

✓ Wind-Powered Road Safety Warning Light

SL SEONGIL ENERGY INC.

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Conventional Solar-Powered System



Wind-Powered Independent Power System

Lighting the Way to Safety with Wind Power — Even Where Electricity Is Unavailable

This system replaces conventional solar-powered road safety facilities with a compact vertical-axis wind power system, generating electricity from both natural wind and airflow created by passing vehicles.

- 독립전원 시스템
외부 전력 없이 자체 발전 및 운영
- 24시간 안전 확보
주·야간 안정적인 LED 경고등 운영

- 친환경 에너지
자연풍 및 차량 주행풍 활용
- 유지관리 비용 절감
배선 공사 및 전력 인입 부담 감소

✓Product Engineering Overview



Core Technologies and System Architecture of a Compact Vertical-Axis Wind Power System for Road Safety Applications

● Standalone Power Module

Integrated Power Generation, Energy Storage, and LED Operation

Wind-generated electricity is stored in a battery module and supplied to LED warning lights, enabling reliable standalone operation even during nighttime hours.

● Dedicated Module for Road Safety Infrastructure

The system is designed as a modular solution that can be installed on existing delineator lights, guardrails, signposts, and other road safety facilities without requiring major structural



✓ Road Safety Infrastructure Should Move Beyond Solar Power to Wind Power

Turning Roadside Wind into Power for Safer Roads

1 Limitations of Conventional Solar-Powered Systems

- Power generation is limited on cloudy days and at night.
- Additional installation space is required for solar panels.
- Dust, snow, and fallen leaves can reduce power generation efficiency.
- Regular inspection and maintenance are required due to contamination and potential damage.
- Vehicle-induced airflow continuously generated on roads remains unused.

2 Wind Power Utilizes the Road Environment Itself as an Energy Source

Electricity can be generated whenever wind is available, regardless of sunlight.
Both natural wind and airflow generated by moving vehicles can be utilized.
The compact vertical-axis structure can respond to wind from various directions.
Generated electricity is stored in a battery to power warning lights at night.
The system can be installed as a modular unit on existing road safety infrastructure.



✓ System Integration with Roadside Safety Infrastructure



System Configuration and Application Examples for Integration with Roadside Safety Infrastructure

The system can be integrated into existing roadside safety infrastructure with minimal modification.

Wind turbine and battery modules can be installed on various road safety facilities, including highway delineator posts, guardrail warning lights, bridge marker lights, and construction-zone warning lights, creating a standalone power supply system.

- ✓ Wind turbine and battery modules can be installed on highway delineator posts, guardrail warning lights, bridge marker lights, and construction-zone warning lights.
- ✓ Dedicated mounting brackets and waterproof cable glands provide secure installation without the need for external wiring.
- ✓ Aluminum alloy components and stainless-steel fasteners provide corrosion resistance and long-term outdoor durability.

✓ Deployment Scenarios

Examples of real-world installations and improved visibility across various road environments



Mountain & Curved Roads

Reliable warning light operation can be maintained using wind power even in areas with limited sunlight, such as mountain roads, coastal roads, and curved road sections.



Road Sign Pole Installation

The turbine module can be installed on existing road sign poles and guardrail beacons, providing an immediate standalone power supply without additional wiring.



Multiple Highway Deployment

The system can be deployed across multiple high-risk locations, including highways, bridges, and construction zones, to improve road safety and visibility.

Comparison of Advantages over Existing Systems

Key comparative analysis of the wind-powered standalone warning light system against conventional solar and wired systems

