Exhibit B

Prepared Direct Testimony of
Dr. Adam Borison
on Behalf of San Diego Unified Port District

Company: San Diego Unified Port District
Application: 17-09-005
Witness: Adam Borison
Exhibit No.: SDUPD-____

PREPARED DIRECT TESTIMONY OF
ADAM BORISON
ON BEHALF OF SAN DIEGO UNIFIED PORT DISTRICT

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

SEPTEMBER 26, 2017

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I. INTRODUCTION

My name is Adam Borison. I am an expert in economic/engineering analysis in the power industry. I am a Managing Director at Berkeley Research Group, LLC ("BRG"), a corporate advisory and expert testimony firm headquartered in Emeryville, California. My business address is 2200 Powell Street, Suite 1200, Emeryville, California. A copy of my CV is included in Appendix A.

I have been retained by the San Diego Unified Port District ("the District") to offer independent expert opinions with respect to the proposed San Diego Gas & Electric ("SDG&E") shore power rate. This testimony sets forth my expert opinions. BRG staff working at my direction and under my supervision provided assistance with the preparation of this testimony. My testimony deals primarily with the economic impact of alternative electricity rates on the region and the District, and practice elsewhere with respect to shore power rates. This complements SDG&E's testimony on alternative rates, and the District's testimony on its business and the role of shore power in that business.

The balance of this testimony is organized as follows:

- Part II describes the background and scope of my assignment;
- Part III provides a summary of the opinions offered in this testimony;
- Parts IV through IX provide details on my individual opinions; and
- Appendix A contains my CV.

II. BACKGROUND AND SCOPE

Since 2007, the District has been required by the California Air Resources Board to make primary use of on-shore electrical power or shore power for visiting cruise vessels, rather than have those vessels rely on on-board fossil-fuel-based generation.[1] Visiting vessels essentially "plug in" and metered electricity costs are passed on to the cruise lines on a per-visit basis.

Historically, the District has been served by SDG&E per Schedule A, General Service, and more recently Schedule TOU-A, General Service – Time of Use. These rates are dominated

[1] California Environmental Protection Agency, https://www.arb.ca.gov/ports/shore power/shore power.htm, accessed July 9, 2017.

by energy (per kWh) charges, rather than fixed (per customer) and demand (per kW) charges. Schedule A is no longer offered and the District will soon be ineligible for Schedule TOU-A.[2]

The District is currently eligible for Schedule AL-TOU, General Service – Time Metered and for Schedule A6-TOU – Time Metered Optional.[3] These rates are dominated by fixed and demand, rather than energy, charges. Without another rate solution, the District would receive Primary service under Schedule A6-TOU. As such, this is the relevant rate going forward and is referred to as the "New Rate" in the remainder of this testimony. The District's draft Energy Management Plan ("EMP") includes a proposed shore power discount negotiated by SDG&E and the District.[4] This discount is referred to as the "EMP Discount" in the remainder of this testimony.

In my assignment, I have been asked by the District to evaluate the impact and appropriateness the EMP Discount. I reserve the right to supplement or modify this testimony as I become aware of new facts, data, or issues. Prior to formulating any opinions, I reviewed numerous published and proprietary documents, held discussions with District and SDG&E personnel, and conducted extensive data-gathering, modeling and analysis of District shore power electricity rates.

III. SUMMARY OF OPINIONS

I offer the following opinions:

- The New Rate, without the EMP Discount, creates challenges for shore power.
- The New Rate, without the EMP Discount, will do substantial economic damage to the San Diego region.
- The New Rate, without the EMP Discount, will put District finances at additional risk.
- The EMP Discount is better suited to shore power.
- The EMP Discount is consistent with accepted practice.

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[2] California Public Utilities Commission, Agenda ID 15787: Energy Division Resolution E-4812 (Rev. 1), August 10, 2017.

[3] San Diego Gas and Electric, *Schedule AL-TOU*, January 17, 2017 and *Schedule A6-TOU*, January 17, 2017.

[4] Port of San Diego, *Energy Management Plan (port changes V3)*, June 2, 2017.

