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The next issue of *Consult* will have a new title!

ICF Consulting's Perspectives will continue to bring you the unique perspectives gained from ICF Consulting's extensive industry knowledge, credentialed professionals, and innovative analytics.

powered by perspective

A Successful Future Forecast for Competitive Power Markets

How would increased competition affect the electric power system in the United States?



ICF Consulting examined this question in a new study for the U.S. Federal Energy Regulatory Commission (FERC). Billions of dollars and sweeping changes in regional power markets are at stake, as detailed in this report.

Charged with overseeing wholesale electric power markets throughout the nation, FERC turned to ICF Consulting to provide a rigorous and comprehensive analysis of the current policy of promoting more competitive energy markets. A central element of this policy establishes large power markets, known as Regional Transmission Organizations (RTOs), that are to be the building blocks of the competitive electricity markets of the future.

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Industry Continues to Grapple with Uncertainty after Bush Releases Air Regulatory Initiatives

President Bush recently unveiled two proposals aimed at controlling air pollution emissions in the United States. The *Clear Skies Initiative* calls for reductions in sulfur dioxide (SO₂), nitrogen oxide (NO_x) and mercury emissions to be achieved in two phases over the next 20 years. These pollutants are targeted because of their potential to pose environmental and public health risks. For example, SO₂ and NO_x contribute to acid rain and fine particulate (soot) formation and



smog problems. Mercury deposition in lakes, rivers, and streams can contaminate fish, potentially leading to nervous system disorders in humans who consume them.

The *Global Climate Change Initiative*, calls for a gradual reduction in greenhouse gas (GHG) emissions intensity, or the ratio of emissions to economic activity, over the next 10 years. Increasing emissions of GHGs, including carbon dioxide, contribute to global climate change.

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Economic Effects of Transportation: The Freight Story

Freight transportation enhancements that reduce the costs of moving goods to and from markets are critical to economic expansion.

Much like labor and capital, transportation costs directly affect the price of goods and services and the profits of producers. Lower costs or better service, or both, in freight movement have a positive effect on all firms engaged in the production, distribution, trade, and retail sale of physical goods. Reducing the per-mile cost of goods means that any production or distribution facility can serve a wider market area, with potential gains from scale efficiencies. It also means a factory can draw supplies from a wider area with potential gains in terms of the cost and/or quality of parts and materials coming to the factory.



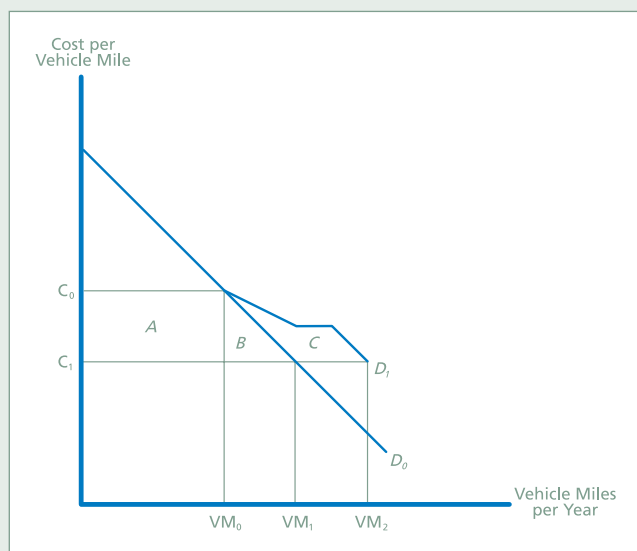
Beyond lower dollar costs to shippers, reductions in transit time and/or increases in schedule reliability can be expected to also have significant impacts. These gains in terms of time allow firms to manage their inventories and supply chains more efficiently. In recent years, trucking costs have fallen and reliability has improved. Businesses have tended to respond by buying more transportation and using it to reduce other components of logistics costs (e.g., through fewer warehouses or lower inventories).

