



Powering ITS Devices in Challenging Environments

North/West Passage – August 26, 2026

Garrett Chaston, FE, UDOT Region Four

Troy C. Torgersen, P.E., UDOT Region Four



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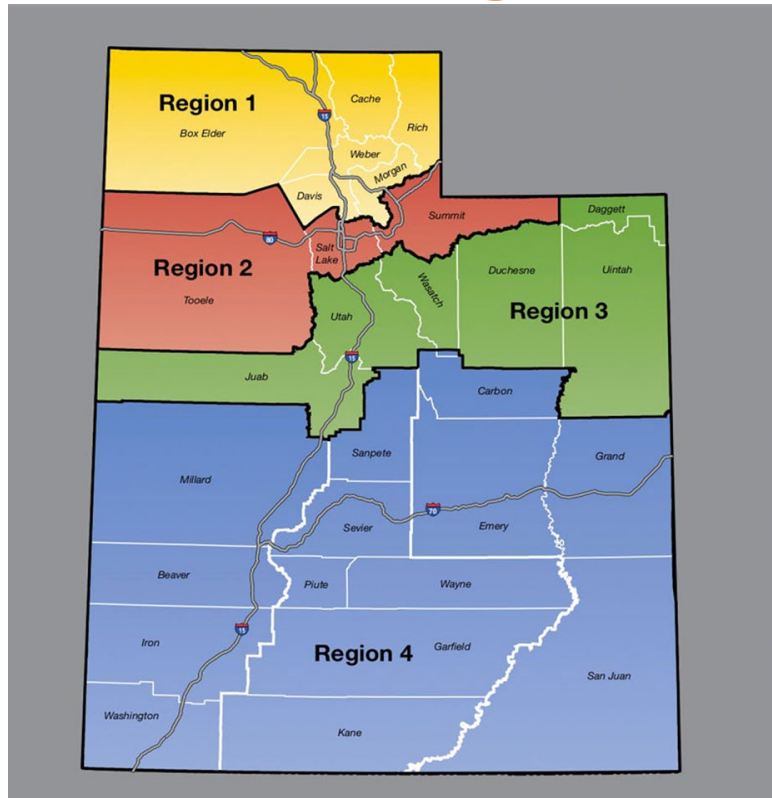
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UDOT Regions



Typical Solar Site Layout



LiveView Replacement Project



LiveView Project Details

- Company provided CCTV Camera Service
- 173 CCTV Camera Sites Statewide
- Camera Sites did not meeting States needs
- UDOT tasked with replacing the sites

LiveView Installations



Design Services Contract

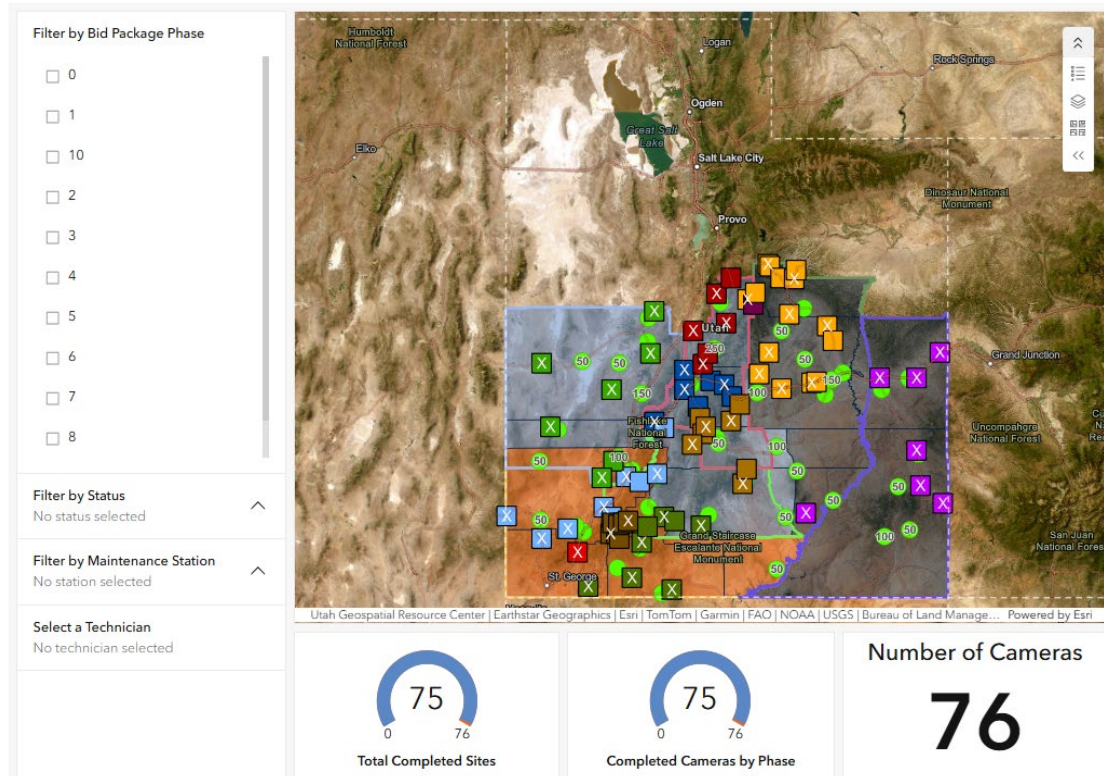
Design Engineering Services support – \$2,250 per site:

- Design site plans for up to 75 sites just in Region 4
- Coordinated with UDOT Maintenance Stations
- Ideally 6-7 site plans will be delivered at a time for advertisement.
- Procurement Advertisement



R4 LiveView Replacement Map

LiveView Camera Replacement Status



Project Cost Estimate

ePM505 Cost Estimate (Rev 2311) 10-MAY-2025 09:25:31

Cost Estimate

PIN: 18894 Remote Cctv System Replacement - Region 4 Current Status of PIN is Under Construction Save Print History

Project: S-R499(384) Location: Managed out of Region 4 Print 506 Print Current

FMS No: F015931 Subcategories: Yes ☒ No ☐

Estimator: [REDACTED]
 Date: 04/23/2025

Environmental: 0
 CD: 0
 PE: 265,653 281.5
 Right of Way: 0
 Utilities: 94,357
 Construction: 0
 CE: 384,927 407.9
 Incentives: 0
 Miscellaneous: 1,482,872
 Contingency: 89,896

Total Estimate: 2,317,705
 Project Value: 2,317,705
 Under Planning: 0

Capacity / Efficiency Percentage: 10 %

Capital-Operating Expense Classification
 GASB Infrastructure Reporting FAQ

Subcategories	Cash Flow	Reference	Calc CE	History
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	UNASSIGNED
03/02/2021	03/02/2021	08/05/2020	07/30/2020	
0	0	0	0	0
0	0	0	0	0
169,548	200,000	200,000	200,000	200,000
0	0	0	0	0
0	0	0	0	0
800,000	800,000	0	0	0
0	0	0	0	0
0	0	0	0	0
1,000,000	1,000,000	1,800,000	0	0
0	0	0	0	0
1,969,548	2,000,000	2,000,000	200,000	

