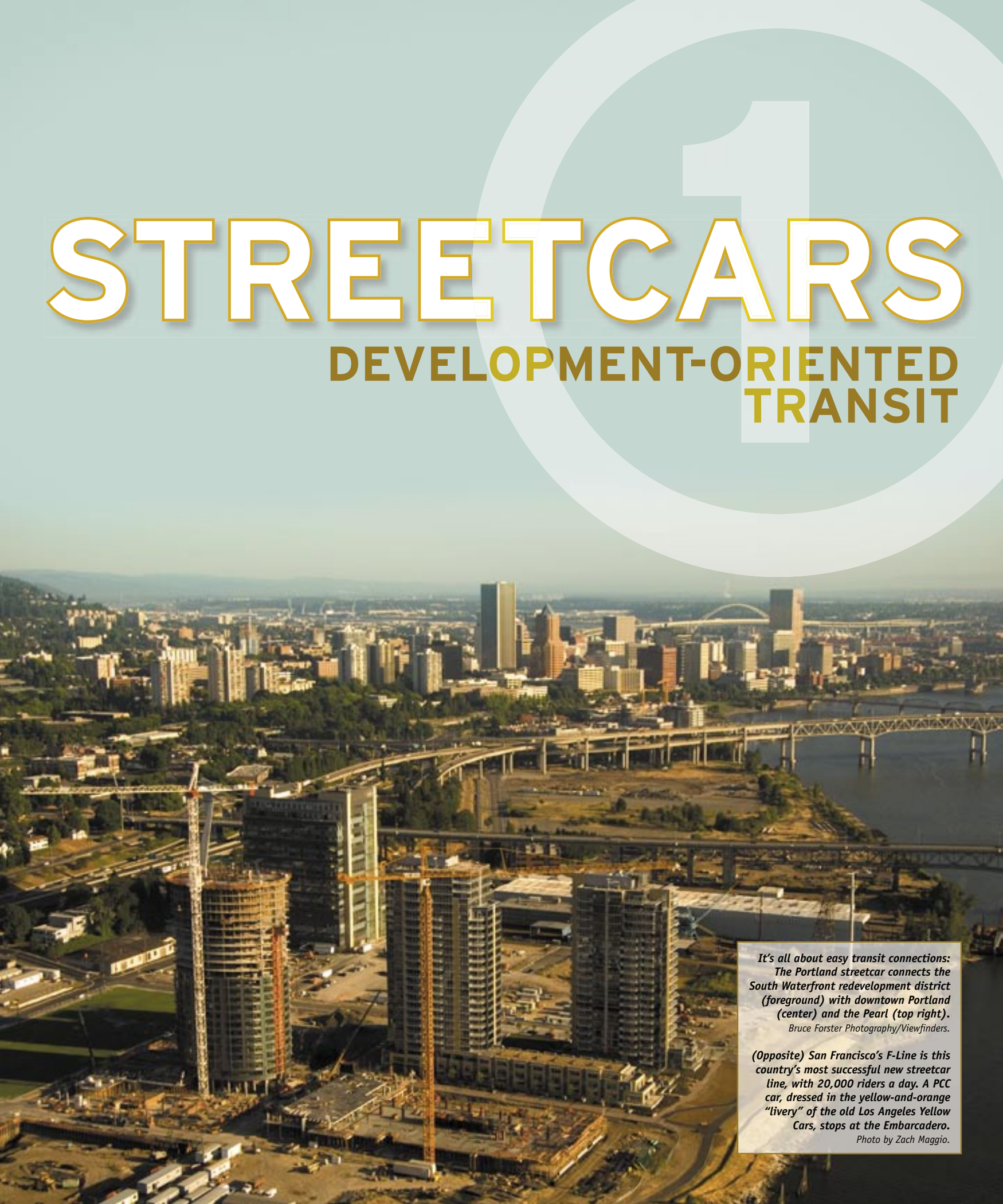
STREETCARS

DEVELOPMENT-ORIENTED TRANSIT



It's all about easy transit connections: The Portland streetcar connects the South Waterfront redevelopment district (foreground) with downtown Portland (center) and the Pearl (top right). *Bruce Forster Photography/Viewfinders.*

(Opposite) San Francisco's F-Line is this country's most successful new streetcar line, with 20,000 riders a day. A PCC car, dressed in the yellow-and-orange "livery" of the old Los Angeles Yellow Cars, stops at the Embarcadero. *Photo by Zach Maggio.*

WHY STREETCARS AND WHY NOW?

By Shelley Poticha and Gloria Ohland, Reconnecting America

Streetcar systems were ubiquitous at the turn of the last century and are uniquely suited now to serve all the high-density development underway in downtowns across the United States. They're much cheaper than light rail, are hugely successful in promoting development and street life, and fit easily into built environments with little disruption to existing businesses, residents, and traffic. They can provide high-quality transit service to support compact, walkable, higher-density development in small and mid-size cities that can't afford bigger rail systems — offering the potential to significantly increase the constituency for transit in the United States.

AFTER WORLD WAR II, families flocked to a burgeoning suburbia, lured by the "rural ideal" of open spaces and supported by massive federal programs to provide ready credit for home mortgages and to build new highways. More recently, cities around the country have seen an influx of people move back to the urban core. Whether these are young adults disenchanted by suburban childhoods (all those weekend nights where there was "nothing to do"), or empty nesters (a group destined to balloon in size as baby boomers get older), they like the convenience and attractions of the city.

Demographics are changing: American households are older and smaller, and singles — not families — are becoming the new majority. Combined with the problem of traffic, these changes are having a dramatic impact on the housing market, as evidenced by the renewed popularity of loft and condo projects in close-in urban neighborhoods — many of them early streetcar suburbs — including Seattle's Denny Regrade, the Heights in Houston, the Central West End in St. Louis, and Midtown Sacramento.