IV. THE NEW RATE CREATES CHALLENGES FOR SHORE POWER.

Most commercial and industrial ("C&I") customers use electricity fairly steadily over the course of a day or year. They have what is referred to as a medium or high "load factor" – the ratio of average consumption to peak consumption. For example, in an extensive survey of its commercial/industrial customers, one utility reported load factors ranging from 35% to 80% with the lowest being 15%.[5] Public Service Company of New Mexico defines "low load factor" as under 35%.[6]

The District is a unique electricity customer. District shore power has a low 2% load factor virtually unheard of among C&I electricity customers. Essentially, this means that District shore power requires little electricity most of the time and a great deal of electricity on occasion. Perhaps it is easiest to think of a cruise ship as a floating town with thousands of people that shows up occasionally at the District and only requires electricity for the few hours when it is docked. This is a truly distinctive situation.

Until recently, rate schedules on which the District received service were dominated by energy charges ($/kWh). However, the New Rate includes significant fixed ($/customer) and demand ($/kW-month) charges rather than energy charges. Broadly speaking, the shift from energy to fixed and demand charges reflects an effort to better represent underlying system costs in electric rates. The low load factor of District shore power makes the impact of the New Rate extreme since large fixed and demand charges are spread among relatively few kWh.

Using representative fixed, demand and energy charges, Figure 1 shows the effective electricity rate per kWh for businesses consuming the same amount of energy (kWh) but with different load factors.[7] In this representative example, an illustrative C&I customer with a more typical load factor of 35 to 80% would face an effective rate of $0.15 to $0.20/kWh, whereas an illustrative shore power customer with a load factor of 2 to 4% would face an effective rate of

[5] Colorado Springs Utilities, *White Paper #7: The Hidden Costs of Low Load Factor*, date?

[6] Public Service Company of New Mexico, *General Power Service (Low Load Factor)—Time of Use Rate*, October 1, 2016.

[7] Our analysis used a demand charge of $20/kW-month and energy charge of $0.10/kWh.

$1.00 to $2.00/kWh. Electricity costs are essentially ten times as much for the shore power customer than the more typical C&I customer.

