Energy Commission's Battery and Energy Storage System Lists

Erica Chac
Abtin Mehrshahi
Joseph Omoletski

Renewable Energy Division
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Agenda

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2. Energy Commission's Listing Request Review Process
3. Battery Listing Request
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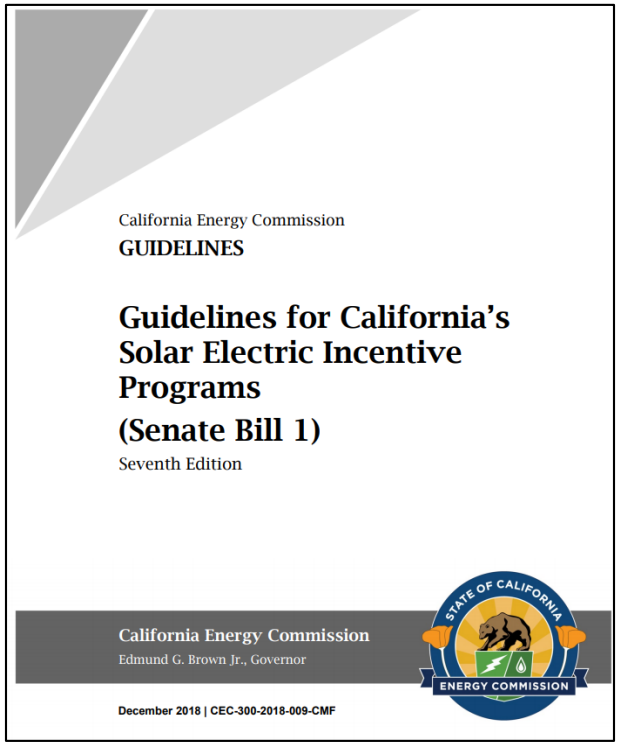
Energy Commission's Battery & Energy Storage System Lists

California Senate Bill 1 (SB 1)
(Murray, Chapter 132, Statutes of 2006)

7th edition of SB 1 Guidelines
http://www.energy.ca.gov/sb1/documents/



Energy Commission's Battery & Energy Storage System Lists

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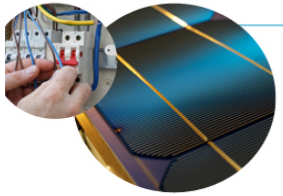


Home > equipment

Battery and Energy Storage Systems (ESS)

The California Energy Commission led the Energy Storage List Working Group, comprised of nationally recognized testing labs, solar and storage equipment manufacturers, trade groups, utilities, and other governmental entities to facilitate the addition of Battery and Energy Storage Systems (ESS) to the Energy Commission's Solar Equipment Lists.

Effective August 21, 2019, the listing request forms used to request listing of Battery and Energy Storage Systems (ESS) to the Energy Commission's Solar Equipment Lists have been uploaded. The List of Battery and the List of Energy Storage Systems (ESS) are included as separate lists:

- The Battery List includes electrochemical Battery equipment certified to UL 1973 standards.
- The Energy Storage Systems (ESS) List includes electrochemical Energy Storage Systems certified to UL 9540 standards.

The forms and instructions can be accessed below.

Please note that the Energy Commission's Solar Equipment Lists updates are typically completed twice a month, on the 1st business day of the month and the 15th of the month or the following business day.

Submit inquiries regarding the Energy Commission's Solar Equipment Lists to the California Energy Commission at SolarEquipment@energy.ca.gov. For any equipment listing related questions, please contact the Solar Equipment Call Center at 916-654-4120.

List of Battery and Energy Storage Systems (ESS)

Effective August 21, 2019, the List of Battery and the List of Energy Storage Systems (ESS) have been added to the Energy Commission's Solar Equipment Lists.

There is one version of the List of Battery available for download, and two versions of the List of Energy Storage Systems (ESS) available for download – Simplified version and Full Data version. The Simplified version is intended to show basic information such as manufacturer, model number, description, and basic equipment data. The Full Data version contains additional information and more detailed equipment data that may be of interest to stakeholders.

