Go West! Getting Commuter Rail on Track
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More Than Commuting

What Commuter Rail Has Been and Can Be

Loren Herrigstad

Transportation Development

Note: Switch to Notes Page view for this page only to see additional speaker bio information.
We will explore . . .

What Commuter Trains are

How they developed

What they can do

And why they perhaps shouldn’t really be called Commuter Trains anymore
Commuter Trains . . .

- Are operated mostly on existing rail infrastructures, often being legacies from the past
- Tend to have longer routes than other forms of rail transit:
  - Commuter Rail: 20 – 80 miles
  - Heavy Rail: 15 – 40 miles
  - Light Rail: 5 – 20 miles
  - Streetcars: ≤ 5 miles
- Their stations are spaced farther apart:
  - Commuter Rail: 2 – 10 miles
  - Heavy Rail: 0.5 – 5 miles
  - Light Rail: 0.5 – 2 miles
  - Streetcars: 0.25 – 0.5 miles
- Tend to have lower Capital Costs:
  - Commuter Rail: $1.3 – $26 million/mile
  - Heavy Rail: $60 – $2,100 million/mi
  - Light Rail: $25 – $204 million/mi
  - Streetcars: $2 – $50 million/mi

US DOT FHA & FTA 2001 & PublicTransport.about.com 2016 data
Commuter Trains . . .

- Can operate on at-grade / un-segregated corridors
- Tend to be operated at rush hours
- At frequencies of:
  - Commuter Rail: 10 – 60 minutes
  - Heavy Rail: 2 – 20 min
  - Light Rail: 5 – 20 min
  - Streetcars: 5 – 60 min
- At higher speeds:
  - Commuter Rail: 30 mph (avg) / 90 mph (max)
  - Heavy Rail: 30 mph (avg) / 70 mph (max)
  - Light Rail: 15 mph (avg) / 65 mph (max)
  - Streetcars: 8 – 15 mph (avg) / 45 mph (max)
- Offering flexible capacities:
  - Commuter Rail: 2,000 – 78,000 pphpd
  - Heavy Rail: 50,000 pphpd
  - Light Rail: 16,000 pphpd
  - Streetcars: 2,000 pphpd

US DOT FHA & FTA 2001 & PublicTransport.about.com 2016 data
First Passenger Trains

**Oystermouth Railway** (1807)
Swansey, Wales, UK
- World’s first passenger railway
- Served 7 stations along 5.5 mile route

**Baltimore & Ohio Rail Road** (1830)
Baltimore – Ellicott Mills, Maryland
- America’s first passenger railway
- Served 4 stations along 13 mile route

**Chemin de Fer Saint Étienne a Lyon** (1830)
Saint Étienne – Givors, France
- Continental Europe’s first passenger railway
- Served 5 stations along 22.2 mile route

**Liverpool and Manchester Railway** (1830)
Liverpool – Manchester, UK
- First “modern” railway
- Served 25 stations along 35 mile (flat) route
First Commuter Lines

London & Greenwich Railway (1836)
London Spa Road – Deptford, UK
- London’s first passenger railway & terminus
- Served 3 stations along 4 mile route

Long Island Rail Road (1836)
Brooklyn – Jamaica, NY
- New York’s first passenger railway
- Served 5 stations along 10 mile route

Chemin de Fer Paris a St Germain (1837)
Paris – St Germain, France
- Paris’ first passenger railway & terminus
- Served 8 stations along 12 mile route
Railways coined term “Commuter” as well . . .
The railways’ original “Last Mile” problem . . .

. . . It was expensive to get into town
So railways terminated around city centers . . .
These two termini made it downtown, but their lines did not connect . . .

