

**Light Rail Development in the United States and the United Kingdom
since 1980: A Comparative Analysis**

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Introduction

Since 1980, urban areas in both the United States and the United Kingdom have renewed a century-old form of public transport and provided it with a new term: Light rail. These systems are often referred to as ‘new starts,’ especially by the U.S. Federal Transit Administration (FTA). Cities in both countries had at one time extensive streetcar or tram systems that were abandoned following World War II in favor of bus and auto transport. However, since 1980, 12 cities in the U.S. have added LRT (light rail transit) to their landscape where no other fixed-guideway form of transit had presently existed. Two other U.S. cities added LRT to complement existing heavy rail lines. In the United Kingdom beginning in 1980, seven new light rail, or the commonly-used term ‘tram,’ operations have opened in six cities (including London) and several more lines are in the planning or construction phase. In each British case, light rail was supposed to be integrated with already-existing local transport network.

Why LRT? A legion of supporters, from representatives in both the U.S. FTA and U.K. Department for Transport (DfT) and scholars such as Newman and Kenworthy (1999), see light rail as a way to respond to central city (particularly CBD) degeneration, suburban sprawl, traffic congestion, and air pollution. LRT construction costs are significantly less than building new heavy rail lines and re-using existing infrastructure has also helped lower costs. Furthermore, transport officials usually see this mode as one key way to create new transport ridership. Pushkarev et al. (1982) pointed out that the immediate purpose of a new urban rail system was to improve the movement of people in a tightly settled area, to do so in an environmentally and aesthetically attractive manner, and to provide capacity for future urban growth. They add that urban rail may enhance the magnetism of a city’s CBD, and allows for a city to unify its people by rerouting them through a common corridor through the central city.

Opponents of the mode, including Gomez-Ibanez (1985), Kain (1990), and Pickrell (1992) in the United States point to high initial costs to build new fixed-guideway systems, the lack of return for costs in the form of actual ridership, and LRT’s use of funds that potentially could have been used to improve existing bus service. In Britain, John Hibbs (2000) reports that the single greatest weakness of the argument for LRT lies in the very high level of capital spending required, in comparison with investment in the infrastructure of the bus industry.

Regardless of whether light rail is a cost-effective, cost-efficient, service-effective or service-efficient (Fielding, 1995), the fact remains that over twenty new fixed-guideway transit systems have been built in two countries in a period of less than 25 years and more are expected to open in the near future. Thus, this study (an extension of Light Rail Transit ‘New Starts’ in the United States: If You Build It Will They Come?, a forthcoming Doctoral Dissertation from the University of Louisville’s School of Urban and Public Affairs) will not take up the debate between supporters and opposition to the mode. Rather, this paper will identify the ‘new start’ operations in both countries, and will assess the recent past and present light rail transport policies in place offered by the U.S. FTA and the U.K. Department for Transport (DfT). Overall, this study provides a comparison of each country’s recent experience with light rail.

Overall, it can be said that by all indications of ‘on-again’ and ‘off-again’ transport funding policies, the national government in Britain has considerable weight regarding the funding of LRT new starts. In the United States, ‘new starts’ must follow

an establish procedure of planning in order for funding from the federal level to occur (FTA, 1998); therefore, the FTA also has considerable weight regarding LRT new starts. In both countries, a failure to follow procedures will jeopardize funding of new projects. In Britain, though, funding cutbacks and reversed changes in policy are more apparent than in the United States, where funding is available if the project passes through the 'New Starts' process.

Definition of Light Rail

The definition in the United States for light rail transit (LRT) that has been largely adopted over the years comes from a U.S. Transportation Research Board committee (De Leuw et al., 1976):

“Light rail is a mode of urban transportation utilizing predominantly reserved but not necessarily grade-separated rights-of-way. Electrically propelled rail vehicles operate singly or in trains. LRT provides a wide range of passenger capabilities and performance characteristics at moderate costs.”

Armstrong-Wright (1986) identified three main categories of LRT although most U.S. and U.K. LRT systems fit into the second category (LRT proper) and operate with a mixture of both city streets (usually in the CBD) and segregated rights-of-way. Armstrong-Wright's first category is 'tramways,' which use trams, a general term applied to light rail throughout Europe; common American terms used to describe trams are streetcars or trolleys, which align LRT with its beginnings a hundred years ago. Tramways typically use single vehicles and usually operate on city streets in mixed traffic. Armstrong-Wright's definition of LRT proper, his second category, refers to a larger vehicle or multiple vehicles that operate on city streets, in segregated rights-of-way, or mixture of both. His third category is LRT metro, which refers to trains with multiple vehicles operating along completely segregated tracks either on the surface, on viaducts, or in underground tunnels. According to Schumann and Loetterle (2003), new starts utilize subway or tunnels, exclusive rights-of-way (where no other form of transit uses the trackage), private rights-of-way (where trackage is shared often with freight trains at night), medians (in-between lanes of a highway), reserved lanes (usually street level but no other vehicles access the street), and mixed traffic (where light rail shares the street).

Implied in Armstrong-Wright's categories are that the first two types have low-level or street-level platforms (if platforms at all) and the third has high-level platforms although there are exceptions. Furthermore, the speed of tramways is relatively slow due to the use of city streets and operating in mixed traffic while LRT metro can operate at relatively fast speeds when operating on segregated tracks. According to Armstrong-Wright (1986), the other obvious differences among the three categories are capital and operating costs (trams are less expensive to build and operate) and passenger capacities (LRT metro can carry considerably more passengers than single-vehicle trams).