Click on the links below to download the current list of eligible Battery and Energy Storage Systems (ESS):

Energy Commission's Battery & Energy Storage System Lists

Battery List Format

Battery List (Full Data)

Data has not changed since May 15, 2019

Batteries List Notes

(1) This information references the 2019 Building Energy Efficiency Standards' Reference Joint Appendix 12. This appendix outlines requirements for energy storage systems to qualify for battery storage compliance credit. For more information refer to [JA 12 Instructions]

(2) **Maximum continuous discharge rate** as stated by the manufacturer on the spec sheet.

Guidelines for California's Solar Electric Incentive Programs (Senate Bill 1)

Blue colored text indicates that the model number occurs multiple times on the list under different manufacturer names.

Manufacturer Name	Brand[1]	Model Number	Technology	Description	UL 1973 Certification		Nameplate Energy Capacity	Maximum Continuous Discharge Rate[2]	Manufacturer Declared Roundtrip Efficiency	Certified JA12 Control Strategies[1]	Declaration for JA12 Submitted[1]	Notes	CEC Listing Date	Last Update
					Certifying Entity	Certificate Date (mm/dd/yyyy)	(kWh)	(kW)	(%, Ac-AC)[1]				(mm/dd/yyyy)	(mm/dd/yyyy
MFR A	Brand X	ABC-225B	Lithium-Ion	225 W, 2.2 kWh, lithium-ion battery pack	CSA Group	12/4/2018	2.2	0.225	80	Basic, TOU	Y		2/1/2019	
MFR B	Brand Y	DCB300-L	Lithium-Ion	300 W, 3 kWh, lithium-ion battery pack	TUV Rheinland of North America	1/6/2019	3	0.3	No Information Submitted	No Information Submitted	N		2/1/2019	

Energy Commission's Battery & Energy Storage System Lists

Energy Storage System (ESS) List Format

Energy Storage Systems List (Full Data)

Data has not changed since May 15, 2019

Storage Systems List Notes

(1) This information references the 2019 Building Energy Efficiency Standards' Reference Joint Appendix 12. This appendix outlines requirements for energy storage systems to qualify for battery storage compliance credit. For more information refer to [JA 12 Instructions]

(2) **RPP**: UL 1741 SA13 tested with reactive power priority (when operating at apparent power capacity, inverter will reduce active power as needed to ensure curve-required reactive power is provided)

(3) **Maximum continuous discharge rate** as stated by the manufacturer on the spec sheet.

(4) The listed Firmware Version is the version that was used during the inverter's UL 1741 Supplement SA testing and was certified on the listed Certificate Date; multiple firmware versions may be listed for a single certificate date if all are required to comply with Supplement SA. Multiple certificate dates with different firmware versions may be listed if new firmware versions were certified under Supplement SA and reported by the manufacturer. Additional firmware versions may be certified but not reported. Check with NRTL for the most current information.

Guidelines for California's Solar Electric Incentive Programs (Senate Bill 1)

