

**Committee on Energy and Commerce**  
**U.S. House of Representatives**  
Witness Disclosure Requirement - "Truth in Testimony"  
Required by House Rule XI, Clause 2(g)

<b>1. Your Name: Kenneth H. Ditzel</b>		
<b>2. Are you testifying on behalf of the Federal, or a State or local government entity?</b>	<b>Yes</b>	<b>No</b> <b>X</b>
<b>3. Are you testifying on behalf of an entity that is not a government entity?</b>	<b>Yes</b>	<b>No</b> <b>X</b>
<b>4. Other than yourself, please list which entity or entities you are representing:</b>  		
<b>5. Please list any Federal grants or contracts (including subgrants or subcontracts) that you or the entity you represent have received on or after October 1, 2011:</b>  		
<b>6. If your answer to the question in item 3 in this form is "yes," please describe your position or representational capacity with the entity or entities you are representing:</b>  		
<b>7. If your answer to the question in item 3 is "yes," do any of the entities disclosed in item 4 have parent organizations, subsidiaries, or partnerships that you are not representing in your testimony?</b>	<b>Yes</b>	<b>No</b>
<b>8. If the answer to the question in item 3 is "yes," please list any Federal grants or contracts (including subgrants or subcontracts) that were received by the entities listed under the question in item 4 on or after October 1, 2011, that exceed 10 percent of the revenue of the entities in the year received, including the source and amount of each grant or contract to be listed:</b>  		
<b>9. Please attach your curriculum vitae to your completed disclosure form.</b>  		

Signature: \_\_\_\_\_

Date: March 23, 2014

**Kenneth H. Ditzel**  
Principal, Charles River Associates

MBA  
Georgetown University  
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Ken Ditzel is a Principal in the Energy Practice of CRA where he has provided economic damages and market planning analysis to the power generation, oil and gas, and manufacturing industries. He specializes in developing and examining future scenarios for natural gas, coal, oil, and electricity markets under a range of technology, policy, and economic environments. Mr. Ditzel leads the development of CRA's proprietary energy-economy model, electric sector model, and global gas and LNG models. He uses these models to assess impacts on clients' asset portfolios and strategic direction. In recent work for CRA, Mr. Ditzel has been the lead author on a series of reports detailing the impacts of LNG exports on the US Economy and on US Natural Gas Prices.

Mr. Ditzel also is a testifying expert who recently testified before the London Court of International Arbitration regarding a failed gas processing facility in South America.

Prior to CRA, Mr. Ditzel served as a power generation industry expert at Booz Allen Hamilton and as a power plant engineer for the Dow Chemical Company at two cogeneration plants in Texas. Mr. Ditzel also has worked in the aerospace and biofuels industries. Mr. Ditzel has a B.S. in Mechanical Engineering from the University of Virginia and an MBA from Georgetown University.

## Experience

### Natural gas

- **LNG Demand & Supply Curve Analysis:** For an international chemicals manufacturer, CRA was asked to produce a global LNG supply, demand, and price outlook. CRA used its Global LNG model along with its US Gas Model to assess the international supply curve for LNG under different scenarios of US gas prices. The analysis showed the competitiveness of US LNG exports relative to other supply sources that are facing increasing domestic prices and reserve depletion.
- **LNG contract dispute:** For a US electric utility, CRA was retained to assess whether there were any justifiable damages related to the plaintiff's allegation that the utility did not perform under its LNG-take contract. Mr. Ditzel led the analysis of storage levels at the regasification terminal to determine whether additional shipments in the actual and but-for worlds could have been taken by the utility without surpassing allowable storage limits.
- **Impact of LNG exports on US economics and gas prices:** Mr. Ditzel led the analysis showing the economic impacts of LNG exports on gas-intensive manufacturing and on US gas prices. Mr. Ditzel used CRA's proprietary electric sector, North American gas, and LNG models along with its macroeconomic models to forecast these impacts. The report showed that the opportunity costs (economic trade-offs) if LNG exports were left unconstrained.