Enter, or rather reenter, the streetcar. Almost every U.S. city once had an extensive streetcar system, which extended the pedestrian environment out into neighborhoods, served as a collector for intercity rail systems, and stopped at every street corner to stimulate a density and an intensity of uses that made for exemplary and engaging downtowns. If the high cost of providing parking drives development today, streetcars make it possible for developers to provide less parking and put their money into high-quality design, building materials, and community benefits like affordable housing and parks. Streetcars also enable residents to give up a car — freeing up a substantial amount of money for other household expenses.

Streetcars aren't like light or heavy rail, designed to carry lots of people over long distances at high speeds. The cars are smaller, the average streetcar system is just 2-3 miles in length, and the average speed is only 3-5 miles per hour. They're not like buses — streetcars are easier to get in and out of, don't lurch in and out of traffic because most run on fixed guideways, and they're less threatening to pedestrians, they're quieter and they don't smell of exhaust.

But like rail, streetcars channel development, and like buses, they're less expensive to build — about a third the per-mile cost of light rail, or $12 million to $15 million per mile as compared to $30 million to $50 million. Notably, the 2-mile system in Kenosha, Wisconsin, was built in 2000 for $5.2 million, plus another $1 million for a maintenance facility. The ability of streetcar projects to engender development is highlighted in the following table, which shows the cost of the system and the handsome returns in private investment. The permanence of the fixed-guideway system, developers and investors say, helps mitigate the risk, and the higher densities and lower parking ratios typically permitted in downtowns make projects more profitable.

Moreover, streetcars are prime examples of the concept of value capture: Acknowledging that a streetcar will increase property values and stimulate business because more customers will be walking down the street, the impetus for streetcar projects and at least some of the funding often comes from the business sector, with operations funding raised through business-improvement districts.

TABLE 1: *Private returns on the public investment*

	Start of Service	Initial Track Miles	Initial System Cost Per Track Mile	Initial System Cost	Development Investment	Return on Investment
Kenosha	2000	2.0	3.10	6.20	150	2319.35%
Little Rock	2004	2.5	7.84	19.60	200	920.41%
Tampa	2003	2.3	21.00	48.30	1000	1970.39%
Portland (1)	2001	4.8	11.50	55.20	1046	1794.93%
Portland (Ext.)	2005	1.2	14.83	17.80	1353	7501.12%

Source: Reconnecting America

STREETCARS AND DEVELOPMENT

THIS IS NOT TO CONTEND that streetcars cause development to happen. Rather, in the words of Rick Gustafson, CEO of the Portland Streetcar, they "create the right decision-making environment" for policy and investments that will support compact, walkable, high-density, sustainable development. And developers and investors are far more willing to take a risk and build at higher densities with lower parking requirements.

Streetcar critics will argue that this development probably would have happened anyway somewhere else in the region — that a streetcar isn't going to lead to a net increase in development. But that's missing the point, which is that the development is happening at higher densities and with a mix of uses and less parking in those very neighborhoods where residents are most likely to walk or take transit — and streetcar systems typically connect with a regional transit system and therefore promote overall transit ridership — instead of in neighborhoods that don't have density or transit. (This is borne out in the alternatives analysis done for the Eastside extension of the Portland Streetcar in Chapter 6, on page TK.) In other words, this is the most sustainable kind of development, and can yield increased tax and sales revenues for local governments and local businesses.

Portland's Pearl under construction. Photographer Jerome Unterreiner has documented the transformation of this neighborhood from abandoned railyard to fashionable address over several years. *Photo by Jerome Unterreiner/ZGF.*

Moreover, streetcar projects are relatively easy to construct in already built-up environments. The reasons why:

- Systems can be easily integrated into a built environment because cars are small, can run in mixed traffic, and share stops with buses;
- Systems can be built quickly so that sections of a street need be closed for only two to three weeks;
- Streetcars stop so often that they serve and promote an intensity of uses;
- Streetcars are slow and integrate seamlessly into the environment and are nonthreatening to pedestrians;
- Streetcar systems don't require the massive infrastructure — big stations, parking lots and structures, bus bays, exclusive rights of way — that make bigger rail systems so expensive and difficult to build.

Streetcar projects have typically been championed by cities and not transit agencies — which tend to view them as competition for long-planned light-rail and commuter-rail projects that have already been waiting in the long queues for oversubscribed funding programs. But in fact streetcars are the very investment that can help promote transit ridership because they provide that "last mile" connection that makes the rest of the transit system work better by getting people to their final destinations, be it work or home: If regional rail systems are like the highways and arterials of our road system, streetcars are like the local roads.