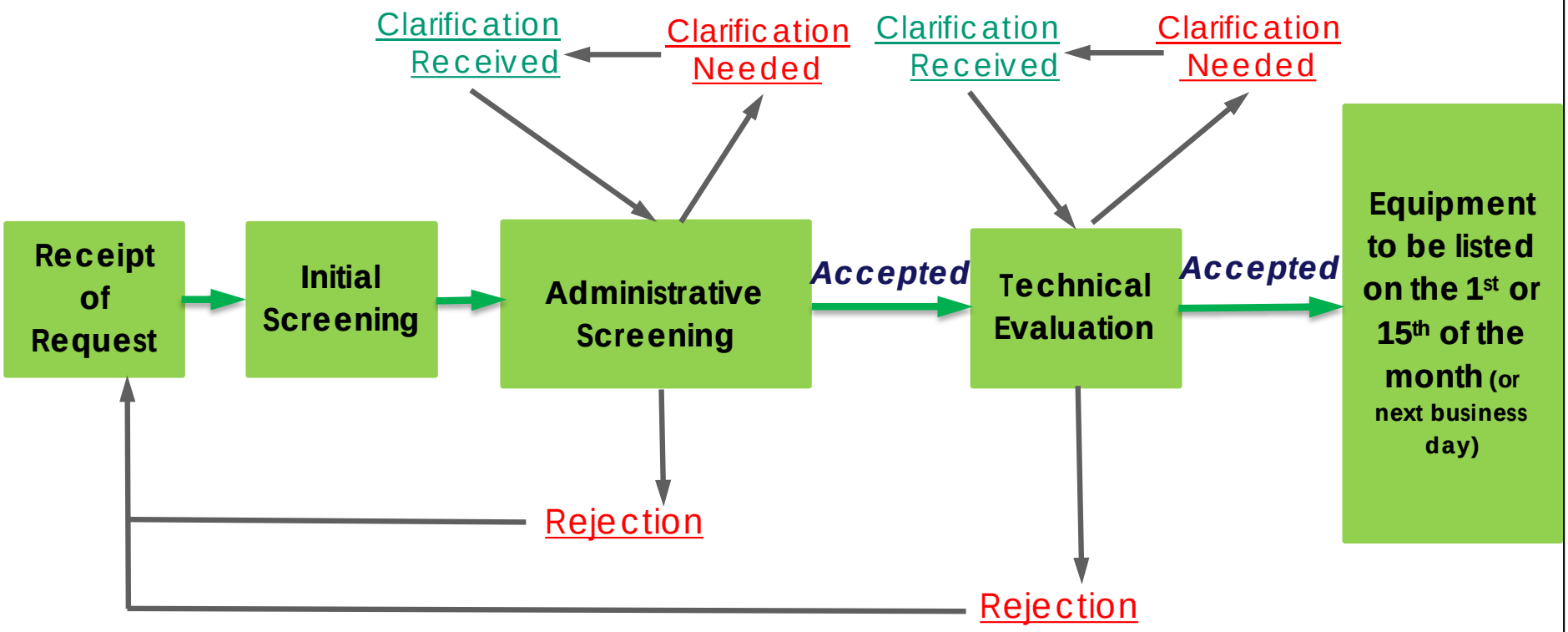
Blue colored text indicates that the model number occurs multiple times on the list under different manufacturer names.

Manufacturer Name	Brand[1]	Model Number	Technology	UL 9540 Certification		UL 1741 Supplement SA Testing	UL 1741 SA13 Volt-Var	UL 1741 SA Freq-Watt Volt-Watt	Common Smart Inverter Profile Conformance	Description	Nameplate Energy Capacity	Nameplate Power	Nominal Voltage	Maximum Continuous Discharge Rate[3]	UL 1741 Supplement SA Certification (SA8-SA13)[4]			UL 1741 SA Freq-Watt Volt-Watt	CSIP Certification		Manufacturer Declared Roundtrip Efficiency	JA S
				Certifying Entity	Certificate Date (mm/dd/yyyy)	SA8-SA13	RPP[2]	SA14-SA15	CSIP		(kWh)	(kW)	(Vac)	(kW)	Certifying Entity	Certificate Date [mo/day/yr]	Firmware Version(s) Tested	Certificate Date [mo/day/yr]	Certifying Entity	Certificate Date [mo/day/yr]	(%, Ac-AC)[5]	
MFR 1	Brand 1	XYZ-9KTHS	Flow Battery	UL	5/12/2018	Y	Y	Y	N	9 kW, 4.5 kWh, flow battery energy storage system	4.5	9	240	0.225	UL	5/12/2018	1.0A	5/12/2018	No Information Submitted	No Information Submitted	80	
MFR 2	Brand 2	LES-50G	Lithium-Ion	Intertek	7/9/2018	Y	Y	Y	N	5 kW, 50 kWh, lithium-ion energy storage system	50	5	208	0.3	Intertek	7/9/2018	1.3B	7/9/2018	No Information Submitted	No Information Submitted	No Information Submitted	N

Energy Commission's Battery & Energy Storage System Lists

- Requests for listing, equipment information and data are submitted by manufacturers
- Manufacturers' data is not guaranteed by the Energy Commission
- The lists are updated twice a month
- Per SB 1 Guidelines, Energy Commission reserves right to remove equipment for any reason adversely affecting the goals or successful implementation of the program

