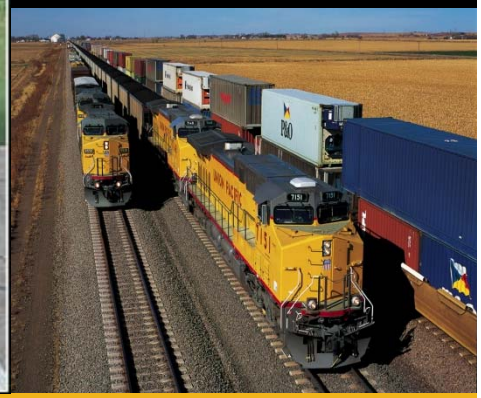
Today's Railroad – Union Pacific Railroad

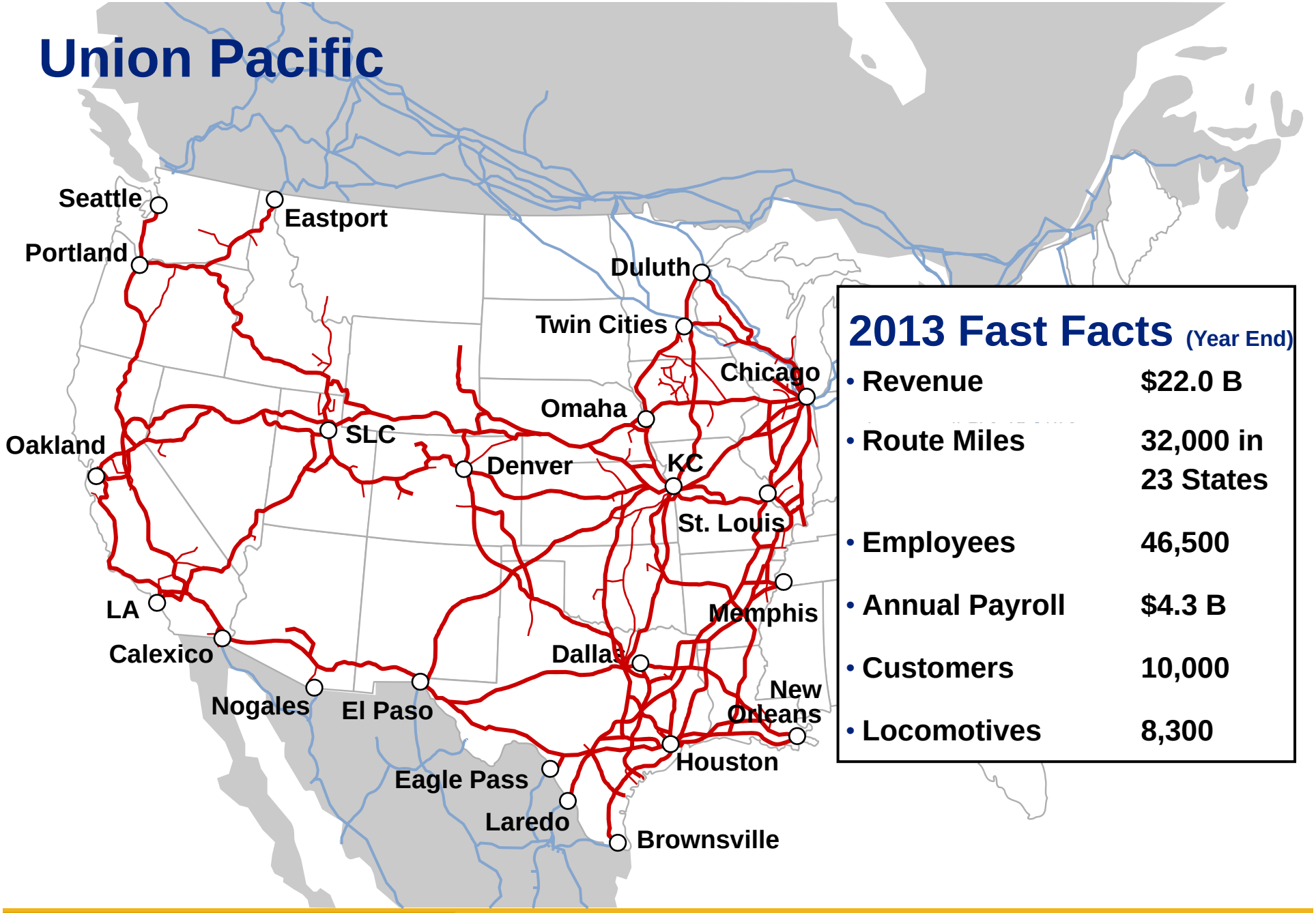
CEC- IEPR Workshop June 25, 2014

Liisa Stark, Director Public Affairs Northern California



BUILDING AMERICA®

Union Pacific



2013 Fast Facts (Year End)

• Revenue	$22.0 B
• Route Miles	32,000 in 23 States
• Employees	46,500
• Annual Payroll	$4.3 B
• Customers	10,000
• Locomotives	8,300

