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Wattway Pack,

an autonomous energy solution
for roadside equipment

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CONTENT

COLAS
WE OPEN THE WAY

Wattway Pack provides electricity to off roadside equipment

A turnkey solution for autonomous electrical outlets

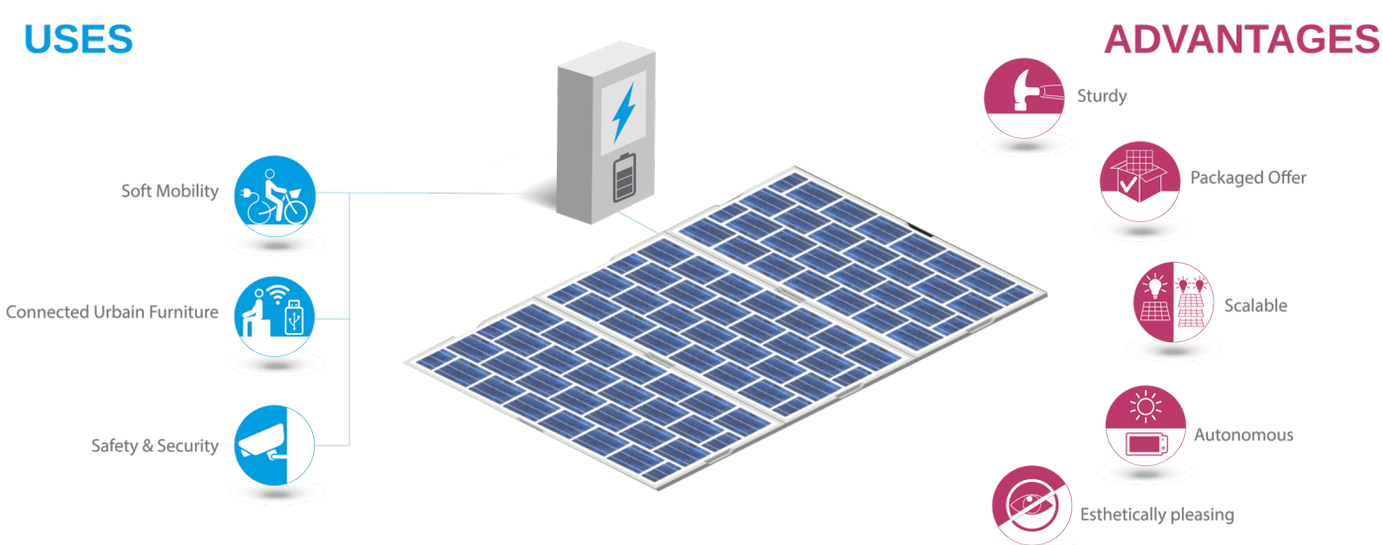
On the occasion of the French Mayors and Local Authorities Convention in 2019, Colas launched the first market-ready Wattway solution called Wattway Pack, thanks to a new generation of photovoltaic road surfacing.

Wattway Pack is an autonomous power outlet, a versatile solution that provides energy autonomy to any type of electrical equipment and connected furniture, in urban and rural locations.

The idea is simple: Wattway pack is composed of trafficable, renewable energy-producing photovoltaic panels that are glued to the pavement. The system also includes an electrical cabinet with a battery to store the power produced by the panels. The equipment connected to Wattway becomes energy autonomous (charging station for bicycles or electric scooters, closed circuit security cameras, connected benches & bus shelters, dynamic signs, etc.). Installation work is minimal, allowing for very quick commissioning. This solution is particularly suitable for remote areas where connecting to the existing electrical grid is an issue. At this point in time, Wattway Pack is marketed in France. Outside of France, local partnerships to accompany commercialization will be created progressively, on a country-by-country basis.

Providing energy autonomy to roadside equipment

pack



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Energy autonomy, quick installation times, and scalability open up opportunities to power electrical equipment on the roadside in view to provide services to users in zones with little to no access to electrical grids.

The Wattway Pack solution will simplify and accelerate the roll out of future services in a variety of fields:

- soft mobility: charging stations for bicycles and electric scooters, service areas for cyclists, etc.;
- connected street furniture: benches and bus shelters equipped with USB, Wi-Fi, interactive terminals, etc.;
- security: CCC, automatic barriers, pedestrian crossings, etc.