Philadelphia Rail Termini
Boston Rail Termini

North Station

South Station
First Underground Railway

London’s Metropolitan Railway (1863)
Built to mainline clearances to connect London’s rail termini with steam trains.
It was Parisians who adapted “Metropolitan” into today’s “Metro”
First Planned Suburbs
(1890 | 1912 | 1920s)

London’s Metropolitan Railway
Metro-Land – A perfect union of country living and railways
First Planned Suburbs

Spanning dozens of square miles, Metro-Land was the largest real estate development of its day . . . perhaps ever.
Then came World War I
By 1920, railways in both Europe and America were realizing that commuters were a marginal proposition.
Even in San Francisco, the Southern Pacific decided to cancel its “Grand Central” of the West; settling for a more modest commuter terminal at Third & Townsend, completing its prime 1 Market Street property as an office building, and relying on the publicly-owned Ferry Building as its civic gateway instead . . .
The Stock Market Crash, World War II, and the Post-War Auto Boom further weakened Commuter Rail . . .
By the late 1960s, the German Siemens-Duewag U2 Light Rail Vehicle was catching the attention of American transit planners, who thought it might become a total answer for rail transit in metro areas.

... while overlooking European Suburban Rail systems that were continuing to carry many more passengers daily without fanfare.
While modern rail transit development in North American cities tends to focus on single systems or technologies; European cities typically employ a mix of Light, Heavy, and Suburban Rail . . .

Paris is now even adding trams to its already dense network of Metro and RER lines, and they’re already carrying 900,000 riders daily.
But if Americans still want one form of rail transit that could do it all . . .

I’d nominate the Commuter Train
Commuter Trains can . . .

Combine the best aspects of Subway and Light Rail:
- High Capacity
- Lower Capital Costs outside city centers
- Lower Per Passenger Costs

While providing the equivalent capacity of a new freeway using a fraction of the space
The Paris RER – A truly Super Train
New York Subway vs. Paris RER

NYCTA 10-car R160 Train
Length 602.1 ft | Max Speed 55 mph
2,556 total passengers
552 seated
26 – 30 trains per hour per direction
76,680 passengers per hour per direction (pphpd)

PARIS RER 10-car M109 Train
Length 735 ft | Max Speed 74 mph
2,600 total passengers
948 seated
30 trains per hour per direction
78,000 passengers per hour per direction (pphpd)
Paris RER

78,000 passengers per hour per direction = 39 freeway lanes
At 2,000 pphpd (LOS E)

... and that’s just on one track!
It makes for a web of super-capacity criss-crossing Paris, each line capable of carrying 10 times more passengers than a typical 8-lane motorway.
But other cities are discovering what RERs and S-Bahns can do . . .

Leipzig, Germany
City Population: 560,000
Metro Population: 1 million
Area: 115 square miles
A small city with a huge rail terminus
Despite its large terminus, Leipzig built the subway-like City-Tunnel under its downtown from 2003-13. It now provides more direct routes for both S-Bahn and Regio-Bahn trains, and handles double-deck trains.
Philadelphia Center City Commuter Connection (built 1978-84)

- 4 Tracks
- 650 Trains per Day (some just 2 cars though)
- 107,000 daily riders
Philadelphia Center City Commuter Connection

13 Regional Rail lines feeding into 4 tunnel tracks
But across Europe, RERs and S-Bahns are for more than just commuters, as this crowd for a weekend marathon in Paris demonstrates...
So just as we’ve imported Sushi, Karaoke and Espresso into American English . . .
... as well as increasingly adopting international symbols for Metros and Light Rail ...
... how about we restyle Commuter Trains as ... 

S-Bahns

Simple to say • World-class terminology
So in summary . . .

Commuter trains are flexible, lower cost, and can be run on existing rail infrastructures.

They created suburbs and commuting, even the word “commuter”

They can burrow under downtowns like Light and Heavy Rail, and carry as many people daily as 39 freeway lanes.

And like Light and Heavy Rail, they can attract and be used by a lot more people than just commuters.
Finally . . .

Think big . . . enough.
A number of European cities have built “Pre-Metros” — tram lines running in larger tunnels and stations built for eventual upgrading to Heavy Rail Metros, even mainline RERs or S-Bahn Suburban trains, as here in Brussels, Belgium.
So consider the difference in capacities between Light Rail and RER . . .