The analytical work to provide definite quantitative information on the link between improved freight transportation and economic performance is just beginning. Benefit-cost models have been developed for evaluation of highway investments, but no model accords proper treatment to the benefits of freight improvements. In particular, previous models do not account for the benefits to the owners of the cargo and all they can mean in terms of more efficient logistics and greater productivity in manufacturing. For example, a major omission of previous models is that they did not account for the effects of road improvement on the owners of the cargo moving over the road.

A shipper's response to the change in freight-movement cost is determined by the conditions of its demand for freight transportation. This demand reflects both the market's demand for the firm's products and the way in

which it uses freight transportation as an input to its production and/or distribution processes. As depicted in the graph below, a shipper's reaction to a cost reduction in freight transport can be thought of as occurring in three phases.

How the Business Reorganization Effect Can Be Captured under a Benefit-Cost Framework



The shipper's demand curve (D_0) reflects the benefits the shipper gets from buying freight transportation before an improvement to the system. In the very short term after an improvement, area A reflects the benefit of that cost reduction with an existing volume of freight (VM_0). Area B adds to the benefits as the shipper takes advantage of the cost reduction and buys more freight. The change in the demand curve (D_1) reflects the greater benefits the shipper can get once the firm has reorganized its logistics set-up following an improvement.

A freight improvement's full benefit is reflected in the sum of areas A, B, and C.

In commenting on the condition of the system, shippers and carriers tend to stress two themes. One is that they are, to a large degree, satisfied with the highway network as it now performs. They have designed their schedules and logistics systems around the current level of performance. Two, many of these people also emphasize that they would have a low level of tolerance for any deterioration in performance. For instance, there are choke points

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A Successful Future Forecast for Competitive Power Markets (cont.)

The policy scenarios developed for the FERC examine three main types of economic benefits that the Commission expects RTOs to deliver: transmission improvements, generator improvements, and improved demand response to electric price signals. Each policy scenario was crafted to show the importance of these three types of economic benefit, and to highlight the aspects of the FERC policy that might make the greatest contribution to overall policy goals.

ICF Consulting employed its powerful computer simulation framework, the Integrated Planning Model® (IPM®), to quantify the magnitude of each of these three benefits.

Designed for detailed, long-term dynamic forecasting, IPM can simulate every power plant and transmission link in the electric power system, and incorporates a fully integrated treatment of fuel and environmental linkages. Capturing such linkages is increasingly important

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around the country. Higher-price export markets in Florida, for example, attract more Midwestern power,

which is currently shipped to the Northeast. This forces the Northeast to rely more on local resources for electric supply. This dynamic demonstrates that electric power

markets are truly large in scope. Events separated by thousands of miles—Florida's import of power and Illinois' shifting of power to the Southeast—can directly affect an area such as New York City.

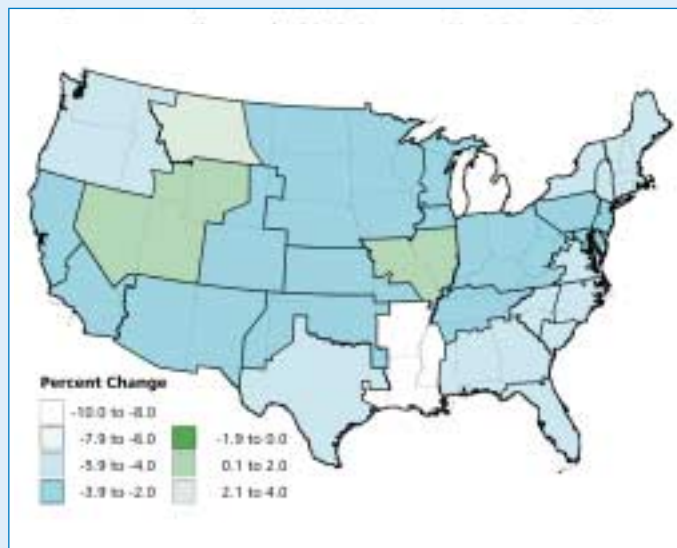
Over the 20-year time frame of the study, the results show that RTO policy as envisioned by the FERC could deliver economic benefits ranging from \$7 billion to \$60 billion. On an annual basis economic benefits could be as high as \$10 billion. ICF Consulting also forecasted electric prices, using the IPM, and the results show sub-

stantial regional variations. Although most regions likely will experience declining prices under the policy scenarios, some regions may have price increases instead. These price increases typically are due to increased exports of power to regions such as Southern California and Florida.