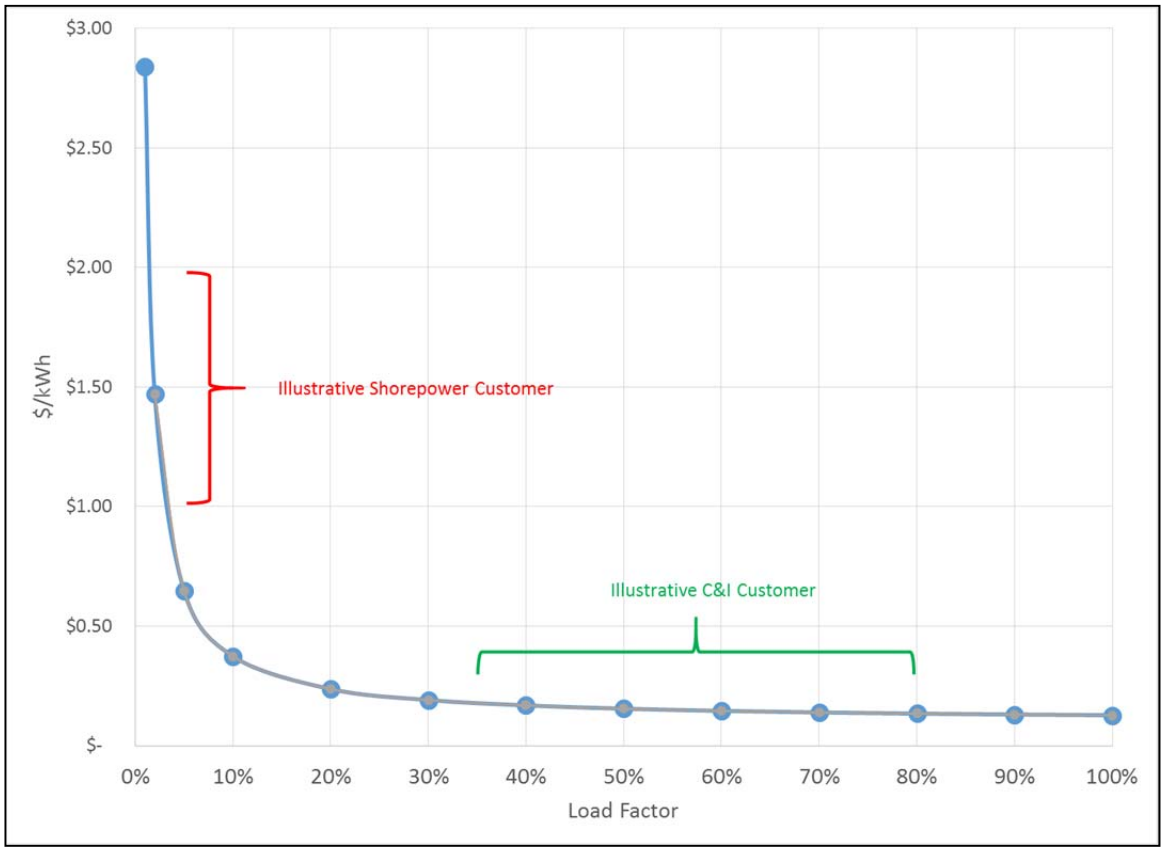

Figure 1. Effect of Load Factor on Effective Rate

Utilities and regulators across North America recognize how rates with higher fixed and demand charges such as in Schedule A6-TOU may impact customers with low load factor like ports. In its ultimately-successful application for an energy-only custom shore power rate, Nova Scotia Power stated: *"The unique circumstances of the shore power service, such as the…very low load factor, low volume of consumption and uncertainty around…consumption, make the direct applicability of the embedded cost-based framework [traditional rate making with fixed, demand and energy charges] impractical."*[8] The British Columbia Utilities Commission made a similar argument in approving BC Hydro's application for an energy-only custom shore power rate: *"…eligible vessels have low load factors…that would result in relatively high blended energy and demand rates…[and] uncertain load factors due to an uncertain frequency of shore*

[8] Nova Scotia Power, *Shore Power Rate*, July 9, 2013.

power connectivity…These uncertainties may discourage investment in shore power facilities and equipment and may ultimately discourage the use of shore power."[9] The New York City Council referred specifically to the negative impact of the *"price of shore-based electricity"* in supporting the special shore power rate provided by the New York Power Authority to the Brooklyn Cruise Terminal.[10]

V. THE NEW RATE WILL DO SUBSTANTIAL ECONOMIC DAMAGE TO THE SAN DIEGO REGION.

The cruise ship business provides significant economic benefit to the San Diego region. A recent study by Business Research and Economic Advisors concluded that the regional benefit of a home port (disembark/embark) visit is roughly $2 million, and the regional benefit of a transit visit is roughly $600,000.[11] With current vessel traffic, annual net benefits to the region are well over $100 million. The regional benefits of ports was specifically recognized by the California Public Utilities Commission ("CPUC") in approving a settlement agreement between the Port of Long Beach and Southern California Edison ("SCE") with a custom shore-power rate.[12]

Figure 2 below illustrates the impact that alternative electricity rates can have on this regional economic benefit. This is based on custom analysis of the District's cruise ship business.[13] With the historical TOU-A rate, the estimated effective electricity price is roughly $0.23/kWh and the total all-in (electricity and other services) cost per visit is $114,000. This results in an estimated 87 visits per year, producing a regional benefit of $134 million per year.

With the New Rate, the effective electricity price estimated in our analysis is more than four times higher given the District's low load factor– essentially $1.00/kWh – and the total all-in cost per visit increases by over $40,000 or almost 40%. The demand for cruise ship services is highly elastic, meaning that small increases in cruise ship costs can lead to significant reduction

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[9] British Columbia Utilities Commission, *Order Number G – 111 – 15*, June 25, 2015.

[10] The New York City Council, *Res. No. 550*, January 26, 2015.

[11] Business Research and Economic Advisors, *Economic Analysis of the San Diego Cruise Sector: 2015*, June 2016.