- **Natural gas fuel forecasting:** For a major U.S. utility, Mr. Ditzel leads the annual effort to develop natural gas and coal price, supply, and demand through 2050. The assignment involves modeling the impacts on fuel pricing under a range of technology development, energy and environmental policy, and energy demand growth scenarios. As part of this engagement, CRA evaluates technology market penetration under scenarios with varying assumptions of technology cost and efficiency learning. Additionally, CRA also forecasts macroeconomic (e.g., gross domestic product, welfare, job losses) and microeconomic (e.g., asset valuation, retirements, new builds, technology advancement) impacts under the scenarios.
- **Natural gas price manipulation:** For a California utility, Mr. Ditzel supported the expert witness in a multibillion-dollar class-action lawsuit involving alleged natural gas price manipulation. Mr. Ditzel authored sections of an expert report on how Rocky Mountain natural gas reserves and production impacted gas development and prices for gas imported into California.
- **US Gas Gas-to-Liquids Project:** Mr. Ditzel has co-authored two expert reports assessing the technology feasibility and damages related to a failed gas processing facility. Mr. Ditzel testified on the matter in October 2013 before the LCIA.

## Transportation fuels

- **Refinery of the future:** A global integrated oil and gas firm retained CRA to assess the economics of deploying emerging energy technologies as part of its Refinery of the Future technology programs. Mr. Ditzel was essential in designing and building the preliminary analytical tool for assessing the client's programs and in conducting the interviews to collect the necessary data from the client's project managers. This data was used by the analysts to populate the preliminary evaluation tool. The tool was used to project revenues, labor hours, and net present value of the program project and refinery. Mr. Ditzel also helped design the sales pitch for obtaining buy-in from the supersite refineries.
- **Review of coal to liquids market landscape:** Mr. Ditzel provided a leading oil and gas company with a strategic and economic framework for assessing direct and indirect (gasification-based) coal to liquids (CTL) technologies. The work included an assessment of the current state of direct and indirect CTL technologies, major players, possible technological breakthroughs, and a highly flexible economic model that is sensitive to oil price environments. Mr. Ditzel also provided the implications of how capturing carbon from a CTL plant would affect the overall economics.
- **Economic assessment and strategic analysis of alternative transportation fuels:** For a global oil and gas company, CRA assessed the economic and future outlook for alternative transportation fuels. As part of the analysis, Mr. Ditzel focused on biofuels (ethanol and biodiesel) and CTL. The biofuels and CTL work consisted of evaluating the current state of the technology, major players, technology trends, and cost analysis on a per-barrel basis. In addition, the analysis provided insight for the client as to whether licensing agreements, joint ventures, technology purchases, and/or manufacturing acquisitions would be an optimal choice.

- **Valuation of a biofuel technology:** Mr. Ditzel led a biofuels technology valuation for a major oil and gas firm that was developing a next-generation technology for replacing traditional, grain-based ethanol production. The client used CRA's valuation analysis in structuring a technology transfer to a foreign subsidiary to minimize future tax payments. To support the valuation, CRA developed a global biofuel model that projects market penetration by major regions/countries. CRA's analysis culminated in a final report that documented the current state of the biofuels industry, how the industry was expected to evolve, and a detailed summary of the methodology used and results of the butanol technology valuation.
- **Power generation technology peer review:** Mr. Ditzel helped lead a peer review of current and future fossil energy technologies for the DOE's Energy Information Administration (EIA). The results from this peer review were to be included in the modeling for the 2005 Annual Energy Outlook. The review included cost and performance assessments of natural gas, coal, distributed generation, and fuel cell technologies along with the market barriers impacting penetration. Mr. Ditzel also provided discounted cash flow analyses of the different technologies as points of comparison.

## Gasification

- **IGCC cogeneration for utilities:** Mr. Ditzel assembled a financial and heat and mass flow model to assess the economics of IGCC cogeneration in four major US markets. The model is flexible in that fuel input, power and steam prices, and steam take-off agreements can be varied to determine whether the IGCC cogeneration unit has a positive net present value under an optimal configuration.
- **IGCC market penetration study:** Mr. Ditzel supported the Department of Energy's (DOE) National Energy Technology Laboratory (NETL) by managing a market penetration study of coal-based, Integrated Gasification Combined Cycle (IGCC). Along with managing the effort, Mr. Ditzel also served as the technology, financial analysis, and business strategy lead for the project. He reviewed and assessed technology and financial data for competitor technologies, examined economic sensitivities of cost and performance data using discounted cash-flow analysis, and provided the market analysis tools to assess the quantitative and qualitative issues surrounding IGCC's market penetration potential. The project's recommendations provided NETL and industry members with a technology road map, policy solutions, and business strategies for increasing IGCC's market penetration potential quickly and successfully.
- **IGCC cogeneration for refining applications:** For two major oil and gas firms, Mr. Ditzel assisted in evaluating IGCC cogeneration potential in refineries using distillation and coker residuals. The analysis examined whether power and steam prices would support IGCC cogeneration in relation to the opportunity cost of selling the residuals on the market. CRA found that the residual value generally would need to be less than 40% to 50% of market fuel oil prices to support building an IGCC cogeneration site.