Project Equipment



Cabinet Used

DDB Unlimited SOD-372425



Solar Panel

Solar Controllers & Accessories (NON-STOCK)

Description		Commodity Code	
PV Modules / 320W / LR6-60HPB-320M		NONSTOCK404	
	Category	Solar Controllers & Accessories (NON-STOCK)	
	Model #	LR6-60HPB-320M	
	Unit Price	\$234	
	Compatible with...		
	Notes	320W Solar Panel. 66.2 in H x 39.2 in W x 1.4 in T. Need 2 for a 2-Panel Solar Site and 4 for a 4-Panel Solar Site.	
Lead Time:	8 weeks	Vendor:	Steadfast Solar
Desired Stock:	0	Contract:	219522
Reorder Threshold:	0	Contract Expiration Date:	October 31, 2025
Spec Sheet:	https://s3.amazonaws.com/ecodirect_docs/1/ONGI/1/ONGI-LR6-60HPB-305M-datasheet.pdf		

Battery

- NorthStar NSB 190FT Blue+

- Long Design Life
 - 12 yrs @ 68°F
 - 2,050 Cycles
- Operating Temp
 - -40°F to +149°F
- Ultra-fast Recharge
- Shelf life up to 24 month
- Weight 132 lb



Battery Design Details Cont.



NSB 190FT BLUE+



NSB 210FT BLUE+

Height	12.4 in (316 mm)	12.9 in (328 mm))
Width	4.9 in (125 mm)	4.96 in (126 mm)
Length	22.1 in (561 mm)	22.0 in (560 mm)
Weight	132 lbs (60 kg)	139 lbs (63 kg)
Terminal	Male M6	Male M6
Terminal Torque	9.0 Nm (81 in-lbs)	9.0 Nm (80 in-lbs)
10 hr Capacity to 1.80VPC @ 25°C (77°F)	183 Ah	200 Ah
8 hr Capacity to 1.75VPC @ 25°C (77°F)	180 Ah	198 Ah
Float Voltage at 20°C (68°F) / 25°C (77°F)	2.28 / 2.27 VPC	2.28 / 2.27 VPC
Impedance (1kHz)	3.3	3.3
Short Circuit Current	3990 A	3800 A
Maximum Charge Current	No Limit	No Limit
Nominal Voltage	12 V	12 V

Solar Controller

 **MORNINGSTAR**
PROFESSIONAL SERIES



Equipment Selected - Relay Driver

RELAYDRIVER™

Logic Module Accessory

Installation, Operation and Maintenance Manual



.....
Four-Channel Relay Driver
.....



World's Leading Solar Controllers & Inverters

www.morningstarcorp.com

Relay Driver Settings

1.3 Factory Settings

The Relay Driver is pre-configured at the factory with a default configuration as outlined below. If a different configuration is needed, a custom configuration will need to be programmed into the Relay Driver. ***Sections 2.0 through 5.0 explain software installation, custom configuration, and installation.***

Channel 1

Threshold Function:

Channel OFF when $V_{\text{battery}} < 11.5\text{V}$

Channel ON when $V_{\text{battery}} > 12.6\text{V}$

1 minute delay before turning on/off

Channel 2

Threshold Function:

Channel OFF when $V_{\text{battery}} < 11.1\text{V}$

Channel ON when $V_{\text{battery}} > 12.2\text{V}$

1 minute delay before turning on/off

Channel 3

Threshold Function:

Channel OFF when $V_{\text{battery}} < 14.0\text{V}$

Channel ON when $V_{\text{battery}} > 15.0\text{V}$

Channel 4

TriStar Alarm/Fault Monitor:

Channel OFF when no alarms/faults exist

Channel ON when any alarms/faults exist

Excludes RTS open alarm

No communication time-out alarm

Project Relay Driver 24 Volt System

1.3 Factory Settings

The Relay Driver is pre-configured at the factory with a default configuration as outlined below. If a different configuration is needed, a custom configuration will need to be programmed into the Relay Driver.

Sections 2.0 through 5.0 explain software installation, custom configuration, and installation.

Channel 1 - Camera

Threshold Function:

Channel OFF when $V_{\text{battery}} < 23.0\text{V}$

Channel ON when $V_{\text{battery}} > 25.2\text{V}$

minute delay before turning on/off

Channel 2 - Communication Device

Threshold Function:

Channel OFF when $V_{\text{battery}} < 22.2\text{V}$

Channel ON when $V_{\text{battery}} > 24.4\text{V}$

1-minute delay before turning on/off

Channel 3

Threshold Function:

Channel OFF when $V_{\text{battery}} < 14.0\text{V}$

Channel ON when $V_{\text{battery}} > 15.0\text{V}$

Channel 4

TriStar Alarm/Fault Monitor:

Channel OFF when no alarms/faults exist

Channel ON when any alarms/faults exist

Excludes RTS open alarm

No communication time-out alarm

Project Relay Driver 48 Volt System

1.3 Factory Settings

The Relay Driver is pre-configured at the factory with a default configuration as outlined below. If a different configuration is needed, a custom configuration will need to be programmed into the Relay Driver.

Sections 2.0 through 5.0 explain software installation, custom configuration, and installation.

Channel 1 - Camera

Threshold Function:

Channel OFF when $V_{\text{battery}} < 46.0V$

Channel ON when $V_{\text{battery}} > 50.4V$

minute delay before turning on/off

Channel 2 - Communication Device

Threshold Function:

Channel OFF when $V_{\text{battery}} < 44.4V$

Channel ON when $V_{\text{battery}} > 48.8V$

1-minute delay before turning on/off

Channel 3

Threshold Function:

Channel OFF when $V_{\text{battery}} < 14.0V$

Channel ON when $V_{\text{battery}} > 15.0V$

Channel 4

TriStar Alarm/Fault Monitor:

Channel OFF when no alarms/faults exist

Channel ON when any alarms/faults exist

Excludes RTS open alarm

No communication time-out alarm

Equipment Selected - Camera



AXIS Q6135-LE PTZ Network Camera

High-speed PTZ with long-range optimizedIR

AXIS Q6135-LE offers HDTV 1080p with 32x optical zoom. It features OptimizedIR up to 250 m (820 ft) or more depending on the scene and Lightfinder 2.0 for clear, sharp images even in challenging light. Sharpdome technology allows you to see 20° above the horizon with the same sharp image quality as below. It includes orientation aid and autotracking 2 with click and track functionality. Privacy masking with mosaic lets you pixelate whole areas of the scene. It includes enhanced security features such as signed firmware, secure boot and TPM module. Plus, Axis Zipstream with support for H.264 and H.265.