[12] California Public Utilities Commission, *Advice Letter 3024-E*, May 30, 2014.

[13] Our analysis used an own price elasticity of -1.0 for cruise ship visits. In common usage, the negative sign is often ignored so this is referred to as a "price elasticity of 1.0."

in cruise ship visits. Cruise ships are of course inherently mobile, and can choose not to use District services. With the New Rate, without the EMP Discount, and the increase in cost per visit, cruise ship visits are projected to drop to an estimated 54 per year. Economic benefits are reduced by almost $50 million per year or almost 40%. The comparative impact of the EMP Discount in Figure 2 is discussed below in Part VII.

Importantly, if the elasticity is somewhat higher (that is, farther from zero) than our nominal estimate, the New Rate could lead to a "death spiral" for the District. Specifically, in an effort to collect fixed or demand charges from fewer and fewer visits, the number of visits will be driven literally to zero over time. The resulting economic damage to the region would be over $100 million per year.

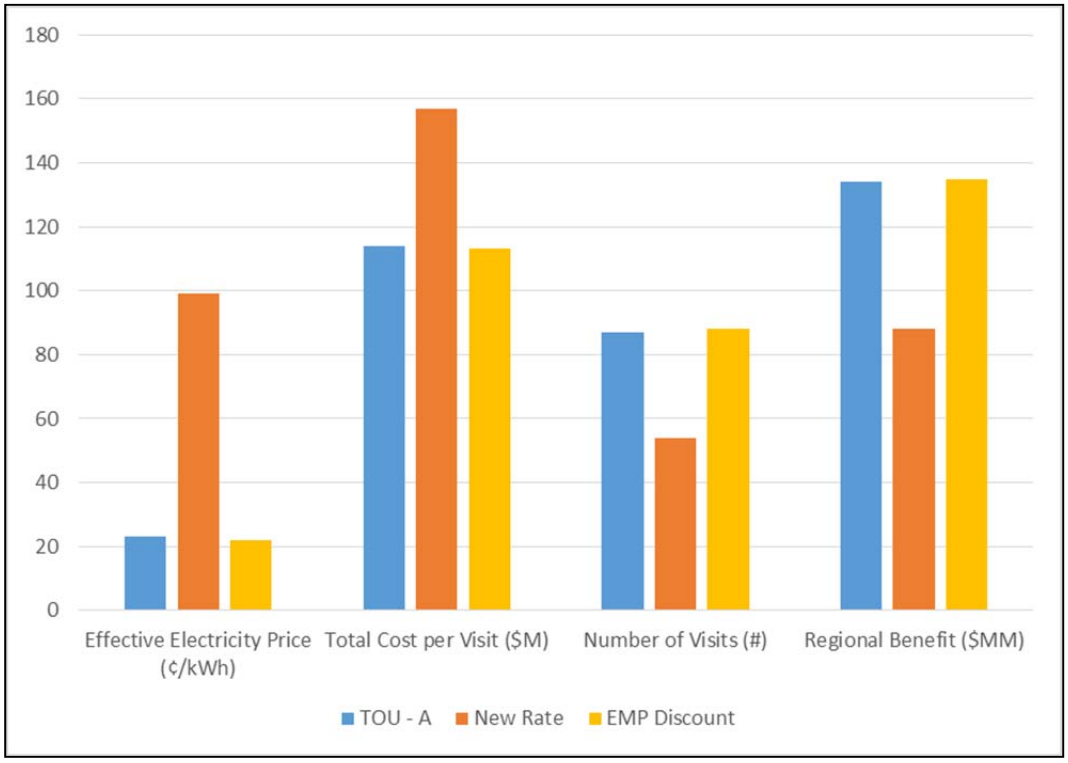

Figure 2. Impact of Alternative Rates

VI. THE NEW RATE WILL PUT DISTRICT FINANCES AT ADDITIONAL RISK.

Currently, the District passes on per kWh electricity charges to cruise ships. This approach is straightforward to administer and monitor. Importantly, no matter how many cruise ships come and go, electricity charges have no effect on the District finances.

