Charge/Discharge Profile Programming through the Monitoring Portal – Application Note

Introduction

SolarEdge's StorEdge Solution can be used for various applications that enable energy independence for system owners, by utilizing a battery to store power and supply power as needed. One of the main applications of the StorEdge Solution is Charge/Discharge Profile Programming: the system operates according to a configurable charge/discharge profile, for example for time of use arbitrage (charge the battery from the PV/grid when tariffs are low and discharge the battery when tariffs are high).

A charge/discharge profile is created from a yearly calendar, repeated for 20 years as long as no profile changes are made. The yearly calendar is divided into segments, with one of seven charge/discharge modes assigned to each segment. This application note describes how to program a profile through the SolarEdge monitoring portal.

A profile comprises three components:

- 1 A daily profile type: defines the charge/discharge modes throughout a day. Different day types may be defined, for example, winter weekday, spring weekday, weekend, holiday, etc.
- 2 A seasonal profile: defines weekly profiles to use during specified periods of the year. These periods must cover the entire year. A typical use case is creating seasonal profiles corresponding to the seasonal changes of electricity rates.
- 3 Special day type: defines dates that should have a specific daily profile instead of the profile defined for the relevant period. For example, if you defined a seasonal profile from Dec. 15 to Jan. 15 but want the system to have a different daily profile for New Years, define a special day. Special days can be set as one-time events or as recurring events.

The following table describes the	available modes:
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Mode	Description
Off	No battery charging/discharging; can be used to extend battery lifetime by minimizing the number of shallow discharges (for example at night-time or during the winter).
Charge excess PV power	Charge the battery with PV power that is not self-consumed.
Charge from PV	Charge battery with all available PV power until it is full, and only then use PV power for self-consumption; useful when import rate is low.
Charge from PV and grid	Charge battery with all available PV power and with grid power until it is full, and only then use PV power for self-consumption; useful when import rate is very low and for StorEdge systems with backup in case a grid outage event is expected.
Discharge to maximize export	Discharge battery until the inverter reaches its AC limit; useful when export rate is high.
Discharge to minimize import	Discharge battery only for self-consumption, not for export to the grid; useful when import rate is relatively high.
Maximize self-consumption	Charge/discharge battery as needed to maximize self- consumption.



Configuring a Profile

This procedure can be completed before the system is installed or connected to the portal, that is, the site was defined in the monitoring portal but not connected.

To create a storage profile:

1 In the monitoring portal home page, click **My Account** and select the **Storage Profiles** tab.

solar <mark>edge</mark>				Home	Welcome	T I
					User Setting	<u>s</u>
😭 Sites 🛛 🚔 Account	s 🕞 Reports 🛛 🔅 C	perations 🧳 🖌 Suppo	ort 🛛 🛠 Maintenance		My account	
		New features added! C	lick to learn more		Logout	
 Company Details 	Time-of-Use Rates	Storage Profiles	Users	Modu	le Models	Inverter Model +
Storage Profiles	the system behavior for differe	ent time frames. Profiles are a	applied per site.		Add S	storage Profile

Figure 1: Storage Profiles tab and Add Storage Profile button

2 Click Add Storage Profile. The following window is displayed:

+	Company Details	Time-of-Use Rates	Storage Profiles	Users	Module Models	Inverter Model 🕈
	Add Storage Profile					
	Name:*					
	Country:*	United States	V			
	Description:					
	Daily profiles					
	Use the daily profile to se	t hourly modes				+ Add Daily Profile
	Name 🔺		Default mode (# modes)		Used in	Delete
	Backup reserve: *	% Res	erve a portion of the battery	capacity as backup for	grid outage event	
						Cancel Create

Figure 2: Add Storage Profiles

- **3** Fill in the profile details: name, country and optionally a profile description.
- 4 In the **Backup reserve** field enter the battery capacity portion to reserve for backup (in %). This is applicable only to StorEdge systems with backup.

- **5** Create daily profiles:
 - a. Click Add Daily Profile Type. The following window is displayed:

• 0
Create

Figure 3: Add Daily Profile

- b. Fill in the profile details: name and optionally a profile description.
- c. Select the profile default mode from the dropdown list. The default mode will apply to the entire day; you can then set different modes for selected timeslots.