Energy Commission's Listing Request Review Process



Energy Commission's Listing Request Review Process

✓ Listing requests are accepted continuously

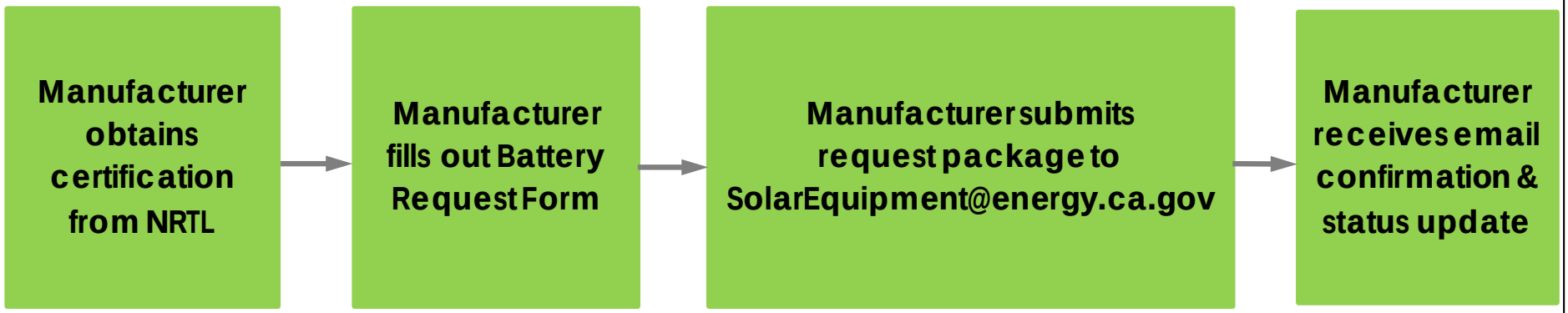
✓ Listing requests are processed on a first-in, first-out basis

Listing Request Types:

- Add equipment
- Revise equipment
- Remove equipment

Battery Listing Request

Current steps for manufacturers to submit battery requests:



Request package includes:
(1)Request Form
(2)Certification
(3)Spec sheet(s)
(4)Other supporting documents

Status update:
(1) Clarification
(2) Rejection
(3) Acceptance

Battery Listing Request

Battery Listing Request must include:

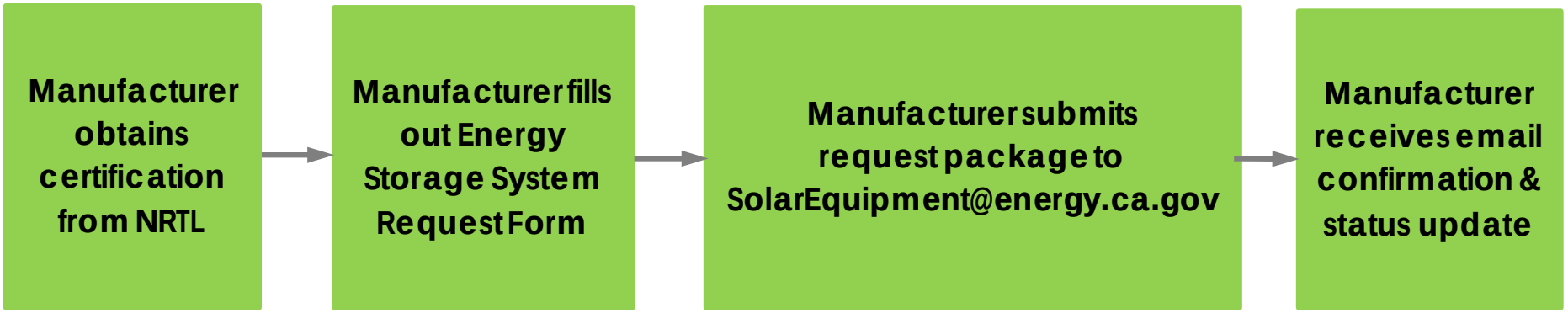
1. Battery Listing Request Form
2. Certificate of Compliance or ATM
   - UL 1973 from a NRTL
3. Manufacturer's spec sheet(s)

Optional Documentation:

- ❑ Joint Appendix 12 (JA12) Declaration Form

Energy Storage System (ESS) Listing Request

Current steps for manufacturers to submit ESS requests:



Request package includes:
(1)Request Form
(2)Certification
(3)Spec sheet(s)
(4)Other supporting documents

Status update:
(1) Clarification
(2) Rejection
(3) Acceptance

Energy Storage System (ESS) Listing Request

Energy Storage System Package must include:

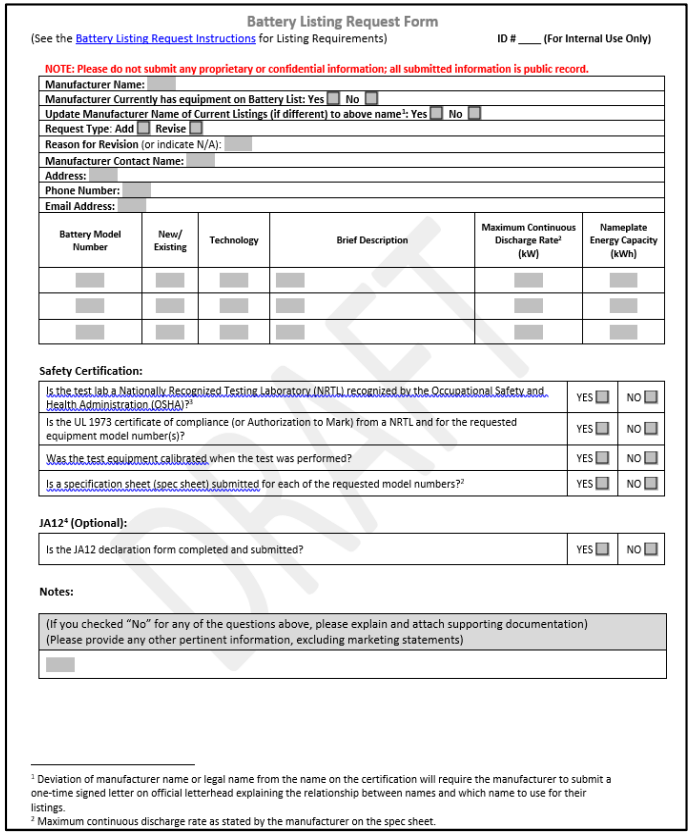
1. Energy Storage System Listing Request Form
2. Certificate of Compliance or ATM
   - UL 9540 from a NRTL
3. Manufacturer's Spec Sheet(s)

Optional Documentation:

- ❑ Joint Appendix 12 (JA12) Declaration Form
- ❑ Certification and Test Report Summary
  - o UL 1741 including Supplement SA from a NRTL
- ❑ Common Smart Inverter Profile (CSIP) Certification

Listing Request Forms

Battery Listing Request Form



Battery Listing Request Form

(See the Battery Listing Request Instructions for Listing Requirements) ID # ____ (For Internal Use Only)

NOTE: Please do not submit any proprietary or confidential information; all submitted information is public record.

Manufacturer Name:
Manufacturer Currently has equipment on Battery List: Yes ☐ No ☐
Update Manufacturer Name of Current Listings (if different) to above name[1]: Yes ☐ No ☐
Request Type: Add ☐ Revise ☐
Reason for Revision (or indicate N/A):
Manufacturer Contact Name:
Address:
Phone Number:
Email Address:

Battery Model Number	New/ Existing	Technology	Brief Description	Maximum Continuous Discharge Rate[2] (kW)	Nameplate Energy Capacity (kWh)

Safety Certification:

Is the test lab a Nationally Recognized Testing Laboratory (NRTL) recognized by the Occupational Safety and Health Administration (OSHA)?[3]	YES ☐	NO ☐
Is the UL 1973 certificate of compliance (or Authorization to Mark) from a NRTL and for the requested equipment model number(s)?	YES ☐	NO ☐
Was the test equipment calibrated when the test was performed?	YES ☐	NO ☐
Is a specification sheet (spec sheet) submitted for each of the requested model numbers?[2]	YES ☐	NO ☐

JA12[4] (Optional):

