VERTICAL SOLAR
CCTV SYSTEM

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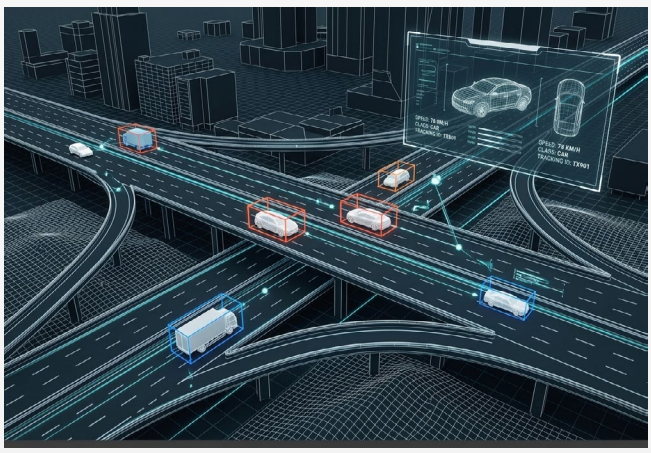
CCTV SYSTEM

The Vertical Solar CCTV System is an innovative off-grid surveillance solution that integrates advanced monitoring technology with a unique vertical solar power structure. Utilizing high-efficiency square vertical solar modules, the system ensures reliable energy generation while maintaining a compact and modern design.

Unlike traditional flat-panel solar systems, the vertical solar configuration significantly reduces dust accumulation and shading impact, enabling more stable power generation throughout the day. This design is especially effective in urban environments, narrow streets, and areas with limited installation space.

The system is equipped with intelligent CCTV cameras, supporting real-time monitoring, video playback, and remote management. It can be widely applied in highways, city roads, industrial zones, parks, and remote areas where grid power is unavailable or unstable.



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SQUARE

VERTICAL SOLAR MODULE

360° Full Day Charging

Half area of round solar tube is facing to sun all the time to ensure continous charging all day long, generating more power

Modular Installation

It adopts modular concepts and uses male and female sliding installation structures to make the installation easier

No Sand & Dust Accumulation

Sand & dust will not accumulate on the vertically installed solar panel. no need to clean the solar panels frequently

No Snow Accumulation

The vertically mounted solar cylinder prevents snow buildup, ensuring reliable power generation even in snowy climates.

No Accumulation of Snow

There is no risk of less or even no power generation from solar panel caused by snow accumulation in winter time.

Strong Wind Resistance

With smaller wind resistance area and stronger installation bracket it has very great wind resistant performance up to 160km/H.

Aesthetics Appearance

All the mounting poles adopted vertical PV cylinder blend into environments perfectly without disturbing the beauty of the view.

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Lithium Battery Cylinder

Built into Poles I Outside of Poles

Enhanced Safety

The design, integrated into the light pole, effectively protects the battery from external environmental impacts such as extreme weather, theft, and vandalism. This ensures the battery's safety and longevity.

Space Saving

Utilizing the internal space of the light pole for battery installation avoids the issue of traditional external battery boxes occupying ground space, keeping the installation area clean and neat.

Efficient Heat Dissipation

The environment inside the light pole typically offers excellent heat dissipation conditions, helping maintain the battery at an optimal working temperature, thereby extending battery life and enhancing system performance.

Simplified Installation and Maintenance

The integrated battery design makes the system more unified, simplifying and speeding up the installation and maintenance processes, thus reducing labor and time costs.

Aesthetic Uniformity

Integrating the battery inside the light pole results in a cleaner, more stylish appearance for the entire solar street light system, aligning with the aesthetic standards of modern cities and high-end communities.

High-Performance Energy Storage

Utilizing high-quality lithium batteries provides higher energy density and longer lifespan, ensuring street lights can operate normally even on cloudy days and at night.