The visuals hereunder present examples of Wattway Pack designs in two areas (north and south of France) with three usages

6 photovoltaic panels 3 kWh of energy stored		3 photovoltaic panels 1 kWh of energy stored	
	- Per day on average, 17 charges for a bike after an 8-km journey - Up to 7 days autonomy and remote monitoring		- Per day on average, 12 charges for a bike after an 8-km journey - Up to 2 days autonomy and remote monitoring
	- USB charging and Wi-Fi hotspots (service level adjusted in December) - Up 9 jours autonomy		- USB charging and Wi-Fi hotspots (service level adjusted in December) - Up to 3 days autonomy
	- Low def static CCTV camera - Up to 15 days autonomy		- Low def static CCTV camera - Up to 5 days autonomy

Wattway Pack was awarded a Solar Impulse Foundation label

In the Greater Montpellier region in France,
Wattway Pack was installed to power an autonomous closed circuit camera

New generation of panels

Wattway has considerably evolved since the concept was launched at the end of 2015. Thanks to feedback from some 40 trial sites in France and around the world, the new generation of panels is even more efficient and robust. The industrial innovations brought to the photovoltaic cells, in addition to a new full, aligned cell layout, have helped boost Wattway's energy performance by 21% per square meter. Panel strength and resistance have also been optimized thanks to a new design in the resin multilayer which encloses the cells. Finally, the electrical architecture has been redesigned to reduce the amount of wiring, and the electrical equipment needed to operate the solution was enhanced to ensure better performance.

A cost-wise, competitive solution

When it comes to arbitrating between the power supply of roadside equipment with Wattway Pack (3 to 12 photovoltaic panels associated with a battery system) and costly connection work to the electrical grid, Wattway is a competitive solution.

In France, Wattway Pack has been powering an autonomous closed-circuit traffic surveillance camera since October 2018 in Montpellier. In Châteauneuf-le-Rouge, Wattway Pack helps secure a pedestrian crossing. In addition, Nielsen Concept, the designer of a safe, connected multiservice bike shelter called Mobilyprod and partner of Wattway, has approached the Colas Group to develop one of the first autonomous bike shelters, powered by a Wattway Pack installed in front of the shelter. The solution provides it with the electricity needed to recharge e-bikes and power other associated services. The first shelter of this type will soon be installed in the Greater Nantes region.

The advantages of Wattway Pack

Wattway Pack is a turnkey solution, sold as a package comprising 3, 6, 9 or 12 panels, that produces solar electricity, combined with a battery storage system. Once the installation is completed and the equipment is connected, the solution can be commissioned immediately.

Wattway Pack works by assembling photovoltaic panels. The system is therefore scalable, making it possible to adapt the solution according to energy needs over time. For example, it is possible to change the number of panels if new services are added on (e.g., new charging station for additional electric bikes and additional lighting).

Designed to be glued on pavement in soft mobility zones such as sidewalks and bike paths, Wattway photovoltaic panels are visually unobtrusive and blend in perfectly with the surrounding environment.

Wattway provides a heavy-duty road surface that is trafficable, waterproof and fire resistant. In addition, the fact that it is glued to the existing pavement means that there is no wind resistance and less theft.

From the concept to the first marketed application

A French innovation

The collaboration between Colas, a world leader in the construction and maintenance of transport infrastructure, and INES, the French solar energy center of global renown, which brings together teams from CEA and the University of Savoie, has made it possible to combine road construction techniques with those of photovoltaic production. The partnership resulted in an innovation: a composite material, consisting of photovoltaic cells, inserted in resin layers which are resistant and provide tire grip. The material is also able to adapt to thermal dilatations of the roadway and bear vehicle traffic.

Wattway, a trafficable photovoltaic panel that is glued on existing roadways, is a breakthrough innovation because the panels, which are connected to electrical equipment, provide a second use to roads: the production of renewable energy.

The Wattway panels are manufactured in Châtellerault, France by VMH, a company that acquired the photovoltaic business of the initial manufacturer, SNA. VMH is a recognized photovoltaic manufacturer in France, and its expertise is continuing to contribute to optimizing the technology in Wattway.

Feedback from some 40 trial sites

Since the concept was unveiled in October 2015, the Wattway solution has been deployed on some 40 trial sites around the world, voluntarily exposing the innovation to a wide variety of weather and traffic conditions. The iterative tests involved ten versions of panels, 24 application modes and four versions of electrical engineering.