Light Rail Transit in the United States Prior to 1980

The streetcar era (Muller, 1995) began in the 1880's as horse-drawn forms of transit were rapidly displaced by electric streetcars operating primarily on city streets. The electric streetcar emerged as the primary mode of urban transportation for almost every American city; by 1917, there were 60,000 streetcars operating on 26,000

miles/41,860 km of track and carrying 11 billion passengers annually (Middleton, 2003). The “electric streetcar era” ended by the 1920’s and was replaced by what Muller refers to as the “auto-air-amenity” era. During this period transit companies, which were largely private operations, began the conversion from streetcars to motor buses. Buses were more flexible than streetcars when route changes were necessary and buses were less expensive to operate. By the 1950’s only a handful of U.S. cities (Boston, Cleveland, Newark, New Orleans, Philadelphia, and Pittsburgh) retained their streetcar operations; these cities tended to have segregated rights-of-way, which proved to be a major factor in retention (Black, 1993). Furthermore, in 1956, federal funding to build limited-access interstate highways began, which launched a major effort to build limited-access motorways across the country and caused further migration of commuters from public transit to private automobiles.

However, by the 1960’s and 1970’s many urban areas were seeking an alternative to the construction of limited-access interstate highways (Weiner, 1999). Several U.S. metropolitan areas (San Francisco Bay Area as well as Atlanta, Baltimore, Los Angeles, Miami, and Washington, D.C.) embarked on constructing heavy rail systems, which already existed in Boston, Chicago, New York, and Philadelphia. Many areas, however, did not have the threshold to consider heavy rail; additionally, the costs to build heavy rail systems, particularly BART and the Washington Metro, were considered prohibitive for smaller metropolitan areas. Bus transit enhancements were initially considered to be the direction that many cities could go (Weiner, 1999), but by 1975, the Urban Mass Transit Administration (UMTA, now known as the Federal Transit Administration, or FTA), published a study indicating that urban areas should give their consideration to light rail transit (LRT). The UMTA indicated that it did not have a modal favorite, but that LRT was seen as a cost-effective and a potentially attractive option for many urban areas and that the UMTA would assist in its deployment in areas where proper conditions existed (Transportation Systems Center, 1977).

LRT in the United States: Cities with systems built since 1980 (‘New Starts’)

Since 1980, the unofficial point of rebirth for light rail transit, 14 cities have opened new light rail lines; these cities, with the exception of Baltimore and Jersey City, relied on bus service only prior to the opening of the LRT line. The urban areas are as follows, in order of their initial segment opening dates:

San Diego (1981), Buffalo (1984), Portland (1986), Sacramento (1987), San Jose (1988), Los Angeles (1990), Baltimore (1992), St. Louis (1993), Denver (1994), Dallas (1996), Jersey City (1999), Salt Lake City (1999), Tacoma (2003), and Houston (2004).

In July 1981, San Diego became the first U.S. city to open a new light rail line since the heyday of the streetcars (Middleton, 2003). A light rail advocate and state senator, James R. Mills, spearheaded the movement to build light rail on former railroad lines (the San Diego and Arizona Eastern Railway); San Diego’s Metropolitan Transit Development Board (MTDB) acquired the trackage. The initial 16-mile/25.8 km line, called the San Diego Trolley, operated from downtown San Diego to San Ysidro at the Mexican border. In a pattern to be mirrored by future lines, the LRT operates except between early morning hours so that freight trains can operate on the grade-separated portion. The current system has a network of 45.4 miles/73.1 km of one-way line and 49

stations with an extension currently under construction (Middleton (2003); Polzin and Page (2003); Schumann and Loetterle (2003); There were 24.8 million unlinked passenger trips in 2002 and 71,000 daily weekday riders (APTA, 2003).

In 1984, Buffalo opened most of its 6.4 mile/10.3 km line (which was completed by 1986). Buffalo's LRT is literally on Main Street in the city's CBD and cultural district before going underground in a subway for the rest of the journey; in other words, a pre-metro, based on Armstrong-Wright's terminology (1986). The 5.2 miles/8.4 km that this line spends underground is longer than any other 'new start' (Schumann and Loetterle, 2003). The original proposal was to build a heavy rail line, but the UMTA ejected the plans (Desmond, 1984). With 15 stations, Buffalo's system has never been expanded since 1986. It had 5.7 million unlinked passenger trips in 2002 and a daily weekday average of 19,700 riders.

Portland, Oregon, opened its first segment, a 15-mile/24.1 km line from its downtown to Gresham, an eastern suburb, in 1986. The line was built in part by funds diverted from a cancelled interstate freeway project. Voters approved a \$125 million bond issue, in 1990, to expand the system west to Hillsboro (Black, 1993). The current system operates 38.2 miles/61.5 km and 54 stations, including Portland International Airport. An extension, the Yellow Line, will open in May of 2004 adding 5.8 miles/9.3 km and 10 stations. Portland's Max, as its known, utilizes every different type of light rail right-of-way. In 2002, there were 25.7 million unlinked passenger trips and a daily weekday average of 80,000 riders.