With the New Rate, without the EMP Discount, 80% or more of the electricity cost will be fixed and demand charges rather than energy charges. In order to charge an uncertain number of cruise ship customers for electricity, the District would have to estimate the number of visits in advance, would have to develop new protocols for charging ships, and would face the risk of considerable over and under collection. In the recent past, Port visits have varied substantially. Even a small variation from the estimated number could mean an error of hundreds of thousands of dollars in a single year.

VII. THE EMP DISCOUNT IS BETTER SUITED TO SHORE POWER.

As shown in Figure 2 and discussed above, the New Rate, without the EMP Discount, is estimated to cause $50 million or more in annual economic damage to the San Diego region. Figure 2 also shows the impact of the EMP Discount. In contrast to the New Rate, without the EMP Discount, the effective electricity rate will be comparable to the Schedule TOU-A rate. With the EMP Discount, the estimated number of visits increases slightly to 88 and the regional economic benefit increases slightly to $135 million. The EMP Discount avoids the regional economic damage caused by the New Rate without the EMP Discount.

As discussed above, the New Rate, without the EMP Discount, also creates potential administrative and financial problems for the District. In contrast to the New Rate, the EMP Discount can be passed through to cruise ships consistent with current practice, avoiding the requirement for more complex administrative procedures and the risk of under and over collection.

VIII. THE EMP DISCOUNT IS CONSISTENT WITH ACCEPTED PRACTICE.

Industry observers recognize that traditional rate designs can create special challenges for certain types of customers – not just ports – who may then benefit from customized approaches. This is particularly true when there are "non-cost" social objectives such as encouraging technology development or reducing environmental impact. For example, electric vehicle (EV) charging stations serve multiple clients and have low and unpredictable load factors. Rate designs with high fixed and demand charges that must be allocated in advance appear to be ill-suited to

these circumstances, and may discourage the adoption of EV technology and reduce the associated environmental benefits. As a result, utilities, regulators and industry organizations have proposed and implemented alternatives.[14],[15]

As noted above, utilities and regulators across North America understand the special nature specifically of shore power electricity. As a result, most ports with shore power are afforded low, custom, energy-dominant rates by their local utilities, as approved by local regulators. Table 1 provides several examples.[16] As the table indicates, custom rates for shore power are common. Some rates are below $0.10/kWh; many are below $0.15/kWh, and the highest is a bit over $0.30/kWh. These rates reflect the regional economic benefits of ports and the high-elasticity of ship visits. The effective rate with the EMP Discount, estimated to be roughly $0.22/kWh, would actually at the higher end of this group.

Cruise Port	Utility	Regulator	Est. Rate in $ /kWh	Notes	Source
Brooklyn	NYPA	NA	0.12	Discount split between NYPA and NYC	www.star-revenue.com, Red Hook Shore Power System is Operational, 8/6/2016.
Halifax	Nova Scotia Power	NSURB	0.09 to 0.10	Non-firm, rate depends on voltage	Nova Scotia Utility and Review Board, Order 2016 NSUARB 2012: M07742, 12/15/2016.
Juneau	Alaska Electric Light and Power	RCA	<0.10	Non-firm, capped	BC Hydro, Shorepower Rate, 1/28/2015.
Long Beach	Southern California Edison	CPUC	0.04 to 0.33	Non-firm, 66kV, rate depends on load and season	BC Hydro, Shorepower Rate, 1/28/2015.
Los Angeles	LADWP	NA	0.12 to 0.15	Non-firm, includes estimated effect of small facilities and service charges	www.ladwp.com, Electric Rate Schedules, accessed 7/6/2017; BC Hydro, Shorepower Rate, 1/28/2015.
San Francisco	SFPUC	NA	0.16	Non-firm	BC Hydro, Shorepower Rate, 1/28/2015.
Seattle	Seattle City Light	NA	0.13 to 0.15	Includes estimated effect of small demand charge	BC Hydro, Shorepower Rate, 1/28/2015.
Vancouver	BC Power	BCUC	0.04 to 0.09	Non-firm, rate depends on load	British Columbia Utilities Commission, Order G-111-15, 6/25/2015.