- > HDTV 1080p with 32x optical zoom
- > OptimizedIR (250 m/820 ft range)
- > Lightfinder 2.0
- > Autotracking 2 and orientation aid
- > TPM, FIPS 140-2 level 2 certified



- Typical 10.3 W
- Max 51 W (Stated)

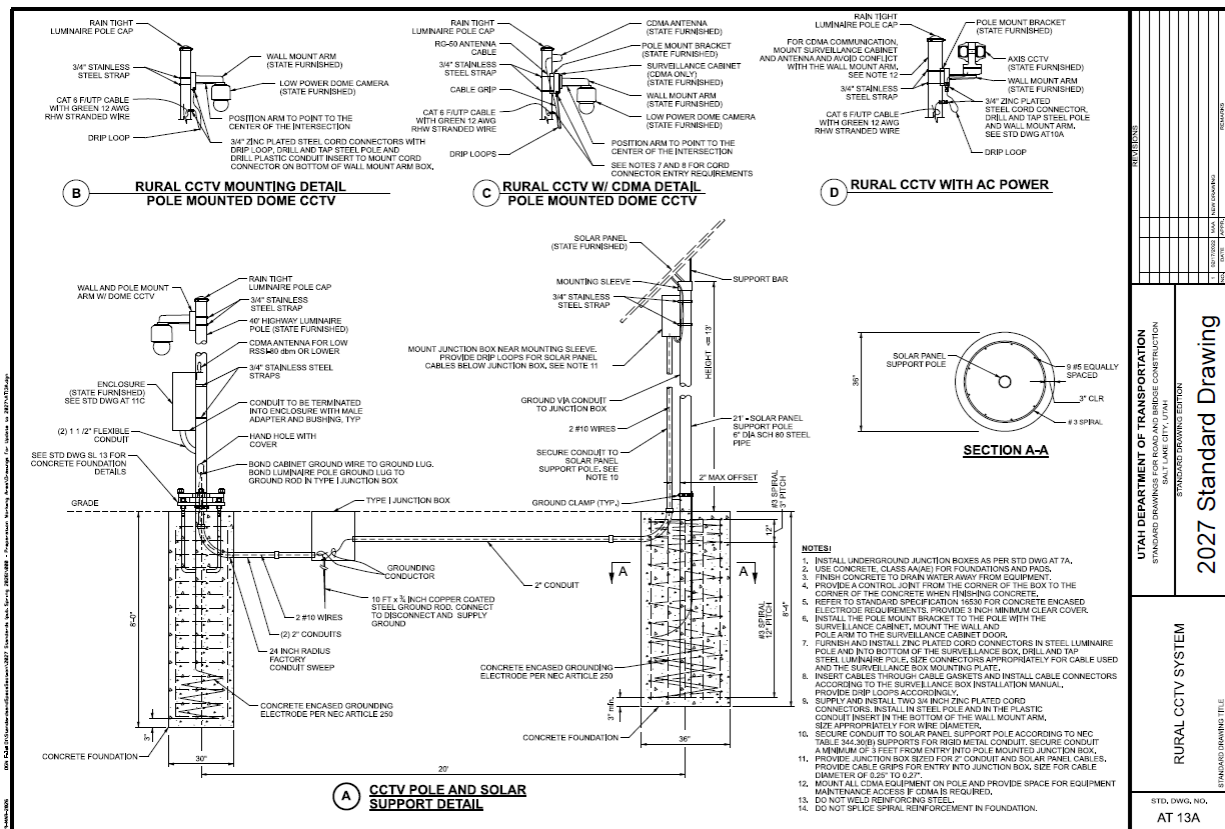
Axis Q6215-LE PTZ Camera

Axis Q6215-LE
(Q6225-LE)

- Typical 25 W
- Max 71 W



CCTV Camera System Layout



Definitions Table

Row	Variable	Calculations	Units
A.	Total Daily Load	Total Load x Hours of Load/Day	Wh/day
B.	Effective Daily Load - 85% Efficiency	Total Daily Load / System Efficiency Factor	Wh/day
C.	Total Energy	No. of Batteries x Battery Voltage x Battery Ah Rating	Wh
D.	Usable Energy - 50% DoD	Total Energy x DoD	Wh
E.	Days of Autonomy (Row D / Row B)	Usable Battery Energy / Effective Daily Load	Days
DoD	Depth of Discharge	Lead Acid Battery	0.50
DoD	Depth of Discharge	LiFePO4	0.85
SE	System Efficiency	0.85 to 0.95	0.85

LiveView Solar Site Loads

Device	Watts	Hrs./Day	Wh/Day
Camera (night)	51	12	612
Camera (day)	14	12	168
Midspan Power Supply	1	24	24
Modem	9.8	24	235
Solar Controller	2.7	24	65
		Total	1,104

Fiber Switch Communication

Device	Watts	Hrs./Day	Wh/Day
Camera (night)	51	12	612
Camera (day)	14	12	168
Midspan Power Supply	1	24	24
Switch (9.5 W - 15 W)	12	24	288
Solar Controller	2.7	24	65
		Total	1,157

LiveView Calculated Days of Autonomy

2-12V batteries - 24V System

50% Depth of Discharge

Row	Variable	Calculated Values	Units
A.	Total Daily Load (Wh/day)	1,157	Wh/day
B.	Effective Daily Load - 85% Eff. (Wh/day)	1,361.18	Wh/day
C.	Total Energy (Wh)	4,800	Wh
D.	Usable Energy - 50% DoD (Wh)	2,400	Wh
E.	Days of Autonomy (Row D / Row B)	1.76	Days
F.	Battery Capacity (each battery)	200	Ah
G.	Battery Capacity (Total)	200	Ah
H.	System Voltage	24	V
I.	Depth of Discharge	0.50	DoD
J.	System Efficiency	0.85	Eff.

LiveView Calculated Days of Autonomy

4-12V batteries - 24V System

50% Depth of Discharge

Row	Variable	Calculated Values	Units
A.	Total Daily Load	1,157	Wh/day
B.	Effective Daily Load - 85% Efficiency	1,361.18	Wh/day
C.	Total Energy	9,600	Wh
D.	Usable Energy - 50% DoD	4,800	Wh
E.	Days of Autonomy (Row D / Row B)	3.53	Days
F.	Battery Capacity (each battery)	200	Ah
G.	Battery Capacity (Total)	400	Ah
H.	System Voltage	24	V
I.	Depth of Discharge	0.50	DoD
J.	System Efficiency	0.85	Eff.