In 1987, two California cities opened light rail lines. In September 1987, Sacramento began operation of an 18.3 mile/29.5 km line that has two radial lines from a downtown transit mall, 11 miles/17.7 km of which contains single trackage (Black, 1993). The line was also built partly on a canceled interstate freeway project funds (and in one section, on the site of the canceled freeway) as well as railroad rights-of-way and on reserved lanes downtown. The current system has 26.9 miles/43.3 km and 36 stations; its southern extension opened in the fall of 2003 and another extension eastward is due to open in 2005. In 2002 there were 8.9 million unlinked passenger trips and 31,000 daily weekday riders.

In December of 1987, San Jose opened a six-mile section of the current 30.5 mile/49.1 km system, which operates primarily in the Guadalupe Corridor. The system has 50 stations and operates as well on downtown reserved lanes and on railroad rights-of-way. Ridership has declined considerably since 2000; there were 21% fewer unlinked passenger trips in 2003 compared with 2002 (APTA, 2004), which amounted to 5.5 million unlinked passenger trips and a weekday average of 18,000 riders.

In 1990, Los Angeles, which had abandoned its Pacific Electric interurban system in favor of interstates and diesel buses, found itself re-establishing 16 of the 22 mile (25.8 of 35.4 km) fixed-guideway line along former interurban tracks (Black, 1993). This initial line, the Blue Line, operates in a short tunnel in downtown Los Angeles before heading south to Long Beach, where the line is at street-level. In 1995, L.A. added the Green Line, 20-mile/32.2 km east-west line primarily in-between lanes of the Century Freeway. In addition to adding the Red Line, a heavy rail line from downtown to Hollywood, the Gold Line was opened in the summer of 2003. It runs from Downtown L.A. to Pasadena, adding another 13.7 miles/22.1 km; the total is currently 55.7 miles/89.7 km and 48 stations and other extensions proposed; before the opening of the

Gold Line, the system saw 30.7 million unlinked passenger trips in 2002 and 97,000 daily weekday riders. It should be noted that the heavy rail portion is not expected to be expanded any further.

Baltimore opened the first section of its light rail operation in 1992; LRT joined a single heavy rail line operation that opened in 1983. The current system, which runs from Hunt Valley to Baltimore-Washington Airport and Cromwell, has 29 line miles/46.7 km and 33 stations. In similar fashion to Sacramento, Baltimore's system has sections that are single-tracked although double-tracking is underway in 2004 (Middleton, 2003). In 2002, the light rail portion itself had 26,000 daily weekday riders and 8.3 million unlinked passenger trips.

In 1993, St. Louis opened the initial 17-mile/27.4 km segment of its operation, which starts at Lambert International Airport and heads downtown along former railroad trackage (which is still used during early morning hours by freight trains); downtown, the LRT uses an old railroad tunnel; the system then proceeds over the Eads Bridge (across the Mississippi River) into East St. Louis. In 2001, an extension to Belleville, Illinois opened, adding 20.9 miles/33.6 km (total 37.9 miles/61 km). Ridership for 2002 found 14.9 million unlinked passenger trips and 38,400 daily weekday riders. The 28 stations have high-level platforms, which are rare for U.S. LRT and are more reminiscent of a pre-metro or heavy rail system (Armstrong-Wright, 1986). There are two extensions to the system under construction; one is an extension of the current line to the Mid America Airport and the other is a cross-county line for St. Louis County.

Denver opened its initial 5.3 mile/8.5 km section that features street-running downtown and railroad rights-of-way otherwise in 1994. The line was extended to Littleton, a southern suburb, in 2000. Currently, there are 15.8 line miles/25.4 km and 31 stations and extensions are planned. Daily weekday ridership in 2002 counted 37,300 daily weekday riders and there were 10.4 million unlinked passenger trips.

Dallas opened its first segment in 1996, a 20-mile/32.2 km line with two routes split into three directions from downtown; part of the initial system is in a cut below the street surface while the rest is former railroad lines and a utility right-of-way. The LRT is joined by the McKinney Avenue heritage trolley line and the Trinity Railway Express commuter rail line to Fort Worth. Currently Dallas Area Rapid Transit's (DART) operates 44 miles/70.8 km and 34 stations and the system opened northward to Garland and Plano in 2002. Further extensions are planned. The light rail portion carried almost 17 million unlinked passenger trips, a 16% increase from 2002 (APTA, 2004); there were 52,600 daily weekday riders.

In late 1999, Utah Transit Authority opened an initial line from downtown Salt Lake City to Sandy, a southern suburb. A few months before the opening of the 2002 Winter Olympic Games in the region, an extension eastward from downtown to the University of Utah was opened. During the summer of 2003, a further eastward extension to Salt Lake City's medical complex was opened. The current operation has 17.4 line miles/28 km and 23 stations. Attention is currently shifting to establish a commuter rail line to Provo and not for light rail extensions. Before the extension opened, there were 10 million unlinked passenger trips and 31,000 daily weekday riders in 2002.

In April 2000, a light rail line opened in Hudson County, New Jersey, with the bulk of the operation in Jersey City. One branch continues to Bayonne while the line was

extended northward to Hoboken Terminal in 2002. Considerable running occurs at street surface level, making this new line similar to tram lines in Europe. This line has helped alleviate some of the burden left when a portion of the PATH (Port Authority Trans-Hudson) subway system was severed after its subway station under the World Trade Center was destroyed on September 11, 2001. The PATH WTC station reopened in the fall of 2003. Currently, there are approximately 9.6 line miles/15.5 km and 17 stations, with further extensions into Bergen County under construction. New Jersey Transit, the line's operator does not reveal individual line ridership figures (APTA, 2004).