Table 1. Sample Shore Power Rates

[14] www.euci.com/demand-charges-seen-as-a-barrier-to-the-growth-of-public-ev-charging-stations, accessed June 29, 2017.

[15] See, for example, NYSERDA, *Electricity Rate Tariff Options for Minimizing Direct Current Fast Charger Demand Charges*, December 2015.

[16] Individual information sources are shown in the table.

Appendix A

Appendix A

APPENDIX A

ADAM B. BORISON
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SUMMARY

Dr. Adam Borison, a Managing Director in BRG's Energy and Natural Resources Practice, is an internationally-recognized consultant, academic and entrepreneur. He is an expert in energy industry economics and management, and has had a successful twenty-five year career in the application of advanced analytic methods to strategy, valuation, operations and risk assessment in power and fuels, beginning with Ph.D. work on generation planning under uncertainty sponsored by the Electric Power Research Institute (EPRI).

Dr. Borison has led numerous engagements in investment strategy, performance improvement, corporate M&A, ERM, project planning and evaluation, product pricing and design, capital allocation, government policy and regulation, and litigation/arbitration. He has broad experience across a wide range of geographies, technologies and applications. His experience covers supply-side planning with large-scale central generation, dispersed generation, base-load generation, peaking generation, intermittent generation, nuclear, fossil, and renewables. In T&D, he has examined investments and operations, rights-of-way, substations, and transformers. On the demand side, he has looked at EE, DSM, and Smart Grid investments, as well as wholesale, retail and service pricing. Most recently, Dr. Borison has advised on pipeline gas/power business strategy in the Midwest United States, supported utility resource planning efforts involving tens of billions in dollars of generation and transmission facilities in Canada, and helped develop renewable energy policy and regulation in the Caribbean. He has also worked on dozens of capability-building engagements for clients involving data development, model transfer, results review, training and coaching. Dr. Borison has submitted expert testimony in arbitration, litigation and regulation settings both domestically and internationally.

Dr. Borison has served on the visiting faculty at Stanford University, U.C. Berkeley and the University of Cambridge, teaching courses both specifically in the energy business and generally in management methods. Most recently, he co-taught a renewable energy project development

course at Stanford. Dr. Borison is widely-known as an expert in management science and operations research, especially decision/risk analysis, real options and other forms of uncertainty analysis. He has authored several articles on the application of analytic methods in leading publications such as *The Electricity Journal*, *Public Utilities Fortnightly*, *Sloan Management Review, California Management Review* and *The Journal of Applied Corporate Finance*. Dr. Borison led the original development team for DPL, a leading decision and risk analysis software package now in its eighth release. He also co-founded Agni Energy, an India-focused bioenergy company.

EDUCATION

Ph.D.	Management Science and Engineering	Stanford University
M.P.P.	Kennedy School	Harvard University
B.S.	Molecular Biophysics and Biochemistry (summa cum laude)	Yale University

PREVIOUS POSITIONS

2011-2013	*Director,* Navigant Consulting, San Francisco, CA
2009-2011	*Vice President & Senior Vice-President,* National Economic Research Associates, San Francisco, CA
2006-2008	*Co-Founder & EVP-Strategy,* Agni Energy, Walnut Creek, CA and New Delhi, INDIA
2004-2006	*Co-Founder & CEO,* Stratelytics, Redwood City, CA
2002-2003	*Executive Vice President,* Xamplify, Berkeley, CA
1998-2001	*Principal,* PricewaterhouseCoopers, Menlo Park, CA
1984-1998	*Principal,* Applied Decision Analysis, Menlo Park, CA (acquired by PwC)

PROFESSIONAL EXPERIENCE

Strategy and Operations

Midwest US Gas and Power Expansion Strategy A large diversified energy company had a strong position in both gas and power in much of North America. Given the "shale gas revolution" and the challenges faced by incumbent players, management was becoming increasingly interested in opportunities in changing Midwest US markets where it had only a modest presence. Dr. Borison led the team that developed a strategy for this new business. We first conducted an extensive assessment of the economic and regulatory situation in specific Midwest states and locales, examining demand

growth, supply infrastructure, competition and market structure. We then provided a detailed quantitative evaluation of market size and growth. Our analysis revealed precisely where opportunities were best (and worst) by both customer type and locale. This analysis has served successfully as a guide for the company's expansion strategy.