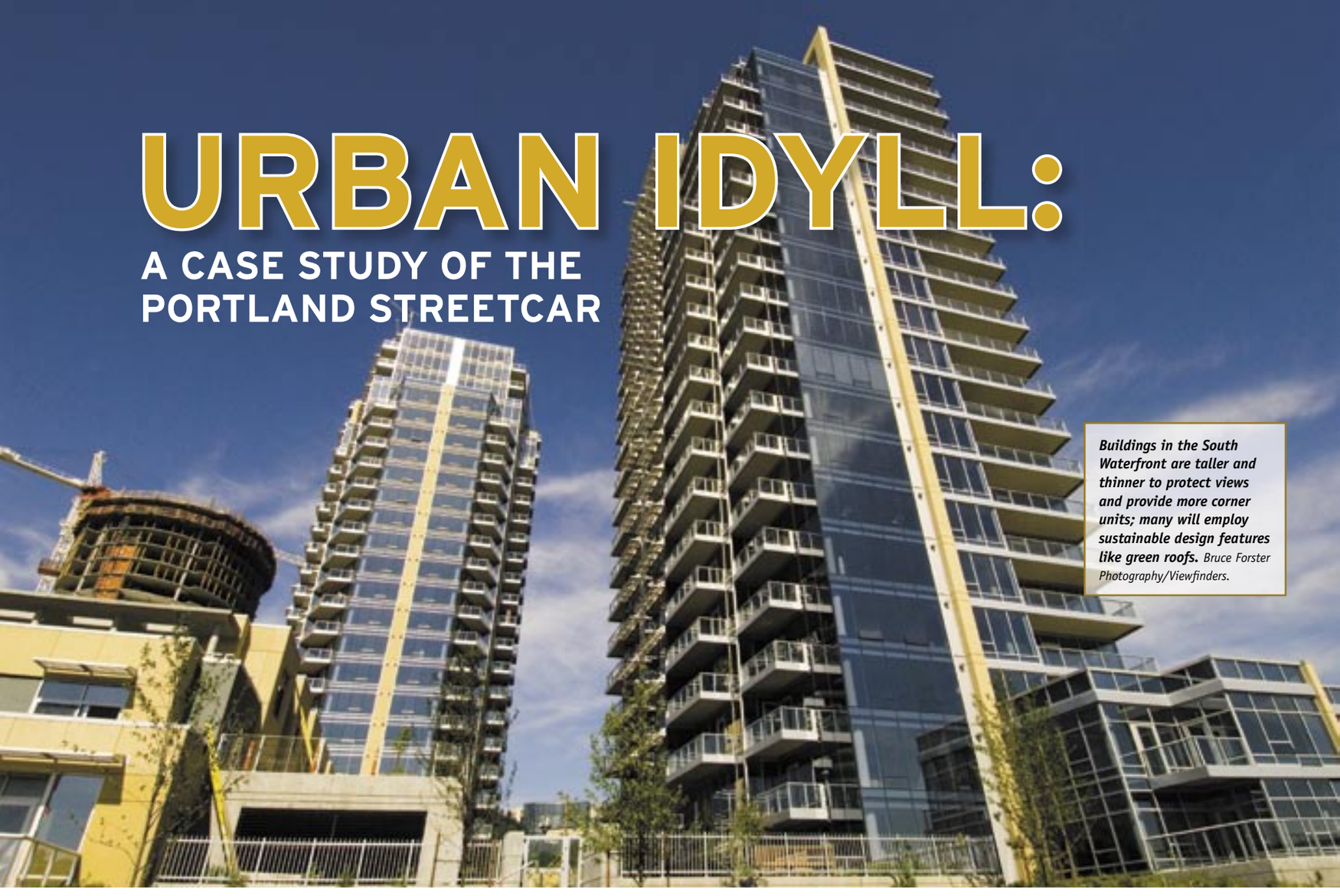
> Streetcar systems are about a third of the per-mile cost of light rail —about $12 million to $15 million instead of $30 million to $50 million—and total just 2-3 miles in length. Notably, the 2-mile system in Kenosha, Wisconsin, was built in 2000 for $5.2 million, plus $1 million for a maintenance facility.

Moreover, streetcars utilize a domestic energy source. And the higher-density development that they promote is also the most efficient in terms of infrastructure cost and energy use. "Cities lose money providing infrastructure and services to dispersed low-density neighborhoods," said Len Brandrup, director of transportation for the city of Kenosha. "If you ask the question, 'What tools does the federal government have that use the power of the private market to change development patterns?' I would say that transit is one of the most powerful ones. But we need to figure how to build more than a half dozen new systems a year."

For all these reasons, we believe that it's time for a streetcar renaissance in the United States.

URBAN IDYLL:

A CASE STUDY OF THE PORTLAND STREETCAR



Buildings in the South Waterfront are taller and thinner to protect views and provide more corner units; many will employ sustainable design features like green roofs. *Bruce Forster Photography/Viewfinders.*

By Shelley Poticha and Gloria Ohland, Reconnecting America

The Portland Streetcar was the first modern streetcar system built in the United States when it opened in 2001. By 2005, it had engendered so much development — about 100 projects worth $2.3 billion — and such a high-quality urban environment that it stimulated tremendous interest in streetcars across the country. The Portland Streetcar is a case study in the creative leveraging of local, state, and federal resources to link transportation investments and development.

PORTLAND IS MODELING a new kind of downtown neighborhood that appeals to the demographic groups (smaller, older households) that are becoming the new majority in the United States. The downtown Pearl District is dense and mixed use and walkable, with high-quality public space including parks, plazas, and public art. There's easy, friendly, frequent transit, and a visually interesting mix of historic and ultra-modern buildings, with warehouses and former industrial spaces now converted to residential and other uses. And the Pearl includes housing for the entire market spectrum — from affordable (25 percent) to penthouses, plus lofts, live/work, low-rise townhomes, conventional mid-rise buildings, and high-rise towers providing magnificent views over the city and Willamette River.

But it's the high-quality urban environment that's most striking — with interesting things to look at and do, and an intensity of uses that has created an animated, intimate neighborhood with few cars. Portland has become, as they say, the "biggest small town in the world," urbane and sophisticated, yet human scaled, and with a healthy mix of incomes. But it's not like other American high-rise cities — it's more European in style but relaxed and still very West Coast. "We were pretty clear about what we wanted to achieve with redevelopment: the best European city in America," Charlie Hales, a former city commissioner who now works as a consultant, told *The New York Times* in 2006.

The Portland Streetcar was a watershed event in the development of downtown Portland. Planning and design began in 1997. The streetcar opened for service in 2001. By 2005 $2.3 billion had been invested within two blocks of the line, resulting

While it was tempting to say the streetcar was responsible for leveraging all this development, that would not be entirely accurate. Rather, the streetcar was said to be part of a "perfect storm" of planning and policy, development opportunities, and public-private investment.

in 7,248 housing units and 4.6 million square feet of office, institutional, retail, and hotel space. A study completed that same year by E.D. Hovee for the city of Portland documents the streetcar's power to connect places and shape neighborhoods: The study, which is discussed in detail in Chapter 6 on page TK, showed that developers built at 90 percent of allowable density right on the alignment, twice as high as 3 blocks or more away, Significantly, these developers were parking their buildings at significantly lower parking ratios than elsewhere in the region — about one to 1.3 spaces per unit.

SOUTH WATERFRONT

A SECOND EXTENSION of the streetcar was to open in late 2006 to the South Waterfront, 130 acres of abandoned industrial land on the other side of downtown. While the Pearl was being called this country's most successful redevelopment project, South Waterfront was almost double the size and potential. Construction was already underway in 2006 on the first neighborhood, the $2 billion Central District, covering 31 acres. Five towers were coming out of the ground, including the eliptical glass-encased John Ross, which sold out in two weeks; another five had gone through the planning process. When completed, the South Waterfront was to include a new campus for the Oregon Health and Science University, 2 miles above the waterfront on Marquam Hill, which would be connected to the South Waterfront and the streetcar by a four-minute aerial tram ride providing spectacular views.