In 2003, the shortest LRT operation in the U.S. opened in downtown Tacoma, Washington. The initial segment is 1.6 miles/2.6 km and five stations located primarily at street level. Currently all rides are free as the line is in the "Free Transit Zone" in downtown Tacoma. In January, 2004, Houston, a city well known for its traffic congestion, opened a line from the University of Houston's downtown campus southwest to Houston's medical complex and stadiums. Also in early 2004, a diesel-operated LRT started service from Camden to Trenton, New Jersey. It currently operates at 30-minute frequencies. One more new LRT operation will open in June, 2004 from downtown Minneapolis through MSP Airport to suburban Bloomington and the Mall of America. (Note: Further ancilliary information regarding the LRT 'new starts' came from two web sites: www.lightrail.com and www.nycsubway.org.)

LRT U.S. New Starts: System Figures (1981-2003*)

Location	Date start	Miles/km (1)	Vehicles	Sta.	Extensions?
Baltimore	1992	29.0/46.7	53	33	(2)
Buffalo	1985	6.4/10.3	27	15	No
Dallas	1996	44.0/70.8	95	34	Yes
Denver	1994	15.8/25.4	31	24	Yes
Jersey City	1999	9.6/15.5	28	17	Yes
Los Angeles	1990	55.7/89.7	121	48	(3)
Portland	1986	38.2/61.5 (4)	78 (4)	54 (4)	Yes (5)
Sacramento	1987	26.9/43.3	56	36	Yes
St. Louis	1993	37.9/61	65	28	Yes
Salt Lake City	1999	17.4/28	33	23	(6)
San Diego	1981	45.4/73.1	123	49	Yes
San Jose	1987	30.5/49.1	50	46	Yes (7)
Tacoma	2003	1.6/2.6	3	5	Yes (8)

Sources: Middleton (2003); Polzin and Page (2003); Schumann and Loetterle (2003); Lightrail.com (2004); confirmation by transit agency websites.

Notes: (1) One-way line, not total trackage; (2) Double-tracking in 2004. (3) New Orange Line is a BRT line. (4) Does not include the Portland Streetcar; (5) Yellow Line opens May, 2004 (adds 5.8 miles, 10 stations, and 27 vehicles). (6) Proposals only; commuter rail line planned. (7) Tasman East Line opens in summer, 2004. (8)Ground broken in 2003 for Seattle light rail line. * Does not include 2004 openings.

Light Rail Transit in the United Kingdom

The United Kingdom, unlike the United States, has only two heavy rail operations: London and Glasgow. Glasgow's Underground is an underground tube line that is essentially a closed circle located entirely within central Glasgow. London's

Underground was the first of its kind (1863); it is still currently has more line miles (not trackage) than any other heavy rail system in the world and it is one of the busiest, with close to one billion passengers a year. It carries as many people as the National Rail network does in a year (Knowles and White, 2003).

As for trams and light rail, a similar history emerged in Britain as did in the United States regarding the decline of tramways after World War II; for the U.K., though, this decline was in sharp contrast to Continental Europe, which has found many urban areas maintaining their tramway operation. In the U.K. trams were considered an outdated mode of transport and no tram network survived past 1962 except for Blackpool's tourist-oriented seafront line, which continues to use vintage trams north to Fleetwood (Knowles and White, 2003).

Thus, for all intents and purposes, Residents of British cities outside of London had to rely on two modes of public transport (bus and national rail) or convert to private automobile use, which increasingly people have done especially suburbanites and/or the middle class. While there is a national bus network, most bus travel is for intra-city use. British Rail's network (now officially referred to as National Rail after the dissolution of British Rail in 1997) includes a dense pattern of suburban services for a number of large British cities; however, the network has had a number of limitations. Stations tend to be farther apart than for a rapid transit system; trains operate less frequently; and usually the city centre is served by a single, large terminus. The latter often requires a modal change to reach a final central destination.

Light Rail Transport (LRT) in Britain was originally conceived as the backbone of an integrated urban transport system, in particular for cities of moderate size; Newcastle, Manchester and Sheffield were chosen as the first cities to have integrated schemes (Knowles and White, 2003). However, only Newcastle was able to launch their integrated system before bus deregulation began in October, 1986 (Preston, 2003); the integration scheme fell apart after deregulation and bus companies ended up competing with each other and with Britain's first light rail 'new start' operation, the Tyne and Wear Metro.

LRT 'New Starts' in the United Kingdom

Tyne and Wear Metro, which serves Newcastle and its surrounding area, opened its initial route in 1980; it was 55 km/34.1 mi. long (single line kilometers) and cost 284 million pounds (DfT, 2003). The city centre portion was built underground, or the equivalent of a 'Pre-Metro' (Armstrong-Wright, 1986). The rest of the line replaced a British Rail Diesel Multiple Unit (DMU) operation and reused the rail stations (therefore, Tyne and Wear's platforms are high-level). Before bus deregulation, Tyne and Wear Metro had 61 million passenger trips, a huge difference compared to the previous British Rail operation. After bus deregulation, ridership was cut in half, but two extensions, one (3.5 km/2.2 mi.) to the airport in 1991 and a 19.2 km/11.9 mi. extension to Sunderland in 2002 have brought ridership numbers back up to 36.6 million a year (DfT, 2003). The current system is 77.7 km/48.2 mi. long (DfT, 2004), which makes Tyne and Wear Metro the longest in Britain; approximately one-third of all LRT line kilometers/miles can be found here.

