Rocky Mountain Rail Authority (RMRA)
Corridor Input Team Meeting #2

Alternatives Overview
December 2008
Agenda

- Introductions
- Study Overview
- Alternatives Overview
  - Station Options
  - Technology Categories
  - Route Options
- Next Steps
Rocky Mountain Rail Authority

- Multi-jurisdictional government body formed in 2007
- Created to determine viability of high-speed passenger rail in Colorado
- Nearly 50 member counties, municipalities and other organizations
  - Board and Executive Committee
  - Rail Feasibility Study Steering Committee
- Funded by CDOT SB-1 Transit Grant and memberships
Corridor Input Teams

- Cities, Counties, MPOs, TPRs, Transit/Transportation Agencies
- Elected Officials / Senior Staff
- Provide Policy/Technical Input at Key Milestones
  - September `08: Study Kick-Off / Scoping
  - December `08: Alternatives Overview
  - Spring `09: Alternatives Analysis & Optimization
- Represent Local Constituencies
- Share Study Information w/ Local Constituencies
- Individual Collaboration as Appropriate
Purpose: To determine the technical, financial and economic feasibility of implementing high-speed intercity passenger rail service in the I-25 and I-70 Corridors and secondary corridors along I-70.

The study will not make final decisions on alignment or station locations. It will recommend whether further study is warranted.
The Study Includes

- **Full market assessment** including stated-preference survey and preliminary investment-grade ridership and revenue forecasts

- Evaluation of a **wide range of high-speed rail technologies**

- Assessment of **potential routes and station locations** to identify those capable of supporting high-speed rail operation
The Study Includes

- Development of a **business and implementation plan**
  - Cost-benefit and operating ratios
  - Detailed financial and economic analysis

- **Pro-Forma Financials**
  - Expected levels of federal, state, local and private financial support

- **Potential economic benefits** to local communities, regions and the state

- **Recommended next steps** for gaining necessary regulatory, environmental and financing approvals
Study Schedule

- **Scoping** (July-Sep `08)
  - Introduced the study and its purpose
  - Gathered input on local needs, concerns and desires
  - Gathered existing data (from MPOs, railroads, CDOT, local plans, etc.)
  - Corridor Input Teams provide input on need/expectations to inform development of alignment/station/technology options

- **Alternatives Selection** (Oct-Dec `08)
  - Determine potential station, technology and route alternatives to be evaluated
  - Gather data on the proposed technology and route alternatives
  - Develop market database (o/d data, travel flows, socioeconomic data, stated preference surveys)
  - Introduce and gather input on proposed alternatives
  - Corridor Input Teams provide input about alternatives to inform upcoming evaluation
Study Schedule

- **Alternatives Analysis** (Dec `08-June `09)
  - Develop measures of feasibility
    - Cost-benefit ratios
    - Operating ratios
    - Potential economic/community benefits
    - and more
  - Identify most feasible alternative(s)
    - Alignment(s)
    - Technology/technologies
    - Stations,
  - Select most feasible alternative(s) and identify next steps
  - Develop business and implementation plan
  - **Corridor Input Teams consider trade-offs among the alternatives and provide input to help optimize them**
Alternatives Development Process
Alternatives Development & Evaluation Process

- Identify locations with greatest demand for stations
- Determine technology options
- Identify route options to connect stations for each technology option (our alternatives)
- Evaluate and refine to identify best combination(s) of technology/route/stations
- Gather input to further refine/improve best combination(s)
- Develop business/implementation plan
Alternatives at a Glance

- **6 technology categories**
  - <79 MPH Diesel
  - 120-150 MPH Electric (tilting and non-tilting)
  - 150-220 MPH Electric
  - <125 MPH Maglev
  - 250-300 MPH Maglev

- **4 route types**
  - Highway Right of Way
  - Highway Corridor/Valley
  - Unconstrained
  - Existing Rail Lines (with and without freight relocation)

- **2 station types**
  - Primary
  - Secondary
### Alternatives at a Glance

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<th>Route</th>
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Alternatives Development
Considerations
Station Options
Influencing Factors for Station Options