Project Installation



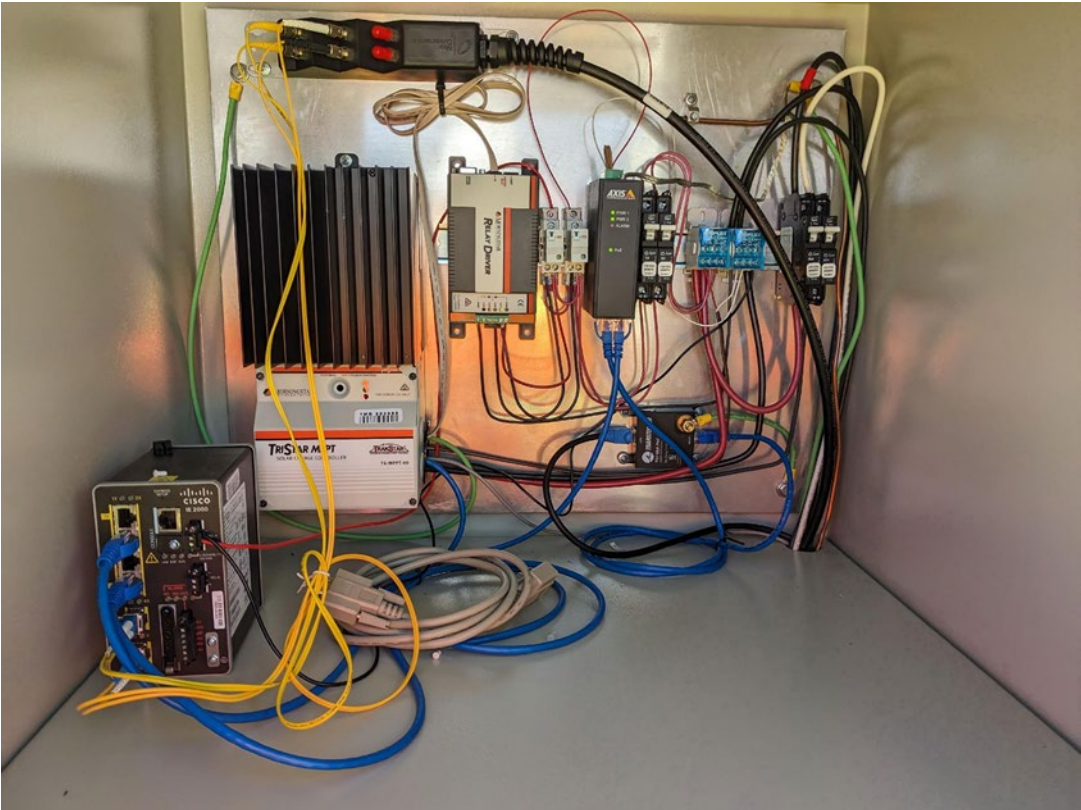
Project Installation



Project Installation



Project Installation



Price Comparison of Sites

Installation Type	Construction	Equipment	Total
2-panel/2-battery solar	\$8,730.00	\$10,062.68	\$18,792.68
4-panel/4-battery solar	\$11,503.00	\$14,134.76	\$25,637.76
AC Power	\$6,593.00	\$5,595.24	\$12,188.24

Note: Prices reflect UDOT State Furnished Materials and Procurement Construction Costs

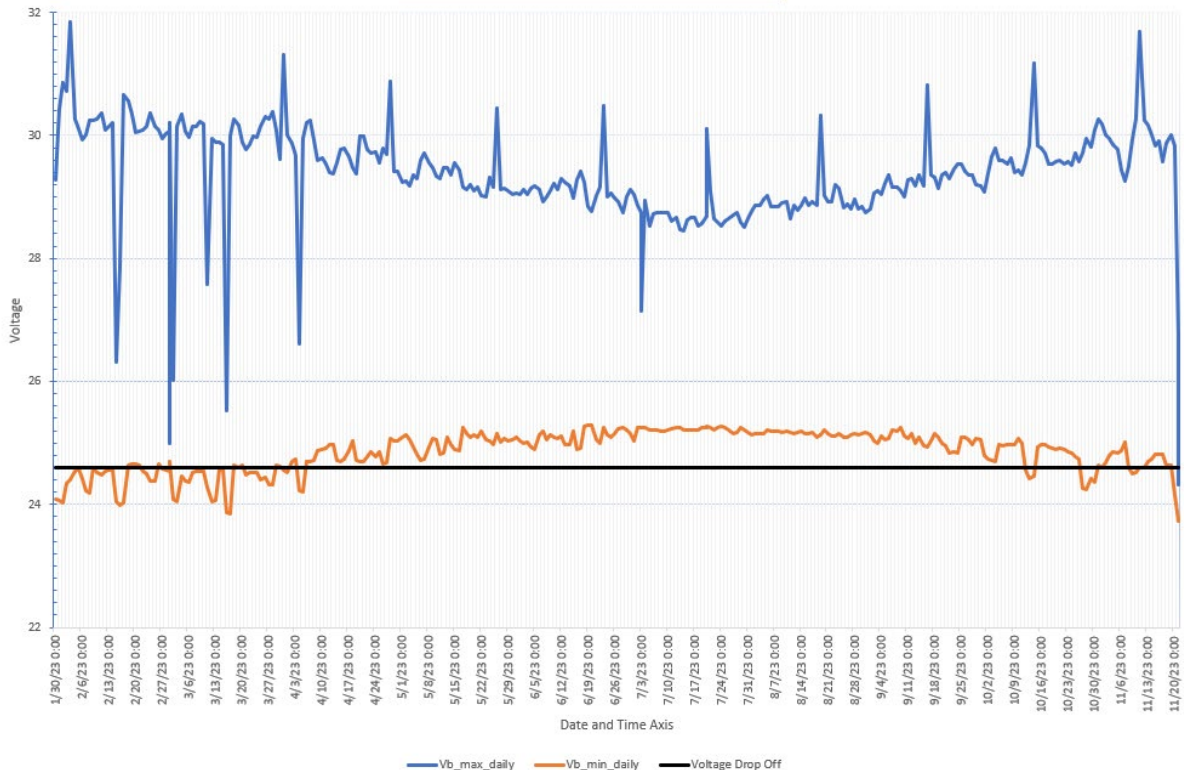
Lessons Learned First Winter

- Maintenance crews rely on the CCTV Camera sites
- Storms lasting more than three days – Autonomy inadequate
- Cameras go down first, Communication down second
- Had sites within a fiber channel without any redundancy
 - Drop one site, every site downstream goes down on the channel



LiveView Site Daily Graph

I-70 MP 44.90 Live View Chart - Voltage Chart



Back to the Drawing Board

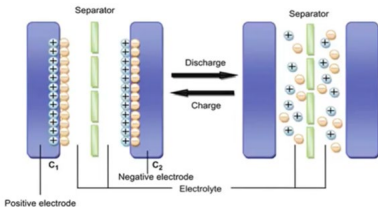
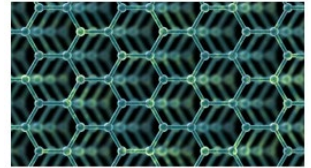
- Region 4 Signals and ITS crew combined
- Decided to use a technology used in signals for ITS sites
- Supercapacitors were used for Uninterruptible Power Systems/Battery Backup Systems in signals.
- Supercapacitors were similar to a battery

Supercapacitors



Supercapacitors

Graphene, a sheet of carbon atoms bound together in a honeycomb lattice pattern, is recognized as a “wonder material” due to the myriad of attributes it holds.



It is a potent conductor of electrical and thermal energy, extremely lightweight, chemically inert, and flexible with a large surface area.

It is also considered eco-friendly and sustainable, with possibilities for numerous applications.