BUILDING AMERICA®

Union Pacific in California

3,267 Miles of Track

4,860 Employees

$429 M Annual Payroll

$326.7 M Capital Spending

I - 5 Route

Feather River Route

Donner Pass Route

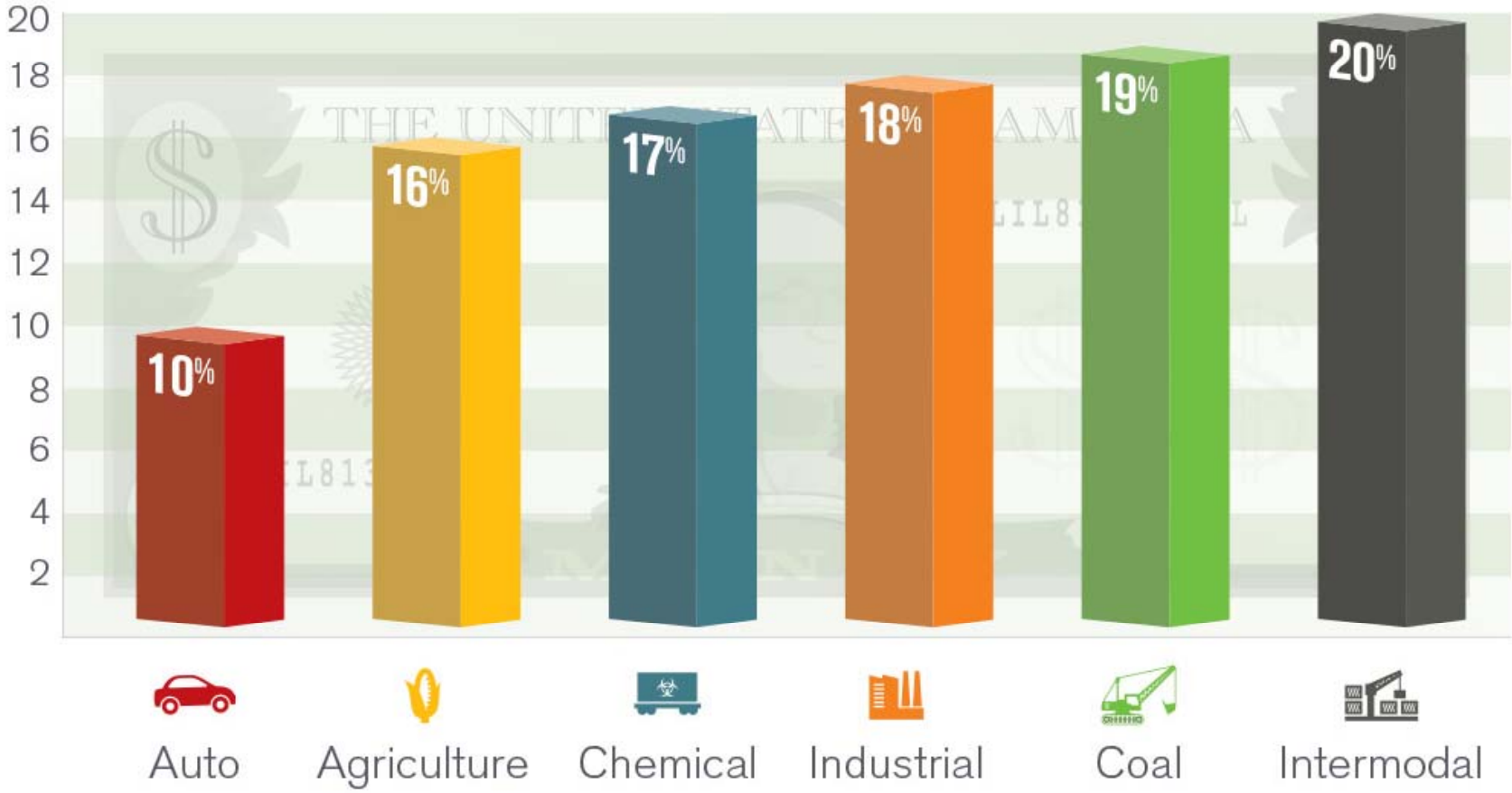
San Joaquin Valley Line

Sunset Route

Coast Line