- **Underground coal gasification feasibility analysis:** For the Cook Inlet Region Inc. (CIRI), Mr. Ditzel developed a Monte Carlo analysis of an underground coal gasification (UCG) combined cycle project in the Cook Inlet area. The analysis hinged on the relative economics of a UCG-combined cycle project versus a substitute project (the natural gas Bullet Line proposed by Enstar). Additional phases of the project reviewed the potential for CO<sub>2</sub> enhanced oil recovery and the economic benefits of incentives within the proposed Waxman-Markey bill. CRA's analysis demonstrated that the project would be economically viable, justifying to the board of CIRI the decision to spend \$10 million for an enhanced geologic study of CIRI's unmineable coal. The final deliverable was a working Monte Carlo model, a primer on coal, a primer on UCG, and an executive summary of the project delivered to the board.

## Emerging energy technologies

- **Grid energy storage market potential:** For an international energy investor, Mr. Ditzel recently led a global review of ancillary service (AS) markets to determine opportunities for grid energy storage participation. CRA profiled more than 70 countries collecting data and describing in detail current quantities and prices for ancillary services, how AS is tendered, regulatory structures, market participants, and proposed changes to the current AS market structure. In addition, we described whether markets were structured correctly to adequately compensate unconventional resources such as energy storage. Finally, we quantified factors affecting the increase/decrease of future AS requirements, such as planned intermittent renewable capacity additions, proposed pooling of markets, demand response initiatives, and possible high voltage direct current (HVDC) links with advanced power electronics.
- **Corporate growth strategy for an energy storage company:** Mr. Ditzel managed a growth strategy assignment for one of the world's largest lead-acid battery manufacturers. The assignment was to evaluate "step-change" growth strategies along different parts of the battery value chain in the automotive, grid-storage, industrial motive and network storage, and off-grid solar energy storage market segments. CRA used its attractiveness, fit, and feasibility approach to determine the best entry strategy for its client within each of the market segments. The client has used the analysis to support an acquisition of a lithium-ion company and in resurrecting its research and development group to focus on developing advanced lead-acid batteries.
- **Energy storage acquisition due diligence:** A major international cobalt mining and processing company retained CRA to assist in a sales and marketing due diligence assessment of a battery manufacturer. The targeted acquisition was part of a downstream diversification approach that CRA had developed as part of a prior multi-year growth strategy. CRA's role in the assignment was to evaluate growth prospects and market attractiveness of the acquisition target's position within the aerospace and defense, medical, automotive, and grid energy storage market segments. Mr. Ditzel led the analysis of the medical, automotive, and energy storage market segments. CRA's analysis helped enable the client to obtain the targeted company for \$25 million less than the original bid price.

- **Battery separator market assessment:** For a chemical manufacturer of lead-acid battery separators, CRA performed a global assessment of the lead-acid battery separator market to determine the merits of a potential strategic horizontal integration bet. Mr. Ditzel assisted in assessing the direction of the lead-acid separator market in light of new, potentially cheaper battery technologies displacing conventional lead-acid technology. In addition, Mr. Ditzel constructed the discounted cash flow analysis of the acquisition target under several market share scenarios to assess the target's value relative to its total enterprise value.
- **Magnetic parts acquisition due diligence:** A major international cobalt mining and processing company retained CRA to assist in a sales and marketing due diligence assessment of a German magnetic parts manufacturer. Mr. Ditzel led the revenue due diligence of the solar, wind, and electric vehicle segments where permanent magnet and conventional magnet technology are used. The work entailed assessing the target's competitive position and growth projections in each of these end markets. This analysis supported the eventual acquisition of the target by the client and the completion of the client's strategy to transform from a cobalt mining and processing company to a high-end energy products manufacturer.