The second system to open was not in a provincial city but in London. The Dockland's Light Railway (DLR) opened its starter line in 1987; since its opening in

London, it has been integrated with the rest of London Transport (unlike Tyne and Wear, which found itself separated from deregulated bus companies and British Rail despite being part of a Public Transport Executive). The initial segment of 12 km/7.4 mi. operated from Tower Hill to the Isle of Dogs and Stratford; it cost 77 million pounds to construct on abandoned ex-mainline elevated structures and also newly-built elevated portions. Also unlike Tyne and Wear, this service was entirely brand new, not merely upgrading a pre-existing rail line. In 1991, a tunnel portion, 1.5 km/1 mi. long, opened to the Bank Underground station at a cost of 282 million pounds. It allowed for greater connection ease between DLR and the Underground. In 1994, the railway extended to Beckton (another 8 km/5 mi.) and in 1999, the railway crossed the Thames River into Greenwich and Lewisham. This 4.5 km/2.8 mi. extension brought DLR's total to 26 km and a price tag close to 1,000 million pounds. It does carry more passengers than any other LRT in Britain – 45.7 million passenger journeys in 2002/2003.

Manchester opened Metrolink's starter line, from suburban Altricham through Manchester's centre north to suburban Bury, in 1992. The initial route was 30.9 km/19.2 mi. long and essentially replaced long-running EMU service to Altricham and Bury that dated back decades and helped replace 30+ year-old stock on each line. It cost 140 million pounds to construct. In addition to the upgrade, Metrolink operates through the city centre at street-level, allowing better access to the centre, and connects the city's two main railway stations (Piccadilly and Victoria). An extension (phase II) to Eccles occurred in 1999 and 2000, adding another 7.5 km/4.6 mi. The extension cost 160 million pounds to construct. Currently 38.4 km/23.8 mi. of single route line exists; there were 18.8 million passenger journeys in 2002/2003. There are planned extensions (known as Phase III).

By 1995, Sheffield opened its Supertram, a 29 km/18 mi. line through Sheffield at a cost of 240 million pounds. It utilizes street running in the centre and uses old rail alignments towards suburban areas (but did not replace any main line operation). Despite initial concerns regarding its usage and considered by some to be an early financial failure (Hibbs, 2000), passenger figures have been rising, Supertram had 11.5 million passenger journeys in 2002/2003; this is an improvement from 7.8 million in 1996/1997.

In 1999, after a series of delays, Midland Metro opened from Birmingham Snow Hill Station (not New Street, which is one of busiest stations in the country) to Wolverhampton Centre via a closed Great Western Railway line and some on-street operation in Wolverhampton. It closely parallels the National Rail mainline from Birmingham to Wolverhampton and totals 20 km/12.4 miles. Its construction costs were 145 million pounds but so far have seen less than 5 million passenger journeys a year – the system lacks compatibility and interchange with other Birmingham transport modes.

A second Greater London LRT scheme, Croydon's Tramlink, opened in 2000. The central portion of the line runs through this Greater London suburb located 16 km/10 mi. south of Westminster. There are three lines with 28 total line kilometers/17.4 miles. The lines use feature street-running through a lot of Croydon, but also employ in some areas the use of former British rail suburban lines. The extent of the system runs east to Beckenham and west to Wimbledon. The construction cost was 200 million pounds. It had 18.7 million passenger journeys in 2002/2003. Tramlink intersects with main line rail, the London Underground, and London buses; while it has its own tickets, passengers can use all-zone or outer-zone London Transport Travelcards. This feasibility allows on-

price access to the system and connections, a feat apparently only fully realized between Greater London's two light rail systems.

Overall, LRT in Britain accounted for 136.2 million passenger journeys, a rise of 6.9% from 2001/2002 (DfT, 2004). Its share of all rail journeys in Britain is 7% of the total (National Rail and London Underground almost equally split the rest.) As indicated before, Dockland's Light Railway carried more passengers than any other LRT in the UK – 34% of the total. Tyne and Wear was next with 27% of the total. As LRT figures for 2002/2003 were released, Nottingham Express Transit opened its initial operation of 14 km/8.7 mi., the first opening in four years. (Again, a web site, lrta.org, provided ancilliary information to this section.)

LRT U.K. New Starts: System Figures (1980-2003*)

<u>Location</u>	<u>Date start</u>	<u>Miles/km (1)</u>	<u>Vehicles</u>	<u>Sta.</u>	<u>Extensions?</u>
Croydon	2000	17.4/28	24	38	(2)
Docklands	1987	16.7/27	94	34	Yes
Manchester	1992	24.2/39	32	37 (3)	Yes
Midland	1999	12.4/20	16	23	Yes
Sheffield	1995	18/29	25	48 (4)	(2)
Tyne and Wear	1980	48.4/78	90	58 (3)	(2)

Source: Department for Transport (2003)

Notes: (1) One-way line, not total trackage; (2) Studies underway; (3) Includes shared stations; (4) Referred to as 'tram stops.' * Does not include 2004 openings.