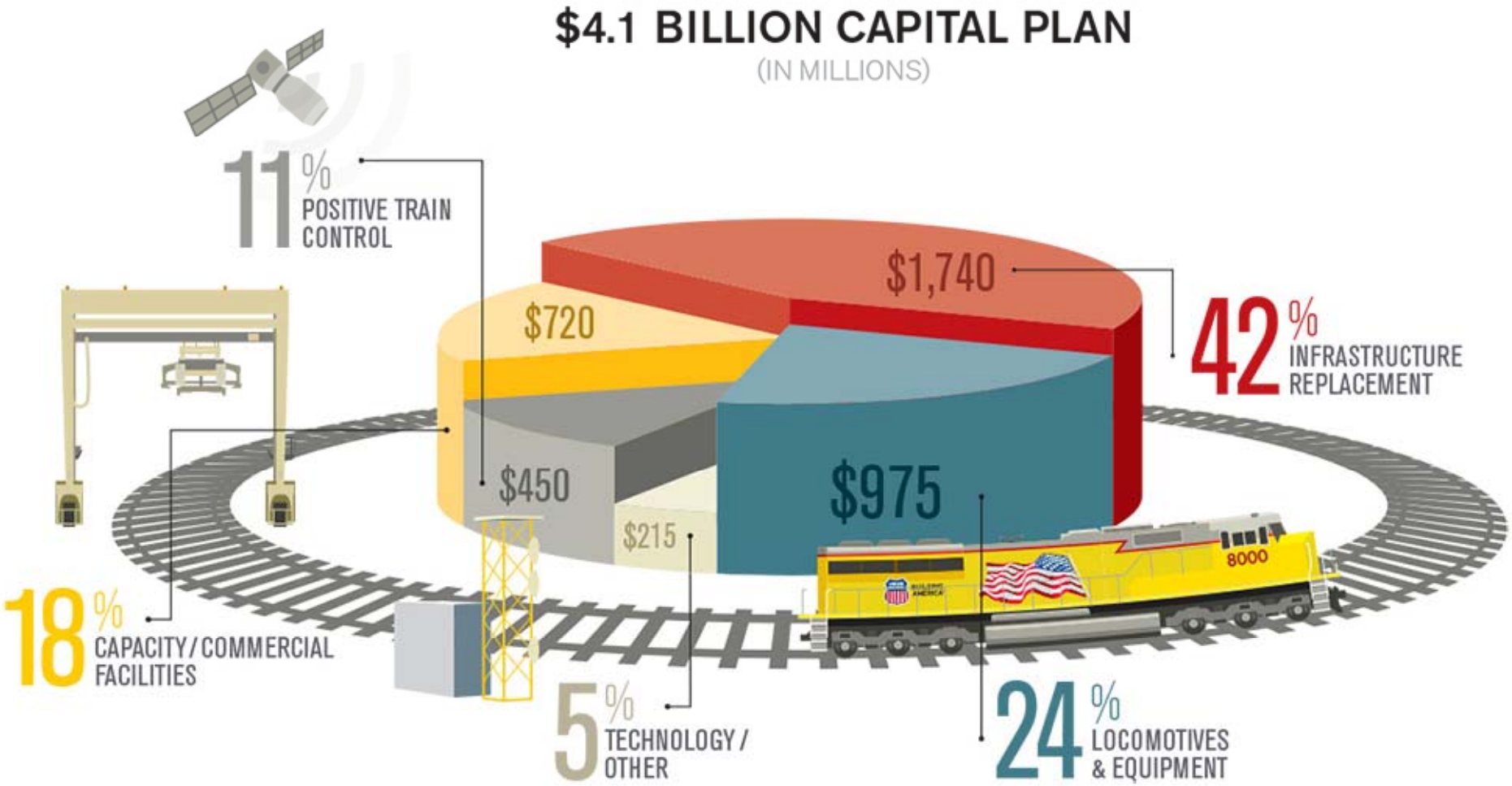
BUILDING AMERICA®

2013 Business Mix
by Freight Revenue $20.7 Billion



BUILDING AMERICA®

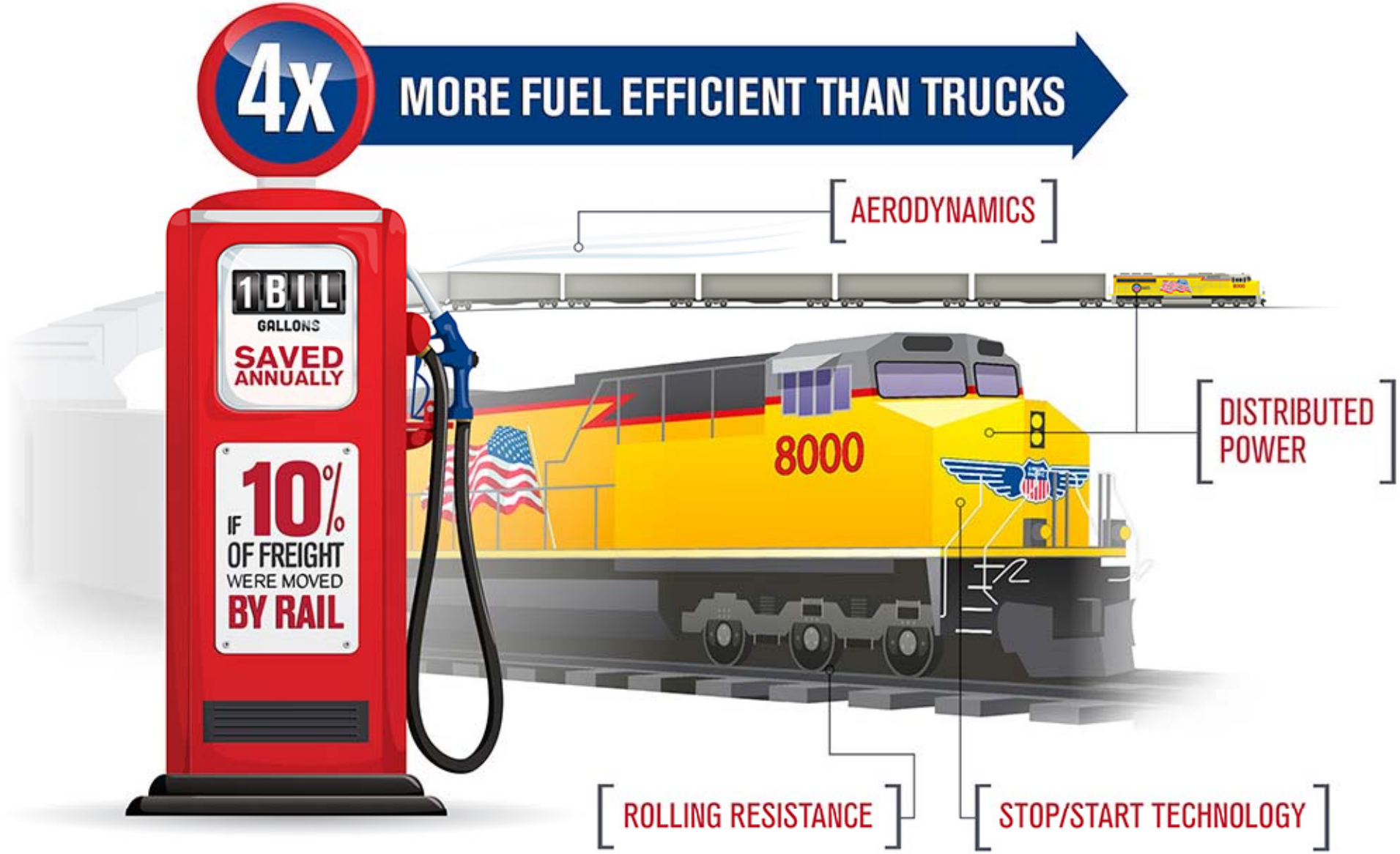
Strengthening the Franchise
2014 Estimate



*** Includes cash capital, leases and other non-cash capital.**

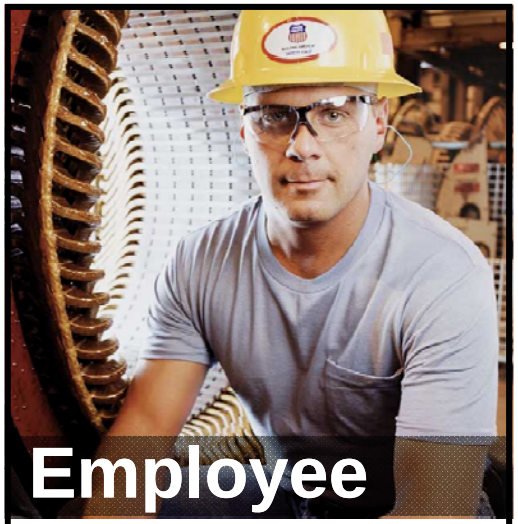
