

EnergyFlow_for_Tesla_Documentation

EnergyFlow for Tesla

The EnergyFlow for Tesla driver suite enables seamless Control4 integration with Tesla Energy products including Tesla Powerwall, solar installations, and energy management systems. The suite includes:

- **EnergyFlow for Tesla:** The main proxy driver for Tesla API connection
- **Battery Display:** Represents individual Powerwall units
- **Grid Display:** Shows grid connection status and power flow
- **Solar Display:** Displays solar production information
- **Load Display:** Shows house power consumption
- **Storm Mode Display:** Controls and displays storm mode status

Installation and Updating

Installation Steps

1. Unzip the driver package.
2. In Composer Pro:
 - Go to **Driver > Add or Update Driver or Agent**
 - Add all bundled drivers from the package
 - All drivers must be added before proceeding with configuration

Prerequisites

1. Energy products must be provisioned by Tesla installers
2. Customer must have an active Tesla account with access to their energy products
3. Tesla account must have the energy products registered and visible in the Tesla mobile app

Configuration

Initial Setup

1. In **System Design**, add **EnergyFlow for Tesla** to the project

2. Select the driver in the project. In the **Properties** tab:
 - In the **Actions** property dropdown, select `Authenticate` and click **Set**
 - Copy the `Authentication URL` that appears
3. Send the authentication link to the customer. The authentication link will direct them to the Tesla authentication site where they will:
 - Enter their Tesla credentials
 - Grant “EnergyFlow Control4 Driver” access to:
 - **Profile Information:** Required to determine customer region for correct API endpoint
 - **Energy Product Information:** Access to installed energy products like Powerwall
 - **Energy Product Commands:** Permission to modify settings such as backup reserve percentage

Note: The authentication process will time out after 30 minutes. If the customer takes longer, restart the process with a new **Authenticate** action.

1. Monitor authentication status. The driver will periodically check for completion. Upon successful authentication:
 - `API Status` will display `Successfully authenticated`
 - `User Account` will populate with the customer’s name and email — confirm this matches the expected Tesla account
 - Customer will not need to re-authenticate unless access is revoked
2. After authentication, the driver automatically discovers energy products and creates connection bindings for each Site and feature:
 - **Battery** (Powerwall)
 - **Grid** connection
 - **Solar** panels (if installed)
 - **Load** (House consumption)
 - **Storm Mode**

Adding Device Drivers

Automatic (Recommended)

1. In the **Actions** property, choose `Add Devices` and click **Set**
2. The driver will:
 - Create a display driver for each discovered energy component
 - Automatically bind connections between main driver and display drivers
 - Place devices in the current room (move to appropriate rooms as needed)

Manual (Optional)

1. In **Actions**, run `Create Bindings`
2. Add individual display drivers to the project:
 - **Battery Display** for Powerwall units
 - **Grid Display** for grid connection
 - **Solar Display** for solar production
 - **Load Display** for house consumption
 - **Storm Mode Display** for storm mode control
3. Connect bindings manually through the **Connections** tab

Driver Properties

EnergyFlow for Tesla (Main Driver)

Status Properties

- **Cloud Status:** License activation status and update availability
- **Automatic Updates:** Automatically update the driver when updates are available. (Recommend setting to `On`)
- **Driver Version:** Current driver version number
- **Authentication URL:** Authentication link (visible during setup only)

Configuration Properties

- **Actions:** Driver management actions (`Authenticate`, `Update Energy Sites`, `Add Devices`, `Refresh Weather Status`)
- **Log Level:** Debug output level (`Off`, `Debug`, `Trace`, `Trace with API Calls`). `Trace with API Calls` will output the raw API responses for maximum debugging.
- **Poll Time Minutes:** API polling frequency (default: 2 minutes, minimum: 2 minutes). Affects both the Tesla and Weather APIs.
- **Auto Storm Mode On Severe Weather:** Automatically enable storm mode on all Tesla sites when NWS severe weather alerts are detected for the project location. Requires latitude and longitude to be set in project properties. See [Auto Storm Mode](#) below.
- **Minimum Alert Severity:** (visible when Auto Storm Mode is enabled) Minimum NWS severity level to trigger storm mode — includes this level and all more severe levels. Default: `Severe`, which catches events most likely to cause power outages: Tornado Warnings, Blizzard Warnings, High Wind Warnings, Ice Storm

Warnings, and Red Flag Warnings. Set to to also include Wind Advisories and Special Weather Statements.

- **Minimum Alert Urgency:** (visible when Auto Storm Mode is enabled) Minimum NWS urgency level to trigger storm mode — includes this level and all more urgent levels. Default: , which includes watches (Flash Flood Watch, Fire Weather Watch, Winter Storm Watch) in addition to warnings, allowing batteries to pre-charge well before severe weather arrives. Set to to trigger only on warnings and active threats.
- **Combine Solar Inverters with Battery:** Aggregate solar data with battery metrics. Most installs should leave this set to . For customers with more than one solar inverter, metrics will be aggregated into one set of display drivers. If set to , each inverter will have separate device drivers and there will also be aggregated drivers, as well, causing confusion. Setting this property to may be desired if the install does not include a CT clamp monitoring total combined solar output.

