TOSA, Flash-charging e-bus for sustainable mobility

Catenary-free operation and 15-seconds charging time at selected bus stops offers opportunities for next generation e-bus enabling silent, flexible, zeroemissions urban mass transportation.

The electric bus, named TOSA, looks like a regular trolleybus, except when you look on the roof. Instead of the usual trolley poles to overhead lines, this e-bus has a controlled moving arm that connects, in less than a second, to an overhead receptacle integrated into the bus shelter. The high-power flash-charging technology is activated and feeds the onboard batteries for 15 seconds as passengers are getting on and off the bus. The bus wastes no time and is ready to leave.

From concept validation to Line 23

The first articulated bus (18m75 length) for 132 passengers ran under real-life operating conditions from May 26, 2013 to end 2014 on a route from Geneva's airport (terminus) to the nearby Palexpo exhibition centre (flash-charging station). Based on the results, a decison has been made to deploy TOSA on Line 23 (13 km, 12 buses) in 2017.

Challenges for sustainable mobility in cities

Urbanization and increased mobility demands :

– Reduction of CO2 and other harmful greenhouse gas emissions
– Noise reduction
– High-capacity vehicles for public mass transit
– Increased energy efficiency
– Sustainable overall solutions across the life cycle, from creation to recycling
– Control of investments and operating costs

Four partners, four key competencies to achieve sustainable mobility

ABB launched the new electric bus charging system TOSA together with Geneva city's public transport operator TPG, the Office for Promotion of Industries and Technologies OPI and the Geneva power utility SIG.

TPG operates and maintains a fleet of 92 trolleybuses, 231 buses and 104 trams. For the new TOSA e-bus, they defined the operating conditions as 15 seconds charging time during stops, automation and priority to high capacity. SIG provided their power grid experience. OPI led the project management in line with the innovation and partners' roles. ABB developed the concept, the on-board traction equipment and the new type of fully automatic and flash-charging system.

TOSA
TROLLEYBUS OPTIMISATION SYSTEME ALIMENTATION

TOSA, innovation for a clean and attractive city

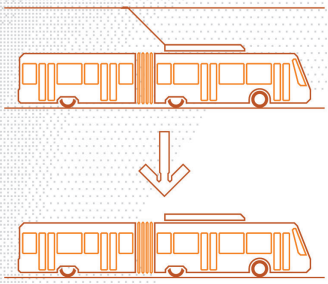
Urban mass transportation
Thanks to re-charging along the route, the battery size and the weight of the bus have been reduced, resulting in increases in both space for passengers and energy efficiency.

High capacity without overhead lines
According to the bus route, one flash-charging station is installed at every forth or fifth stop.This technology allows to reduce visual impact and noise emissions at the same time. Bus autonomy also offers higher flexibility in terms of itineraries. This makes TOSA an ideal solution for urban mass transport.

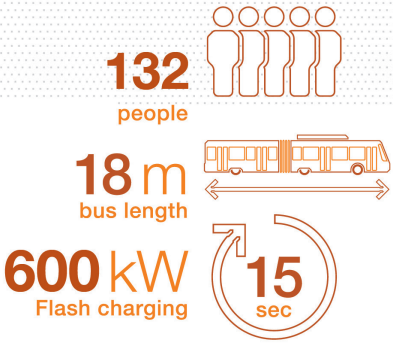
Comfort, safety and public health
The power transfer system is designed to ensure passenger comfort as well as health and safety. The direct-contact technology prevents electromagnetic field emissions associated with induction loop charging technologies.

Operating costs and investments
TOSA can be used like trolley- or diesel buses - ie, itineraries and stop times remain unchanged. This is especially important during peak hours and directly impacts costs. Timetables can be maintained without the need for extra operating hours or additional buses.

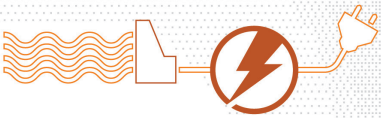
Many international awards for this solution
2012 : OMPI Award (Organisation Mondiale de la Propriété Intellectuelle), Switzerland
2013 : British-Swiss Chamber of Commerce Innovation Award, Switzerland
2014 : Ecological Innovation of Legambiente Award, Italy
2014 : Smart Awards, France
2014 : Two EBUS awards, Germany



Mobility solution without **any overhead lines. Visual pollution reduced** and **flexibility highly increased.**



World's fastest bus flash charging device.



Zero local emission mobility
with hydropowered electric bus enabling urban mass transportation.

For more information or a feasibility study for your city, please contact:
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