This new neighborhood was to connect thousands of students and workers at OHSU and Portland State University; ensure that OHSU could expand in the city instead of moving to the suburbs; link the two centers of research and education with downtown; and provide another 5,000 residents and 10,000 jobs. Modeled after buildings in Vancouver, British Columbia, the structures were to be taller and thinner than conventional towers, thereby protecting views and providing more highly marketable corner units. Many developers were employing sustainable-design features like green roofs; one developer said all their buildings would be built to LEED-Platinum standards. The waterfront was to be protected with a mile-long river walk with habitat meadows and tree canopy for migratory birds.

While it was tempting to say the streetcar was responsible for leveraging all this development, that would not, of course, be entirely accurate. Rather, the streetcar was, it is said, part of a "perfect storm" of planning and policy, development opportunities and public-private investment. "The streetcar was a device," said Portland Streetcar Inc. CEO Rick Gustafson, "for changing attitudes and development priorities and creating the right decision-making environment." It's an environment in which, he added, laughing, "developers are rock stars," and they are willing to "negotiate with the public sector as an investment partner."

A RISK TAKER

IN THE EARLY '90S, downtown Portland was full of old warehouses and industrial buildings that that were ready to be torn down or converted to other uses. It was zoned for 14 housing units per acre; an economic study at the time projected a market absorption rate for condos of 30 units per year. In 1994 the City Council adopted a streetcar alignment running from northwest Portland through downtown and literally through Portland State University to connect two large and vacant parcels of land north (the Pearl) and south (South Waterfront) of downtown. It was then that the city cut an unusual deal with a risk taker named Homer Williams, who owned 40 acres in the middle of what would become the Pearl:

The city would remove an onramp, which bisected his property, to the Broadway Bridge and build the streetcar on an alignment that ran in front of his property if he would agree to upzone it from 15 dwelling units per acre (dua) to 125 dua. At the time there was no evidence of a market for this kind of high-density housing downtown. But the city was intent on creating an urban neighborhood where residents didn't need to rely on their cars to get around, with parks and affordable housing mixed in with the

Portland, "the biggest small town in America," is modeling a new style of high-rise urban living that's modern and multimodal. *Bruce Forster Photography/Viewfinders.*

Galleries stay open late on "First Thursday" in the Pearl and it's a party; the streetcar is the recommended mode of transport as there's no room for cars.
Bruce Forster Photography/Viewfinders.

expensive condominiums that would provide profit for developers.

The development agreements that the city used to leverage private investment in exchange for public improvements in the Pearl are detailed in Chapter 6. Significantly, the agreement set ambitious goals for affordable housing: by 2006 about 25 percent of the 7,000 units build were affordable. The agreement had also mandated that 15 percent of all rental units and 10 percent of for-sale units be 700 square feet or smaller, as another way of ensuring affordability. A lot of diffeent incentives and public subsidies were used to ensure affordability including low-income housing tax credits, fee waivers, property tax abatements, and money from the city's housing trust fund.

In 1995, the city contracted with the nonprofit Portland Streetcar Inc. to design, manage construction of, and operate the streetcar. The nonprofit's board was made up of citizens and property owners along the alignment as well as representatives of the public sector. The decision to contract with Portland Streetcar Inc., an organization governed by all the stakeholders, was a particularly effective way to help market the streetcar and build support for the creation of the local improvement district that has helped fund it.

The arrangement also allowed the city to retain control of what is a local circulator for downtown, instead of ceding control to TriMet, the regional transportation agency, which has a very different focus and mission — to move thousands of workers from the suburbs into the city and back home again. And with neighborhood stakeholders in control, the streetcar system was designed to have minimum impact on existing neighborhoods and businesses. Key design features are detailed in Chapter 7.

CREATIVE LEVERAGING OF RESOURCES

THE APPROACH TO funding construction illustrates the creative leveraging of local, state, and federal resources that characterizes most streetcar projects. Parking rates were increased from 75 cents to 95 cents, and bonds backed by parking revenues from city-owned parking garages were sold to raise $28.5 million. The local improvement district (LID) created along the line provided another $10 million; there was $7.5 million in tax-increment financing; a mix of other sources provided another $11 million. Tax-increment financing paid for most of Phase 2, and regional transportation funds were to be used to pay for Phase 3. The streetcar mostly operates in a fareless zone, but there's also income from sponsorships and advertising, and other regional and federal funding has been used. TriMet pays for two-thirds of the operating costs in lieu of having to provide additional transit capacity to serve all the development that's occurred and because the streetcar has boosted bus and light-rail ridership. The city pays for the other third.

When the streetcar opened in 2001, the projected ridership was 3,500 weekday rides. Actual ridership exceeded these expectations and climbed to more than 9,000 in 2005, while Saturday ridership

"We were pretty clear about what we wanted to achieve with redevelopment: the best European city in America," Charlie Hales, a former city commissioner who now works as a consultant, told *The New York Times* in 2006.

There are both affordable (top) and market-rate (bottom) rooms with a view in the Pearl. Almost a quarter of all the housing is affordable. *Top photo: Ed McNamara, Turtle Island Development LLC. Bottom: Bruce Forster Photography/Viewfinders.*

grew from 3,200 to 6,650. There is considerable use of Flex Car, and there are reserved parking spaces for Flex Car at streetcar stops, and an extensive network of bicycle paths. Moreover, downtown is transit rich, with frequent light-rail service and an excellent bus system.

Perhaps most importantly, the developer agreement with Williams resulted in a critical mass of development that showcased an urbane new lifestyle to city residents, which proved so popular that other developers began constructing high-density housing on adjacent property. New projects couldn't be built fast enough, and Portland set a record for the number of building permits issued seven years in a row. News of Portland's success has traveled around the country, and delegations from other cities routinely visit the Pearl District.