SOLUTION A

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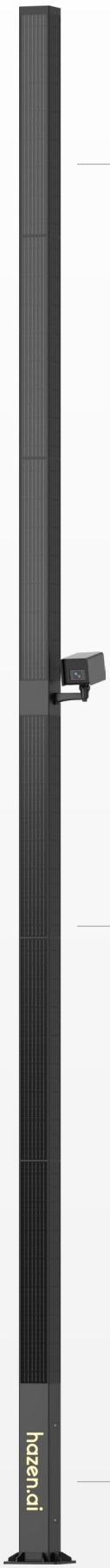

Solar Modules

CCTV

Solar Modules

Battery Compartment
Built-in lithium battery

Main Parameters

CAMERA	Model Name	Vista Pro1
	Power Consumption	60W
	Operating Hours	24h/day 24/7 operation
	*Subject to actual situation	
SOLAR MODULES	Solar Panel	36V 220Wp MONO *6nos
	Total power	1320Wp
	Cell Efficiency	22.5%
	Frame	Anodised aluminium alloy
	Tempered Glass	3.2mm Permeability Coated
	Dimension	220*220*1560mm
	Lifetime	>20 years
	IK&IP Rating	IK08 IP65
	Warranty	5 Years
LIFEPO4 BATTERY	Nominal Capacity	90Ah
	Voltage	25.6V
	Working Temp.	-10°C ~ +65°C
	Lifetime (D.OD. 50%)	4,000 cycles D.O.D 50%
	IP rate	IP66
	Installation	Installed in light pole
	Warranty	3 Years
MPPT CONTROLLER	System Voltage	24V
	Max LED Load	120W
	Charging current	10A
	Efficiency	98%
OTHER	Total Height	10,500mm
	Pole Material	Steel
	Pole Color	Grey / Black / Customized

SOLUTION B

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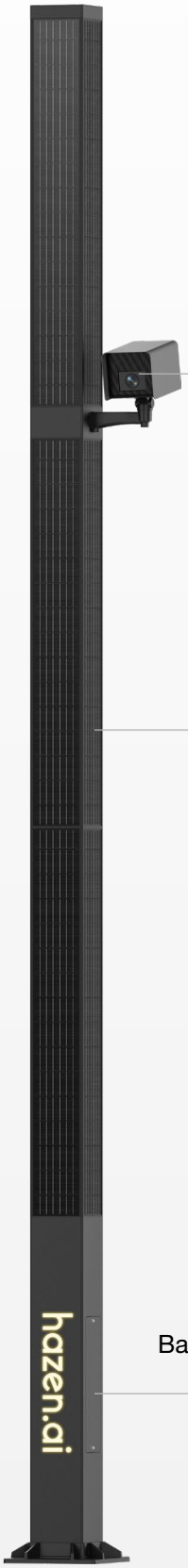

CCTV

Solar Modules

Battery Compartment
Built-in lithium battery

Main Parameters

CAMERA	Model Name	Vista Pro1
	Power Consumption	30W
	Operating Hours	24h/day 24/7 operation
	*Subject to actual situation	
SOLAR MODULES	Solar Panel	36V 220Wp MONO *3nos
	Total power	660Wp
	Cell Efficiency	22.5%
	Frame	Anodised aluminium alloy
	Tempered Glass	3.2mm Permeability Coated
	Dimension	220*220*1560mm
	Lifetime	>20 years
	IK&IP Rating	IK08 IP65
	Warranty	5 Years
LIFEPO4 BATTERY	Nominal Capacity	48Ah
	Voltage	25.6V
	Working Temp.	-10°C ~ +65°C
	Lifetime (D.OD. 50%)	4,000 cycles D.O.D 50%
	IP rate	IP66
	Installation	Installed in light pole
	Warranty	3 Years
MPPT CONTROLLER	System Voltage	24V
	Max LED Load	120W
	Charging current	10A
	Efficiency	98%
OTHER	Total Height	6,000mm
	Pole Material	Steel
	Pole Color	Grey / Black / Customized

SOLUTION C

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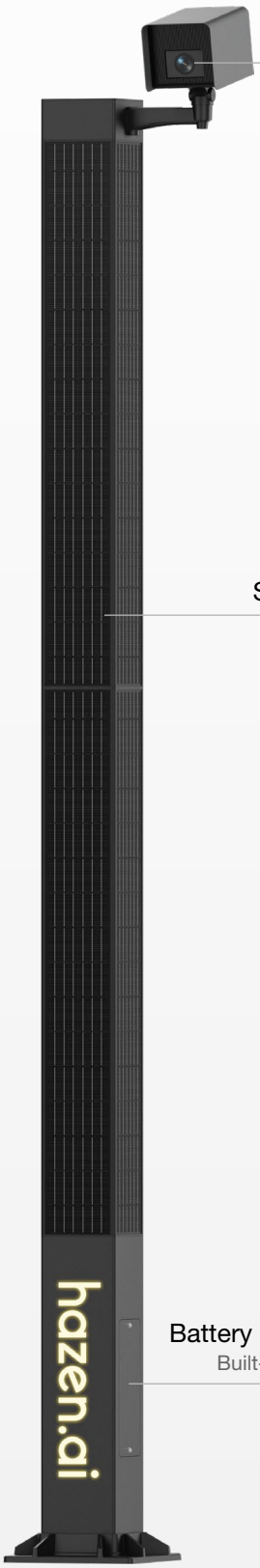

