North American Industry Perspective on Railroad Sustainability

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ASSOCIATION OF AMERICAN RAILROADS

Overview of Presentation

- What is sustainability?
- Major Sections of Railroad Sustainability / Environmental Reports
  - Fuel Efficiency / Alternative Fuels / Renewable Energy / Technology
  - Water, Wastewater, Stormwater Treatment
  - Waste Minimization / Recycling
  - Other Environmental
- Metrics
- Other Key Sections
- List of Environmental / Sustainability Reports

What is Sustainability?

- Sustainability: “to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations”[1]

1. Source: “Sustainability and the U.S. EPA Committee on Incorporating Sustainability in the U.S. Environmental Protection Agency” (NEPA[1969]; E. O.13514[2009]4). http://op.bna.com/env.nsf/id/smiy-8kcsj3/$File/NRCepa.pdf

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Major Sections of Railroad Sustainability / Environmental Reports

- Fuel Efficiency / Alternative Fuels / Renewable Energy / Technology
  - Train Operations
  - Other Energy Efficiency
  - Alternative Fuels / Renewable Energy
  - Air Quality
- Water, Wastewater, Stormwater Treatment
- Waste Minimization / Recycling

Major Sections of Railroad Sustainability / Environmental Reports (cont.)

- Other Environmental
  - Environmental Management Systems
  - Performance metrics
  - Environmental assessments
  - Land Stewardship
  - Capital Projects
  - Remediation
  - Clean right-of-way policies
  - Employee training
  - Vegetation Control
  - Wildlife Protection
  - New Construction

Train Operations Fuel Efficiency

- New more fuel efficient locomotives (new and re-built)
  - New road locomotives and Genset switchers
  - Locomotive research projects
  - Green Goat Locomotives
- Train performance optimizers
  - Fuel Trip Optimizer (FTO)
  - RailEdge Movement Planner
  - Event Recorder Automated Download (ERAD)
  - LEADER
  - Tons Per Axle (TPA)
- Engine start stop systems / Auxiliary Power Units (APU's)
- Training of crews to minimize fuels use
  - Fuel Masters Unlimited
  - Engine shutdown policies

Train Operations Fuel Efficiency (cont.)

- More efficient operating plans / route optimization
  - Reduce empty carloads
  - Unified Train Control System - Movement Planner
  - Continuous improvement
- Improved aerodynamics
  - Aero Wedge
- Rail lubrication (Gage face – Top-of-Rail – Tangent Track)
  - Solar powered dispensers
- Modal shift
- Results
  - On average, railroads are four times more fuel efficient than trucks
  - Trains produce nearly one-quarter fewer carbon dioxide emissions per ton mile than trucks
  - Trains emit less than 1/7th the PM, and 1/3rd the NOx and CO compared to trucks

Energy Efficiency Other

- Intermodal equipment e.g. cranes, trucks, and yard tractors
  - Preventative maintenance
  - Operator training
  - Route optimization
  - Aerodynamic equipment
  - Reducing terminal dwell time for motor carriers
- Building efficiency: lighting, heating, energy efficient design
  - Leadership in Energy and Environmental Design (LEED)
  - The Green Building Council
  - Occupancy sensors
  - Use of natural lighting
  - Computer control of building heating and air conditioning

Alternative Fuels / Renewable Energy

- Train operations
  - Bio-diesel 5-20%
  - Natural gas switchers and locomotives
  - Ultra Low Sulfur Fuel diesel fuel
  - Battery-powered switcher
  - Dual-engine diesel locomotive
  - Ethanol powered locomotive
- Other
  - Wood pellets
  - Wind turbines
  - Solar power signals, wayside rail lubrication and detectors, water heaters, lighting, microwave communications and wastewater treatment

Air Quality

- Commitments to reduce GHG emissions
  - One railroad committed to a five-year goal to reduce their carbon footprint by 10 percent per revenue ton-mile of freight
- Results
  - According to EPA all freight railroads contribute less than 1 percent of the greenhouse gas emissions in the US compared to 5.8 percent for trucking
  - If just 10 percent of the long distance freight that currently moves by highway switched to rail, annual greenhouse gas emissions would fall by approximately 12 million tons
  - One AAR member received a score of 91 in the Carbon Disclosure Project's 2010 S&P 500® report, the highest score for an industrial company

Carbon Calculators

1. BNSF: http://www.bnsf.com/communities/bnsf-and-the-environment/carbon-estimator/
2. CN: http://www.cn.ca/en/greenhouse-gas-calculator-tool.htm
3. CP: https://www8.cpr.ca/enetp22/GHGCalculatorUser/UserDetails.aspx
4. CSX: http://www.csx.com/index.cfm/customers/tools/carbon-calculator/
5. KCS: http://www.kcsouthern.com/en-us/Media/Pages/CarbonCalculator.aspx
6. NS: http://nssustainability.com/green-machine/
7. UP: http://www.aar.org/Environment/Carbon-Calculator.aspx