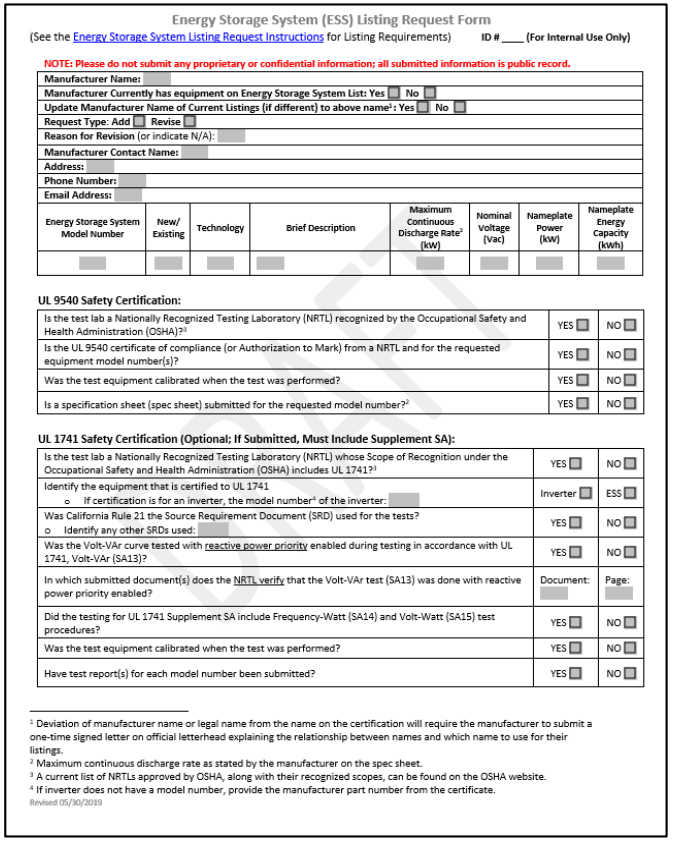
Is the JA12 declaration form completed and submitted?	YES ☐	NO ☐

Notes:

(If you checked "No" for any of the questions above, please explain and attach supporting documentation) (Please provide any other pertinent information, excluding marketing statements)

[1] Deviation of manufacturer name or legal name from the name on the certification will require the manufacturer to submit a one-time signed letter on official letterhead explaining the relationship between names and which name to use for their listings.
[2] Maximum continuous discharge rate as stated by the manufacturer on the spec sheet.

Energy Storage System (ESS) Request Form



Energy Storage System (ESS) Listing Request Form

(See the Energy Storage System Listing Request Instructions for Listing Requirements) ID # ____ (For Internal Use Only)

NOTE: Please do not submit any proprietary or confidential information; all submitted information is public record.

Manufacturer Name:
Manufacturer Currently has equipment on Energy Storage System List: Yes ☐ No ☐
Update Manufacturer Name of Current Listings (if different) to above name[1]: Yes ☐ No ☐
Request Type: Add ☐ Revise ☐
Reason for Revision (or indicate N/A):
Manufacturer Contact Name:
Address:
Phone Number:
Email Address:

Energy Storage System Model Number	New/ Existing	Technology	Brief Description	Maximum Continuous Discharge Rate[2] (kW)	Nominal Voltage (Vac)	Nameplate Power (kW)	Nameplate Energy Capacity (kWh)

UL 9540 Safety Certification:

Is the test lab a Nationally Recognized Testing Laboratory (NRTL) recognized by the Occupational Safety and Health Administration (OSHA)[3]?	YES ☐	NO ☐
Is the UL 9540 certificate of compliance (or Authorization to Mark) from a NRTL and for the requested equipment model number(s)?	YES ☐	NO ☐
Was the test equipment calibrated when the test was performed?	YES ☐	NO ☐
Is a specification sheet (spec sheet) submitted for the requested model number?[2]	YES ☐	NO ☐

UL 1741 Safety Certification (Optional; If Submitted, Must Include Supplement SA):

Is the test lab a Nationally Recognized Testing Laboratory (NRTL) whose Scope of Recognition under the Occupational Safety and Health Administration (OSHA) includes UL 1741?[3]	YES ☐	NO ☐
Identify the equipment that is certified to UL 1741 o If certification is for an inverter, the model number[4] of the inverter:	Inverter ☐	ESS ☐
Was California Rule 21 the Source Requirement Document (SRD) used for the tests? o Identify any other SRDs used:	YES ☐	NO ☐
Was the Volt-VAr curve tested with reactive power priority enabled during testing in accordance with UL 1741, Volt-VAr (SA13)?	YES ☐	NO ☐
In which submitted document(s) does the NRTL verify that the Volt-VAr test (SA13) was done with reactive power priority enabled?	Document:	Page:
Did the testing for UL 1741 Supplement SA include Frequency-Watt (SA14) and Volt-Watt (SA15) test procedures?	YES ☐	NO ☐
Was the test equipment calibrated when the test was performed?	YES ☐	NO ☐
Have test report(s) for each model number been submitted?	YES ☐	NO ☐