Main Parameters

CAMERA	Model Name	Vista Pro1
	Power Consumption	20W
	Operating Hours	24h/day 24/7 operation
	*Subject to actual situation	
SOLAR MODULES	Solar Panel	36V 220Wp MONO *2nos
	Total power	440Wp
	Cell Efficiency	22.5%
	Frame	Anodised aluminium alloy
	Tempered Glass	3.2mm Permeability Coated
	Dimension	220*220*1560mm
	Lifetime	>20 years
	IK&IP Rating	IK08 IP65
	Warranty	5 Years
LIFEPO4 BATTERY	Nominal Capacity	36Ah
	Voltage	25.6V
	Working Temp.	-10°C ~ +65°C
	Lifetime (D.OD. 50%)	4,000 cycles D.O.D 50%
	IP rate	IP66
	Installation	Installed in light pole
	Warranty	3 Years
MPPT CONTROLLER	System Voltage	24V
	Max LED Load	120W
	Charging current	10A
	Efficiency	98%
OTHER	Total Height	4,000mm
	Pole Material	Steel
	Pole Color	Grey / Black / Customized

Structural Design Report

1.Wind Load Calculation

Convert wind speed	V = 160km/h = 44.44 m/s
sing standard wind pressure	$q=0.613V^2$
	$q=0.613 \times (44.44)^2 = 1210\ N/m^2 \approx 1.21\ kN/m^2$
Apply	Gust factor = 1.3
	Shape factor (square pole + cladding) ≈ 1.2
	$q_{design} = 1.21 \times 1.3 \times 1.2 = 1.89 kN/m^2$

2.Effective Wind Area

Pole width	0.22 m
Module height	1.56 m
Pole 01 (9m)	Total exposed height ≈ 9 m; Area ≈ 9 × 0.22 = 1.98 m^2
Pole 02 (6m)	Total exposed height ≈ 6 m; Area ≈ 9 × 0.22 = 1.32 m^2
Pole 03 (4m)	Total exposed height ≈ 4 m; Area ≈ 9 × 0.22 = 0.88 m^2

3.Wind Force

Pole	Force (kN) $F = q \times A$
9m	1.89 × 1.98 = 3.74 kN
6m	1.89 × 1.32 = 2.50 kN
4m	1.89 × 0.88 = 1.66 kN

4.Overturning Moment (Critical)

Pole	Moment $M = F \times \frac{H}{2}$
9m	3.74 × 4.5 = 16.8 kNm
6m	2.50 × 3 = 7.5 kNm
4m	1.66 × 2 = 3.3 kNm

5.Foundation Sizing (Based on SBC = 200 kPa)

We check stability using: Overturning / Bearing pressure / Sliding

FINAL OPTIMIZED FOUNDATION:

Pole	Minimum safe foundation	Checks:
9m	1.0 × 1.0 × 1.8 m depth	Bearing OK ; Overturning FS ≈ 2.1
6m	0.9 × 0.9 × 1.5 m	
4m	0.8 × 0.8 × 1.2 m	

6.Anchor Bolts Design

For 9m Pole (critical case):

Bolt circle	300 mm	
Number	4 bolts	
Size	M24	
Grade	8.8	
Embedment	600 mm minimum	
Tension per bolt	$T \approx \frac{M}{bolt\ spacing} \approx 16.8/0.3 = 56\ kN$	· M24 is suitable (capacity ~90 kN)

For 6m Pole:

Bolts	M20 bolts
Embedment	500 mm

For 4m Pole:

Bolts	M16 bolts
Embedment	400 mm

Final Result

Pole	Foundation Size	Anchor size	Camera pole
9m	1.0 × 1.0 × 1.8 m	M24x700mm	Vista pro-1
6m	0.9 × 0.9 × 1.5 m	M20x600mm	Vista pro-2
4m	0.8 × 0.8 × 1.2 m	M16x 500 mm	Vista pro-3

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