National Policies Toward Light Rail Transit: United States Government Light Rail 'New Starts' Policy

In 1968, the Urban Mass Transit Administration was created by moving urban public transit from the Department of Transportation. During the early 1970's, the UMTA was fundamental in funding heavy rail projects in places such as the Bay Area and Washington D.C. These projects had been supported because at the time there were strong convictions that rail transit systems could solve the problems of urban congestion, petroleum dependence (read the crises of 1973-1974), and promote efficient development patterns (Weiner, 1999). The UMTA also funded various capital improvement projects throughout the country including replacing vehicles on already-existing LRT systems in cities such as Boston, Philadelphia, and San Francisco. In 1975, the UMTA realized that requests for funding outpaced available funds, so funding guidelines were established. In particular, preferences would be made for urban areas where densities, travel volumes, and growth patterns indicated a need. Roughly at the same time, the first conference on light rail took place in 1975, the UMTA acknowledged that LRT must be given adequate consideration, especially when compared to the cost and effort associated with heavy rail (Transportation Research Board, 1975).

The criteria method used today to determine whether 'new starts' are eligible for federal funding was originally conceived in 1984 in an effort to better manage funding of transit projects. Considerable funding for rail projects went the rehabilitation of older systems, such as New York City's massive subway system, or for new heavy rail projects in Atlanta, Baltimore, Los Angeles, and Miami and for extensions of BART and the

Washington Metro. Literally billions of dollars were spent on these projects. Thus, in 1984, the Project Development Process was unveiled (US DOT, 1984). It included five steps: 1) System Planning; 2) Alternatives Analysis and Draft Environmental Impact Statement; 3) Preliminary Engineering and Final EIS; 4) Final Design, and 5) Construction after funding contract assigned.

In 1991, the UMTA was changed to the FTA, or Federal Transit Administration. This change occurred at the same time of the creation of ISTEA, the Intermodal Surface Transportation Efficiency Act (US DOT, 1991). With specific regard to new starts, which fell under Title III of the Act, new starts would have access to 40% of the FTA capital grant funds. In order to receive funding, new fixed guideway projects had to be based on the results of an alternatives analysis and preliminary engineering (rules established in 1984), and be justified by the following: Expected mobility improvements, environmental benefits, cost-effectiveness; operating efficiency, and finally by an acceptable degree of local financial commitment (Weiner, 1999). In other words, there had to be support locally for the project.

In 1998, the reauthorization of ISTEA changed its name to TEA-21. While the new starts process has been established since 1984, the following is the current wording of the process under TEA-21 rules (FTA, 1998).

The first step of the 'New Starts' Process is to determine locally if light rail is correct modal choice. Thus, an "Alternatives Analysis" must be conducted. The analysis considers all transit alternatives; in the case of cities considering light rail, usually bus enhancements (including bus rapid transit, HOV lanes in which buses would utilize, and/or improving current bus operation) have to be explored as well. There is also a "do nothing" alternative, which must consider what issues may occur if no action is taken with regard to LRT or bus enhancement. The result of the "Alternatives Analysis" is choosing a Locally Preferred Alternative (LPA). The choice is made usually by local/regional decision-makers and the LPA must be adopted by the metropolitan planning organization (MPO). Often an "Alternatives Analysis" will include a draft environmental impact statement (DEIS) and input from the public. Additionally, TEA-21 requires a "Project Justification" section. A project must be justified based on several criteria: Mobility improvements, environmental benefits operating efficiencies cost effectiveness, and transit-supportive land use and future patterns. Furthermore, in particular if LRT is chosen as the LPA, an estimate of ridership must be made. The Analysis and the decision of the LPA must be submitted to the FTA before any further action can take place. Annually, the FTA evaluates projects and rates the project's justification criteria, including local funding sources. Local funding commitment is measured by stability and reliability of capital financing plan, the stability and reliability of the operating financing plan and also procurement of the local share of project's costs. These project criteria are then given a rating of high, medium-high, medium, low-medium, or low. These scores are summarized and the project is given an overall score of "highly recommended," "recommended," or "not recommended."

If approved, the project can begin the second phase of preliminary engineering. Once again, the project must submit a report; this one includes an environmental impact statement. Local funding, ridership projections, and other aspects of the project must be re-iterated and once again, the project must be recommended by the FTA. If a project is again recommended, then the third phase, final design, begins. This section includes

securing rights-of-way, utility relocation, and detailed construction preparation. Furthermore, the project must consider applying for Full Funding Grant Agreement (FFGA), which will secure funds beyond the initial starter line.

If the final design is approved, then the project can begin construction. Since 1984, new start LRT operations have gone through this process or a similar version if prior to 1998. While critics charge that local authorities overstate their case in order to develop light rail, they must concede that at least there is a process in place before funding is allotted. It must also be stated that various urban areas in the United States have started the 'new starts' process only to stall along the way, including Louisville, Kentucky (where the author resides). While the local agency, Transit Authority for River City, passed through the first stage in choosing LRT as the local preferred alternative, the agency could not secure local funding or withstand the project's justification criteria in subsequent stages (Poynter, 2004). Currently, Charlotte and Phoenix appear to be the next metropolitan areas closest to completing the 'new starts' process and both have plans for a 2006 opening date.

National Policies toward Light Rail Transit in the U.K.