BUILDING AMERICA®

Innovations Conserve Fuel

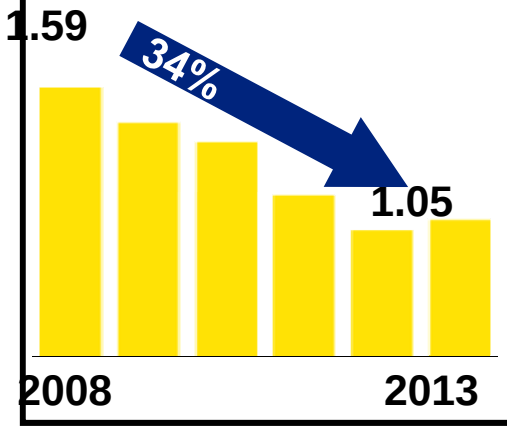


UNION PACIFIC
BUILDING AMERICA®

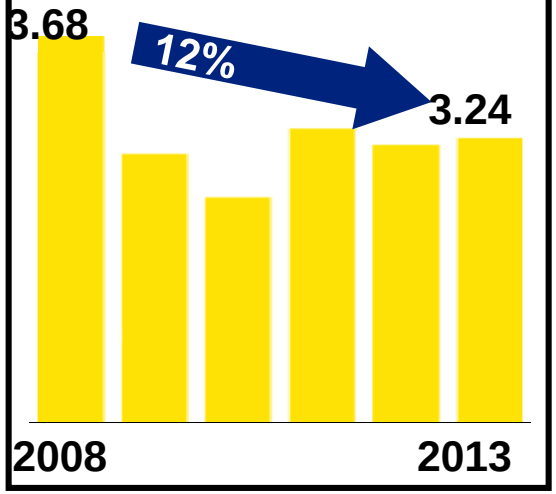
Safety - Top Priority at Union Pacific



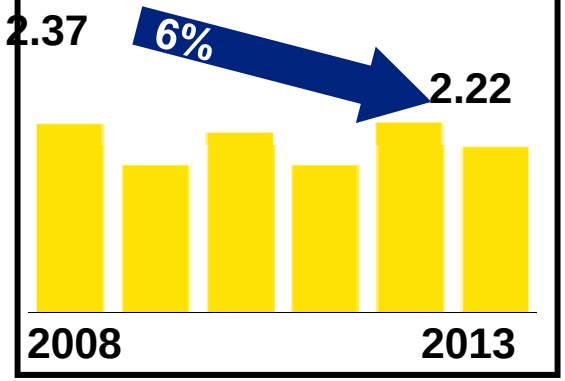
Reportable Injuries Per 200,000 Work Hours