"The creation of additional housing in the central city is a key transportation and economic strategy," said Congressman Earl Blumenauer from Portland, who has been a key proponent of streetcars both in Portland and nationally. "By absorbing growth in the central city you preserve valuable open space and farmland, and the distances people travel for employment and other daily needs are greatly reduced. Transportation is never an end in itself. It's always been about shaping growth."

LESSONS LEARNED IN PORTLAND

(Adapted from "Portland Streetcar: Development Oriented Transit," prepared by the City of Portland Office of Transportation and Portland Streetcar Inc., January 2006.)

PUBLIC AND PRIVATE responsibilities: The enormous success of linking transportation investments with development can be replicated in municipalities that have one or more large development sites with owners who are willing to work together to advance a common vision. The city's obligation is to fund public improvements. The developers' obligation is to contribute to infrastructure costs and commit to building high-density, mixed-income housing to meet the city's housing targets. Developer agreements are crucial.

Developer agreements: The Portland Development Commission negotiated a master development agreement with Hoyt Street Properties. The agreement tied development densities to public improvements. The developer has stated that without the streetcar and the accessibility it provides these densities would not have been possible. The agreement between Hoyt Street Properties and the City of Portland was an essential piece of the public-private partnership that catalyzed development of the River District and serves as a model for the agreement established for the South Waterfront.

Local improvement district, or LID: The innovative $14.6 million Streetcar LID has been a useful tool and includes those property owners that stand to receive the greatest financial benefit from their proximity to the streetcar. The LID plus other public and private resources helped fund both the streetcar and the critical investments in the urban environment that complement the higher-density vision for the area.

While the Pearl was being called this country's most successful redevelopment project, South Waterfront was almost double the size with twice the potential. Construction was already underway in 2006 on the first neighborhood, the $2 billion Central District, covering 31 acres.

Stakeholder involvement: Involving stakeholders has been critical. Without public support, projects of this magnitude can get bogged down to the degree that public investment cannot move in tandem with development. The individuals and agencies that make up Portland Streetcar Inc. are nimble and astute, and this makes the streetcar something that can be counted on. In addition, a whole new interest group has emerged, composed of individuals interested in high-density urban living — a perspective that didn't exist before.

Reduced parking: The success of early projects in the River District demonstrated a market demand for a new type of higher density community — one that supports living with or without a car. As a result, developers are able to construct mixed-use projects with lower parking ratios than are found elsewhere in the city. Reducing the amount of parking that a developer must build makes a building more financially feasible. Now, with a full understanding of the role that the streetcar can play in affecting the urban environment and market confidence in urban living, developers have begun construction on larger, higher-risk projects in the South Waterfront. The first River District projects were six stories. South Waterfront has started with 23- to 31-story condominium towers.

Improving livability: Higher-density development does not always mean a more livable community. In the case of development near the streetcar, however, in addition to density there are parallel public and private efforts to ensure that there is also affordable housing, public open space, brownfield redevelopment, high-quality urban design, and public art.

WHY CONSERVATIVES SHOULD WANT STREETCARS

By Paul M. Weyrich and William S. Lind, *the Free Congress Foundation*

Car 39 stops on Park Row in Westminster, B.C., one fine day in 1909. *Photo by Peggy Webb, from the Henry Ewert collection and frontispiece of his book,* The Story of the B.C. Electric Railway, *Whitecap Books Ltd., 1986.*

IT IS BECAUSE we are conservatives that we like streetcars. In many ways America was a better place in the past than it is today. Thanks to streetcars, interurbans, and the Pullman Company, it was a far better place to travel in. Had it been up to us, the automobile would have remained what God intended it to be — a rich man's toy.

There is also a practical reason conservatives should want streetcars. They are wonderful tools to spur economic development, something most conservatives favor. Kenosha, Wisconsin, built a new streetcar system for $6 million; that system has already spurred $100 million in new development with another $50 million planned. Portland's modern streetcar system cost $57 million; it has brought $2 billion in new development. In terms of economic growth, few infrastructure investments can offer such dramatic rates of return.

> There seems to be an ancestral memory of streetcars, and it is a pleasant memory. It brings to mind an earlier and happier time, when "going downtown" was a major event, and downtown itself was an exciting place to shop, go to dinner, and see a show.

Some "conservatives" — they are really libertarians — argue for buses instead of streetcars. Buses have no effect on development. Why? Because a bus route can disappear overnight. Buses also seldom attract riders from choice with significant disposable incomes, which is what downtowns need economically. Streetcars, with their investments in tracks and wires, represent a commitment to lasting, high-quality transit service, service developers can count on in the years to come. Streetcars appeal to middle-class and upper-middle-class people, who have money to spend in stores, restaurants, and theaters.

In terms of economic development, streetcars are silk purses and buses are sows' ears. Conservatives learned a long time ago that you can't make one into the other, not even through an unfunded federal mandate. We'll take the silk, thank you.

WHAT'S RIGHT WITH THIS PICTURE?

EVERYTHING. It is a fine summer day in New Westminster, British Columbia, in the year 1909. Car 39 has stopped briefly on Park Row on its way into town. It carries its passengers through a world that is ordered, serene, at peace. Their eyes feast upon the glories of Queen Anne architecture. They hear the birds and the trolley wire sing a duet in an ether as yet unpolluted by engine noise or cell phones. Their poised servants, the motorman and conductor of the car, stand as visible assurances of responsibility and reliability. God is in His Heaven and all is right with the world.

To us, the picture is almost painful. It reminds us of a world we had, and have lost. But it does more than that. From the standpoint of public transportation, it points not only to the past, but also to a possible future. This photograph shows a virtually perfect integration of a highly attractive, widely desirable means of public transit — the streetcar — with the environment in which it operates.

The streetcar right of way is visually less conspicuous than the boardwalk on the other side of the street. The track is barely visible, and much of the track bed appears to be planted with clover (or maybe just weeds). The wires are few and the poles blend in with the trees. The car, though large for its time, is small enough so that its surroundings dominate the view. It is all done to a human scale, comfortable, friendly, welcoming.