As stated previously, Britain has had a series of "on-again, off-again" positions with regard to the support (and funding) of its urban light rail transit schemes. For example, in 1989, new guidelines required LRT's outside London to be privately operated with revenue subsidy if the national government was going to fund up to 50% of the construction costs. This policy echoed the attempts of the Conservative Party to privatize public transport in Britain. Furthermore, non-user benefits had to be derived from LRT, including urban centre regeneration, a reduction in noise and air pollution, and a reduction in traffic congestion. These guidelines made it considerably difficult for local public transport executives (PTE) to develop plans, which may have been the goal in the first place at the national level. But by 1991, the British House of Commons Report, "Urban Public Transport, the Light Rail Option," strongly suggested LRT as an option, and it proposed improved evaluation, approval, and funding procedures for the mode. However, a turnabout to this policy came in the form of cuts in government expenditures that occurred with John Major's election in 1992, thus delaying extensions and new starts (Knowles and White, 2003).

In 1997, after years of Conservative party transport policies that favored privatization and deregulation, the Labour Party issued a White Paper, A New Deal for Transport: Better for Everyone. (House of Commons, 1998) However, the paper did not appear to assist light rail. First of all, the Paper preferred investment in buses over light rail (probably since most poor residents were dependent on bus transport, especially outside of London) and second, it maintained bus deregulation policy. Furthermore, while light rail could be seen as part of an integrated transport scheme, the costs versus bus could not necessarily be justified. The result was that LRT projects were downgraded (despite the fact that Birmingham and Croydon's systems were under construction) for a while.

In 1999, the government reversed itself after John Prescott, the Secretary of State for Transport, predicted that there would be more light rail transit systems. He saw LRT as an attractive alternative to private automobile travel. In 2000, the House of Commons' Environment, Transport and Regional Affairs Select Committee also saw LRT as an

attractive alternative to private transport (House of Commons, 2000a). Thus, in July 2000, light rail transit became an integral part of Transport 2010: The 10-Year Plan, (House of Commons, 2000b) another Government paper. It targeted that by 2010, there would be twice the LRT ridership as there was in 2000; this included the prospect of 25 new light rail routes. Overall, the opinion of the government toward light rail was as follows:

“Light rail, trams, and other rapid transit systems can play a significant part in improving the attractiveness and quality of public transport in major conurbations. They can move large flows of passengers quickly and reliably. They compete with the car in terms of journey times and convenience. And they help to reduce congestion and pollution (House of Commons, 2000b).”

The result of the Paper and subsequent funding has aided Tyne and Wear (to extend to Sunderland in 2002), the DLR extension to London City Airport, and the expansion of Manchester Metrolink to Oldham and Rochdale (Metrolink’s Phase III). It also allowed for Nottingham to open its NET (Nottingham Express Transit) line in 2004.

As far as further ‘new starts,’ because of the *Transport 2010* Paper, Leeds’ Supertram obtained government funding and Private Finance Initiative credits in 2001; the 500 million pound, 17.5 mile/28 km, 3-line system has been in the planning stages for years. South Hampshire’s plans were also approved in principle (again, after years of planning) as were Liverpool’s plans for ‘Merseytram’ (Knowles and White, 2003). Other cities have also made proposals, but there have been no other acceptances to date.

Despite recent awards being made, the goal of completion for light rail new starts is not finished. In addition to the Government’s support (or not) of light rail, Britain also has two processes that all light rail projects, including extensions, must go through. The first is the Transport and Works Act (TWA) Order; this process is similar to the United States’ case because there have to be justifiable reasons why either the extension or new LRT operation is needed. A recent extension proposal of the Dockland’s Light Railway to London City Airport took the Government 20 months to decide in favor of the project despite a public inquiry period into the project took only four days to complete because of a lack of objections (Sully, 2003). Similar delays by other agencies have also been reported.

The second process is franchising process, a requirement of the privatization efforts in Britain. There is a bidding process, but recently projects have found few bidders and the cost estimates to the “Consortia” too high to attract their interest. For example, Leeds’ Supertram has had only two bidders for its project (LRTA, 2003). These two hurdles keep new starts in Britain developing at a slow pace despite general government support.

Conclusions

Overall, it can be stated that both countries have revised a form of transportation technology that began over 100 years ago, abandoned in favor of road vehicles (buses, automobiles, etc.) after World War II, and re-invented in the 1980’s and 1990’s as a way to address road congestion. Both countries have used railway rights-of-way where possible and tend to use surface streets in a city center. Both countries have tended to have Government support of light rail projects, but only after proposals have been scrutinized by federal transport agencies. Today, in both countries, local transit agencies

must justify the need for LRT, thus on one hand making it more difficult to develop a 'new start,' but the justification process should address critics' charges that universally LRT systems have lower than expected ridership figures and alleged benefits to the community that can't be justified by its high construction and operation costs.

Thus, the conclusion as to the future of light rail transit development in each country is dependent on what occurs at the local level and the national government level. In the U.S., federal funding levels for 'new starts' remain, as long as a local transit agency and local leaders can develop a justifiable LRT project. In Houston and Minneapolis, local authorities succeeded in opening new LRT lines despite heavy criticism and opposition. Phoenix and Charlotte, both rapidly growing U.S. metropolitan areas, have so far been convincing in their LRT plans. However, as previously stated, cities such as Louisville have now abandoned plans for LRT because locally they haven't convinced leaders that an LRT line is necessary and deserves local funding, and they haven't fully convinced the FTA that estimated ridership figures and benefits to the community outweigh the expected construction and operating costs.