Haiti Bioenergy Development Strategy With funding from the Inter-American Development Bank (IDB), the Government of Haiti (GoH) is developing and implementing a bioenergy strategy. The energy situation in Haiti represents both a substantial opportunity and a substantial challenge. Dr. Borison led a diverse international team to conduct an assessment of the current and potential situation in Haiti for the supply and demand of bioenergy, and to develop policy/regulatory recommendations and an action plan for implementing these policies. IDB and GoH have both received the recommendations with great enthusiasm, and are about to embark on the suggested roadmap for achieving important bioenergy goals.

Manitoba Hydro Resource Plan A critical element of the resource planning process in Manitoba is called NFAT, or Needs For and Alternatives To. This is the process whereby the utility, Manitoba Hydro, identifies and evaluates resource plans, and proposes and justifies a recommended plan and the associated electricity rates. In recent years, Manitoba Hydro has been considering a large and ambitious investment potentially involving tens of billions of dollars in hydro generation, gas generation, transmission and demand management. Manitoba Hydro understood the significance of this potential investment, and reached out for expert assistance in analysis and communication with a particularly focus on the treatment of uncertainty. As an outside expert, Dr. Borison worked closely with utility planners and executives on the development of economic, financial, technological, and regulatory scenarios, the design of alternative resource plans, the modeling and data used to evaluate these plans, the analysis conducted on those plans, and the documentation used to communicate recommendations and the rationale behind them. Our work has contributed to a well-received, state-of-the-art comprehensive and rigorous regulatory filing, and we are now supporting this work in the regulatory process.

UK Market Entry Strategy A major diversified Asian energy firm was considering entry into the UK energy market. Dr. Borison led the team to research the current and likely future situation with respect to this market, including evolving fuel and power prices as well as changing business and environmental regulations. We then developed a detailed financial model of potential UK investments, and analyzed the risk and return for various entry strategies. To the surprise of our client…who had been planning on moving forward, the analysis revealed that the proposed investment in this market was not advisable under anticipated future conditions. Our client tabled its investment plans, and subsequent events have confirmed the accuracy of our analysis.

West Coast US Utility Diversification Strategy A mid-sized West Coast electric utility was considering a major effort to expand beyond its core power business into related retail services. This interest was driven in part by the fact that similar firms were expanding into these services and technology in this area was improving rapidly. The company's "default" plan was to move strongly in this direction. We worked closely with the client to understand the needs and preferences of their

customers, their internal capabilities, and the competitive landscape. We then analyzed business plans involving a variety of service offerings. Our analysis revealed clearly that the "default" plan for expanding into this new business, despite its apparent attractiveness, involved extraordinary risks and would almost certainly lead to substantial losses. It also revealed that other plans were considerably superior – involving better return and lower risk. To quote top management, *"The analysis revealed the pros and cons of alternative plans much more clearly than before. The default plan turned out to be among the least preferred - expensive and risky. And a previously-controversial plan turned out to be preferred - most cost effective and least risky. We and our Board enthusiastically adopted this preferred plan. In hindsight, this saved our customers millions of dollars."*

East Coast US Utility Environmental Compliance Strategy A large East Coast electric utility had a sizable and diverse coal fleet, including plants of various sizes, vintages and designs. These plants were subject to a complex and changing set of environmental regulations involving air emissions of various types, solid waste, cooling water and the like. Management was faced with making expensive environmental compliance decisions in a challenging environment of declining demand, volatile fuel prices, uncertain regulation, and increasing public scrutiny. Working with a range of experts inside and outside the utility, Dr. Borison led the team that conducted a thorough analysis of the environmental compliance alternatives across the fleet including emissions control technology, fuel conversion and operational changes. We helped the utility develop a comprehensive, flexible strategy that ensured regulatory compliance, addressed key stakeholder concerns and saved money. The utility has successfully adopted this strategy.