Information Properties

- **API Status:** Last API request status and error messages
- **User Account:** Authenticated Tesla account name and email address (e.g.). Populated automatically after successful authentication. Useful for confirming the correct Tesla account is connected.
- **User Region:** Tesla API region (automatically detected after authentication)
- **Weather Alert Active:** (visible when Auto Storm Mode is enabled) Read-only. when one or more active NWS alerts match the configured severity and certainty filters. Updated on every poll.
- **Weather Alert Details:** (visible when Auto Storm Mode is enabled) Read-only. Lists all active NWS weather alerts at the project location with their severity, urgency, and whether each alert matches the configured thresholds. Updated on every poll. Use the action for an immediate update.

Display Drivers

Each display driver includes:

Status Properties

- **Cloud Status:** License and update status
- **Automatic Updates:** Automatically update the driver when updates are available. (Recommend setting to)
- **Driver Version:** Current driver version number

Configuration Properties

- **Log Level:** Debug output level (Off, Debug, Trace)

Current State Properties

- **Varies based on driver**

Composer Pro Programming

See **Programming Reference** below for comprehensive lists of events, commands, variables, and conditionals available for programming.

Programming Reference

Events

EnergyFlow for Tesla (Main Driver): - When a variable changes

Battery Display: - Battery is low - Battery is charging - Battery is discharging -
When a variable changes

Solar Display: - Starts producing power - Stops producing power - When a variable changes

Grid Display: - Starts importing power - Starts exporting power - Stops importing or exporting power - Goes off grid - Reconnects to grid - When a variable changes

Load Display: - When a variable changes

Storm Mode: - Storm mode is enabled - Storm mode is disabled - Storm mode is enabled by weather - Storm mode is disabled by weather - When a variable changes

Variables

EnergyFlow for Tesla (Main Driver):

Variable	Description	Type
{SITE_NAME} BACKUP_RESERVE_PERCENT	Battery backup reserve percentage	Number
{SITE_NAME} BATTERY_IS_CHARGING	Battery charging status	Boolean

Variable	Description	Type
{SITE_NAME} BATTERY_IS_DISCHARGING	Battery discharging status	Boolean
{SITE_NAME} BATTERY_PERCENT	Current battery charge level	Number
{SITE_NAME} BATTERY_POWER_WATTS	Battery power (+ charging, - discharging)	Number
{SITE_NAME} GRID_POWER_WATTS	Grid power (+ importing, - exporting)	Number
{SITE_NAME}_GRID_STATUS	Grid connection status (Active, Inactive)	String
{SITE_NAME}_ISLAND_STATUS	Grid mode status (on_grid, off_grid, off_grid_intentional)	String
{SITE_NAME} LOAD_POWER_WATTS	House power consumption	Number
{SITE_NAME} SOLAR_POWER_WATTS	Solar power production	Number
{SITE_NAME} STORM_MODE_ENABLED	Storm mode activation status	Boolean
WEATHER_ALERT_ACTIVE	Whether active NWS alerts match the configured filter	Boolean

Battery Display:

Variable	Description	Type
POWERWALL_PERCENT	Current charge percentage	Number
POWERWALL_POWER_WATTS	Current power flow	Number
POWERWALL_IS_CHARGING	Charging status	Boolean
POWERWALL_IS_DISCHARGING	Discharging status	Boolean

Variable	Description	Type
POWERWALL_LAST_UPDATED	The date/time the variables were last updated	String

Solar Display:

Variable	Description	Type
SOLAR_POWER_WATTS	Current production	Number
SOLAR_LAST_UPDATED	The date/time the variables were last updated	String

Grid Display:

Variable	Description	Type
GRID_POWER_WATTS	Current grid power flow	Number
GRID_STATUS	Grid connection status (Active, Inactive)	String
GRID_LAST_UPDATED	The date/time the variables were last updated	String

Load Display:

Variable	Description	Type
LOAD_POWER_WATTS	Current home consumption	Number
LOAD_LAST_UPDATED	The date/time the variables were last updated	String

Storm Mode:

Variable	Description	Type
STORM_MODE_ENABLED	Storm mode enabled status	Boolean
STORM_MODE_MINUTES_REMAINING	If enabled, how many minutes remain before storm mode is disabled	Number

Auto Storm Mode

When **Auto Storm Mode On Severe Weather** is set to ☐ Yes, the driver polls the [National Weather Service \(NWS\)](#) alerts API on every poll cycle and automatically enables storm mode across all Tesla sites when active alerts match the configured severity and urgency thresholds.