Off
Charge excess PV power
Charge from PV
Charge from PV and grid
Discharge to maximize export
Discharge to minimize import
Maximize self-consumption

Figure 4: Profile modes

d. Click **Create**. The Daily Profile Details window is displayed:

aily Profile	Details		×
Name:*		Weekend	
Descripti	on:	Flat rates	
Default m	node:*	Maximize self-consu	mption 🔻 🕝
Mode			Change Schedule
6am			·
7am			-
8am			-
9am			-
10am			
11am			
42.000			
12pm			
1pm			
2pm			
3pm			
4pm			
5pm			-
6pm			-
			_ ·
		Cancel	Delete Create

Figure 5: Daily Profile Details



e. You can set different modes for selected time slots, either by clicking **Change Schedule**, or by selecting a time slot in the window. The Change Schedule window is displayed.

	×
ctivation time	
	▼
9:00 AM 🔻 to 10:00 AM 🔻	
(Cancel Save
	ctivation time 9:00 AM v to 10:00 AM v

Figure 6: Changing the schedule in a daily profile

- Select the mode from the **Schedule** drop down and optionally add a description.
- Click Save.
- Click **Update** in the Daily Profile Details window.
- f. Click **Create**. The daily profile is added to the Storage Profiles window.

÷	Company Details	Time-of-Us	se Rates	Storage Profiles	Users	Module Models	Inverter Model
	Storage Profile Details						
	Name:*	Demo					
	Country:*	United King	gdom	•			
	Description:	Storage pro	ofile for demo				
	Daily profile types						
	Use daily profile types to	o set hourly sch	nedule				+ Add Profile Type
	Name 🔺		De	fault mode (# schedules)		Used in	Delete
	Weekend		Max	imize self-consumption (0)	ļ	Automn,Winter,Summer	Î
	<u>Weekday - summer</u>		Max	imize self-consumption (1)		Summer	Î
	<u>Weekday - winter</u>		Max	imize self-consumption (1)		Automn,Winter	Î

Figure 7: Daily profile types

- g. To create additional daily profiles, click **Add Profile Type**. Repeat the steps above to create as many profile types as needed. For example, you can use Maximize Self-consumption mode on the weekend, Charge from PV mode in summer mornings, or Charge from PV mode in autumn noon hours.
- **6** Create seasonal profiles:
 - a. In the Storage Profiles window, click Add Seasonal Profile.

asonal Profiles		
Use seasonal profiles to set daily profile types for each	period	+ Add Seasonal Profil
Name 🔺	Date range (recurring)	Delete
Automn	Oct 1 - Dec 31	Î
Winter	Jan 1 - Mar 31	Ĩ
Summer	Apr 1 - Sep 30	Ĩ

Figure 8: Add Seasonal Profiles in the Storage Profiles window



The following window is displayed:

iption: d (recurring): *	From: v	v To: v	Ŧ				
N	onday*	Tuesday*	Wednesday*	Thursday*	Friday*	Saturday*	Sunday*
n							
m							
n							
1							
pm							

Figure 9: Adding Seasonal Profiles

- b. Fill in the profile details: name, optionally a profile description, and the start and end dates of the period when the profile should be used.
- c. For each day of the week, select a daily profile from the dropdown list. This weekly profile will recur each week of the defined period.
- d. Click **Create**. The profile is added to the Storage Profiles window.
- e. To create additional seasonal profiles, click **Add Profile Type**. Repeat the steps above to create as many profile types as needed.

NOTE

The seasonal profiles must cover the entire year, from Jan 1st to Dec 31st.

- 7 Optionally, create specific day profiles for holidays and other days requiring a different profile:
 - a. In the Storage Profiles window, click Add Special Day. The following window is displayed:

Name:*			
Description:			
Date:*			recurrin
Profile:*			
6am			
7am			
8am			
9am			
10am			
11am			
12pm			
1pm			
2pm			
3pm			
4pm			
5pm			
6pm			

Figure 10: Creating a special day profile

- f. Fill in the profile details: name and optionally a profile description.
- 8 Click in the **Date** field. Enter a single date or click the calendar icon to select a date or a period that should be defined with the same settings.

• s	peci ate r	fic da rang	ate e											
	July 2016 ▼ →							◀ July 2016 ▼ ▶						
S	М	Т	W	т	F	S	S	М	Т	W	Т	F	S	
26	27	28	29	30	1	2	26	27	28	29	30	1	2	
3	4	5	6	7	8	9	3	4	5	6	7	8	9	
10	11	12	13	14	15	16	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	17	18	19	20	21	22	23	
24	25	26	27	28	29	30	24	25	26	27	28	29	30	
31	1	2	3	4	5	6	31	1	2	3	4	5	6	
												ok		

Figure 11: Calendar

- g. To repeat the profile yearly, select the **recurring** check box.
- h. Select a daily profile from the dropdown list.
- i. Click **Create**. The profile is added to the Storage Profiles window.
- **9** Click **Create**. The profile is saved.