Reportable Derailments Per Million Train Miles



Grade Crossing Accidents Per Million Train Miles

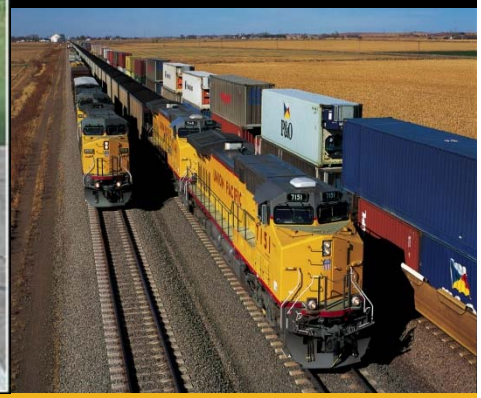


BUILDING AMERICA®

Today's Railroad – Union Pacific Railroad

CEC- IEPR Workshop June 25, 2014

Dave Wickersham, Chief Engineer, Western Region



Engineering Department's Responsibility

- **Designing, constructing and maintaining track, bridges, structures and signals.**

UNION PACIFIC BUILDING AMERICA®

Engineering Mission at U. P.

- **Maintain a safe and reliable infrastructure that provides optimum operating conditions and supports the long term capacity and growth goals of Union Pacific Railroad**

- **Engineering Sub-departments**
  - **Design/Construction**
  - **Track Renewal**
  - **Track Maintenance**
  - **Structures/Bridges**
  - **Signal/Train Control**

- **Resources**
  - **12,500 employees**
  - **5,719 Vehicles**
  - **4,463 Pieces of Equipment**
- **Capital Intensive Business**
  - **Annual Capital Spending**
    - **$ 1.6 - $1.7 B Renewal Capital**
    - **$ 375 - $500 M Growth Capital**
  - **$ 100 M Public - Private Partnerships**
  - **$ 92 M Federally funded.**
  - **Operating Expense**
    - **$ 1.05 B Operating**