Supercapacitors



- **ZX2000**

- Voltage Configurations: 24, 36, 48 & 72 VDC
- Standard size: 17.25" W x 14.25" D x 5.25" H
- Optional ZX2000-48F: 16" W x 10" D x 7" H

Supercapacitors

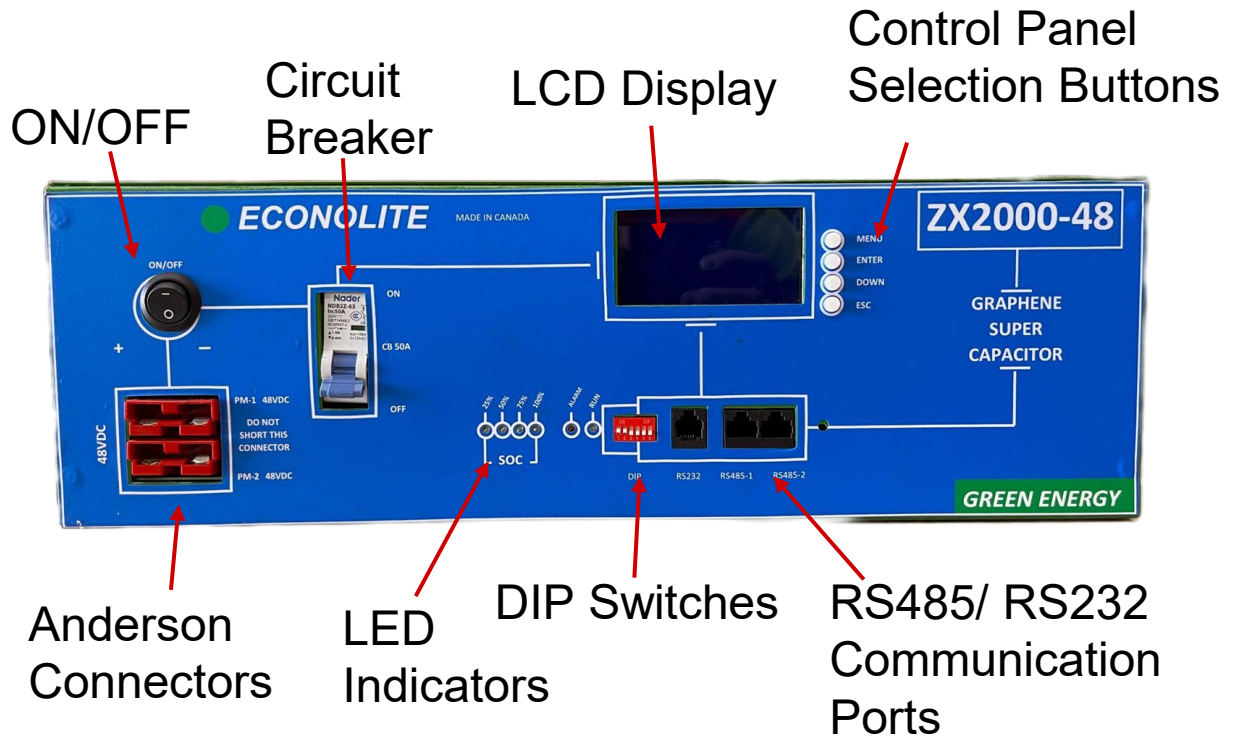
How to read the Super Capacitor status/info

- Basic and important info:
- Voltage is the key factor in energy level:
 - Depleted is around 42.5V for a ZX2000-48 (not 0V!)
 - Fully charged is around 54.5V
- Current
 - Positive current showing means it is being charged
 - Negative current means it is on backup (being discharged)
 - Zero current usually means it is fully charged (~54.5V)
 - Or... the charger on the UPS may not be working properly
- State of Charge (SOC): Predicted by Super Cap SW algorithm
 - Can be inaccurate before any charge/discharge cycles have occurred



Modules	ZX2000-24*	ZX1000-36*	ZX2000-36*	ZX2000-48*	ZX2000-48F*	ZX2000-72***
Rating	2000WHR	1000WHR	2000WHR	2000WHR	2000WHR	2000WHR
VDC Nominal	24V	36V	36V	48V	48V	72V
AH Rating C3	105*	34*	58*	60*	60*	39*
Max VDC	28.5	42	42	57.6	57.6	82.7
Minimum VDC	20.0	31.0	31.0	41.2	41.2	73.7
Max Discharge Amp***	105	66	66	66	66	36
Max Charge Current	100A	60A	60A	100A	100A	40
CMS/BMS	Active with current and VDC control	Active with current and VDC control	Active with current and VDC control	Active with current and VDC control	Active with current and VDC control	Active with current and VDC control
Display	• LCD: Capacity, VDC, & AH • Charge & discharge amp • Cell: VDC cell temp, alarm, & parallel status	• LCD: Capacity, VDC, & AH • Charge & discharge amp • Cell: VDC cell temp, alarm, & parallel status	• LCD: Capacity, VDC, & AH • Charge & discharge amp • Cell: VDC cell temp, alarm, & parallel status	• LCD: Capacity, VDC, & AH • Charge & discharge amp • Cell: VDC cell temp, alarm, & parallel status	• LCD: Capacity, VDC, & AH • Charge & discharge amp • Cell: VDC cell temp, alarm, & parallel status	• LCD: Capacity, VDC, & AH • Charge & discharge amp • Cell: VDC cell temp, alarm, & parallel status
Indicators	LED: 25%, 50%, 75%, & 100% charge/discharge, run, alarm	LED: 25%, 50%, 75%, & 100% charge/discharge, run, alarm	LED: 25%, 50%, 75%, & 100% charge/discharge, run, alarm	LED: 25%, 50%, 75%, & 100% charge/discharge, run, alarm	LED: 25%, 50%, 75%, & 100% charge/discharge, run, alarm	LED: 25%, 50%, 75%, & 100% charge/discharge, run, alarm
Control Buttons	Menu, Enter, Down, Esc.	Menu, Enter, Down, Esc.	Menu, Enter, Down, Esc.	Menu, Enter, Down, Esc.	Menu, Enter, Down, Esc.	Menu, Enter, Down, Esc.
Communication	Parallel RS485 x 2 ZX2000-72 Ethernet x 1	Parallel RS485 x 2 ZX2000-72 Ethernet x 1	Parallel RS485 x 2 ZX2000-72 Ethernet x 1	Parallel RS485 x 2 ZX2000-72 Ethernet x 1	Parallel RS485 x 2 ZX2000-72 Ethernet x 1	Parallel RS485 x 2
Parallel Dip Switch	6x ON/OFF setting	6x ON/OFF setting	6x ON/OFF setting	6x ON/OFF setting	6x ON/OFF setting	6x ON/OFF setting
ON/OFF Control	Rocker switch with DC breaker 2 pole/w-finger guard	Rocker switch with DC breaker 2 pole/w-finger guard	Rocker switch with DC breaker 2 pole/w-finger guard	Rocker switch with DC breaker 2 pole/w-finger guard	Rocker switch with DC breaker 2 pole/w-finger guard	Rocker switch with DC breaker 2 pole/w-finger guard
DC Connections	Anderson 2 x SB Series black or grey	Anderson PP75 Series 2 x red/black	Anderson PP75 Series 2 x red/black	Anderson SB 50 Series 2 x red molded	Anderson SB 50 Series 2 x red molded	Anderson SB 50 Series 2 x blue molded
Dimensions (in.)	17.25W x 5.25H x 14.25D	15.0W x 5.25H x 9.35D	17.25W x 5.25H x 14.5D	17.25W x 5.25H x 14.25D	16W x 7.0H x 10.25D	17.25W x 5.25H x 14.75D
Weight	23kg/50.6lbs	16kg/32lbs	22.27kg/49lbs	22.2kg/48lbs	22.2kg/48lbs	24.5kg/54lbs