The map above shows changes in energy prices in 2010 under one of the main policy scenarios. In this scenario, regional price increases in more competitive power markets have implications for policy makers. The tradeoffs and possible policy solutions could affect everyone in the country and one of the most critical sectors of the national economy. Electric power has a unique role in society because it affects our security, safety, economy, and environment. Few industries have such a profound and far-reaching influence.

For more information about ICF Consulting's energy practice, visit www.icfconsulting.com/energy.

Changes in Energy Prices Projected in 2010 Average Firm Power Prices Under an RTO Policy Scenario



Information Technology

Managing Environmental Compliance

Environmental compliance obligations in upstream oil and gas operations are increasingly complex, time consuming, and costly. To remain competitive, organizations must find a high-quality, low-cost solution for environmental, health, and safety compliance functions. An intelligent compliance system can help streamline activities, reduce costs, and minimize violations.

BP (formerly known as BP Amoco) instituted a prototype of an environmental compliance system built by ICF Consulting for their off- and on-shore facilities in the Gulf of Mexico. This system included an auditable database of applicable regulations and a compliance tracking and workflow management system to improve environmental performance and knowledge management.

The prototype used a secure browser-based intranet system to centralize the management of information within the Gulf of Mexico operations, as well as the flow of information to BP headquarters and government agencies.

Included was a calendar-based notification system for regulatory activities and responsibilities and an electronic library of database-linked environmental reports to eliminate duplicative data entry and simplify routine environmental reporting. The ability to view and track environmental performance at an appropriate level using tabular and map-based reports proved to be valuable. For example, line personnel could track their own performance, platform managers could track the performance of the entire platform, and unit managers could track the performance of their business unit.

The lessons learned from the BP prototype are being integrated into a more comprehensive system in conjunction with ICF Consulting's business partners Enverity and the Bureau of National Affairs.

For more information about ICF Consulting's information technology practice, please visit www.icfconsulting.com/it.

Risk Management

More Coverage at Less Cost: Are there Mechanisms that Can Supplement Insurance to Provide More Coverage at a Lower Cost?

The Canadian Government wanted to increase the required amount of liability coverage for nuclear power generating stations from C\$75M to a level in the neighborhood of C\$650M. However, plant operators were understandably concerned about how this action might raise the substantial premiums being paid to the Nuclear Insurance Association of Canada even though the industry has an excellent safety record.

The Government turned to ICF Consulting to evaluate potential solutions. The analysis offered recommendations for feasible alternatives to meet the higher levels of coverage at a more cost-effective rate. ICF Consulting also anticipated issues such as the implications of making noninsurance mechanisms the primary or secondary layer of coverage.

Possible alternatives we recommended included self-insurance, financial guarantees, letters of credit, and surety bonds. By allowing these options in conjunction with insurance, the Government will give insurers an incentive to price their product more competitively. Plant operators will have lower-cost options for meeting higher amounts of coverage. The public at large benefits because it will not pay for excessive insurance costs.

ICF Consulting's analysis provided the technical basis for a novel system that allows the market to play a greater role in generating cost-effective solutions for nuclear liability coverage. The market will be able to function when alternative suppliers of acceptable coverage are allowed to participate.

For more information about ICF Consulting's risk management practice, please visit www.icfconsulting.com.



Emergency Management

FEMA's Growing Role in Supporting Terrorism Preparedness

The Federal Emergency Management Agency (FEMA) was created as a solution to problems plaguing the federal government in responding to a host of natural hazards, as well as in addressing the United States' "civil defense." FEMA became the host agency for various national programs ranging from flood insurance to earthquake hazard reduction, along with promulgating regulations governing disaster grants and making training available to state and local agencies.

