

High Speed Rail

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## Class Is on fuel management: Good to the last drop

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*With diesel prices soaring, Class Is continue to lean on education, equipment and experimentation to conserve fuel*

Like calorie-counting dieters seeking every possible edge to shed those few last, hard-to-shake pounds, Class Is continue searching for ways to curb their diesel appetite. That might appear to be a tall order for railroads that already consider themselves lean and mean from a fuel-efficiency standpoint. But then again, there's no better motivation than the harsh reality of soaring fuel prices, which now top \$3 per gallon in the retail market and threaten to take some of the luster off Class Is' record earnings and income. Fuel costs are the second-largest line item on large roads' expense sheets, trailing only compensation and benefits. Fuel expenses soaked up 15.5 percent of the Class Is' total operating revenue in 2006, up from 2005's 13.5 percent, says Association of American Railroads (AAR) spokesman Tom White. Data from 2007 wasn't available at press time.

And large railroads aren't expecting any relief in 2008. BNSF Railway Co. underscored that point when Executive Vice President and Chief Financial Officer Tom Hund told Wall Street analysts during the Class I's Jan. 29 earnings conference that higher fuel prices will account for about three-fourths of an expected 15 percent increase in first-quarter operating expenses.

A few days earlier, Union Pacific Railroad officials told analysts during a Jan. 24 earnings conference that they expect fuel prices this year to rise between 15 percent to 20 percent over 2007's average price of \$2.24 a gallon — no small matter for a Class I that consumed 3.6 million gallons of diesel daily in 2007.

The ripple effect of high diesel prices impacts much more than fueling locomotives, and the Class I can only recover so much from fuel surcharges passed onto shippers, says UP spokesman James Barnes.

"Increasing fuel costs have dramatically increased our costs of doing business, as well as our customers' costs," he says. "And a fuel surcharge doesn't fully capture the higher prices we pay to fuel our own vehicles and track machines, or for heating and cooling office buildings and the like. In addition, we're seeing higher costs in general from our vendors for their added fuel costs."

So, what are Class Is doing to manage costs and further reduce fuel usage? A lot. Their methods include motivation and educational programs aimed at changing how employees think about everything from operations to nuts-and-bolts maintenance, investments in the latest fuel-saving equipment and locomotives, and the exploration of emerging technologies. But Class I officials know they'll need to do even more to offset escalating fuel costs.

For UP officials, that means expanding a Fuel Masters program to ensure more locomotive engineers are aware of their fuel usage and seek ways to reduce it. Introduced in 2004, the program rewards fuel-saving engineers with \$100 gas station gift cards they can use to fuel their own vehicles.

Each engineer is graded by comparing monthly fuel consumption against fellow engineers in the same territory. A two-month snapshot of data is used to calculate individual average consumption rates, and engineers in the top 15 to 20 percent earn the reward. On average, service units employing the Fuel Masters program reduce fuel usage about 5 percent.

At 2007's end, UP had trained 7,000 engineers on Fuel Masters techniques; by 2008's end, it'll train 500 more, ensuring all 7,500 locomotive road engineers are trained, says Barnes.

Along with other fuel-conserving programs and methods, Fuel Masters helped UP conserve more than 20 million gallons of diesel in 2007, he says.

### The 'most valuable' tool

At BNSF, a similar "Fuel MVP" program introduced last year rewards engineers with gas gift cards if they reach certain fuel-saving benchmarks. The Class I uses a two-month snapshot of gross ton-miles per gallon, horsepower per ton, train handling and other data to evaluate an engineer's performance. The top 10 percent receive \$100 gift cards; those in the 10 percent to 20 percent range receive a \$50 card.

The program is in place at about 10 percent of the railroad's districts and eventually will cover all engineers, says BNSF spokesman Pat Hiatte.

BNSF also is reaching out to workers through renewed education efforts, such as emphasizing reduced locomotive idling, which burns an average of five gallons of fuel per hour; avoiding stretch braking, which can consume an average of five gallons of fuel per braking; and promoting consistent wheel lubrication, which can reduce wheel/rail friction by 40 percent, Hiatte says.

In addition, BNSF uses trip simulators to show engineers how they can save fuel by improving their driving habits. Data is collected from an engineer's runs, then replayed on the simulator so instructors can point out ways the route could have been handled more fuel-efficiently.

### Assists leader

To help its engineers optimize train handling and fuel efficiency, Norfolk Southern Railway continues to use New York Air Brake Corp.'s Locomotive Engineer

Assist/Display Event Recorders (LEADER®). The system combines data, such as train tonnage, track profiles, Global Positioning System coordinates and train handling, to tell engineers when to adjust throttle, air brake or dynamic brake settings for optimal performance.

To conserve fuel, NS also is expanding its use of wheel-impact load detectors, which identify out-of-round wheels that can damage track, equipment and lading, and hamper fuel economy, and electronically controlled pneumatic (ECP) brakes that can eliminate unnecessary train stops and reduce starting times after stops.

Meanwhile, CSX Transportation is trying to promote fuel conservation through a "Shut Down Your Engines" program that recently morphed into a Process Excellence program, which incorporates process improvement with employee expertise, says spokesperson Meg Sacks. Conservation guidelines and manual shutdown procedures are defined in air brake and train handling rules.