Auto Storm Mode vs. Tesla Storm Watch

Tesla's built-in Storm Watch monitors weather conditions and automatically enables storm mode, but it offers no configuration — customers cannot adjust which weather events trigger it, how sensitive it is, or how far in advance it activates. This can lead to unexpected behavior: batteries may not charge when customers expect, or storm mode may not engage until severe weather is imminent.

This driver's Auto Storm Mode addresses those limitations:

- **Configurable sensitivity:** Choose exactly which NWS severity and urgency levels trigger storm mode. A customer in a region prone to minor advisories can set a higher threshold; one in a tornado-prone area might lower it.
- **Earlier activation:** NWS issues watches and warnings well before severe weather arrives. Because the driver responds directly to NWS alerts, storm mode can engage hours ahead of the actual event, giving batteries more time to reach full charge, often from solar rather than grid.
- **Transparency:** The **Weather Alert Details** property shows exactly which alerts are active and why storm mode was or wasn't triggered, making it easy to diagnose and tune.
- **Control4 integration:** Weather-triggered changes fire dedicated events (`Storm mode is enabled by weather`) that can drive additional automations — notifications, scene changes, or other pre-storm actions.

Important: If Auto Storm Mode is enabled in this driver, the customer should **disable Tesla's built-in Storm Watch** in the Tesla app to avoid conflicts. With both active, Tesla's Storm Watch may re-enable storm mode after the driver has disabled it following an alert clearance or customer override, causing unpredictable behavior.

To disable Storm Watch: Tesla App > Powerwall > Settings > Storm Watch > Off.

How It Works

1. On each poll, the driver queries NWS for active alerts at the project's latitude/longitude.
2. If any alert matches both the **Minimum Alert Severity** and **Minimum Alert Urgency** thresholds, storm mode is enabled on all sites and the Storm Mode display driver switches to **Auto** state.
3. When alerts clear, the driver has a **30-minute cooldown** before disabling storm mode to avoid rapid cycling from back-to-back alert updates.
4. If the customer manually taps the Storm Mode button while in Auto state, storm mode is disabled and weather auto-enable is suppressed for **24 hours** to respect the override.

Requirements

- **Latitude and longitude** must be set in the Control4 project properties (System Design → Project Properties).
- The project location must fall within a [NWS-covered area](#) (United States and territories).

Adjusting Sensitivity

The defaults (**Severe** / **Future**) are tuned for events most likely to cause power outages while still providing advance warning via watches. To adjust:

Setting	Effect
Severity: Extreme	Only the most catastrophic events (rare; major hurricanes, significant tornadoes)
Severity: Severe (default)	Tornado Warnings, Blizzard Warnings, High Wind Warnings, Red Flag Warnings, Ice Storm Warnings
Severity: Moderate	Also adds Wind Advisories, Special Weather Statements
Urgency: Future (default)	Watches + warnings — triggers well in advance for maximum charge time
Urgency: Expected	Warnings only — triggers when threat is imminent

Setting	Effect
Urgency: <code>Immediate</code>	Only active/ongoing threats — minimal advance notice

Note: Some NWS alert types (Air Quality Alerts, Shelter in Place Warnings) do not carry structured severity or urgency values and cannot be captured by this feature regardless of configuration.

Use the **Weather Alert Details** property to see exactly which alerts are active and whether they match the current filter. The **Refresh Weather Status** action forces an immediate check without waiting for the next poll.

Programming Notes

The `WEATHER_ALERT_ACTIVE` variable (Boolean) updates on every poll and can be used in Control4 programming independently of whether storm mode is currently active. For example, it can trigger a notification even if the customer has suppressed auto storm mode.

The **Storm Mode** driver fires dedicated weather events (`Storm mode is enabled by weather` / `Storm mode is disabled by weather`) in addition to the standard enable/disable events, allowing programming to distinguish weather-triggered changes from manual changes.

Advanced Features

Multi-Site Support

For customers with multiple Tesla Energy installations: - Each site creates separate device bindings - Site names are prefixed to all main driver variables - Independent control and monitoring per site

Troubleshooting

Common Issues

Authentication Failures: - Verify customer Tesla account access - Check if energy products are visible in Tesla app - Ensure authentication completed within 30-minute window

API Connection Issues: - Check `API Status` property for error messages - Review log output for detailed error information - Confirm Tesla service availability

Missing Device Bindings: - Run `Update Energy Sites` action - Verify products are active in Tesla account

Data Update Problems: - Check polling interval settings - Review network connectivity - Confirm Tesla account permissions

Support

1. **Primary Support:** Contact Driver Central support as first step
2. **Escalation:** Driver Central will escalate to Blessing Innovations LLC when necessary
3. **Feature Requests:** Submit issues at <https://gitlab.com/dblessing/c4-energyflow-for-tesla/-/issues>