

STREETCAR TECHNOLOGY SHOWCASE

Charlotte, NC

January 28, 2008

Charlotte Streetcar Project

The City presently has a two track, north-south system. Charlotte plans to extend the system with an intersecting 10 mile east-west line at an estimated cost of \$450 - \$500 million. On January 25, 2010, the Charlotte City Council voted to apply for a \$25 million federal grant to cover 2/3 of the cost of extending the system by 1.5 miles

Website:

www.charlottefuture.com

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- Bay Area Economics (BAC)

Hired to quantify developmental impact and tax revenue potential.

- URS Corporation.

Hired to design the system and to:

Address conflicts with subsurface utilities and need to relocate and isolate utilities from stray currents (the rail is the return current path to power the streetcar in an overhead wire system). Evaluate alternatives to overhead wire system to power the streetcars. Charlotte’s motivation is economic, rather than aesthetic, because on the existing line, the overhead wire system represented 25% of project costs. URS is looking at batteries, capacitors, hydrogen fuel cells and hybrid systems as non-overhead wire options.

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EXHIBITING MANUFACTURERS

United Streetcars

In partnership with Oregon Ironworks, received a \$4 million Congressional grant under the SAFETCA-LU Act to design and build modern streetcars in the US.

Entered into a technology transfer agreement with SKODA who supplied them with streetcar design drawings, specifications, and manufacturing documents.

In May, 2009, delivered prototype car to Portland Oregon using SKODA propulsion system and 70% of the components were from US suppliers.

Currently have orders to build:

6 cars for Portland and

7 cars for Tuscon

Websites:

www.unitedstreetcar.com

www.skoda.cz/en

Chandra Brown

President

United Streetcar, Clockamus, OR

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Kinki Sharyo

Kinkisharyo International, LLC

Established 1981 in Westwood, MA.

The firm has manufactured rail vehicles since 1920 and manufactured Japan's Super Limited Express.

Claims to be the number one supplier of low floor cars in North America, having supplied Seattle, Phoenix, Jersey City, Santa Clara and Boston.

Will supply a 10 mile, hybrid overhead wire/battery system to Dallas in 2010.

Claimed range on batteries: 3 miles between charges (level track, 10 stops).

Will supply Dubai with a wireless propulsion system supplied by Alstom (who pioneered the surface current collection system in Bordeaux).

Has used other Alstom propulsion systems in N.J. Transit and Santa Clara.

Website: BusinessDevelopment@kinkisharyo.com

Trainelec

A Spanish R&D firm, now getting into streetcars.

Has one installation, in Saville, where they formerly had to remove the overhead wires at times of religious processions.

Uses ultra-capacitors:

One mile run time

20 second recharge

Now designing second installation for Saragossa, Spain

Website:

www.trainelec.com

Niklas Hook

Director, Sales and Marketing

nhook.trainelec.com

Ansaldo Breda

Prior to their 2001 merger, Ansaldo and Breda were separate companies.

DC Metro has 466 Breda cars. They have also supplied cars and systems for San Francisco, Los Angeles, Boston, Cleveland and Atlanta

SIRIO is their current low-floor modular streetcar, designed by Pinnfari/Ferrari.

Their US manufacturing facility is in Pittsburgh

Non-overhead wire power is provided by TRAMWIRE, a next-generation version of the surface current collection system first used by Alstom in Bordeaux. It uses a segmented center rail, energized only when the car passes over. The segments are shorter than the Bordeaux system (20") and are energized by magnets under the car, rather than the complex electronic system used in Bordeaux. The center conduit contains both power and ground conductors, eliminating stray currents associated with using the rail for the electric ground.

A version of TRAMWIRE is used in the bus system of Trieste,

An 800-meter TRAMWIRE streetcar line is undergoing tests in Naples.

Website:

www.ansaldobredainc.com

Loreno Reffreger

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Bombardier

Manufactures two systems:

PRIMEMOVE. A non-overhead wire system that uses contact less, inductive electric power supply located under the cars and between the rails. It is claimed to be resistant to all weather conditions including snow, ice, sand, rain and water.

MITRAC. A high-performance double layer capacitor that stores electrical energy that is gained during operation and braking.

Bombardier has three railroad manufacturing facilities in the US.

Bombardier supplied the Acela trains to Amtrack.

The combination of regenerative braking and the ultra capacitor provides 30% of the power needs. It is used to increase acceleration, without having to increase the capacity of the wiring for the supplied electric power. It has limitation, because the ultra capacitors are almost 10x the size and weight of equivalent capacity batteries. The ultra-capacitor's advantage is in its rapid discharge rate (for acceleration) and better charge/discharge cycle life, compared to a battery.

The streetcar system in Toronto is capable of climbing an 8% grade.

The field test in Bautzen Germany has successfully concluded.

Bombardier will install a PRIMEMOVE /MITRAC streetcar system in an undisclosed German city in 2010.

Website: www.bombardier.com

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Siemens

Offer hybrid systems using lithium-hydride batteries and ultra capacitors.

Installed a hybrid system in Lisbon Portugal in 2008.

Siemens has a production facility in Sacramento CA.

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