[1] Deviation of manufacturer name or legal name from the name on the certification will require the manufacturer to submit a one-time signed letter on official letterhead explaining the relationship between names and which name to use for their listings.
[2] Maximum continuous discharge rate as stated by the manufacturer on the spec sheet.
[3] A current list of NRTLs approved by OSHA, along with their recognized scopes, can be found on the OSHA website.
[4] If inverter does not have a model number, provide the manufacturer part number from the certificate.
Revised 05/30/2019

JA12–Qualification Requirements for Battery Storage System

California Energy Commission

Efficiency Division

Title 24 Hotline Contact Information:

Title24@energy.ca.gov

(916) 654-5106

JA12–Qualification Requirements for Battery Storage System

- Joint Appendix 12 (JA12) of the 2019 Building Energy Efficiency Standards provides the requirements for a battery energy storage system, in combination with an on-site photovoltaic system, to qualify for compliance credit towards meeting the required energy budget.
- New Joint Appendix outlines the minimum qualification requirements for battery storage systems for compliance credit in Title 24 – All batteries must be certified to CEC
- **Minimum Performance Requirements**
  - Minimum usable Capacity of 5 kWh
  - Round-trip efficiency of at least 80 percent; performance credit for better performing systems
  - Energy capacity retention of 70 percent after 4,000 cycles or 70 percent under a 10-year warranty

JA12–Qualification Requirements for Battery Storage System

- **General Control Requirements**
  - Applicable to all batteries in JA12.
  - Remote program capability for charge/discharge periods.
  - Programmed to first meet the load of the dwelling with capability to discharge to the grid with a DR signal.
  - Two times a year, perform system check to ensure the battery is not left in backup mode.

JA12–Qualification Requirements for Battery Storage System

At time of inspection, the battery shall meet one of the following control strategies, and have the capability to switch to others:

- **Basic Control**
  - Charge when generations is greater than load, discharge when PV production is less than the dwelling load

- **Time-of-Use (TOU) Control**
  - Same charging protocol as Basic Control
  - Discharging to dwelling and/or grid only during peak TOU hours - July 1 thru September 30; remainder of the year, Basic Control

JA12–Qualification Requirements for Battery Storage System

- **Advanced Demand Response Control**
  - Programmed as Basic Control or TOU control
  - Upon receipt of DR signal, the battery can change the charge/discharge periods to coincide with highest value critical peak hours.

JA12–Qualification Requirements for Battery Storage System

- **JA12 Certification**
  - Manufacturer shall complete a declaration statement certifying the battery storage models that complies with JA12.
  - Also indicate on the declaration which control strategies the battery storage is capable to perform, along with maximum continuous charge/discharge rate, roundtrip efficiency and usable capacity.

Summary Tables – Listing Request Documentation Requirements

Battery Request	**Required Documents**
New Add	Request Form, UL 1973 Certificate, Spec Sheet
Optional: JA12	***In addition to "New Add" required documents***, JA12 Declaration Form
Revising Data	Request Form, UL 1973 Certificate, Other Supporting Documents As Needed
ESS Request	**Required Documents**
New Add	Request Form, UL 9540 Certificate, Spec Sheet
Optional: UL 1741 SA	***In addition to "New Add" required documents***, UL 1741 SA Certificate, UL 1741 SA Test Summary
Optional: CSIP	***In addition to "New Add" required documents***, Certification to CSIP
Optional: JA12	***In addition to "New Add" required documents***, JA12 Declaration Form
Revising Data	Request Form, UL 9540 Certificate, Other Supporting Documents As Needed

Tips for a Successful Listing Request
(for all equipment)

1. Always **download** the **current forms** from GoSolarCalifornia website
2. Read **listing request instructions** before completing the form
3. The **manufacturer** completes and submits the request form
4. Any questions, please contact 916-654-4120 or email SolarEquipment@energy.ca.gov
5. Accurate, complete, and consistent information (e.g. manufacturer name, address, model numbers, etc.) on:
   - Request Form
   - Certificate of Compliance/ATM
   - Spec Sheet

Tips for a Successful Listing Request
(Continued)

6. Certificate of Compliance or ATM issued by NRTL
7. Confirm there is **no confidential or proprietary info** in the submission
8. Each request **must** contain ***all*** required documents
9. Submit all documentation (required and optional) in ***ONE*** **email** request to SolarEquipment@energy.ca.gov

Common Reasons for Rejection

1. Using an outdated version of a listing request form.
2. Incomplete package, missing information or documents.
3. Model numbers on the Request Form and Certificate do not match .
4. Certificates or spec sheets are submitted in editable format.
5. Certificate not signed or stamped and dated by testing lab.