Twenty years later, FEMA was increasingly being asked by its state and local partners to devote more resources to the growing concerns involving terrorism preparedness. During the Clinton Administration, the division of responsibilities between Department of Justice (DOJ) agencies and FEMA and its partners was defined as "crisis management (investigation/prosecution)" and "consequence management (response to and recovery from an event)", respectively. During this same time, the U.S. Congress began appropriations to a variety of training programs to be designed by federal agencies and delivered to state and local responders.

As ICF Consulting has learned from its support of various FEMA and DOJ programs during the past three years, the need to identify a single point of contact in the federal government to coordinate the delivery of training and exercise programs, equipment grants, and other related preparedness programs and information to state and local levels of government is strong and clearly more acute since September 11, 2001. These programs appeared duplicative, uncoordinated, and confusing to state and local governments.

A significant decision was made in early 2001, when President Bush directed that a new Office for National

Preparedness (ONP) be created within FEMA. This decision acknowledged his recognition of FEMA's leadership role for "consequence management" within the federal government. Until

September 11, 2001 and the subsequent creation of the White House Office of Homeland Security (OHS), ONP was widely viewed as the central location for federal government "consequence management" coordination, working as a counter-part to the Federal Bureau of Investigations' program of "crisis management."

After the terrorist attacks and the creation of the OHS, it became clear that the FEMA/ONP and DOJ/ODP roles overlapped regarding state and local terrorism preparedness needs. As a result, the proposed Bush 2003 budget moves the DOJ/ODP activities to FEMA/ONP to create a "one-stop" shopping concept for terrorism preparedness resources in the federal government.

This proposal is not without some controversy, and a final organizational shift awaits the approval of the budget. These potential changes are being watched very closely by state and local officials in various responder categories, including emergency management, fire services, and law enforcement. All parties agree that the goal is to assist in the nation's preparedness through minimizing federal bureaucratic entanglements and maximizing available resources.

ICF Consulting has been in the unique position of supporting both a DOJ/ODP and a FEMA/ONP contract, performing state and local preparedness exercises in the former and helping with start-up of the new FEMA organization in the latter. For more information about ICF Consulting's emergency management practice, please visit www.icfconsulting.com/em.



The proposed Bush 2003 budget creates a "one-stop" shopping concept for terrorism preparedness resources in the federal government.

Industry Uncertainty after Bush Releases Air Regulatory Initiatives (cont.)

The Clear Skies Initiative

The President's *Clear Skies Initiative* comes at a critical time when some electric power companies are supporting comprehensive air legislation for the first time. These power companies are calling for air legislation, due in part to the realization that under current law further regulation of mercury, SO₂, and NO_x is likely to occur, but in a piecemeal fashion.

This incremental approach to air emissions regulation under current law creates uncertainty and risks stranding billions of dollars of air pollution control investments. For example, a power company may spend \$500 million to install control equipment on its coal-fired electric generation units in order to comply with a recently promulgated NO_x regulation. Investments of this magnitude could result in a loss in earnings of five to ten percent. That same company may discover two years from now that it is faced with spending an additional \$1.5 billion on pollution control equipment as a result of new mercury and SO₂ regulations. Faced with these additional costs, the power company may decide to retire some of its marginal generating units rather than incur the additional investment cost, thereby leaving the company "stranded" with no asset on which to recover part of the original NO_x control investments.

While some in the power industry are supporting multipollutant legislation, in part as a way to reduce uncertainty, a great deal of uncertainty remains as to what will be the ultimate scope, stringency, and timing of future air regulations.

While the President's multi-pollutant approach may be intended to reduce uncertainty by establishing comprehensive, long-term emissions reduction requirements, it primarily serves to intensify the debate over future air regulation.

The President's initiative is just one of several widely ranging proposals put forward recently by members of government and industry. Industry proposals from groups such as the Clean Energy Group and Energy for a Clean Air Future vary in the timing and stringency of their required reductions. A multipollutant proposal sponsored by

Senator James Jeffords (I-VT) calls for significant cuts in emissions beginning in 2007. The President's approach calls for smaller cuts than Jeffords' and delays the most significant cuts until 2018.