For example, in warm weather, locomotives are to be shut down if they're not in use for more than 15 minutes, she says.

The Class I also is emphasizing longer trains when appropriate and improved wheel-flange lubrication.

At Canadian National Railway Co., fuel conservation is a major emphasis of Precision Railroading, which helps save diesel by more efficiently scheduling trains. The railroad also is positioning locomotives in the back and middle of trains to gain better power distribution and improve fuel efficiency, says CN spokesman

Bryan Tucker.

## No idle matter

In addition, technology is helping the Class I reap fuel-saving benefits. CN is equipping most of its locomotive fleet with ZTR Control Systems' SmartStart™ devices, which are designed to automatically shut down locomotives when not in use and power them up only to maintain critical systems.

UP is using similar automatic engine stop-start systems on 3,000 locomotives, or about 34 percent of its fleet, to reduce idling, says Barnes.

CN also is replacing older locomotives with new power that's about 17 percent more fuel efficient than older locomotives, says Tucker. The Class I is buying 65 high-horsepower, fuel-efficient locomotives this year on top of 65 units delivered in 2007. This year's order includes 40 4,400-horsepower ES44DC locomotives from GE - Transportation and 25 4,300-horsepower SD70M-2 locomotives from Electro-Motive Diesel Inc.

CN will retire 145 older locomotives. Because the new models are more powerful — two can do the work of three older locomotives — the railroad needs less power to pull the same number of cars, says Tucker.

NS might purchase additional fuel-efficient locomotives, too. The Class I is determining whether to buy more Generator-Set switchers, which can reduce fuel consumption by up to 40 percent and cut emissions by up to 80 percent compared with a conventional switcher by controlling idling, says NS spokesman Robin Chapman.

The Class I currently uses two Genset locomotives manufactured by National Railway Equipment Co. and two produced by Railpower Technologies Corp. in yard service.

Last year, UP began taking delivery of 60 Genset switchers that will replace 95 older low-horsepower locomotives in Los Angeles-area yards.

New fuel-efficient locomotives are entering CSXT's fleet, as well. The Class I expects to continue purchasing an average of 100 locomotives a year. In mid-2007, CSXT took delivery from GE of its 300th 4,400-horsepower, DC-traction Evolution® Series locomotive, which features a 12-cylinder engine designed to reduce fuel usage.

In addition to employing the latest fuel-saving locomotives and components, the Class Is are exploring new technologies.

Earlier this year, BNSF partnered with Vehicle Projects L.L.C. to develop a hydrogen fuel-cell switcher. To enter field testing later this year, the experimental switcher has the potential to reduce the Class I's dependency on oil for fuel, BNSF officials say.

In addition, BNSF and UP are helping GE develop a demonstration model of a hybrid Evolution Series locomotive, which will feature a series of batteries to capture and store energy dispersed during dynamic braking, and reduce fuel consumption.

## Keeping a close(er) watch

CN currently is piloting a GPS-based device on 90 locomotives to capture data on fuel levels, speed and track condition that the Class I can share with engineers to demonstrate the most efficient way to operate a train, says CN's Tucker. The Class I plans to roll out the devices system-wide later this year.

In the meantime, Class Is are gleaming results from their ongoing fuel-conservation efforts. In 1980, they consumed 3.9 billion gallons of fuel while registering 919 billion revenue ton-miles; in 2006, those figures stood at 4.2 billion gallons and 1.8 trillion revenue ton-miles — almost twice the freight volume and virtually the same amount of fuel, says the AAR's White.

"That's a phenomenal increase in fuel efficiency," he says.

On a smaller scale, BNSF set a fourth-quarter record of 773 gross ton-miles per gallon, up 3.5 percent compared with 2006's 747 gross ton-miles per gallon. Every little bit helps when it comes to getting the most out of every ounce of fuel "Any time you can increase fuel efficiency by three-and-a-half percent, that's meaningful," says BNSF's Hiatte. "It means the initiatives we have in place are working."

— Ken Wysocky is a Milwaukee-based free-lance writer.

### Short line on path to produce biodiesel

Frustrated by the erratic availability and escalating cost of diesel, Tri-City & Olympia Railroad Co. officials last year arrived at a radical solution: produce their own biodiesel.

The Richland, Wash.-based short line created subsidiary Green Diesel Inc. in 2007 to carry out the plan. By the middle of next month, the company plans to start producing biodiesel on an experimental basis at a research facility built last year in Richland.

The facility can produce about 1 million gallons of biodiesel annually, says David Samples, Tri-City & Olympia's director of business development. After the fuel begins to flow, the 127-mile short line will become the first freight railroad to produce its own biodiesel, he says.

Established in 2000, Tri-City & Olympia manages a fleet of 100 rail cars and interchanges with BNSF Railway Co. and Union Pacific Railroad. The short line uses about 500 gallons of diesel weekly to move grain and other agricultural products, Samples says.

Green Diesel will test different fuel blends produced from food-grade oils purchased from ConAgra Foods Inc. The blends, which likely will center on canola oil, will be tested on locomotives throughout 2008, Samples says.

Although it's uncertain how much it will cost to produce "homemade" biodiesel compared with purchasing fuel, the odds favor the homemade variety costing less, he says.

"With the right recipe, it will certainly be cheaper than diesel fuel," Samples says.

— Ken Wysocky

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