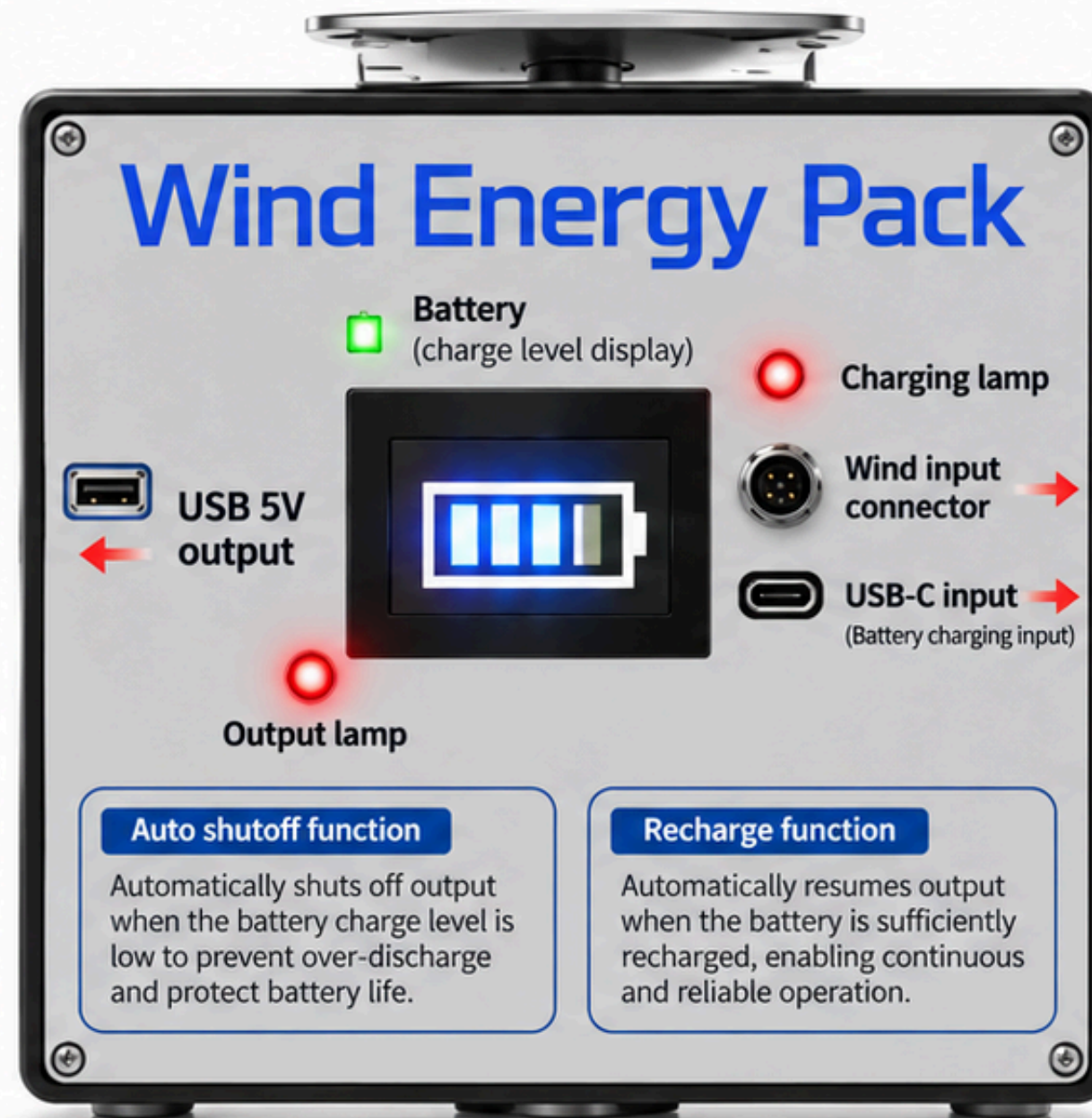
From Initial Design to Final Assembly Managed in-house in Korea

Designed, assembled, and quality-controlled domestically.



