

Cless

THE 100% ELECTRIC TRUCKS



POWER
VEHICLE
INNOVATION



YOUR PARTNER

PVI has been designing and assembling industrial vehicles in France for the European market for more than 20 years.

The company's high degree of expertise acquired in the development and the manufacturing of full electric industrial vehicles has enabled it to be recognized in the field of environmentally friendly transport, and especially trucks for refuse collection. Furthermore the company is very well-known in the field of alternative energies, electrical drivelines and on-board energy storage technologies.

Proposing a full range of electric chassis for urban-cleaning operations, PVI demonstrates its active contribution in the air quality improvement and satisfies the growing demand from public and private operators for clean and silent vehicles in city-centers.

THE MANUFACTURER'S LONG-TERM COMMITMENT

Technologies allowing zero emission vehicles are taking on growing importance, because of the significant impact of transport in greenhouse global gas emissions. PVI's expertise and know-how aim to participate actively in the development of innovatory, reliable and long lasting solutions to give the best alternative to today's energy and climatic challenges.



C-LESS, A RANGE OF 100% ELECTRIC TRUCKS

To answer to its customer's expectation, PVI designs and produces full electric drivelines for trucks from 3.5 to 26 tons GVW. C-Less brand (City Low Emission Silent Solution) symbolizes the significant reduction of the carbon footprint generated by those vehicles.

OPTIMIZED CONFIGURATIONS AND PERFORMANCES

C-Less electric chassis developed by PVI are specifically dedicated to city-center operations. Those compact vehicles offer a good maneuverability and insert themselves very well in urban traffic thanks to their "zero-emission" driveline performances... in an exceptional silent.

Using a C-Less RCV warranties high performances of collection, similar to those reached by conventional vehicles :

- *Similar driving performances thanks to the last generation of electric chassis*
- *A maximum transfer speed from 70 to 90 km/h, depending on collection conditions*
- *A collection capacity equivalent to that reached with conventional internal combustion engine trucks*
- *Capability to climb steep slopes thanks to the integrated gearbox in the driveline.*

More than a standard supplier of electric trucks, PVI is positioning itself as a real partner offering complete solution for its customers :

- *An in-depth analysis of the particular needs of each operating project*
- *A customized and optimized product proposal*
- *A complete electric drive service including battery rental, monitoring over time and maintenance of the electrical components*
- *Assistance strengthened by the training of operating and maintaining personnel.*



ZERO EMISSION

- 100% electric : Zero emission CO2 in operation
- Zero emission of « regulated » pollution

ENERGY SAVING

- Dedicated components power supply, for an optimized energy consumption
- No "idle-speed" during inactive periods
- Compaction body and bin-lifter operating without extra engine idling

URBAN TRAFFIC INTEGRATION

- 100% torque when accelerating
- Very maneuverable chassis
- Maximum visibility

SILENT MOBILITY

- Low-level of noise
- Non-aggressive vehicle for pedestrians
- Significant reduction of noise pollution for urban residents early in the morning or late in night operation

COMFORT & ERGONOMICS

- Easier access with low-entry cab
- No vibration
- Automated gearbox control
- On-board charger
- Battery charge on a standard industrial plug



Beyond their technical performances, C-Less trucks provide an ecological and responsible answer to the problematic linked to the environment and to polluting emissions.

The operation of a city-cleaning contract with C-Less trucks in France saves 95% of the CO2 emissions produced by conventional internal combustion engine trucks.



TECHNOLOGIES

FULLY MANAGED TECHNOLOGIES

PVI manages the design and manufacturing of the electric driveline components and their installation in vehicles. The company can offer several types of full electric vehicles on the European market, respecting the environmental constraints and European official regulations.

Technical innovations developed by PVI are applied on every component of the driveline fitted to the C-Less range :

- Electronic control module providing improved transmission efficiency
- Optimal electrical energy recovery during deceleration and braking
- Integration of a robotized gearbox which allows comparable acceleration performance and high hill climbing capacities
- Energy management for the body power supply, according to the use of the vehicle (refuse collection truck, street hi-pressure cleaning machine, ...)
- The vehicles are equipped with Lithium-ion batteries. This is the technology used by the most important automotive manufacturers.

ENERGY

“ON-BOARD ENERGY”

For more than ten years SODETREL, a 100% subsidiary of EDF, has a partnership with PVI and its customers in the deployment of electric vehicles by offering turnkey “On-board Energy” solutions. SODETREL’s decision to make collaboration on this topic is based on several tests on the batteries that are used in vehicles with PVI electric driveline technology. Results of tests have been satisfactory regarding performances and safety.

The “On-board Energy” contracts proposed to customers aim to avoid heavy financial load represented by a direct purchase of drive battery and to guarantee operating performance.

Every customer using a C-Less truck could sign a contract for drive battery services which provides :

- the supply of Lithium-ion batteries installed on the truck
- a total guarantee of satisfactory operation throughout its duration
- coverage of preventive and curative maintenance operations.

Depending on the operating profile of C-Less trucks and the seasonality of their use, various type of contracts can be studied with the operators.





