

House's National Clean Fleets Partnership. Transit leaders like Navistar and Clean Energy Fuels have launched strategic partnerships to build America's Natural Gas Highway. Manufacturers such as Westport Innovations have made organizational changes to become leading producers of liquefied and compressed natural gas engines. Utility companies like Dominion are replacing coal-based electricity with gas-fired electric generation. And drillers like Range Resources are finding new ways to improve the quality and safety of natural gas exploration while controlling costs.

There are no limits to the possibilities of the Great Shale Gas Rush. However, it will take visionary leadership and skillful management to deliver on the promise of a truly sustainable clean-energy future.

Integrative Case Questions

1. What turbulent forces are causing business leaders to rethink their use of energy?
2. Which managers—top managers, middle managers, or first-line managers—would make companywide decisions about energy use? How might *the new workplace* enable all managers to capitalize on the Great Shale Gas Rush?
3. Which historical management perspectives have particular relevance to the exploration and extraction of natural gas? Explain.

Sources: Based on "Honda Civic Natural Gas Is 2012 Green Car of the Year," *Green Car Journal*, November 17, 2011, www.greencar.com/articles/honda-civic-natural-gas-2012-green-car-year.php (accessed June 7, 2012); Elwin Green, "Natural gas Locked in the Marcellus Shale Has Companies Rushing to Cash in on Possibilities," *Pittsburgh Post-Gazette*, March 16, 2012, www.post-gazette.com/stories/business/news/natural-gas-locked-in-the-marcellus-shale-has-companies-rushing-to-cash-in-on-possibilities-370058/ (accessed June 7, 2012); Kevin Begos, "Gas Drillers Generate About \$3.5 Billion in Revenues From Marcellus Shale," Associated Press, May 5, 2012, www.timesunion.com/business/article/AP-Pa-gas-drilling-brought-3-5-billion-in-2011-3536873.php (accessed June 8, 2012); Timothy J. Considine, Robert Watson, and Seth Blumsack, *The Pennsylvania Marcellus Natural Gas Industry: Status, Economic Impacts, and Future Potential*, John and Willie Leone Family Department of Energy and Mineral Engineering, Penn State University, July 20, 2011, <http://marcelluscoalition.org/wp-content/uploads/2011/07/Final-2011-PA-Marcellus-Economic-Impacts.pdf> (accessed June 8, 2012); IHS, "Shale Gas Supports More than 600,000 American Jobs Today; by 2015, Shale Gas Predicted to Support Nearly 870,000 Jobs and Contribute \$118.2 Billion to GDP," press release, December 6, 2011, <http://press.ihs.com/press-release/energy-power/shale-gas-supports-more-600000-american-jobs-today-2015-shale-gas-predict> (accessed June 8, 2012); IEA: U.S. to Overtake Russia as Top Gas Producer, Reuters, Jun 5, 2012, <http://af.reuters.com/article/energyOilNews/idAFL3E8H45WZ20120605> (accessed June 8, 2012); Environmental Protection Agency, "Clean Energy: Air Emissions," www.epa.gov/cleanenergy/energy-and-you/affect/air-emissions.html (accessed June 8, 2012); Clifford Krauss, "There's Gas in Those Hills," *The New York Times*, April 8, 2008, www.nytimes.com/2008/04/08/business/08gas.html (accessed June 8, 2012).

part 1 Integrative Case

Part One: Introduction to Management

The Clean-Energy Future Is Now

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As *Green Car Journal* prepared to publish its much-anticipated "Green Car of the Year" edition for 2012, audiences might have expected a tribute to the Toyota Prius, Nissan Leaf, or another innovation in electric motoring. Instead, the panel of environmental and automotive experts assembled by the magazine made a surprising choice—one that signaled a sea change in green energy. The judges selected the 2012 Honda Civic Natural Gas, an alternative-fuel, partial-zero emissions vehicle that operates solely on compressed natural gas. As the journal noted, not only is the Civic's sticker price of \$26,155 more affordable than electric vehicles, and not only does the model possess a driving range and horsepower on par with conventional compacts, but the Civic's alternative fuel costs approximately half the price of gasoline and is sourced almost entirely from abundant reserves in the United States.

Against a backdrop of ubiquitous marketing for electric cars and hybrids, the choice of a natural gas vehicle for Green Car of the Year was an unmistakable nod to a development in green energy that is so immense that it promises to transform the U.S. energy grid and end North American dependence on foreign oil. That development is the discovery of the Marcellus Shale. Located throughout the Appalachian Basin of the eastern United States, the Marcellus Shale is a massive sedimentary rock formation deep beneath the Earth's surface that contains one of the largest methane deposits anywhere in the world. Once thought to possess a modest 1.9 trillion cubic feet of natural gas, this 600-mile-wide black shale formation below Pennsylvania, Ohio, New York, and West Virginia was explored by geologists in 2004 and was found to contain between 168 trillion and 516 trillion cubic feet of natural gas. Combined with other U.S. shale plays, including the Barnett Shale in Texas, the discovery of the Marcellus led the International Energy Agency (IEA) to rank the United States the new number one natural gas producer in the world, edging out resource-rich Russia. In addition, the Marcellus has triggered a green-energy boom known as the Great Shale Gas Rush, which is creating thousands of green jobs, revitalizing the nation's economy, and pointing the way to a clean-energy future.