The Global Climate Change Initiative

The Administration's *Global Climate Change Initiative* sets a modest voluntary goal for U.S. GHG emissions reductions over the next 10 years. The initiative delays any further action until 2012, and even then only if justified by "sound science." Based on the Energy Information Administration projections, the President's voluntary goal, if achieved, would result in carbon dioxide emissions levels substantially higher than those allocated to the U.S. under the Kyoto Protocol. Carbon dioxide emissions under the Administration plan also will far exceed those allowed under other proposals, including the Jeffords and Clean Energy Group proposals.

Unlike the *Clear Skies Initiative*, the *Global Climate Change Initiative* delays definitive action on the climate change issue, thereby forcing U.S. businesses to continue making costly, long-term decisions while faced with significant uncertainty.

The Way Forward

While some in the power industry are supporting multipollutant legislation, in part as a way to reduce uncertainty, there remains a great deal of uncertainty as to what will be the ultimate scope, stringency, and timing of future air regulations. Power companies must also grapple with the prospect that further reductions in carbon emissions, beyond the voluntary program proposed by the Bush Administration, still might occur as most developed countries in the world move toward ratification of the Kyoto Protocol.

Given the renewed focus of Wall Street rating agencies on energy company financial performance as a result of the Enron debacle, ICF Consulting recommends that power company executives pursue air emissions compliance strategies that minimize near-term earnings and debt impacts while preserving flexibility to respond to the continuing uncertain air regulatory outlook. 

Calendar of Events

May

May 5, 2002

Portland, Oregon. At the **TRB Conference on Transportation and Economic Development 2002**, Sergio Ostria of ICF Consulting will speak on "How Do Freight Transportation Improvements Affect Economic Development?". *For more information, please contact Sergio Ostria at 1.703.934.3013.*

May 5, 2002

New Orleans, Louisiana. ICF Consulting will be exhibiting at the **Emissions Marketing Association Spring Meeting**. Marcia Trump is co-presenting a paper on the new "Fannie Mae Emissions Trading Initiative" with Fannie Mae. *For more information, please contact Stacey Hohenberg at 1.703.218.2504.*

May 9, 2002

Sacramento, California. Val Jensen will chair a panel on energy efficiency in affordable housing at the **California State Housing Conference, "Housing California"**. *For more information, please contact Carole Norris at 1.415.677.7154.*

May 13-15, 2002

Houston, Texas. Kojo Ofori-Atta of ICF Consulting will speak on "Transmission Congestion Outlook for 2002" and David Kathan will lead a workshop on "Establishing Demand Response Programs in Competitive Markets" at the **New Texas Power Game Conference**. *For more information, please contact Sheila Hudson at 1.703.934.3181.*

May 14, 2002

New York, New York. ICF Consulting's Marcia Trump will co-present a paper on the new "Fannie Mae Emissions Trading Initiative" with Fannie Mae at the **Green Trading Summit** sponsored by the MYA Group. *For more information, please contact Stacey Hohenberg at 1.703.218.2504.*

May 30, 2002

New Orleans, Louisiana. Paul Bailey of ICF Consulting will speak on "Corporate Positioning and Alliances for International Energy Companies" at the **Energy Partnerships and Strategic Alliances Conference** sponsored by the Strategic Research Institute. *For more information, please contact Stacey Hohenberg at 1.703.218.2504.*

June

June 2-4, 2002

Boston, Massachusetts. ICF Consulting will exhibit at the **Edison Electric Institute (EEI) Annual Meeting**. In addition to the exhibition, EEI is providing authoritative speakers on strategic issues shaping the industry and is joined by the Canadian Electricity Association in this year's endeavor. *For more information, please contact Pat Alexander at 1.703.934.3157.*

June 12, 2002

Milan, Italy. ICF Consulting's Abyd Karmali will be speaking on "Maximizing the Value of Your Green Assets in Deregulating Electricity

Markets" at the **PowerGen - Europe Conference**. *For more information, please contact Sue Demmon at +44.20.7554.8730.*