On the trial sites, Wattway demonstrated that it could produce tens of kWh of electricity per year, for each square meter of panel. The initial trials made it possible to identify the limits of the first generations of surfacing, which could not be simulated during the Research and Development phase. The design of the Wattway panels has been therefore constantly adapted to improve robustness and performance. The second technical challenge involved applying Wattway panels on a variety of road surfaces which by nature were not uniform. Many application procedures were tested to experiment with a wide variety of techniques and materials.

Colas capitalized on these lessons learned and, with CEA Tech teams, developed a new generation of photovoltaic panels which are more robust and more economical. Overall, performance improved 21%, reaching 144 Wp / m2.

Market outlets for Wattway

Colas is working on several solutions using the new generation of Wattway panels:

- Wattway Pack, for small-scale installations (3 to 12 panels associated with a battery system), intended to supply and provide energy autonomy for equipment serving road network users (connected urban furniture, lighting, signage, charging terminals, etc.). This turnkey solution is initially intended for soft mobility areas (sidewalks, bike lanes) and marketed in France by the Colas Group, as well as via a network of partners;

- Medium-sized projects with a surface area ranging from 30 to 100 m² to maximize the production of renewable electricity for buildings, to promote self-consumption and a balanced energy mix.

Trials are continuing to perfect the technology under sustained traffic and reduce installation costs, focusing in particular on mechanization processes for installation. This work will make it possible to commercialize other offers in the future, in addition to Wattway Pack.

Colas and Smart Roads

With Wattway, Colas provides electricity to roadways, and is now one of the building blocks of the 5th generation of Roads. Today, Colas has the most advanced expertise in the world in the field of encapsulated electronics for the pavement. From this technology, it is possible to develop Smart Road solutions that give new features to the road. Wattway Pack is the first.

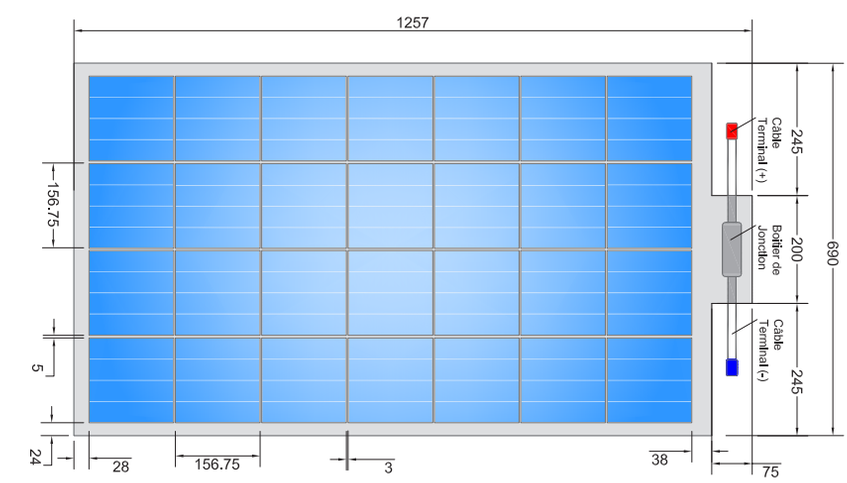
Development on Colas Smart Roads does not stop at Wattway. By leveraging part of the Wattway technology, Colas also designed Flowell, a light-emitting, dynamic road marking solution currently under development. These panels, which are connected to an energy source, consist of LEDs encapsulated in a multilayer substrate, all designed to allow better management of mobility flows and secure sensitive areas.

Wattway Technical Data

Technical and mechanical characteristics

TECHNIQUES	
Production surafe/module:	0.69 m²
Number of active cells:	28
Nominal Power (Pnom)	125 Wc
Average yield (module)	18.2%
Maximum power point Voltage (Vmpp)	15.1 V
Maximum power point Current (Impp)	8.27 A
Open circuit voltage (Voc)	18.5 V
Short-circuit current (Isc)	8.7 A
Maximum system voltage	60 V
Power Temp. coefficient (Pmpp)	–0.40 % / °C
Tolerance (module)	± 5%
Junction box connector	IP68
Inverted current max	15 A
Number of bypass diodes	2
MÉCANIQUES	
Module size	1257 x 690 mm
Thickness	6 mm
Weight	5.5 kg
Impact resistance	IK 07
Cells	monocristallin
Road performance	1 million passes of 13T wheel
Grip test	compliant with DGTIM/DIT 2015-19 requirements

A diagram of Wattway



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