### Economic and uncertainty analyses of energy and environmental policies

- **Gasoline price gouging analysis:** For an oil and gas trade association, CRA was retained to develop a report assessing the impacts of proposed price gouging legislation in Congress. Members of Congress were concerned that price gouging occurred in the wake of Hurricanes Katrina and Rita in 2005. CRA's analysis confirmed that the Federal Trade Commission's conclusions in its report "Investigation of Gasoline Price Manipulation and Post-Katrina Gasoline Price Increases" that no instances of illegal market manipulation occurred. As a contributing editor to the CRA report, Mr. Ditzel described in economic terms how removing market mechanisms that dictate consumer and producer economic surpluses in a time of supply shortages would create negative consequences economically, such as providing scarce supplies to those who least need the fuel, and societally, such as exacerbating shortages for emergency vehicles during a time of crisis.
- **Review of world carbon policies:** For an international oil and gas firm, Mr. Ditzel assisted with the economic evaluation of actual and proposed regional, national, and global carbon reduction policies. The analysis entailed forecasting how policies would affect world oil prices and future revenues. As part of the analysis, Mr. Ditzel used a combination of qualitative and quantitative tools to assess the probabilities of policy acceptance and policy impact.
- **US carbon policies analyses:** Mr. Ditzel has managed several engagements with electric utilities and a major coal company assessing the macroeconomic (e.g., gross domestic product, welfare, job losses) and microeconomic (e.g., asset valuation, retirements, new builds, technology advancement) impacts of proposed climate change policies by the US Congress. In these assignments, CRA has provided analysis and insight to the clients in forming their policy positions and in organizing their corporate strategy regarding the acquisition, divestment, and retention of assets/businesses under a range of carbon policy scenarios.

## Publications

Ditzel, Kenneth "Evaluation of the 2014 Annual Energy Outlook Early Release: Implications for U.S. LNG Exports and Natural Gas Prices," February 3, 2014.

Ditzel, Kenneth "Evaluation of the May 2013 API Report: U.S. LNG Exports: Impacts on Energy Markets and the Economy," July 19, 2013.

Ditzel, Kenneth, Plewes, Jeff, and Broxson, Bob, "Market outlook: Trade-offs between US LNG exports and domestic demand show overweighted manufacturing benefit," ICIS Chemical Business, April 19, 2013.

Ditzel, Kenneth, Plewes, Jeff, and Broxson, Bob, "US Manufacturing and LNG Exports: Economic Contributions to the US Economy and Impacts on US Natural Gas Prices," February 2013.

"A Case Study of Grid Energy Storage in NYISO," PowerGen International 2011 Conference, December 14, 2011.

Montgomery D. and Smith A. et al. "Macroeconomic Analysis of American Clean Energy and Security Act of 2009," United States Association for Energy Economics (USAEE), August 2009.

Neimeyer, M., Bloomberg, S., and Ditzel, K. "The Merits of Combining a Renewable Electricity Standard with a Greenhouse Gas Cap-and-Trade Policy: An Analysis of the American Clean Energy and Security Act of 2009 (H.R.2454)," USAEE, August 2009.

Ditzel, Kenneth (contributing author). "Potential Effects of Proposed Price Gouging Legislation on the Cost and Severity of Supply Interruptions," Journal of Competition Law and Economics, 2007 3(3): 357-397.

Aiken, R., Ditzel, K., Wilson, D., and Morra, F. "Coal-Based Integrated Gasification Combined Cycle: Market Penetration Strategies and Recommendations," August 2004.

## Presentations

Ditzel, Kenneth, "US Manufacturing and LNG Exports: Economic Contributions to the US Economy and Impacts on US Natural Gas Prices," NARUC Summer Committee Meetings, July 2013.

"Industrial Gas Demand Renaissance: Will it Happen?," Energy, Utilities, and Environment Conference, January 30, 2012.

"A Case Study of Grid Energy Storage in NYISO," presentation to the Energy Storage Association Conference, June 6–9, 2011.

"Waxman-Markey and its Implications on Gasification", presented at the 2009 Gasification Technologies Council Workshop, Kingsport, TN, June 2009.

"Gasification Myths and Realities," presented at the Gasification Technologies Council Workshop, Indianapolis, IN, June 2007.