UNION PACIFIC BUILDING AMERICA®

How We Built Track Over 140 Years Ago

UNION PACIFIC
BUILDING AMERICA®

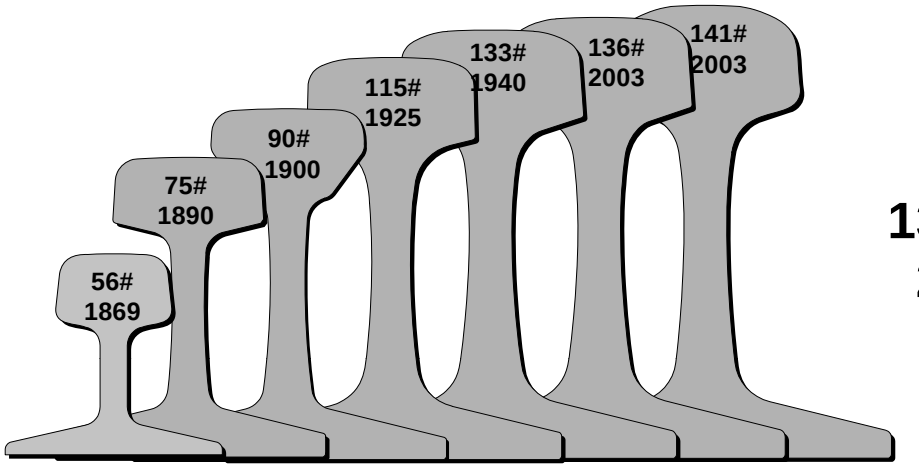
Today's Track Design & Construction

- Foundation
- Drainage
- Concrete ties
- Continuous welded rail

UNION PACIFIC
BUILDING AMERICA®

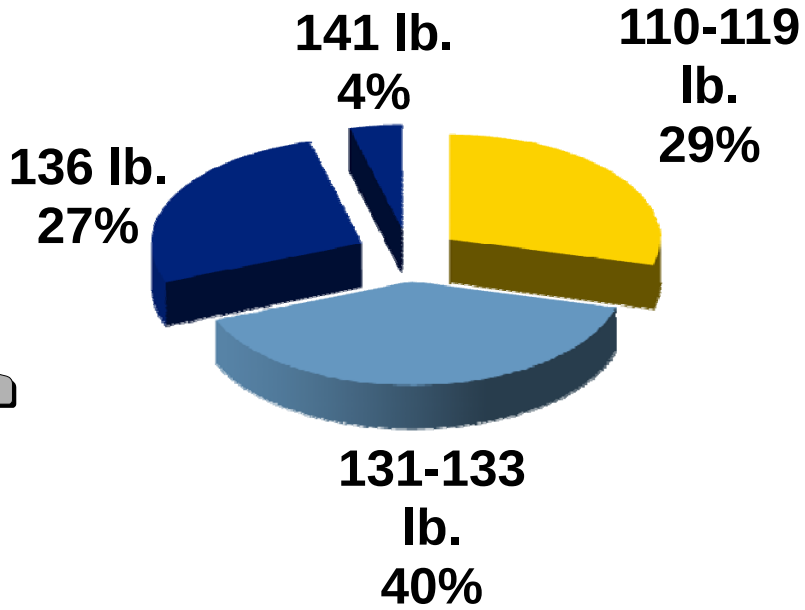
Rail Asset

Developments in Rail Size and Metallurgy



Rail Sections 1869 - 2005

Mainline Rail Weights



- **Rail weight is measured per yard.**
- **Surface hardness of premium 141 lb. RE rail is 415 Brinell.**
- **Rolled at 80', welded at 1,500'.**
- **Delivered and welded continuously.**

UNION PACIFIC
BUILDING AMERICA®

Today's Crosstie Technology

Steel Ties
3,934
1.5 miles

Wood Ties
83.1 million
25,760 miles

Concrete Ties
7.9 million
3,004 miles

Composite Ties
1.6 million
487 miles

UNION PACIFIC BUILDING AMERICA®

Maintaining Railroad Crossties

- **Replace over 4 million/year.**
- **13 mechanized tie gangs.**
- **Replacing over 4,000 daily (dual gang) in 9 hour work windows.**
- **Avg. Tie life between 10 and 50 years.**

UNION PACIFIC BUILDING AMERICA®

UPRR Track Inspection Program

- **43 – Full time dedicated track inspectors working within California**
  - **Training – 5 day FRA track safety standards**
  - **Monthly evaluations by managers**
  - **Annual training and on the job training - track maintenance field handbook**
- **17 – Managers of Track Maintenance in California**
- **480 – track maintenance employees in California**
- **Tracks inspected with "hy-rail" pickups more than twice per week**
- **Visual inspections prevent derailments**
  - **Broken rails**
  - **Track surface conditions**
- **We perform special inspections**
  - **During storms**
  - **After earthquakes**

UNION PACIFIC BUILDING AMERICA®

UPRR Track Evaluation System

- **2 state of the art track geometry cars - $10 million a piece**
- **Prevents track geometry related derailments**
- **Test main lines in California at least twice per year.**
- **Measures track geometry parameters – FRA standards and UPRR policies**
  - **Track Gage**
  - **Track Cross level**
  - **Track profile**
  - **Track Alignment**
- **Also provides**
  - **Rail Profile measurements – curve wear**
  - **Clearances in tunnels and bridges**
  - **Video of track**

UPRR Rail Detector System

- Key technology to prevent broken rail derailments
- UPRR tests main line rail in California every 3 to 6 months
  - Test frequency is based on tonnage
  - Test frequency is more than FRA requirement
- We dedicate 4 rail detectors full time in California
- Ultrasonic (sound wave) searches internally for rail flows
- Cars in California are the latest technology

  2 years old or less
- Car averages 7 mph.

UNION PACIFIC
BUILDING AMERICA®

UPRR – Capital Track Maintenance projects in California

- **Last 5 years, UP has replaced 2,054,000 ties and 452 miles of rail in California.**

- **$992 million**

- **Replacing ties and rail**
  - **2009 542,000 ties, 89 miles new rail**
  - **2010 174,000 ties, 41 miles new rail**
  - **2011 325,000 ties, 65 miles new rail**
  - **2012 446,000 ties, 136 miles new rail**
  - **2013 567,000 ties, 121 miles new rail**

UNION PACIFIC BUILDING AMERICA®

Track Upgrades

- **UP's plan to replace wood tie track with concrete tie track**
  - **Tehachapi mountains – complete**
  - **Dunsmuir – complete**
  - **Feather River Canyon – complete**
  - **Sunset Route – 50% complete**
  - **Donner Pass – 33% complete**

UNION PACIFIC
BUILDING AMERICA®

Bridge Design & Construction

- **400 Lineal Miles of Bridges**
- **Bridge Design**
- **Bridge Construction Replacing Aging Structures**
- **Bridge Construction Due to New Track Construction**

UNION PACIFIC BUILDING AMERICA®

UPRR Bridge Management Program
System Bridge Statistics

Key Statistics for Union Pacific	System	California
Total Number of Bridge Structures	19,339	3099
Total length of Bridge in Miles	407	56
Miles of Concrete Bridge	138	20
Miles of Steel Bridge	183	26
Miles of Timber Bridge	86	10
Number of Culverts	52,846	7340
Total Length of Tunnels in Miles	62	28