Water, Wastewater, Stormwater Treatment / Management and Other Environmental

- Wastewater is treated to meet and exceed NPDES or POTW standards as appropriate
  - One member alone has 149 discharge permits
  - Some railroads recycle wastewater for other uses like locomotive and parts washing
- Results: At least one railroad reported no non-compliances in the latest reporting year
- Other Environmental
  - Environmental Management Systems
  - Railroads establish environmental performance metrics tracked by senior management
  - Environmental assessments are completed to assess impact of construction projects as appropriate

Environmental General (cont.)

- Capital Projects
  - WWTP upgrades
  - Above-ground storage tank dike liners
  - Tank car / fuelling spill pans
- Remediation
- Clean right-of-way policies
- Employee training
- Other programs include:
  - Vegetation management
  - Ecosystem management
  - Wildlife management

Waste Minimization / Recycling

- Waste lubricating oil is recycled or burned for energy recovery
- Automatic fuel shutoff devices are used to minimize spillage
- Locomotive retention tanks collect oil leaks
- The industry replaces 17 million crossties annually
  - 50% of those ties go to co-generation (energy recovery)
  - The vast majority of the rest are reused in less severe railroad service or sold for landscape timbers
- In 2011, the railroads laid 603,369 tons of new rail
  - The old rail is either reused in less severe service or sold as scrap
  - Similar practices are in place for other railroad equipment e.g. scrap cars, locomotives, wheels and axles, etc.
- Other wastes are also recycled including batteries, paper, electronic wastes, engine coolant, fuel collected at fueling facilities, bottles and cans, printer cartridges, etc.

Metrics

- Emissions / energy
  - Metric tons of CO_2, NO_x, SO_x, PM, HC, CO, by year (by source)
  - Fuel used (million gallons)
  - Gross ton miles or revenue ton miles per gallon (469 RTM/Gallon in 2011)
- Land
  - Site assessments and land reclamation costs ($million)
  - Sites rehabilitated (#)
  - Remediation reserve ($million)
  - Spent on remediation ($million)
- Environmental Incidents (#)
- National Park Grizzly Bear Mortalities (#)

Metrics (cont.)

- Waste
  - Total waste generated (metric tons)
  - Ties removed (millions)
  - Liquid waste generated (thousand gallons)
  - Liquid waste recycled (%)
  - Solid waste generated (tons)
  - Solid waste recycled (%)
  - Steel recycled (tons)
  - Ties disposed (#)
  - Portion of ties burned for energy recovery (%)
  - Used oil recycled (gallons)
  - Batteries recycled (pounds)
  - Hazardous waste disposed (pounds)

Other Key Sections

- Top Management Support / Commitment
  - Overall statement
- Stakeholder Engagement
  - Communities
  - Customers
- Safety
  - Hazardous Materials Safety
- Auditing
- Public Transportation
- Sustaining Effective Workforce / Employee Health
- Measures
- Externalities
- Recognition

Environmental / Sustainability Reports

1. Amtrak: “2011 Environmental Health and Safety Report ““Connecting With the Amtrak® Vision””
   http://www.amtrak.com/ccurl/294/246/Environmental-Health-Safety-Annual-Report-2011.pdf
2. BNSF: “BNSF and the Environment”
   http://www.bnsf.com/communities/bnsf-and-the-environment/
3. CN: “CN Sustainability Report 2010”
   http://www.cn.ca/documents/Corporate_Citizenship/Delivering_Resp_EN.pdf
4. CP: Corporate Social Responsibility Report
   http://www.cpr.ca/en/in-your-community/corporate-social-responsibility/Documents/cpcsr2009.pdf
5. CSX: “2011 CSX Corporate Profile and Responsibility Report”
   http://www.csx.com/index.cfm/responsibility/corporate-profile-and-responsibility-report/
6. KCS: “KCS and the Environment”
   http://www.kcsouthern.com/en-us/AboutKCS/Pages/KCSAndTheEnvironment.aspx
7. Norfolk Southern Corporation 2012 Sustainability Report
   http://nssustainability.com/images/uploads/pdfs/NS-Sustainability-Report-2012.pdf
8. Union Pacific 2011 Sustainability & Citizenship Report
   http://www.up.com/cs/groups/public/@uprr/documents/up_pdf_nativedocs/pdf_2011_sustainabilityreport.pdf
9.

Thank You

Questions

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