

## At a glance

### Location

Russia

### Commissioned

March 2010

### Fuel

Natural gas

### Technologies

- C65 Capstone Microturbine.

### Results

- Fuel efficiency of a Capstone energized hybrid electric vehicle (HEV) is 40–80% higher than conventional drivetrain vehicles.
- Service costs of a Capstone energized HEV can be 70% lower than a conventional engine.
- ECObus combines the maneuverability of a standard bus and on-the-fly continuous power of an electric trolley or streetcar.
- Regardless of the type of fuel burned, the environmental attributes of ECObus meet stringent Euro-4 emission standards.
- ECObus emissions are 12 times less than traditional diesel-fueled busses.
- The microturbines reduce fuel consumption up to 40%.

## Trolza ECObus-5250

As the number of motor vehicles and ensuing noxious exhaust grows in Russia, the need for environmentally clean, convenient, and cost-efficient public transportation remains a priority for urban transport developers. Buses, large electric trolleys, and smaller streetcars are an integral part of Russia's mass transportation network, but they lack the capacity to meet the country's accelerating transportation demands.

TROLZA's ECObus-5250 may be the answer. ECObus combines the maneuverability of a traditional bus and the on-the-fly continuous power of an electric trolley or streetcar. Rather than relying on utility electricity or an internal combustion engine for power like many European hybrids, the clean-and-green bus operates entirely with batteries charged by an onboard Capstone C65 Microturbine.

The ECObus-5250, developed by CJSC TROLZA, is Russia's first eco-friendly hybrid bus. "Urban transport must be green, comfortable, and economical," said Sergey Klyucharyev, Engineering Director, CJSC TROLZA. "That's why we chose Capstone microturbines for our new ECObus."

Fueled by natural gas stored in onboard gas cylinders, the microturbine recharges batteries that have run low, which allows the bus to continue rolling quietly and smoothly through city streets without stopping for battery recharges.

"The microturbine increases the distance buses can travel without refueling, which reduces our fuel consumption up to 40 percent," Klyucharyev said. "The absence of oil and cooling fluids means simpler



maintenance and extended maintenance intervals, which significantly reduces our operational costs.” Capstone’s C65 for HEV applications operates on a spectrum of commercially viable fuel types, including – but not limited to – natural gas, methane gas, and diesel. Regardless of the fuel type, the environmental attributes of ECObus meet stringent Euro-4 emission standards, since exhaust from Capstone microturbines contains no more than 9 ppm of NOx and CO.



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*— Sergey Klyucharyev, Engineering Director,  
CJSC TROLZA*

“Microturbines’ ecological features include quiet noise levels and low NOx and CO emissions, which makes the ECObus ideal for resort areas and densely populated cities where clean and quiet transportation is a priority.”

Compared to traditional buses, ECObus emissions are 12 times less than traditional diesel-fueled buses and six to eight times less than buses with gas reciprocating engines.

Fuel efficiency of a Capstone-energized HEV is 40–80 percent higher than conventional drivetrain vehicles. In addition, service costs of a Capstone-powered hybrid can be 70 percent lower than a conventional engine.

The ECObus reduces fuel consumption, emissions, and maintenance, but does not compromise passenger comfort. Using a heating fluid loop, the microturbine’s thermal energy is captured and efficiently used to warm the passenger compartment, which eliminates the need for an autonomous heating system. The mere hum of the microturbine beneath the floorboard does not exceed 60 dB, which is similar to the muted noise level of a trolley-bus. In addition, the microturbine’s low vibration ensures even greater comfort. The compact microturbine equipment allowed ECObus designers to save space and increase the passenger compartment size, which can comfortably transport 95 passengers.

ECO buses currently are deployed in large Russian cities and resorts in Southern Russia, and will play an important transportation role during the 2014 Olympic Games in Sochi, Russia. ■