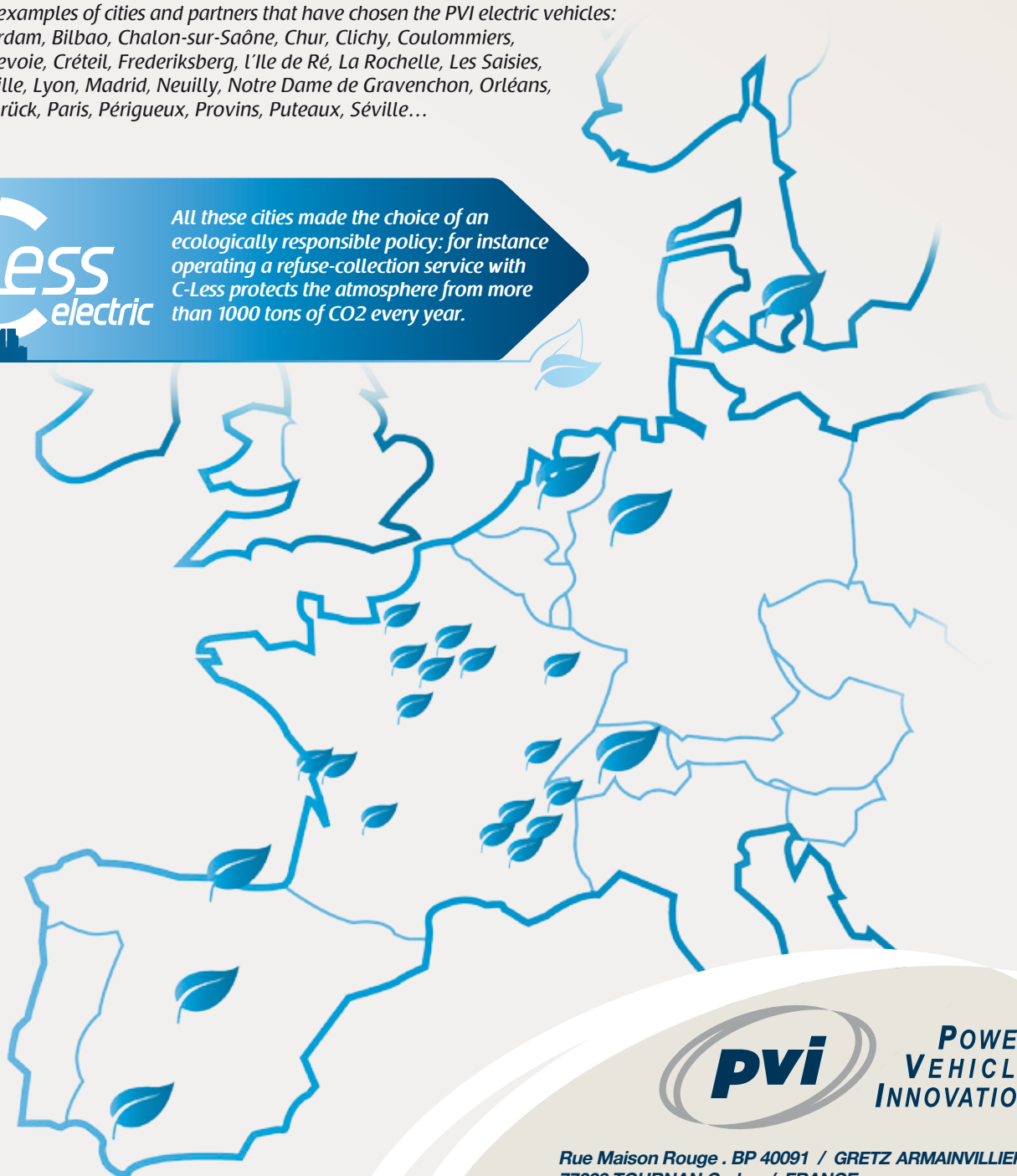
PVI ELECTRIC VEHICLES, THE ENVIRONMENTAL REFERENCE

PVI range of industrial electric vehicles is the most widely sold in Europe, thanks to the confidence placed in them by various municipalities and partners. They have contributed to PVI's leadership in the field of carbon-free vehicles.

*Some examples of cities and partners that have chosen the PVI electric vehicles:
Amsterdam, Bilbao, Chalon-sur-Saône, Chur, Clichy, Coulommiers,
Courbevoie, Créteil, Frederiksberg, L'Ile de Ré, La Rochelle, Les Saisies,
Lunéville, Lyon, Madrid, Neuilly, Notre Dame de Gravenchon, Orléans,
Osnabrück, Paris, Périgueux, Provins, Puteaux, Séville...*



All these cities made the choice of an ecologically responsible policy: for instance operating a refuse-collection service with C-Less protects the atmosphere from more than 1000 tons of CO2 every year.



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**POWER
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Rue Maison Rouge . BP 40091 / GRETZ ARMAINVILLIERS
77223 TOURNAN Cedex / FRANCE

www.pvi.fr

mail : contact@pvi.fr

tel. +33 1 64 42 14 03 / fax +33 1 64 42 14 60