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To edit a profile:

- 1 Click the profile name to open its details
- **2** Edit as required.
- 3 Click Update.

To apply a charge/discharge profile to a site:

1 In the monitoring portal site page, click **Admin** and select the **Energy Manager** tab.

Storage profile	Site	Details	Re	evenue	Perf	formance	Ener	gy Manager		Logical L	ayout	Physical L
Set profile from server Apply this profile Maximize self-consumption Backup only Disable StorEdge mverter profiles mverter profiles mverter 1 (TF102299C-54) Storage Profile mverter 2 (TF19BFF2-49)	Storag	e profile										
 Apply this profile Maximize self-consumption Backup only Disable StorEdge Inverter profiles Inverter _ Storage mode Storage profile name Last Update Status Log Inverter 1 (7F10299C-54) Storage Profile Demo Profile Univerter Demo Profile Univerter Univerter 2 (7F198BFF2-49) Storage Profile Demo Profile Univerter Univerter <td< td=""><td>Set I</td><td>profile from server</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	Set I	profile from server										
 Maximize self-consumption Backup only Disable StorEdge nverter profiles Inverter ^ Storage mode Storage profile name Last Update Status Log Inverter 1 (7F10299C-54) Storage Profile Demo Profile Inverter 2 (7F198FF2-49) Storage Profile Demo Profile	 Ø Ø 	profile from server	Demo	Profile			Ŧ					
Backup only Disable StorEdge Cancel Save Inverter profiles Inverter ^ Storage mode Storage profile name Last Update Status Log Inverter 1 Storage Profile Demo Profile Imported Storage Profile Demo Profile	O N	laximize self-cons	umption									
Disable StorEdge Cancel Save Inverter ^ (7F10299c-54) Storage Profile Demo Profile Inverter 2 (7F198FF2-49) Storage Profile Demo Profile	O B	Backup only										
Cancel Save Inverter A Storage mode Storage profile name Last Update Status Log Inverter 1 (7F10299C-54) Storage Profile Demo Profile Demo Profile Log)isable StorEdge										
Inverter profiles Inverter ^ Storage mode Storage profile name Last Update Status Log Inverter 1 (7F10299C-54) Storage Profile Demo Profile Log Inverter 2 (7F19BFF2-49) Storage Profile Demo Profile												
Inverter profiles Inverter A Storage mode Storage profile name Last Update Status Log Inverter 1 (7F10299C-54) Storage Profile Demo Profile Enverter 2 (7F199BFF2-49) Storage Profile Demo Profile											Cancel	Save
Inverter 1 (7F10299C-54) Storage Profile Demo Profile Inverter 2 (7F19BFF2-49) Storage Profile Demo Profile	verter	profiles									Cancel	Save
Inverter 2 Storage Profile Demo Profile	iverter	profiles	Storage	mode	Storage p	profile name		Last Upd	ate	Status	Cancel	Save
	Inverter	profiles	Storage	mode Profile	Storage p Demo Pro	profile name ofile		Last Upd	ate	Status	Cancel	Log
	Inverter 1 Inverter 1 (7F10299 Inverter 2 (7F19BFI	profiles 9C-54) 2 F2-49)	Storage Storage Storage	mode Profile Profile	Demo Pro	orofile name ofile		Last Upd	ate	Status	Cancel	Log
	Inverter 4 Inverter 4 (7F10299 Inverter 2 (7F19BF1	profiles	Storage Storage Storage	mode Profile Profile	Demo Pro	orofile name ofile ofile		Last Upd	ate	Status	Cancel	Log
	Inverter 1 Inverter 1 (7F10299 Inverter 2 (7F19BF1	profiles 9C-54) 2 F2-49)	Storage Storage	mode Profile Profile	Demo Pro	orofile name ofile		Last Upd	ate	Status	Cancel	Log

Figure 12: Energy Manager tab

- 2 Select the Set profile from server check box.
- **3** Select **Apply this profile** and select the profile name from the drop-down list. The profile is applied to all inverters in the site.
- 4 Click Save. The Energy Manager window displays:
 - In the Storage mode column: "Storage Profile" (if you applied a profile)
 - In the Storage profile name column: The specific profile that was applied to the site, as reported by each inverter.

The site will use the charge/discharge profile that was defined.