Updates and Revisions to Inverter List Format

Grid Support Solar Inverter List (Full Data)

Data has not changed since April 15, 2019

Inverter List Notes

Archive of the "Prior List of Eligible Inverters" Expired March 31, 2005. (Adobe PDF, 6 pages, 120 kilobytes).

% Equipment is in the process of being removed from the list of eligible equipment pursuant to Appendix A, Section B, of the Guidelines for California's Solar Electric Incentive Programs (Senate Bill 1) at:
Guidelines for California's Solar Electric Incentive Programs (Senate Bill 1)

(1) Any text in brackets at the end of the Model Number is not part of the Manufacturer's Model Number. Part of the text in brackets indicates the specified voltage option for that model number, if provided; models with multiple voltage options will have multiple row entries, with one for each eligible option.

(2) Hybrid inverters are capable of taking DC power input from both a solar system and an energy storage system. These models are listed on both the solar and battery inverter lists to reflect the dual functionality. Refer to the manufacturer's documentation for more information on the exact functionality and limitations.

(3) **RPP**: UL 1741 SA13 tested with reactive power priority (when operating at apparent power capacity, inverter will reduce active power as needed to ensure curve-required reactive power is provided)

(4) The listed Firmware Version is the version that was used during the inverter's UL 1741 Supplement SA testing and was certified on the listed Certificate Date; multiple firmware versions may be listed for a single certificate date if all are required to comply with Supplement SA. Multiple certificate dates with different firmware versions may be listed if new firmware versions were certified under Supplement SA and reported by the manufacturer. Additional firmware versions may be certified but not reported. Check with NRTL for the most current information.

*** Microinverter has not been certified according to CSIP. Manufacturer declared that microinverter complies with CSIP when installed with certified external device mentioned in Notes. Certification information pertains to external device.**

Blue colored text indicates that the model number occurs multiple times on the list under different manufacturer names.

Manufacturer Name	Model Number[1]	Hybrid Inverter[2]	UL 1741 Supplement SA Testing	UL 1741 SA13 Volt-Var	UL 1741 SA Freq-Watt Volt-Watt	Common Smart Inverter Profile Conformance	Description	Maximum Continuous Output Power at Unity Power Factor	Nominal Voltage	Weighted Efficiency	UL 1741 Supplement SA Certification (SA8-SA13)[4]			UL 1741 SA13 Volt-Var	UL 1741 SA Freq-Watt Volt-Watt	CSIP Certification	
		PV and Battery	SA8-SA13	RPP[3]	SA14-SA15	CSIP		(kW)	(Vac)	(%)	Certifying Entity	Certificate Date [mo/day/yr]	Firmware Version(s) Test	SI-1R Listing Date (mo/day/y	Certificate Date [mo/day/y	Certifying Entity	Certif Da [mo/d
Solar Example	EX-PV-3 [208V]	N	Y	Y	N	N	3 kW, 208 Vac Grid Support Utility Interactive Inverter	3	208	96	TUV Rheinland of North America	[05/10/2017]	[1.0]	10/15/2018	No Information Submitted	No Information Submitted	N Inform Subm
Hybrid Example	ES-7T-x [240V]	Y	Y	Y	Y	N	7680 W, 240 Vac, Muti-mode Grid Support Utility Interactive Solar and Energy Storage Inverter	7.68	240	97.5	CSA Group	[07/05/2018]	[1.0]	10/15/2018	[07/05/2018]	No Information Submitted	N Inform Subm

Additional Resources for Applicants

Notices and program updates will be posted on the "Workshops, Notices and Training" webpage

www.gosolarcalifornia.ca.gov/equipment/events.php

Sign up on Solar Equipment List Serve to receive automated emails (bottom right corner of webpage)

https://www.energy.ca.gov/programs-and-topics/topics/renewable-energy/solar-equipment-lists

Solar and Storage Online Lists Contact Information

SolarEquipment@energy.ca.gov

(916) 654-4120

JA12 Declaration Form & Instructions

Title24@energy.ca.gov

(916) 654-5106

Q&A

Contact us via email at SolarEquipment@Energy.ca.gov

Or call us at (916) 654-4120 for any further questions.