline” similar to the following:

<i>Duration</i>	<i>Incentive Rate (% of base incentive step)</i>
≤ 2 hours	100%
2 - 4 hours	75%
4 - 6 hours	50%
> 6 hours	0%

Table 1. Proposed Duration Incentive Decline

Tesla’s proposed duration incentive decline utilizes a format similar to the percentage incentive declines already employed for SGIP projects between 1 - 3 MW.<sup>13</sup> Further, Tesla’s proposed duration incentive decline roughly tracks with the decrease in the marginal cost of adding to the duration of storage projects.

As an example of how Tesla’s proposed duration incentive include would be applied, take a 100 kilowatt (“kW”) / 300 kilowatt-hour (“kWh”) energy storage system – a system with a 3 hour duration. The storage system would receive \$0.50 / Wh for the first 200 kWh or two hours of the system, and then \$0.375 / Wh (75% of \$0.50 / Wh) for the remaining 100 kWh or one hour of the system, thus resulting in an incentive payment of \$137,500 for the entire system (\$50,000 for each of the first two hours and \$37,500 for the third hour). While the added complexity of such a proposed duration incentive decline is not ideal, this structure is more

---

<sup>13</sup> As specified in the 2016 SGIP Handbook at p. 35, SGIP projects receive 100% of the base incentive for the first megawatt (“MW”) of a project, 50% of the base incentive for the next MW of a project, 25% of the base incentive for the subsequent MW of a project, and no incentive for any portion of the project above 3 MW.

reflective of the actual cost of systems with varying durations and is more aligned with the benefit that systems with varying durations provide to the grid.

### **III. THE COMMISSION SHOULD CLARIFY HOW IT WILL APPLY THE UPDATED OPERATING REQUIREMENTS FOR STORAGE**

Tesla appreciates that the Proposed Decision recognizes the efficacy of updating the operating requirements for storage.<sup>14</sup> However, the Commission should update its proposed operating requirements to (1) align with the Proposed Decision’s modification to allow energy storage systems of varying durations and (2) apply the requirements to energy storage systems installed under prior SGIP rules, as detailed below.

#### **A. Consistent with the Proposed Decision’s Concept for Storage Operating Requirements, the Commission Should Require 130 Hours of Annual Discharge for Each Hour of Energy Storage Duration**

The Proposed Decision accepts Energy Division staff’s proposal to require 260 hours of annual discharge for commercial energy storage systems, based on the concept that two-hour energy storage systems should discharge every weekday for the warmer half of the year (i.e. 26 weeks per year).<sup>15</sup> However, given that the Proposed Decision also changes the incentive mechanism from a \$/W incentive for a two-hour system to a \$/Wh incentive for any duration of system, the operating requirements should be updated accordingly. Applying the same concept that the Proposed Decision uses to suggest a 260 hour requirement, the Commission should require that storage devices go through at least 130 hours of discharge per year (5 hours per week

---

<sup>14</sup> Proposed Decision at p. 38-39.

<sup>15</sup> Proposed Decision at p. 38.

for 26 weeks) for each hour of duration of a storage device. For a two-hour energy storage device, this updated requirement of 130 hours of discharge for each hour of duration would still equate to 260 hours of discharge per year, but the updated requirement would also accommodate storage devices of other sizes. For example, a four-hour storage device would be required to have at least 520 hours of discharge per year while a one-hour would be required to have 130 hours of discharge per year.

**B. The Updated Operating Requirements for Energy Storage Should Apply to Projects Installed Under the Prior SGIP Rules**

The Proposed Decision updates the operating requirements for commercial energy storage systems recognizing that energy storage provides the greatest benefit to the grid during times of peak need.<sup>16</sup> This logic applies to all storage systems regardless of whether they will be installed in the future or whether they have already been installed in the past. Therefore, the Commission should clarify that the updated operating requirements for commercial energy storage systems should apply to all commercial storage projects in SGIP, even if the systems were installed under previous SGIP rules.

---

<sup>16</sup> Proposed Decision at p. 38.

**IV. THE COMMISSION SHOULD ESTABLISH REGULARLY OCCURRING  
STAKEHOLDER MEETINGS FOR SGIP IMPLEMENTATION AND ALLOW  
THE PROGRAM ADMINISTRATORS TO MAKE IMPLEMENTATION  
DECISIONS THROUGH THAT PUBLIC FORUM**

There are a number of outstanding implementation questions related to the new SGIP design in the Proposed Decision including but not limited to:

- Is incentive based on the alternating current (“AC”) rating or direct current (“DC”) rating of a storage device?
- How will the proposed lottery system work?
- How will the incentive steps interplay with the developer cap?

It is not possible or necessary for the Commission to resolve all implementation questions related to SGIP in advanced of program implementation. However, the Commission should ensure that (1) the Program Administrators have the authority to resolve any remaining questions and (2) the Program Administrators resolve any remaining questions in a fair, transparent, and consistent manner. Thus, Tesla suggests that the Commission direct the Program Administrators, in association with Energy Division, to hold public stakeholder meetings at least quarterly to address outstanding implementation questions. The Commission established a similar public forum for the California Solar Initiative,<sup>17</sup> which proved quite useful especially at the start of the program. Public stakeholder meetings will likely need to occur more frequently at the beginning of the implementation of the redesigned SGIP and less frequently as the program continues but,

---

<sup>17</sup> The California Solar Initiative Program Forum was established in D.06-08-028 at p. 65-67.

at a minimum, the Commission should require public stakeholder meetings for SGIP implementation at least quarterly for the first year of new program design implementation.

**V. CONCLUSION**

Tesla appreciates the Commission's efforts in developing and proposing robust modifications to SGIP. Tesla supports the Proposed Decision and hopes that Commission will make the few additional modifications proposed herein to best ensure that SGIP fulfills its goals of grid support, emissions reductions, and market transformation.

Respectfully submitted,

*/s/ Mateo Jaramillo*

---

Mateo Jaramillo

Vice President of Tesla Energy Products & Programs  
TESLA MOTORS, INC.

3500 Deer Creek Road  
Palo Alto, CA 94304  
Telephone: (650) 681-5306  
E-mail: [mjaramillo@tesla.com](mailto:mjaramillo@tesla.com)

June 6, 2016