Supercapacitor Features



Supercapacitor Features

- Eco-friendly
- 100% recyclable
- 100,000's of discharge cycles
- Long shelf life without cell damage
- Zero Maintenance – Zero environmental impact
- 10-year replacement warranty
- Up to 30 years of service life
- Minimal degradation over life
- Maximum Charge Current: Between 60 A and 100 A
- Single connection to solar charger

Recharge Time

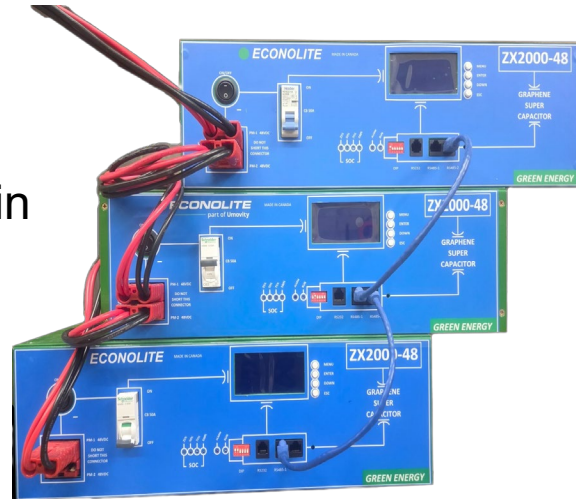
Charge setup	1000Wh-36 charge time	2000Wh-48 charge time
Standard MXU/BBS	8.5 hrs	9.2 hrs
25A Charger	1.5 hrs	3.0 hrs
50A Charger	38 minutes	118 minutes

Recharge to 90% Capacity

Supercapacitor Features

Connect up to 10 Supercapacitors

- Can extend run time with more Supercapacitors
- Connect multiple Supercapacitors in parallel with manufacturer's cables
- Use ethernet cable to connect modules
- Set DIP switches to manufacturer's instructions



Comparison

Supercapacitors

VS

Lead-Acid Batteries



Comparison - Individual

Supercapacitor Econolite ZX2000-48

Rating: 2,000 Wh @ 48 V
Dimensions: 17.25" W X 5.25" H X 14.25" D
Weight: 48 lb
Cost: \$4,527 each



Lead Acid Battery NorthStar NSB 190FT Blue+

Rating: 2,196 Wh @ 12 V
Dimensions: 4.9" W x 12.6" H x 22" D
Weight: 132 lb
Cost: \$464 each



Comparison - Site

2x Supercapacitor Econolite ZX2000-48

Rating: 4,000 Wh @ 48 V
Dimensions: 17.25" W X 10.5" H X 14.25"D
Weight: 96 lb
Cost: \$9,054



4x Lead Acid Battery NorthStar NSB 190FT Blue+

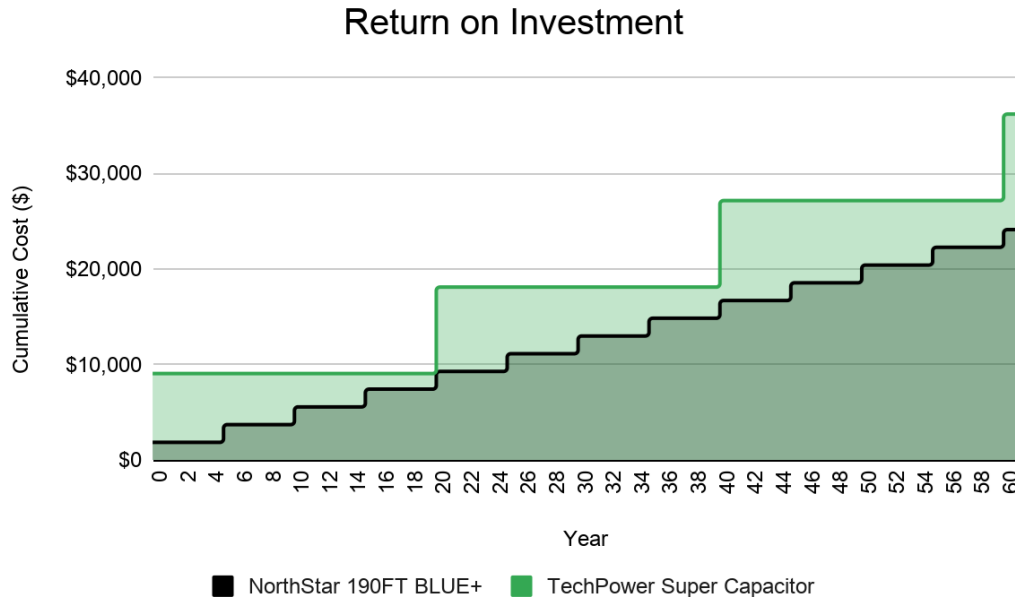
Rating: 8,784 Wh @ 48 V
*5,622 Wh
Dimensions: 20" W x 12.6" H x 22" D
Weight: 528 lb
Cost: \$1,856



**adjusted for temperature and 80% DoD*

Comparison - ROI

- Assumes a 5 year lifespan for batteries and 20 year lifespan for supercapacitors.



1st Supercapacitor Installation

From this



To this



- Calculated autonomy
 - 1.8 Days @77 F
 - 1.5 Days @15 F
- Charge time? Varied with temperature
- Calculated autonomy
 - 2.3 Days
 - Unaffected by cold temperature.

2nd Supercapacitor Installation



Increased
battery capacity
was necessary



Increased
Supercapacitor
capacity was
available

2nd Supercapacitor Installation



- Calc. autonomy
 - 8 Days @77 F
 - 7.5 Days @15 F



- Calc. autonomy
 - 4.5 Days
 - Unaffected by cold temperature.

2nd Supercapacitor Installation



- Run time with solar panel off
 - 6 Days

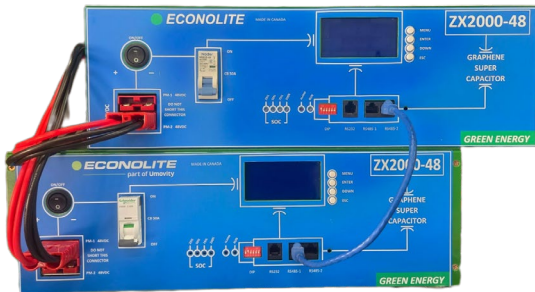


- Runtime with solar panels off
 - 2.5 Days

Utah's mild winter this year prevented a true test.