How many 21st-century Americans, if offered such a streetcar for their own town or city, would turn it down? Offer it we can, because the cost of building and operating a streetcar line like this, a heritage trolley, is remarkably low — lower than any other form of rail transportation. Virtually any place that wants a streetcar line can have one.

All across the country, transit advocates, transit agencies, and local officials see the need for rail transportation. While buses usually carry only the transit dependent, rail service can appeal to "riders from choice" — people who have cars and can drive, but who choose to ride transit instead. Most riders from choice represent a car removed from rush hour traffic, which benefits everyone, including the person who still drives.

THE PROBLEM IS, how to get started? Most cities and virtually all towns lost their rail transit at least half a century ago. Most of their citizens have never ridden a train of any kind. It is hard to go to people who have never been on a train and ask them to vote hundreds of millions or billions of dollars for light rail, a term that has no meaning to them.

But a streetcar is different. Even if they have never ridden or even seen a streetcar, there seems to be an ancestral memory of

what they were, and it is a pleasant memory. It brings to mind an earlier and happier time, when "going downtown" was a major event, and downtown itself was an exciting place to shop, go to dinner, and see a show. Streetcars fit a downtown well, and not only downtowns but also older residential neighborhoods and new developments built to traditional designs. All of these are coming back, or trying to, and streetcars can help. It is not too much to say that downtowns and older suburbs need streetcars.

Not only do people understand what a streetcar is, and think well of it, a proposal to bring back streetcars need not break the bank. Instead of asking the voters for hundreds of millions of dollars, a few million will usually suffice, at least to get the first line up and running. Often, the money may be available without any new taxes.

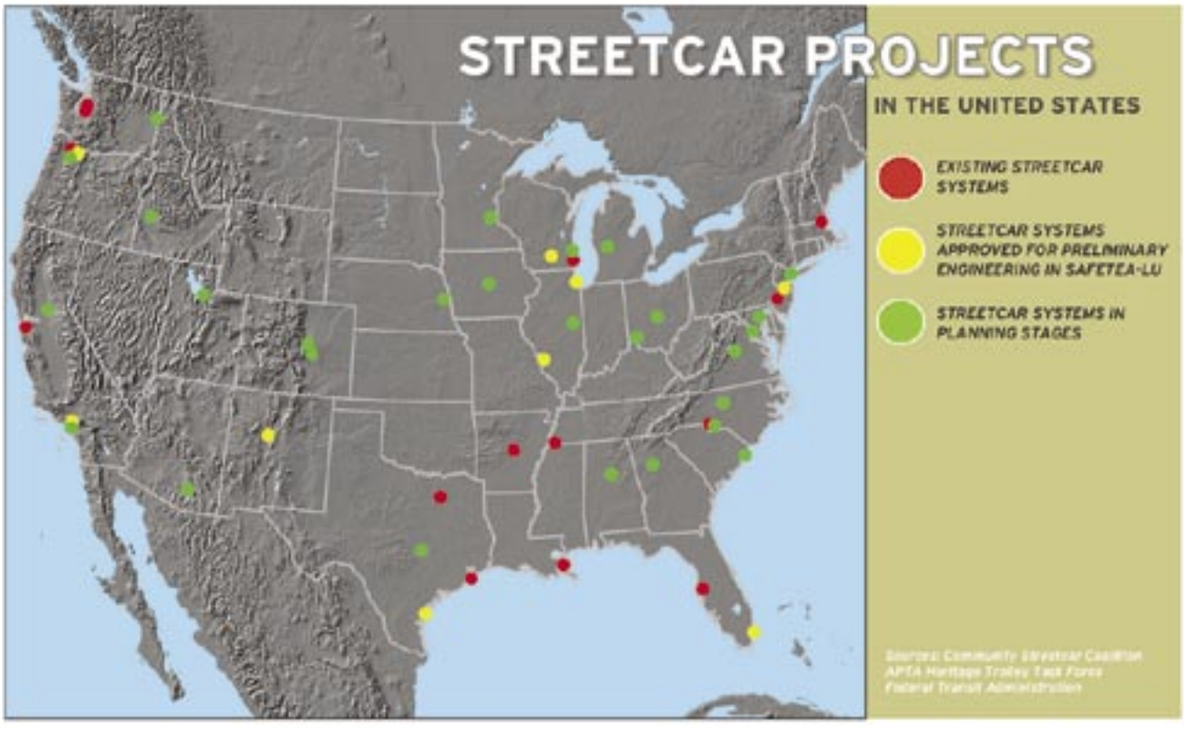
Here, a word of caution is in order. The most dangerous enemy of streetcars today is expensive overbuilding, usually driven by consultants who know nothing of traction history and promote gold-plated "high technology." In fact, the same simple, robust technologies that made streetcar lines function a hundred years ago are still largely adequate today. Where simplicity is the watchword, costs can be low: Kenosha, Wisconsin, built its new streetcar system for $3 million per mile, including five restored PCC streetcars. Our "should cost" figure for a streetcar line is a maximum of $10 million per mile. Confuscious says, "If consultants' figure is higher than $10 million, Heaven decrees new consultants."

OF COURSE, STREETCARS are not the solution to all transit needs. They cannot carry vast crowds of commuters in from the countryside at high speeds; that requires commuter rail. They cannot offer fast suburban service; that need is best met by light rail, or to use a better term, interurbans. Streetcars cannot substitute for subways in large cities, though they may usefully augment them.

What streetcars can do, almost everywhere, is help rail transit make a start. They can give people something to see, ride, understand, and like, so that when it does come time for commuter rail or interurbans, rail transit is no longer an unknown quantity. People can relate to it, in their own city or town, because they have ridden it or at least enjoyed the sight of it passing by. And, knowing what rail transit is, they feel comfortable voting for more.

