

**UITP 2013, May 26 to 30, 2013 in Geneva – Trade fair preview**

## Innovative, all-electric urban bus systems

Climate-friendly, urban transportation systems are becoming more and more important as a consequence of climate change, finite fossil-fuel resources and statutory environmental requirements. Affordable, environmentally compatible urban public transportation will continue to play a significant role in the future. This is where new technologies, such as alternative drive systems, will be a key factor. There are considerable opportunities for electric buses, in particular, because bus services are an essential part of urban transportation. There are many possible uses for electric buses with high-performance energy storage systems. They can be used either as traditional city buses or in Bus Rapid Transit (BRT) systems with dedicated lanes which give them a key competitive position in modern public transportation.

### **Innovative electric bus systems from Siemens Rail Systems**

Electricity-based mobility is already part of today's energy mix, as it is more energy-efficient and eco-friendlier than the internal combustion engine. Electrically powered vehicles are quieter and the absence of a combustion process eliminates local emissions, so they contribute toward improving the quality of the air and life in conurbations. Furthermore, if the vehicles are powered by electricity from renewable sources of energy, electric mobility facilitates CO<sub>2</sub>-free movement. At the same time, eBuses provide passengers with the accustomed high levels of comfort and reliability.

Siemens Rail Systems offers innovative, flexible concepts for all-electric city buses (eBuses), as well as eBRT systems that can be integrated into many different vehicle chassis, thus making them independent of any specific bus manufacturer. The

deployment concept is tailored to the individual customer's needs, and the portfolio covers not only the complete eBus and eBRT technology, but also the associated services. Energy consumption is around 25 percent lower than that of diesel and gas-powered buses. In addition to minimized maintenance costs, operating costs can also be substantially reduced. The energy required to power the electric buses is drawn entirely from the on-board energy stores, which also feed the heating and air-conditioning systems.

The heart of the drive system is the water-cooled electric motor from the Siemens Elfa range. It also acts as a generator and feeds braking energy, which would otherwise be lost as heat, back into the energy stores.

The electrical equipment on the buses does not cause any disadvantages for passengers or drivers. The buses are operated in the same way as usual, the energy storage equipment does not reduce the amount of space available and they are, of course, wheelchair-accessible and feature a kneeling system. Electric bus systems mainly draw their power from the existing infrastructure, such as the tram power supply.

### **All-electric city buses in scheduled service**

The eBuses from Siemens Rail Systems are designed for a wide a range of bus categories, from the midibus to the articulated bus. The energy storage system stores electricity efficiently, so that the buses can be used for public transportation services on the existing road network. They have a range of between 120 and 150 kilometers, and are dimensioned to give them great flexibility and maintain adequate energy reserves at all times.

The batteries are recharged via a two-pole current collector at charging stations in the depot or, for example, at terminal bus stops with a direct power connection, which can be reached every eight to 15 kilometers. The buses can also be equipped with plug-in charging systems. These allow electrical energy to be fed into the battery charger from dedicated substations or from the overhead tram line. Quick recharging is completed within ten to 15 minutes while a bus is in scheduled service. This doubles the life of the batteries, because the frequent recharging during regular service prevents them from ever becoming completely discharged. The energy

stores are usually recharged slowly during the night. This enables the electric buses to be supplied with energy recovered and fed back into the network by braking trams and metro trains.

The braking system of the electric buses works in two stages. The first stage is electric braking, with conventional braking not being initiated until the second stage. The buses are equipped with integrated safety functions, such as an anti-lock braking system (ABS), anti-slip control, electronic braking, electronic stability program (ESP) and "vehicle stationary with a door open".

This Siemens concept was implemented as standard for the first time in the Austrian capital of Vienna, in cooperation with the bus manufacturer Rampini. The first of twelve all-electric buses has been in regular service on routes 2A and 3A since the fall of 2012. These routes are each six to seven kilometers long. The energy stores are recharged quickly during the day from the existing tram power supply at the terminal stops, and recharged slowly in the depot during the night. The bus won the "EBUS Award" from the German Forum for Transportation and Logistics in October 2012 thanks to the close dovetailing of eco-friendly propulsion and integration into the route network that is unique in the whole of Europe.

### **eBRT systems for rapidly growing metropolises**

Rapidly growing metropolises, above all in South America, are increasingly choosing Bus Rapid Transit systems (BRT). Regular bus services run at frequent intervals along dedicated lanes and the objective is to provide fast, comfortable mobility, even during peak-travel times. The bus services are characterized by their frequent and punctual operation.

The eBRT solution from Siemens Rail Systems covers electrically powered buses up to 24 meters in length which are designed for high passenger volumes. The energy stores are recharged at the bus stations via a pantograph and the energy is supplied from dedicated substations or by using, for example, the tram power supply.

The electric drive and its control system use the same components as electric city buses in city transportation. This means that only tried-and-tested components are used, which are dimensioned for the specific vehicles and their area of application.

**Contact for journalists:**

Siemens AG, Media Relations

Ellen Schramke, Tel.: +49 30 386 22370

E-Mail: [ellen.schramke@siemens.com](mailto:ellen.schramke@siemens.com)

All information about the Siemens presentation at the UITP 2013 can be found at

<http://www.siemens.com/press/uitp2013>

Follow us on Twitter: [www.twitter.com/rollingonrails](http://www.twitter.com/rollingonrails)