June 13, 2002

Chicago, Illinois. Rick Fioravanti of ICF Consulting will be co-presenting a case study on "Offering Upgraded Wiring Services to Profit on Premium Services" with APS Energy Services at the **Develop the Right Product and Service Mix to Achieve Your Revenue Goals Conference**. *For more information, please contact Stacey Hohenberg at 1.703.218.2504.*

June 19, 2002

Chicago, Illinois. Steve Fine of ICF Consulting will be participating in a panel discussion on "What Can Brokers and Consultants Offer in a Non-Standardized Market?" at the **CO2 Trading: North American Conference** sponsored by EyeforEnergy. *For more information, please contact Stacey Hohenberg at 1.703.218.2504.*

June 24-27, 2002

Washington, D.C. At the **E-Gov 2002 Annual Conference**, ICF Consulting will host an exhibit booth. Tim Herbst will participate in a panel discussing the benefits of the Web portal designed by ICF Consulting for the Prince of Wales International Business Leaders Forum. *For more information, please contact Chris Holmes at 1.703.934.3536.*



Economic Effects of Transportation: The Freight Story (cont.)

and problem areas where speeds are markedly lower than in the rest of the country.

In the absence of improvements, the speed and reliability of the freight system can be expected to worsen as vehicle traffic grows and congestion increases. Such a development could force shippers and carriers into costly redesign and restructuring of their systems with higher logistics costs and a consequent drop in productivity.

It is reasonable to suppose that, if such costs are to be minimized, the current level of investment must be, at least, maintained. However, improvement in the performance of the freight system, with concomitant gains in national productivity, will require gains in the battle against congestion.

Transportation agencies at all levels of government can bring about improvement in highway freight-carriage. For instance:

- Targeted capacity expansion projects that alleviate high-frequency bottlenecks in the freight system can improve transit time variability.
- Freight planning can help to ensure that freight movement needs are appropriately considered by decision-makers by providing state and local transportation planners with the necessary tools to better account for the impacts of alternative investments on the efficiency of the freight system.
- Programs that strive to improve operations planning (or the interaction of planning and operations functions within a transportation agency) can improve system performance.

Challenges to ensuring the efficiency and reliability of the freight system center on squeezing as much efficiency as possible out of available transportation resources and finding scarce resources to implement efficiency-enhancing programs and projects.

- The deployment of Intelligent Transportation Systems can enhance the efficiency of the highway system through operational improvements, better user information, and incident management (which is particularly problematic from the perspective of system reliability).
- Federal grant programs that provide financing mechanisms for freight transportation improvements can help to generate the types of investments needed to improve the productivity of the freight system.

Challenges to ensuring the efficiency and reliability of the freight system center on squeezing as much efficiency as possible out of available transportation resources and finding scarce resources to implement efficiency-enhancing programs and projects.

These observations are a result of a Freight Benefit Cost Analysis for the Federal Highway Administration conducted by ICF Consulting and HLB Decision-Economics under subcontract to AECOM. The study developed a framework to capture the full extent of the economic impact of changes to the freight transportation system.

Please visit www.icfconsulting.com/transportation for more information about ICF Consulting's transportation practice.



About ICF Consulting

ICF Consulting is a leading management, technology, and policy consulting firm. Drawing upon its extensive industry knowledge, credentialed professionals, and innovative analytics, it develops solutions to complex energy, environment, emergency management, community development, and transportation issues. ICF Consulting's approach to these issues is strengthened by its expertise in information technology, organizational improvement, and communications. Since 1969, ICF Consulting has been serving major corporations, government at all levels, and multinational institutions from key business centers in North America, Europe, and the Pacific Rim.

ICF Consulting was recently selected as a successful bidder for two major consulting divisions of Arthur D. Little, Inc. (ADL). These divisions center on environment, risk, and public sector program management and will add an important new dimension to ICF Consulting's existing competencies. These dimensions will be reflected in future articles in this publication.

For more information on ICF Consulting's services, please visit our Web site at www.icfconsulting.com.

We welcome your comments and suggestions. Please contact us at 1.703.934.3659 or by e-mail at consult@icfconsulting.com.