We do not mean to suggest that the streetcar is useful only as an appetizer before a larger rail-transit banquet. It remains a good and useful way of getting around town, all on its own. In fact, when other modes of transit are available, people still like streetcars. When San Francisco built a subway under Market Street, it ended streetcar service on the tracks above, while wisely leaving them in place. Several years ago, it put the streetcar service back, using vintage trolleys. Now, those streetcars are full, because many regular riders prefer them to the subway. Similarly, when we visited Toronto a few years ago, the Toronto Transit Commission told us that of all the transit modes they offered — bus, trolley bus, subway and streetcars — people said in surveys that they liked the streetcars best.

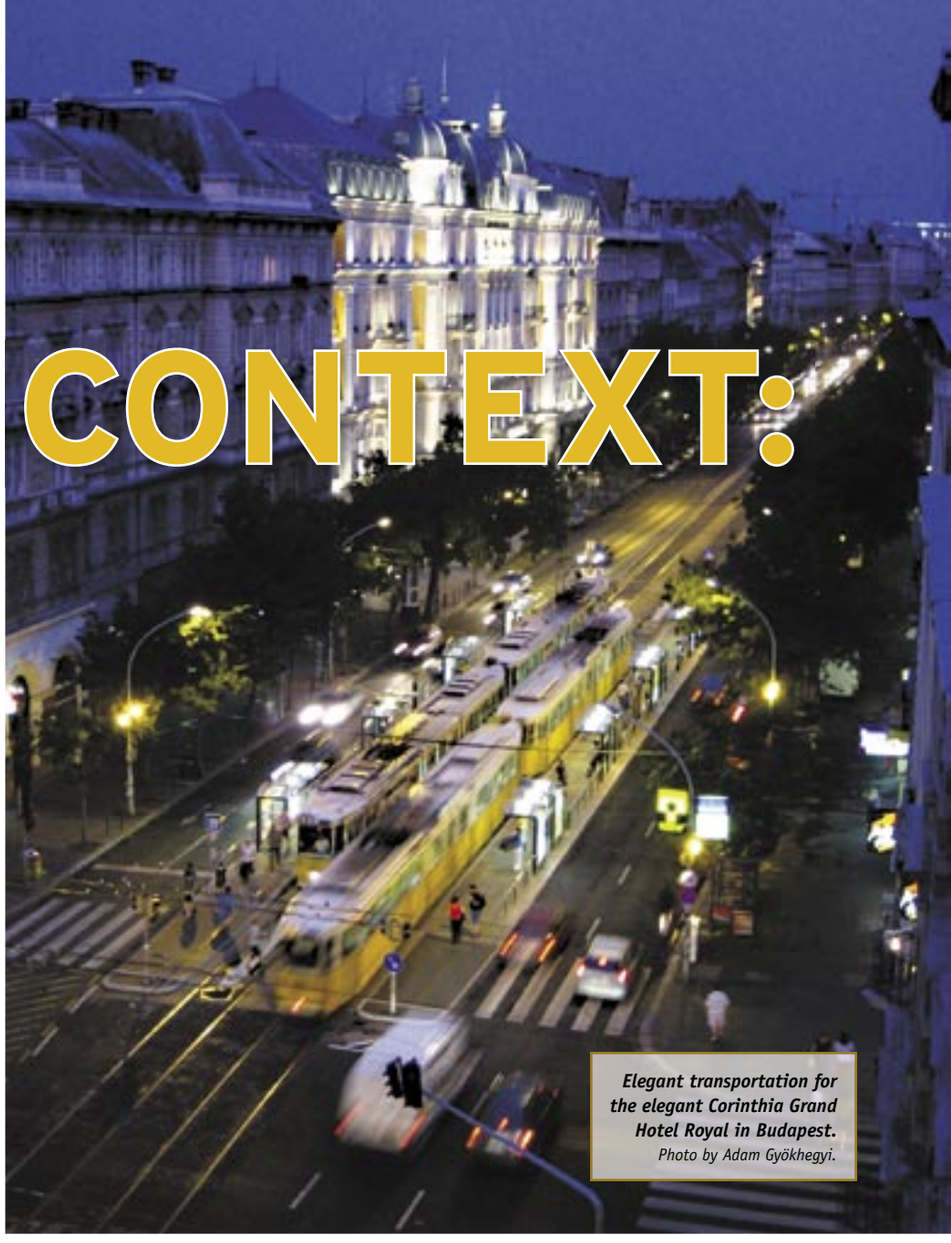
That brings us back to our wonderful photo from New Westminster, British Columbia, in 1909. Our ancestors were not fools. They had some good things going. If we are as wise as they, we will know that what worked once can work again. The same simple, inexpensive technology, the unobtrusive tracks and wires, the charming trolley cars with their inlaid wood and brushed brass that carried our forefathers in safety and comfort around their cities can carry us around ours. Perhaps the best resource for a community looking for new transit solutions is a picture of its own past.



Existing and planned streetcar projects in the United States. *Map by Jeff Wood, Reconnecting America*

WORLD CONTEXT: AND NORTH AMERICAN SYSTEMS

By John Schumann, LTK Engineering Services



Elegant transportation for the elegant Corinthia Grand Hotel Royal in Budapest. Photo by Adam Gyökhegyi.

Streetcars can be thought of as one end of a light-rail "spectrum": They operate mostly in the street with single cars at slow speeds and with frequent stops. Most streetcar systems in the United States were abandoned after World War II. In Europe, they were gradually upgraded to light rail with the placement of tracks in reserved lanes and the purchase of modern light-rail vehicles. Today there are light-rail and streetcars systems in operation in 300 cities around the world

PRACTICAL ELECTRIC streetcars were perfected in the late Victorian era. Following the model of Frank Sprague's landmark 1888 installation in Richmond, Virginia, streetcar technology improved rapidly as systems were built in cities and towns across the United States and throughout the world in the two decades after 1890. Overwhelmed by the automobile culture of the mid 20th century, however, streetcars nearly disappeared in North America and most other countries. For a time after World War II, it appeared the only transit choices were going to be fully grade-separated heavy-rail rapid-transit lines like BART, and local buses operating in traffic on the public streets. We now see these as the high and low ends of the transit spectrum. But where was the middle — technologies and services offering more than a local bus route for areas that couldn't afford and didn't need the capacity of a full rapid-transit railway?