Seattle LINK Light Rail
- 16,000 pphpd
- Tunnel Diameter 6.4 m (21 ft)

Paris RER
- 79,000 pphpd
- Tunnel Diameter 8.7 m (28.5 ft)
While rail transit planners don’t tend to get estimates on differing tunnel diameters, fortunately physicists building colliders have . . .
While there is a 50% increase in tunneling cost between Light Rail and RER or S-Bahn, there is a 394% increase in pphpd.

So let’s think big enough for the future as we plan and build rail transit!
Thank You

Loren Herrigstad

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Caltrain: Commuter Rail on the Verge of Change

Adina Levin - Friends of Caltrain Rail~Volution, October 2016
Ridership up 2.5x in last decade...

Dot.Com Crash

Great Recession

Baby Bullet
Driven by fast-growing economy

14% CA GDP
52% CA patents
25% CA tax revenue
Bi-directional commute pattern

San Francisco

60%

Silicon Valley

40%
TOD along the corridor

State policy to reduce greenhouse gas emissions, coordinate transportation & land use

Accommodate 80% of housing, 60% of job growth in < 5% of land with transit access
Back to the Future

Caltrain corridor is original transit-oriented development

Cities grew around train

RWC, PA, MV 1938
Cities invest to reduce trips

Transportation Demand Management

- Accommodate more people with less cars, traffic, parking demand
- Transit passes, shuttles, carpool, carshare, education/marketing
- Transportation Management Association
- Funded by employers, developments, parking
- Data, reporting, accountability

Established  Developing
Crowding and challenge to keep up
Keeping up with ridership growth

- Extra cars from LA
- Electrification
- Longer trains, level boarding
Verge of Transformation...

- Clockface schedule
- All-day service
- Supporting TOD and car-light lifestyle
60% Farebox Recovery

FY2008: 48%  
FY2009: 48%  
FY2010: 48%  
FY2011: 51%  
FY2012: 59%  
FY2013: 64%  
FY2014: 64%  
FY2015: 63%  
FY2016: 60%

30% (or 14 percentage points) increase since FY2008
Middle-of-pack in revenue vs. peers
Lower expenses than peers
Unstable operating funding

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<th>Source</th>
<th>Revenue</th>
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<td>Fares</td>
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<td>Parking</td>
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<td><strong>Member Agencies</strong></td>
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<td><strong>Other Sources</strong></td>
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<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>$139.1</strong></td>
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</table>

County agency partners: San Francisco, San Mateo, Santa Clara

~30%
No funding to connect downtown

The DTX extends rail service to downtown San Francisco (1.95 miles of construction)
More jobs near Transbay than entire rest of line

Jobs, jobs, jobs at Transbay

There are more jobs within ½ mile of Transbay than within ½ mile of all Caltrain stations combined!

m Tillier
Connections to BART

Backbone rail around the bay

• Integrated fares?
• Integrated schedules?
Regional fragmentation

- 26 transit agencies
- 30,000 fare rules and combinations
On the verge of change...

• Transformation

• Fragmentation

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http://greencaltrain.com
Connecticut’s Travel Corridors
Improving Connectivity with Rail and Transit Options

Presented by
Anna Bergeron,
Connecticut Department of Transportation

Stephen Gazillo
AECOM
» Result of statewide planning initiative
» Reduce congestion
» Improve environment
» Increase rail and transit
» Improve connectivity
Best in Class Vision

- **30-year plan:** all critical preservation & enhancement needs
- **5-year ramp-up:** projects within the 5-year budget cycle to jump start investment
- **Lock Box**
- **Cost:**
  - 30-year *Vision*: $100 Billion investment
  - 5-year ramp up: $10 Billion investment
    - Base Capital Program is $7.2 Billion (fed + state)
    - Ramp-Up funds $2.8 Billion (additional state)
Connecticut’s Commuter Rail Branch Lines

Key Corridor Objectives

- Reduce congestion on I-95 & Rt 15  
  (*CT's most congested corridor*)
- Improve access to NYC (*rail is primary means*)
- Improve mobility & choices (*goal in every corridor*)
Danbury Branch
Danbury Branch Operations