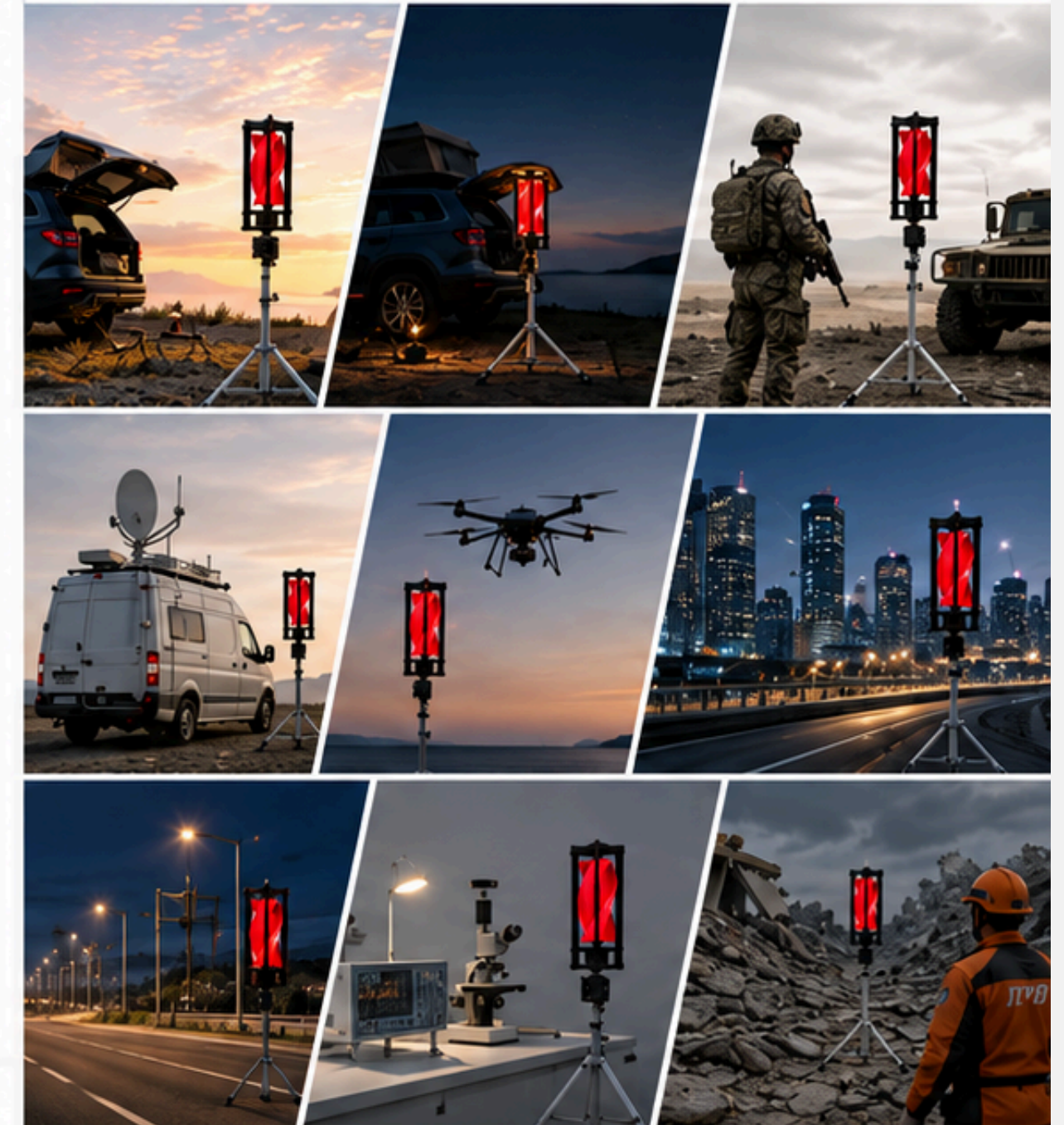
Smart Battery Pack

Easy status check, safe operation



Adaptable to Various Environments

Provides convenient, stable power wherever needed.



Pilot Demonstration Project Plan

Step-by-step implementation plan for pilot installation and validation of the roadside wind-powered warning light system.

Site Selection

Select the optimal pilot installation site within key road safety zones and analyze on-site conditions.

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02

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Performance Evaluation and Verification

Evaluate power generation performance, durability, and safety functions under various weather and traffic conditions.

Prototype Installation and Setup

Install the prototype system, connect monitoring equipment, and perform initial on-site operational checks.

Data Collection and Next Steps

Collect data on power generation, battery performance, and LED operation, and define project milestones and the next project schedule.

The Future Runs 24 Hours

Modular. Scalable. Profitable



(주)성일에너지 (Seongil Energy Co., Ltd.)

Man Ik Kim
Chief Technology Officer (CTO) & Executive Director

010-4405-5604



www.seongileng.kr



kjs8876@naver.com



Biznine #1215
30, Gimpohangang 4-ro 420beon-gil, Gimpo-si,
Gyeonggi-do, Republic of Korea