Lessons Learned - Supercapacitor

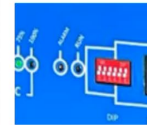
- Properly connect communication cables and set dip switches



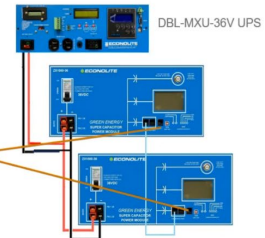
DIP Switch settings when using multiple Super Cap Batteries

- Set DIP Switches per table in user manual when using 2 or more Super Caps
- Use one parallel cable and one Cat 5 cable for each additional Super Cap

Module 1	DIP 1 ON	2 OFF	3 OFF	4 OFF
Module 2	DIP 1 OFF	2 ON	3 OFF	4 OFF
Module 3	DIP 1 ON	2 ON	3 OFF	4 OFF
Module 4	DIP 1 OFF	2 OFF	3 ON	4 OFF
Module 5	DIP 1 ON	2 OFF	3 ON	4 OFF
Module 6	DIP 1 OFF	2 ON	3 ON	4 OFF
Module 7	DIP 1 ON	2 ON	3 ON	4 OFF
Module 8	DIP 1 OFF	2 OFF	3 OFF	4 ON
Module 9	DIP 1 OFF	2 ON	3 ON	4 OFF
Module 10	DIP 1 OFF	2 ON	3 OFF	4 ON



UP is (ON)
DOWN is (OFF)



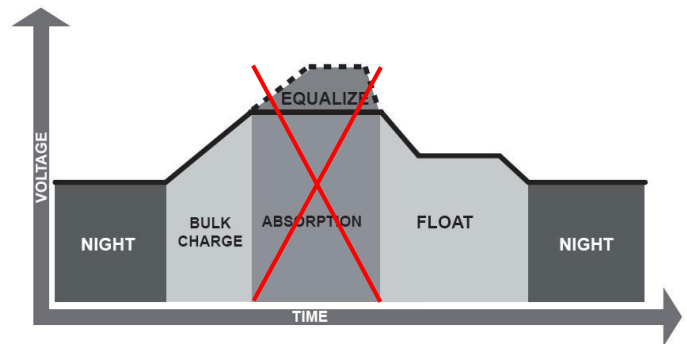
Two ZX1000's in parallel – 2000Whr total

ECONOLITE
part of Unify

Lessons Learned - Supercapacitor

- **Solar controller programming**

- Supercapacitors charge differently than lead acid batteries.
- Absorption and Equalization are not necessary.
- 3-stage battery charging algorithm
 - Night
 - Bulk Charge
 - Float



Lessons Learned - Supercapacitor

- **State of charge indication lights are unreliable.**
 - To check the status of the supercapacitor, check the “pack status” voltage
 - All packs should be very close in voltage
 - A failed cell will impact the module exponentially

Will Wind Work?



Turbine Details

Ryse Energy

- Model: AIR 30 Land 48V
 - 1-AR30-10-48
- Weight: 13 lb
- Rotor Diameter: 46 in
- Startup Wind: 8 mph
- Max. Wind Speed: 90 mph
- Power Production stops: 33 mph
- Rated Power:
 - 400 W @ 28 mph

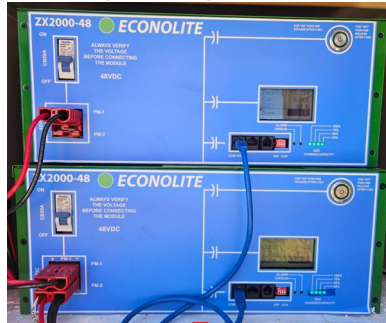


Equipment Line Diagrams

Solar Camera



Supercapacitors



Solar Charge Controller



Solar panels



Wind generator



Bus / Termination Point



Lessons Learned - Wind Generator

- Overcharge
- Overvoltage



Lessons Learned – Site Design

- Need to do the research
 - Use competent and experienced designer
 - The site needs to be designed as a system
 - Select the most efficient components
 - Design each site – Not a cookbook design
 - Critical Design Analysis
 - Load
 - Solar Insolation



Site Design Cont.

- Critical Design Analysis cont.
 - Battery Bank Sizing
 - Array Sizing, Array Orientation
- Consider Existing/Future Loads
- Plan for the Worst
 - High Energy Consumption (Load) – Low Solar Energy (Insolation)

Site Design Cont.

- Critical Design Month
 - Highest Critical Design Ratio
 - Use this data to size the entire system
 - Increase System Availability – for future equipment
- IEEE Std 1562 solar battery autonomy recommendations
 - 5 to 7 days for non-critical loads located in areas with high solar insolation
 - 7 to 14 days for critical loads or low insolation
- Higher Voltage Systems = Less Current = Greater

Efficiency

Lessons Learned

- Didn't anticipate equipment added after original design
- Additional equipment added incorrectly – connected directly to batteries
- On a four battery system, inner two batteries died before the outer two batteries
- Over design of sites

Site shown here designed for 5.82 days of autonomy but ran for more than 30 after a fire destroyed panels



Lessons Learned - Cameras



Camera Power Settings - Dome

AXIS Q6135-LE PTZ Network Camera

Power status

Usage

Current power: 35.98 W
Average power: 30.64 W
Max power: 52.97 W

PoE

PoE class (PSE): 5
Power requested: 51.00 W

Power profiles

- ☒ **Full power (default)**
Suitable for temperatures between -50 and 50 °C (-58 and 122 °F)
- ☐ **Low power**
Suitable for temperatures between 0 and 50 °C (32 and 122 °F)
Note: The heater will be disabled in this profile

Camera Power Settings Cont.