The breakthrough couldn't have come at a better time. In a highly turbulent business environment shaken by a global recession and new government restrictions on traditional energy, today's business managers struggle to know which energy alternatives are viable, or even affordable. The unexpected bankruptcy of well-funded green-energy darlings Solyndra and Beacon Power further underscore the uncertainty of the alternative energy marketplace. To gain stability for their organizations, managers need solutions that are reliable now, not decades into the future.

Thanks to an abundant supply of affordable natural gas, the green energy future has arrived. According to the U.S. Environmental Protection Agency (EPA) profile on clean energy, natural gas is a clean-burning fuel that generates roughly half the carbon emissions of coal and oil while releasing zero sulfur dioxide or mercury emissions. Given its low price relative to other energy sources, natural gas has game-changing implications for trucking fleets, consumer autos, electric power generation, and commercial heating—not to mention natural gas ovens, clothes dryers, water heaters, and other appliances.

While shale gas is a win-win for business and the environment, its impact on green jobs and the economy is equally important. According to a 2011 IHS Global Insight study, shale gas production—currently 34 percent of all natural gas production in the United States—supported more than 600,000 green jobs in 2010, a number that will increase to 870,000 jobs by 2015. As for the national economy, shale gas contributed \$76.9 billion to the U.S. gross domestic product (GDP) in 2010 and is projected to contribute \$118.2 billion by 2015. Over the next 25 years, shale gas will raise more than \$933 billion in tax revenue for local, state, and federal governments. The news about natural gas is good for average consumers as well. In 2011, property owners in the Marcellus region received \$400 million in natural gas royalties—a number that will climb even higher in the next decade. Additionally, individual U.S. consumers can expect \$926 in new disposable income per year from cost savings related to natural gas. Combined, this economic activity equates to much-needed relief in hard times.

What does the switch to natural gas mean for industry-leading companies? For automakers like Honda and Volvo, natural gas vehicles have begun making their way into regular assembly-line production. Transport businesses such as UPS are converting fleets from diesel to natural gas as part of the White

part 2 Integrative Case

Part Two: The Environment of Management

Brown Goes Green: UPS Embraces Natural Gas Trucking Fleet

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Can 3 million commercial trucks consuming nearly 4 billion gallons of diesel fuel annually in the United States really “go green”? To find out, the White House in 2008 launched a National Clean Fleets Partnership aimed at helping businesses embrace vehicles that run on natural gas, electricity, hydrogen, and other alternative fuels. Since it was first announced, the public-private partnership has sparked close collaboration between the U.S. Department of Energy and top fleet operators like United Parcel Service (UPS; nicknamed “Brown”).

UPS’s participation in a national green highways initiative may seem counterintuitive to many—but it shouldn’t. Brown’s quest to attain cost savings through fuel-efficient motoring stretches back to the 1930s, when the parcel delivery service used 20-mph electric cars to deliver packages in New York City. In the 1980s, UPS introduced vehicles that ran on compressed natural gas. In 2006, the company partnered with the U.S. Environmental Protection Agency (EPA) to design and build the world’s first hydraulic delivery vehicle—a truck propelled by hydraulic pumps that store and release energy captured during braking. Today, the Georgia-based delivery giant continues to test alternative-fuel technologies, seeking to transform 95,000 delivery vehicles into fuel-efficient green machines.

Although numerous alternative-fuel technologies are competing for dominance at UPS, liquefied natural gas (LNG) has gained significant momentum in recent years, especially for Brown’s largest trucks. Like most eighteen-wheelers, UPS’s 17,000 tractor-trailers run on diesel fuel. This is beginning to change, however. In the years since the 2004 discovery of massive shale gas fields in the Marcellus Shale region of the United States, natural gas supplies have skyrocketed, causing methane prices to drop to about half the price of diesel. This development has had a significant influence on business. In particular, transportation managers faced with an affordable supply of domestic clean energy have begun evaluating the efficiency and environmental impact of their fleets.

In 2011, UPS embraced the new natural gas boom by ordering 48 LNG-engine tractor-trailers—an investment that boosted the company’s long-haul natural gas fleet total to 59. Brown was not alone; similar moves by Ryder Systems, Waste Management Inc., and AT&T led *Wall Street Journal* energy reporter Rebecca Smith to wonder if the entire trucking industry was about to “ditch diesel.” As Smith noted, “Never before has the price gap between natural gas and diesel been so large, suddenly making natural-gas-powered trucks an alluring option for company fleets.”