- Longwoods International Data
- CDOT AADT
- U.S. Bureau of Transportation
- Amtrak
- Denver International Airport Master Plan
- Ski Country USA Visitor Data
- I-70 Coalition Land Use Planning Study
- I-70 PEIS
- Local Input
- Comparison w/ active or in-development high-speed rail corridors
Station Spacing

Increased Speed Means Greater Station Spacing

- Local Bus (10mph): 2-4 blocks
- Commuter Rail (30-50mph): 3-7 miles
- Intermediate Rail (90-120mph): 10-30 miles
- High Speed Rail (120-200mph): 20-50 miles
- Maglev (250mph): 20-100 miles
Station Options

- Determine the best mix of stations
- Highly unlikely that all station options will be feasible
- Station options drive route options
- Not all station options will be capable of being served by every route under consideration
Station Types

● **Main Stations**
  - Greatest ridership potential
  - Major population centers (originations)
  - Major attractions (destinations)
  - Generally require significant parking

● **Secondary Stations**
  - Generally lower-ridership potential
  - Lower population or smaller/fewer attractions
  - Still require parking, but less than primary stations
Station Options Being Evaluated
Alternatives Development Considerations
Technology Options
FRA Safety Regulations

- FRA Regulations define basic safety rules for all equipment (steel wheel and maglev) regardless of track sharing
  - Window glazing
  - Interior lighting
  - Baggage storage
  - etc.

- FRA Crashworthiness Standards
  - FRA Requires Tier I/II for sharing tracks.
  - Class I Railroads are increasingly requiring it to share ROW and not tracks (e.g. RTD).
  - Tier I/II not required for vehicles that do not share track or ROW with freight rail.
Why Establish Technology Categories?

- Analyzes general performance characteristics, not every specific technology
- Provides greater flexibility/negotiation-power in ultimate technology selection
  - Avoids one-vendor dependency
- New and in-development technologies also considered
  - Potential vendors have provided status information to assess likelihood of near-term deployment

Key Evaluation Categories:
- Physical Performance (e.g. max grades, speed, acceleration)
- General (e.g. seating capacity, size, freight/baggage capabilities)
- Economic (e.g. staffing requirements, operating/capital costs)
Conventional Rail

- 79 MPH
- Non-tilting
- Diesel
- Locomotive hauled
- FRA Tier-1 Compliant for Sharing Tracks
High Speed Rail

- 110 – 130 MPH
- Tilting
- Diesel
- Locomotive hauled or DMU
- FRA Tier-1 Compliant for Sharing Tracks
High Speed Rail

- 120 – 150 MPH
- Tilting or Non-Tilting
- Electric
- Locomotive hauled or EMU
- FRA Tier-1 Compliant for Sharing Tracks

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Very High Speed Rail

- 150 – 220 MPH
- Tilting or Non-Tilting
- Electric
- Locomotive hauled or EMU
- FRA Tier-1 Compliant for Sharing Tracks

Siemens ICE-3 EMU

TGV Atlantique

Shinkansen

Amtrak Acela
High Speed Maglev

- 125 MPH
- Elevated Guideway
- Capabilities defined by 2004 Colorado Maglev Project Study
Ultra High Speed Maglev

- 250 – 300 MPH
- Elevated Guideway
- Capabilities defined by Siemens Transrapid Maglev
Alternatives Development Considerations

Route Options
Study Area
I-70 Corridor: DIA to Idaho Springs

Note: Due to scale of map, the Highway Right-of-Way Alignment is covered by the “Corridor Alignment”
I-70 Corridor: Idaho Springs to Avon

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I-70 Corridor: Avon to Glenwood Springs

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I-70 Corridor: Glenwood Springs to Grand Junction

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I-70 Corridor: Steamboat/Craig Options
I-25 Corridor: Denver to Longmont
I-25 Corridor: Longmont to Wyoming
I-25 Corridor: Denver to Colorado Springs
I-25 Corridor: Colorado Springs to New Mexico
Denver Metro Area
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Next Steps
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- Develop feasibility measures
  - Cost-benefit ratios
  - Operating ratios
  - Economic/community benefits

- Identify feasible alternative(s)
  - Stations
  - Route(s)
  - Technology/technologies

- Gather input on feasible alternative(s)

- Optimize alternative(s) considering Corridor Input Team Input

- Select feasible alternative to develop business and implementation plan
Thank You