In the U.K., government support and funding currently exists, but as in the United States there are no guarantees that a project will be completed. For example, Leeds has received funding "go-ahead" but has had difficulty in finding a builder and operator for its 'Supertram' scheme because the expected costs are too high for a "consortia" to handle. A number of conurbations, including Bristol, Edinburgh, Liverpool, and Portsmouth (South Hampshire) have made considerable proposals for light rail schemes, but face difficulties in justifying the need for their respective new systems. It is expected, that in both the U.S. and the U.K., already existing new start LRT lines will continue to expand and proliferate in their respective communities. Thus, the cities outlined in this paper represent the primary examples of LRT operations for the United States and the United Kingdom for years to come.

References

- APTA (American Public Transportation Association) (2004) *Light rail transit ridership report, Fourth Quarter 2003*. Online: www.apta.com/research/stats/ridership
- (2003) *Light rail transit ridership report, Fourth Quarter 2002*. Online: www.apta.com/research/stats/ridership
- Armstrong-Wright, A. (1986) *Urban transit systems: Guidelines for examining options*. World Bank Technical Paper Number 52: Urban transit series. Washington D.C.: World Bank.
- Black, A. (1993) The recent popularity of light rail transit in North America. *Journal of Planning Education and Research* 12: 150-159.
- DeLeuw, Cather & Co. (1976) *Light Rail Transit: A State of the Art Review*. Washington D.C.: Government Printing Office.
- Desmond, M (1984) Buffalo: Preparing for the birth of a new LRT Mass Transit 11(9): 68-70, 74.
- DfT (Department for Transport) Transport Statistics Branch (2004) *Light rail statistics: England: 2002/2003*. Online: www.dft.gov.uk/stellent/groups/dft_transstats/documents
- DfT (Department for Transport) (2003) *Light rail facts*. PDF online: www.dft.gov.uk

- Gomez-Ibanez, J. A. (1985) A dark side to light rail? *Journal of the American Planning Association* 51: 337-351.
- Fielding, G. J. (1995) Transit in American cities in *The geography of urban transportation*. Susan Hanson ed. New York: Guilford Press. 2nd edition.
- FTA (Federal Transit Administration) (1998). New Starts. Online: www.fta.dot.gov/library/policy/ns/ns.htm
- Hibbs, J. (2000) *Transport Policy: The Myth of integrated transport*. London: Institute of Economic Affairs.
- House of Commons, Select Committee on Environment, Transport, and Regional Affairs (2000a) *Memorandum by the Confederation of Passenger Transport: Light rail systems*. London: Stationary Office.
- (2000b) *Transport 2010*.
- (1998) A new deal for transport: Better for everyone. Cmnd 3950. London: Stationary Office.
- Kain, J. (1990) Deception in Dallas: Strategic misrepresentation in rail transit promotion and evaluation. *Journal of the American Planning Association* 56: 184-196.
- Knowles, R. and P. White (2003) Light rail and the London Underground in *A New deal for transport?* I. Docherty and J. Shaw, Eds. Oxford: Blackwell Publishing.
- LRTA (Light Rail Transit Association) (2003) Historic Day for Leeds Supertram *Tramways and Urban Transit* 66 (785).
- Middleton, W. (2003) *Metropolitan railways: Rapid transit in America*. Bloomington, IN: Indiana University Press.
- Muller, P. Transportation and urban form: Stages in spatial evolution of the American metropolis, in *The geography of urban transportation*. Susan Hanson Ed. New York: Guilford Press. 2nd edition.
- Newman, P. and J. Kenworthy (1999) *Sustainability and cities: Overcoming automobile dependence*. Washington D.C.: Island Press.
- Pickrell, D. H. (1992) A desire named streetcar. *Journal of the American Planning Association* 58: 158-176.
- Polzin, S. and O. Page (2003) Ridership trends of new start rail projects in *Experience, economics and evolution: From starter lines to growing systems*. 9th National Light Rail Transit Conference Proceedings, November 16-18, Portland, OR. Washington D.C.: Transportation Research Board.
- Poynter, C. (2004) Louisville's light rail project placed on indefinite hold. *Louisville Courier-Journal*. May 13, 2004 A-1, A-6.
- Preston, J. (2003) A 'thoroughbred' in the making? The bus industry under Labour in *A New deal for transport?* I. Docherty and J. Shaw, eds. Oxford: Blackwell Publishing.
- Pushkarev, B.S., J. M. Zupan, and R.S. Cumella (1982) *Urban Rail in America: An Exploration of Criteria for Fixed-Guideway Transit*. Bloomington: Indiana University Press.
- Schumann, J. and F. Loetterle (2003) Status of North American transit systems: Year 2003 update in *Experience, economics and evolution: From starter lines to growing systems*. 9th National Light Rail Transit Conference Proceedings, November 16-18, Portland, OR. Washington D.C.: Transportation Research Board.

Sully, J. (2003) Trams not jams: Momentum falters in the light rail market as legal and tendering processes delay new starts. *Modern Railways* 60 (659): 48-52.

Transportation Research Board (1975) *Light rail transit, Special report 161*. Washington D.C.: Transportation Research Board.

Transportation Systems Center (1977) *Light rail transit: State of the art review*. Washington D.C.: U.S. Department of Transportation.

U.S. DOT (Department of Transportation), Urban Mass Transportation Administration (1991) *A Summary – Intermodal Surface Transportation Efficiency Act of 1991*. Washington D.C.

---- (1984) Urban mass transportation major capital investment study. *Federal Register*, Vol. 49, No. 98, p. 21284-91, May 18.

Weiner, E. (1999) *Urban transportation planning in the United States: An historical overview*. Westport, CT: Praeger Publishers.