According to Mike Britt, the director of vehicle engineering at UPS, Brown has good reason to switch from diesel to LNG. “The added advantage of LNG,” says Britt, “is it does not compromise the tractor’s abilities, fuel economy, or drivability, and it significantly reduces greenhouse gases.” The benefits of LNG are numerous indeed. While most alternative-fuel vehicles can drive only limited distances, LNG trucks have a 600-mile single-tank range, plus a reliable network of fueling stations. In addition, LNG-fueled trucks produce 25 percent less carbon emissions and consume 95 percent less diesel than conventional trucks. Most importantly, natural gas engines deliver full horsepower. Highlighting a stark contrast between LNG and electric-powered vehicles, Britt quips that a 450-horsepower eighteen-wheeler uses so much power that to haul two trailers through mountainous terrain, “the first trailer would have to be all batteries.” The performance gap leads Britt to conclude: “LNG is the only suitable alternative to diesel for the really heavy long-haul tractor trailers you see on the highway.”

At UPS, terms like “fleet efficiency” and “environmental impact” aren’t mere buzzwords—they are increasingly part of Brown’s corporate culture. In 2011, UPS created its first executive-level management position for green concerns: the chief sustainability officer (CSO). Scott Wicker, a longtime company veteran appointed to the new post, has been instrumental in defining what a CSO does. “The key thing I do in my job is try to keep UPS focused on the environmental impacts that we have as an organization—and we’re constantly working to reduce those environmental impacts,” Wicker states. “But it’s not just the environment; sustainability is also about what we do as a company in terms of our people, our customers, and the communities in which we live and work.” Under Wicker’s

leadership, sustainability has garnered significant attention at UPS, appearing prominently in the company's policy book, upside blog, and corporate Web site. In addition, Wicker and his management teams develop and roll out sustainability initiatives to UPS's 400,000 employees.

According to the new green chief, effective sustainability reinforces a company's economic responsibility. "Above all else, sustainability is about being able to maintain a balance between our impacts on the environment and society, but at the same time keep the company economically prosperous," Wicker says. Kurt Kuehn, UPS's chief financial officer (CFO), underscores this point, citing two key objectives of sustainability: "Doing what's right for the environment and society, and also being mindful of the bottom line so we're a healthy company financially."

Minding the bottom line is especially relevant to Brown's pursuit of alternative-fuel technologies. At \$195,000 each, LNG tractor-trailers cost twice as much as conventional semi-trailers—a high premium for going green. However, Mike Britt says that UPS can offset that expense through a combination of government subsidies and natural-gas-related fuel savings. For Britt, added investment in LNG reaps added reward for companies and communities: "Liquefied natural gas is a cheaper, cleaner-burning fuel that is better for the environment and more sustainable than conventional diesel. It's also a fuel that's in abundant supply inside the United States—it doesn't have to be imported."

Questions

1. Explain how UPS's alternative-fuels fleet is a response to trends taking place in the company's general environment.
2. Describe how UPS is using *boundary-spanning* roles to adapt to energy-related uncertainty in its environment.
3. How does UPS's clean fleets initiative illustrate the concepts of *sustainability* and *corporate social responsibility*?

Sources: Based on White House Fact Sheet: "National Clean Fleets Partnership," press release, April 1, 2011, www.whitehouse.gov/the-press-office/2011/04/01/fact-sheet-national-clean-fleets-partnership (accessed June 14, 2012); Rebecca Smith, "Will Truckers Ditch Diesel?" *The Wall Street Journal*, May 23, 2012, <http://online.wsj.com/article/SB10001424052702304707604577422192910235090.html> (accessed June 14, 2012); Matthew L. Wald, "UPS Finds a Substitute for Diesel: Natural Gas, at 260 Degrees Below Zero," *The New York Times*, February 22, 2011, <http://green.blogs.nytimes.com/2011/02/22/u-p-s-finds-a-substitute-for-diesel-natural-gas-at-260-degrees-below-zero> (accessed June 14, 2012); Jeffrey Ball, "Natural-Gas Trucks Face Long Haul," *The Wall Street Journal*, May 17, 2011, <http://online.wsj.com/article/SB10001424052748704740604576301550341227910.html> (accessed June 15, 2012); "UPS Adds to Its Natural Gas Truck Fleet," *Environmental Leader*, February 25, 2011, www.environmentalleader.com/2011/02/25/ups-adds-to-its-natural-gas-truck-fleet (accessed June 15, 2012); Scott Wicker (CSO, United Parcel Service), interview by Kevin Coffey, upside blog, April 13, 2012, <http://blog.ups.com/2012/04/13/talkin-sustainable-logistics-fortune-brainstorm-green> (accessed June 16, 2012); William Smith, "New Terminology, Same Priority: Sustainability Engrained at UPS," upside blog, April 30, 2012, <http://blog.ups.com/2012/04/30/new-terminology-same-priority-sustainability-engrained-at-ups> (accessed June 16, 2012); Jill Swiecichowski, "Brown's Legacy of Being Green," upside blog, July 21, 2010, <http://blog.ups.com/2010/07/21/browns-legacy-of-being-green> (accessed June 15, 2012); "UPS Replaces Diesel with Cleaner LNG Tractor Trucks," *Environment News Service*, February 22, 2011, www.ens-newswire.com/ens/feb2011/2011-02-22-091.html (accessed June 14, 2012).