DEFINITIONS

STARTING IN THE 1970S, renewed interest in alternative transportation led to what can now be referred to as the light-rail revolution, a renaissance of surface electric rail lines — now called light-rail transit (LRT) — as the few surviving old systems were rebuilt and new starts blossomed in more than 20 North American cities from about 1980 onward. Most of the new LRT lines serve as regional connections, forming the main lines of transit in the travel corridors they serve, and connecting with the area's bus network to form a multimodal system.

Now, the streetcar itself is coming back, with enough new projects built to illustrate a variety of approaches for locating lines in streets, and for selecting modern, replica, or vintage vehicles. How do these new streetcar lines compare with LRT? Table 1 highlights some of the primary differences between streetcars and LRT.

There also are several similarities between streetcars and LRT. Streecars, like light rail:

- Are a thoroughly proven electric railway technology;
- Are in operation worldwide;
- Employ quiet and clean electric-rail vehicles;
- Are powered by electric power distributed via overhead wire;
- Can operate in a variety of alignment types.

Another way of looking at it is to think of streetcars as a part of a light-rail "spectrum," where different levels are characterized by different alignment combinations and operating patterns:

Light rapid transit:

- Mostly exclusive right-of way;

Good integration: A tram turns a corner in Soflingen, Germany.
Photo by Benjamin Neudek.

TABLE 2: Differences between streetcars and light rail

Item	Streetcars	Light Rail
Operating units	Single cars	Trains of up to 4 cars
Vehicle size	66 ft. or less, 8 ft. wide	80 ft. or longer, 8.75-9.5 ft. wide
Alignment location	Mostly in-street, shared lanes	Mostly private ROW, some street
Route lengths	Under 5 miles	10-20 miles
Service function	Local circulation	Regional connectivity
Composition of ridership	Residents and tourists	Mostly residents

- Higher average speeds (greater than 20 miles per hour, including stops);
- Longer trains;
- Longer distances between stations (1 mile or more).

Light-rail transit:

- Reserved ROW, some in-street segments;
- Medium average speeds (12-20 mph);
- Shorter trains;
- Variable distances between stations (0.5-1.0 miles).

Streetcars:

- Mostly in-street, shared lanes;
- Lower speeds (12 mph or less);
- Single cars;
- Frequent stops (0.1-0.3 miles apart).

Edmonton, St. Louis, and the Green Line in Los Angeles are good examples of light-rapid transit, while most other new lines — San Diego, Portland, Sacramento, Denver, et al. — are best described as light-rail transit. Four old survivor systems and several small new starts fit the streetcar description.

WORLD CONTEXT

LIGHT-RAIL AND STREETCAR systems operate in more than 300 cities around the world. In some countries, notably Germany, Switzerland, and the Low Countries, old streetcar systems were retained and gradually upgraded to LRT with the placement of tracks in reserved lanes and the purchase of modern light-rail vehicles. These systems became models for North American LRT planners in the 1970s and 1980s. European colleagues visiting the new LRT systems in the West immediately grasp the rationale for their development and operation, and feel completely at home riding them.

The German model also has been followed in building new-start LRT lines in the United Kingdom and France where, as in the United States, virtually all the old streetcar systems were abandoned after World War II in favor of buses. In Europe most of the surface electric rail lines are, in fact, light rail; but many retain a significant mileage of in-street trackage that is operated in the fashion of streetcars.

NORTH AMERICAN SYSTEMS

HERE IN NORTH AMERICA, operations representing four subcategories of streetcar system can be identified:

- Survivor systems — Toronto, Philadelphia, San Francisco, New Orleans;
- Modern streetcars — Portland, Tacoma (both operating); Washington, D.C., Seattle, Miami, Atlanta, others are in planning;
- Replica trolleys — Tampa, Little Rock, Charlotte, Lowell;
- Vintage streetcars — Seattle, Memphis, Kenosha, San Francisco (F-Line).

Toronto and New Orleans, and much of the San Francisco Muni and Philadelphia systems, are pure streetcar, though all have some areas of lane reservation and street median running, and each — except New Orleans — even has a streetcar subway, as does Boston. Four of these cities have purchased new light-rail vehicles tailored to fit their streetcar-type alignments. New Orleans continues to use cars built for the city in 1924 on one of its lines, while new replica cars of similar appearance are used on the Riverfront and newly reinstated Canal Street route. On its popular F-Line to Fisherman's Wharf, San Francisco uses a mix of its own older cars and trolleys brought in from other cities in the United States and abroad. This fleet includes groups of PCC and pre-PCC cars.

Having seen that streetcars work in cities across the United States — from San Diego to Kenosha to Little Rock to Tampa to Lowell — leaders from 70 cities have formed the Community Streetcar Coalition, a national alliance to support federal funding for streetcars from the Small Starts program.

Like the Portland system described in detail in this book, a new 1.6-mile line in Tacoma serves as a local circulator, and uses modern streetcars of the same design as in Portland. However, this line is located mostly in reserved median and curb lanes. Its facilities are designed to LRT standards to accommodate regional service if a line now being built in Seattle is eventually extended south.

Other cities, starting with Seattle in the early 1980s, have built circulator lines using old streetcars displaced from their original systems. In Seattle, modern cars will be used on a new, 1.2-mile South Lake Union streetcar line. In Memphis, a variety of cars from Portugal and elsewhere now travel up and down Main Street, along the riverfront, and to the Medical Center. In Kenosha, former Toronto PCCs navigate a 1.7-mile loop linking a large redevelopment site and the shore of Lake Michigan with the business district and commuter train station.

Replica streetcars are new vehicles built to old designs. They have the advantage of being new, while retaining the charm of earlier cars. Supplied primarily by Iowa's Gomaco Trolley Company, these cars are being used on New Start streetcar lines in the Lowell National Historic Park in Massachusetts, and in the downtowns of Tampa, Little Rock, and Charlotte.

Some of the new lines using heritage or replica cars may serve as the nucleus around which larger LRT systems will evolve over time. Both Memphis and Tampa are taking this approach.