AXIS Q6135-LE PTZ Network Camera

Power status

Usage

Current power: 9.56 W
Average power: 30.64 W
Max power: 52.97 W

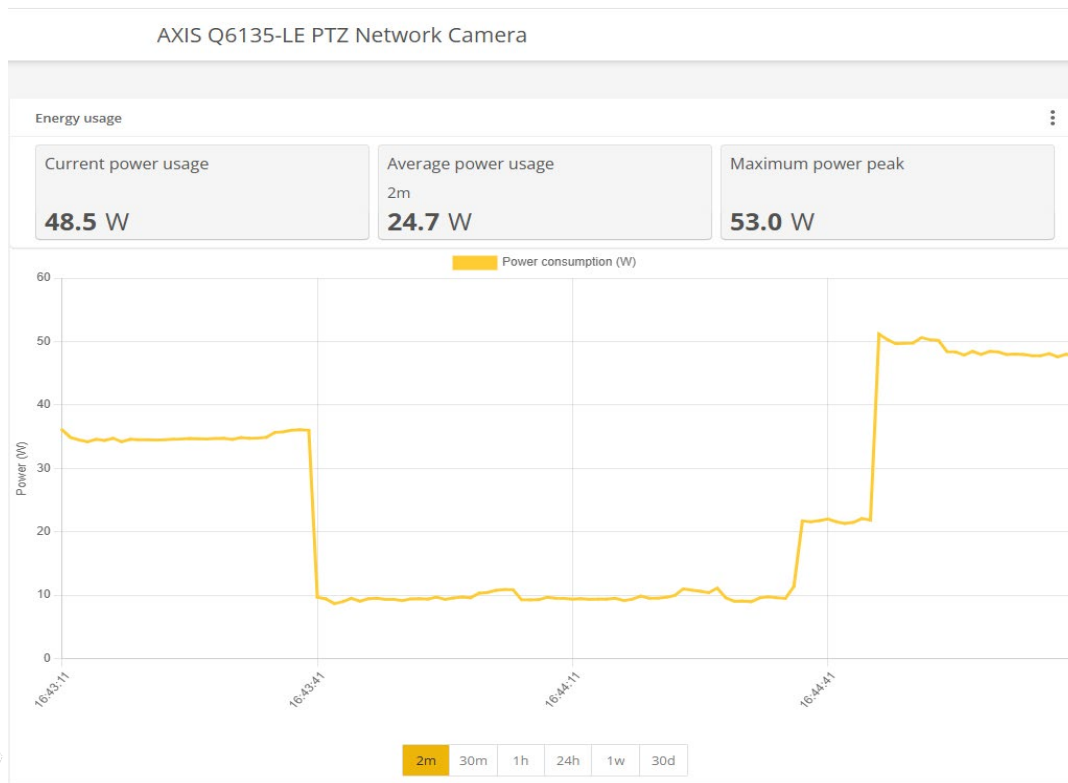
PoE

PoE class (PSE): 5
Power requested: 51.00 W

Power profiles

- ☐ **Full power (default)**
Suitable for temperatures between -50 and 50 °C (-58 and 122 °F)
- ☒ **Low power**
Suitable for temperatures between 0 and 50 °C (32 and 122 °F)
Note: The heater will be disabled in this profile

Camera Power Settings Cont.



Camera Power Settings Cont.

Energy usage



Current power usage

34.8 W

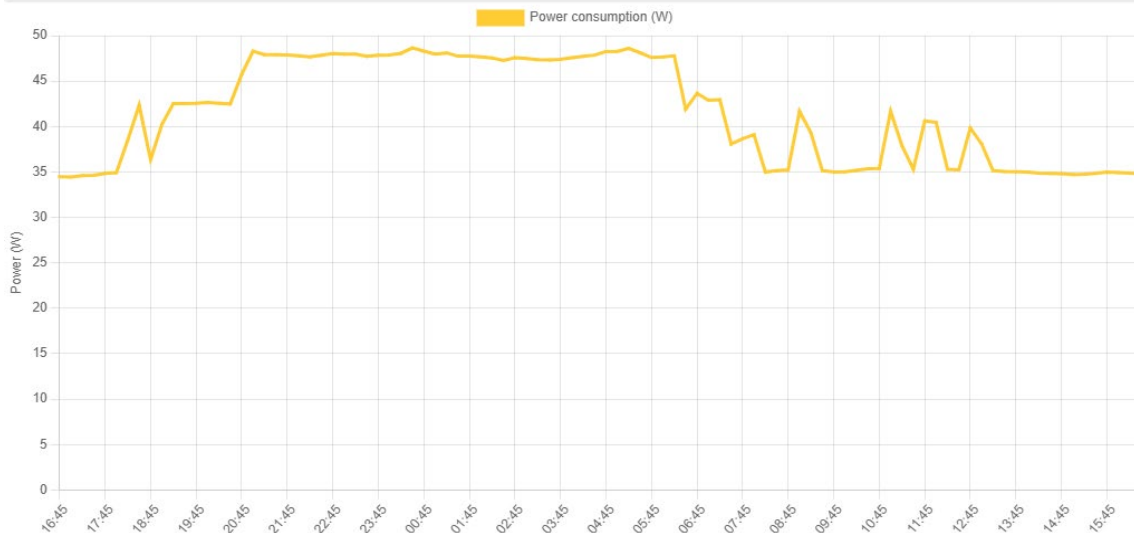
Average power usage

24h

41.7 W

Maximum power peak

53.0 W



2m

30m

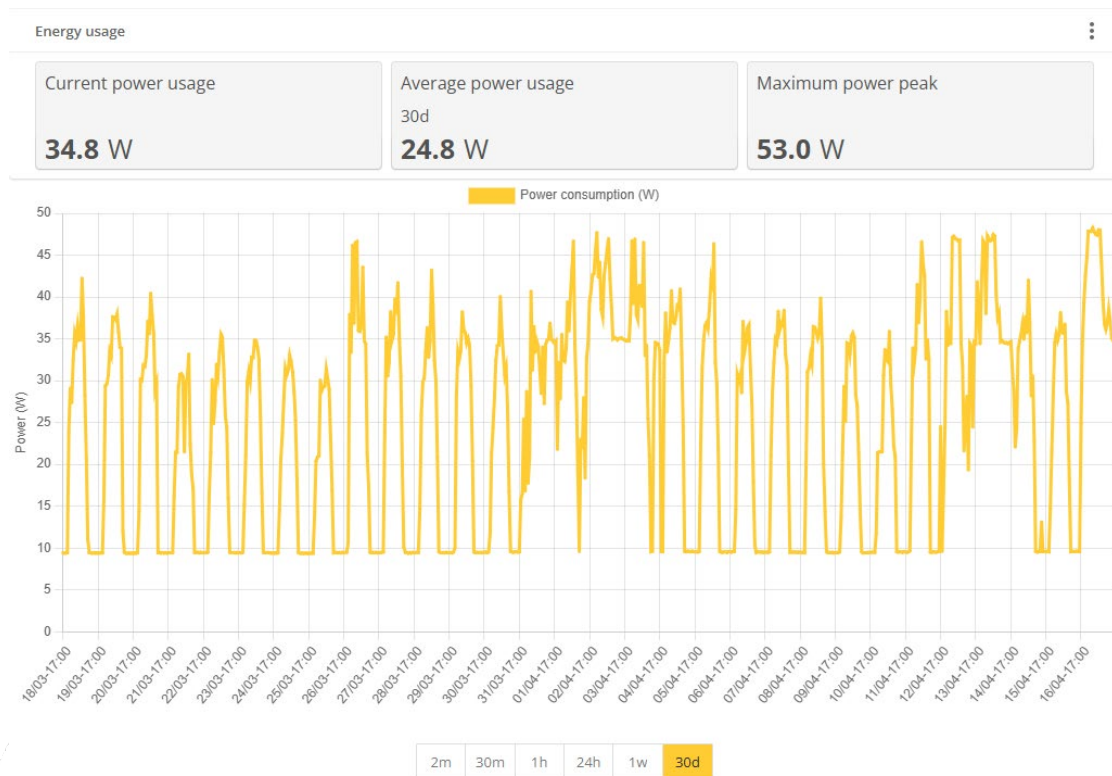
1h

24h

1w

30d

Camera Power Settings Cont.



Conclusion

Special thanks to our team for their assistance.

- Tyson Larson – Former UDOT Electronics Supervisor
- Quaid Mackert – UDOT Engineering Intern
- Jayden Smith – Electronics Supervisor
- Bryce Bair – Electronic Signal Technician II
- Josh Massa – Electronic Signal Technician II



QUESTIONS?

udot.utah.gov



Garrett Chaston
UDOT Region Four
UDOT Engineering Intern

Phone: 801-889-5715
email: gchaston@utah.gov

THANK YOU

Troy C. Torgersen
UDOT Region Four
ITS Manager/ Signals Engineer

Phone: 435-896-0711
email: ttorgersen@utah.gov

udot.utah.gov