UNION PACIFIC BUILDING AMERICA®

UPRR Bridge Inspection Program

- Ensure structural integrity of bridges, culverts, and tunnels.
- Comply with FRA CFR 49 Part 237 Bridge Safety Standards
- All bridges are inspected between 1 and 3 times per year

UNION PACIFIC BUILDING AMERICA®

UPRR Bridge Inspection Program Structures Assessment Team

- 6 – 2 person - full time teams working within California
- 1 snooper truck (hyrail access truck) on Western Region
- 66 bridge maintenance employees in California
- 2 Managers of Bridge Maintenance in California
- 1 Director of Bridge Maintenance in California
- All report to Assistant Chief Engineer Structures

UNION PACIFIC BUILDING AMERICA®

UPRR – Bridge replacement projects in California

- Last 5 years, UP has upgraded 70 bridges
- $70.2 million
- Replacing timber with steel and concrete
  - 2009 12 bridges, 2,288 feet
  - 2010 25 bridges, 980 feet
  - 2011 14 bridges, 242 feet
  - 2012 9 bridges, 760 feet
  - 2013 10 bridges, 2,020 feet

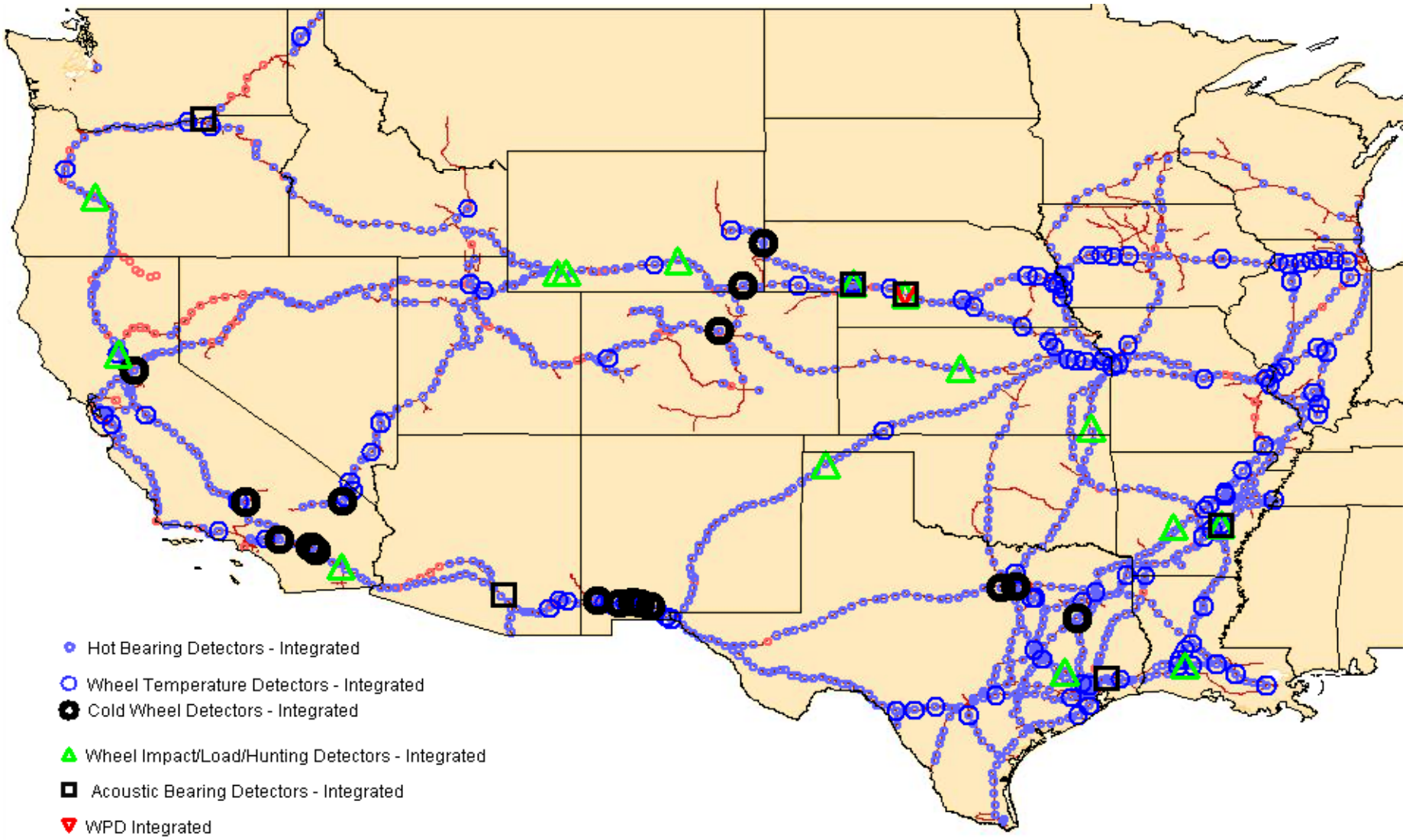
UNION PACIFIC BUILDING AMERICA®