» Danbury Branch – recent past

• Began service 1852
• Originally electrified - removed in 1960
• Diesel service today
• 23 miles long
• Single track
• 8 Station Stops
• 22 trains per day
• No signal system
• Annual Ridership - 734,000
Danbury Branch Improvements

» Danbury Branch - Today

- New signal system
- New passing sidings
- Station and Parking upgrades
- Additional service – 28 trains a day (20% increase)
- Annual ridership – 802,000 (9% increase)
Waterbury Branch Operations

» Waterbury Branch – today

• Began service 1849
• 28.5 miles
• Diesel service,
• No signal system
• Single track
• 8 stations
• Annual ridership – 198,000
» Waterbury Branch Upgrades

- New Signal System in Design
- Infrastructure Improvements
- Devon Bridge replacement
- Future Passing Sidings
- Minor Parking Expansion
- Potential Devon Station
New Canaan Branch Operations

**New Canaan Branch**

- Began service 1866
- 8 miles long
- Single track
- 5 station stops
- Electrified service
- Annual ridership
  1.5 million
New Canaan Branch Improvements

» New Canaan Branch
  • Electrified
  • Frequent service
  • TOD Efforts
RAIL highlights

**Hartford Line**
New Haven - Springfield

**Connections to NY, Boston, & Montreal**

- **Phase 1**: New Haven – Hartford: under construction
- **Phase 2**: Hartford - Springfield
  - Double track & rebuild infrastructure
  - New stations:
    - Enfield
    - Windsor Locks
    - Windsor
    - West Hartford
    - Newington Junction
    - North Haven
    - (Hamden)
The Hartford Line

» The Hartford Line – commuter service to start 2018
  Increase from 6 round trips to 17 round trips per day
  - 62 miles

  - 8 stations
  - Track upgrades
  - Add 2nd track in sections
  - 60 new rail cars
Ongoing Commuter Rail TOD

» Danbury Branch
  - Bethel
  - Branchville
  - Danbury

» Waterbury Branch
  - Derby/Shelton
  - Waterbury
  - Ansonia
  - Naugatuck

» New Canaan Branch
  - Glenbrook
  - Springdale

» Hartford Line (NHHS)
  - Berlin
  - Meriden
  - Wallingford
  - New Haven
Intercity Service – Amtrak

Connecticut Travel Corridors

North East Corridor
Washington DC - Springfield, MA

Potential Second North East Corridor Spine
Washington DC - Boston, MA

North East Corridor
Washington DC - Boston, MA
Thank You!
Getting Commuter Rail on Track

Adapting to Changing Conditions

Barbara Gilliland, AICP
Planning Manager

WSP | Parsons Brinckerhoff

Note: Switch to Notes Page view to see additional speaker comments throughout this presentation.
The Future Story

» Lessons Learned
» All About Access
» Building Communities
» Looking for Opportunities
In the Beginning . . .

There were the Railroads

We needed to connect growing suburban cities with the central city of the region.
Maximizing Existing Infrastructure

Lessons Learned Along the Way

- Costs
- Capacity
- Connection
- Culture
Sometimes it's just about Access
Trains, Transit and Automobiles

» Expanding site planning from storage . . .
It’s About Curb Space

- Walking
- Biking
- Shared Rides
- Pick-up/Drop-off
- Shuttles
Vision meets Reality

How do we take this and . . .

Make it this . . .
Creating a Front Door in Fresno
Green Field Challenges
Integrating Communities without Sprawl
Looking for Win/Win Scenarios
Early Partnerships and Planning
Creating System Value

Build a train
Create New Community Connections
Catalyze Development
Attract Public and Private Support and Capital
Attract a private operator??
Questions and Discussion
What are some solutions you have seen to the “first mile” – “last mile” challenge of commuting?

- Increased parking at commuter rail stops
- Improved bicycle and pedestrian connectivity
- CT Rides
- Transit connections
- Potential TMA solutions
Challenges to Implementing TOD on Commuter Rail Lines

- What are the challenges to implementing TOD on commuter rail lines?

- **Service frequency**
- **Location**
- **Density**
- **Parking**
- **Mindset**