Wayside Systems at Union Pacific - Summary

Wayside Device	Number Installed On UP	Detects
Hot Bearing Detector (HBD)	1,521	Overheated bearings
Hot Wheel Detectors (HTW)	354	Stuck brakes
Cold Wheel Detectors	155	Inoperative brakes
Wheel Impact Load Detectors (WILD)	17	Out of round wheels, wheel tread defects
Truck Hunting Detectors	17	Worn trucks
Acoustic Bearing Detectors (ABD)	7	Internal bearing defects
Wheel Subsurface Defect Detector (CWD)	1	Wheel subsurface cracks
Wheel Profile Detectors (WPD)	4	Wheel/rail interface issues, uneven wheel wear
Low Air Hose Detectors (LAH)	7	At-risk coupled air hoses
Vision Systems	2	Various (full train defects, worn brake shoes, defective coupler securement)
Dragging Equipment Detectors (DED)	4,718	Fallen equipment components, derailed wheels
AEI Tag Readers (AEI)	993	Equipment identification and orientation on a moving train

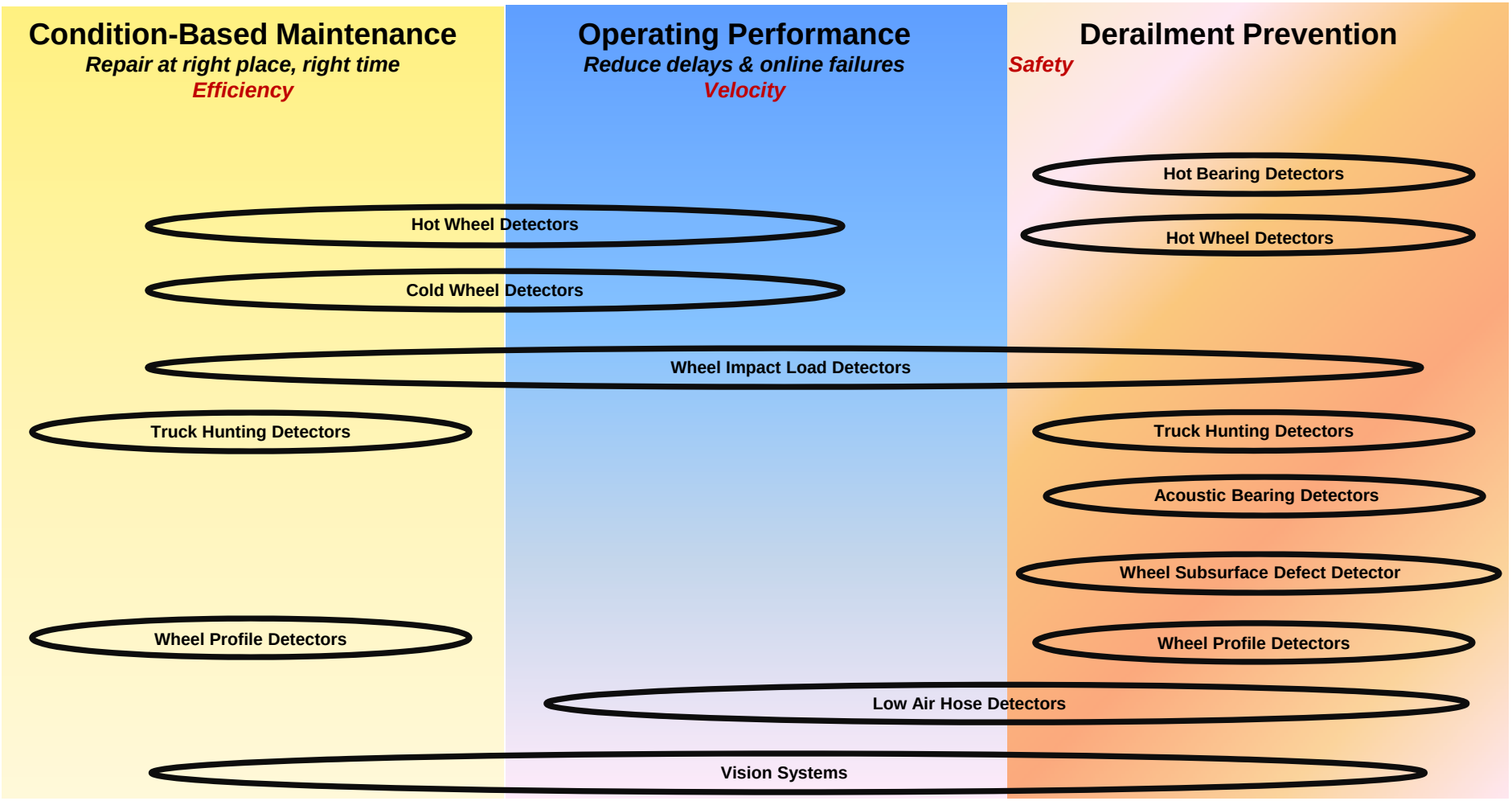
UNION PACIFIC BUILDING AMERICA®

UPRR Wayside Locations



UNION PACIFIC
BUILDING AMERICA®

Union Pacific Wayside Strategies



BUILDING AMERICA®

Questions?

BUILDING AMERICA®