Palo Alto Carbon Neutral Resource Plan The City of Palo Alto Utilities (CPAU) has been in operation since 1896, and is the only municipal utility in California providing electric, fiber optic, natural gas, water and wastewater services. Palo Alto has a strong commitment to environmental sustainability, and CPAU has been a leader in the adoption of energy efficiency, renewables and other sustainable resources. In March 2013, the City Council approved a further step in this direction CPAU's Carbon Neutral Electric Resource Plan. To quote the City's website, this plan "eliminates all greenhouse gas (GHG) emissions from the City's electric portfolio effective right now." Dr. Borison led the team that worked closely with CPAU in the evaluation of alternative resource plans, and in communicating the results of the evaluation to key stakeholders. For an entertaining and informative video from CPAU on carbon neutrality, see http://vimeo.com/61055308.

Valuation and Risk Management

Middle East Oil/Gas Field Valuation A mid-sized European oil and gas firm held a significant position in a sizable oil/gas field in a promising but very troubled area in the Middle East. Recently, this field had become the subject of international arbitration involving alleged breach of contract. Dr. Borison led the team that quantified the value of the field and the damages involved. This valuation was particularly challenging because of the uncertainty associated with the field, ranging from technical to economic to political. Our team as able to establish that…despite the uncertainty…the field was highly valuable because of the potential upside. This valuation work was a key part of the successful conclusion of the arbitration.

West Coast Energy Company Due Diligence Our client, one of the world's largest pension funds, was considering acquiring a significant stake in a West Coast energy company. Dr. Borison was part of the senior team that conducted economic and financial due diligence on this potential investment. He was primarily responsible for the identifying and evaluating key "going forward" risks associated with the company's business plan, and for determining the impact of these risks on the value of the investment. Our work identified several factors, including changing regulatory conditions and major necessary capital improvements, indicating that the investment was overpriced. In part due to this analysis, our client passed on this investment.

Biogas Company Due Diligence Our client, a major infrastructure investor, was considering a major investment in a leading biogas company. The company was well established in Europe, but was planning on embarking on an expansion in North America. Dr. Borison led the team that conducted an economic and technical due diligence of the investment, focusing on the planned expansion. Our analysis indicated that the company's projections were optimistic, but that the success in Europe could likely be replicated in specific North American niches. Based in part on this analysis, our client went ahead with the investment and is pleased with results to date.

Fuel Cell Business Due Diligence Our client was considering investment in an emerging fuel cell company with a promising technology but little market presence or experience. Dr. Borison led the team that conducted a market due diligence of the business to determine if revenue projections were realistic, and what impact reasonable revenue projections would have on the company valuation. Our analysis revealed that the company faced considerable market hurdles and was unlikely to overcome those hurdles. Recent events have confirmed this assessment, and the company has begun the process of winding down.

West Coast Utility Generation Risk Assessment Our client was a major west coast utility responsible for meeting the gas and electricity needs of a large and varied service territory. The company had been meeting these responsibilities successfully, but recognized that the landscape was changing in difficult ways. It was becoming more difficult to identify and obtain the resources needed to meet these needs, and the planning environment was becoming increasingly subject to a variety of unfamiliar business, regulatory and technological risks. Our client was concerned that this might mean that its traditional approach to managing its risks and responsibilities might not be adequate, particularly in the face of extreme…but not impossible…events. Under Dr. Borison's leadership, the team identified these risks, quantified their impact and then developed innovative and flexible resource strategies for avoiding or mitigating them. The company incorporated key recommendations into its strategy and risk management process. This proved important within a few years when the utility was faced with several challenging events, and needed to respond quickly.

EPRI Transmission Risk Management The mission of EPRI is to help utilities address emerging economic and technological issues facing the utility industry. In this EPRI study, Dr. Borison co-led the team that examined the long-term risks associated with transmission development and described tools that could help manage these risks. The study was documented in a report designed to serve as a "primer" for EPRI members.

SELECTED PUBLICATIONS

"The Electric Power Industry: Lessons from Silicon Valley," *BRG White Paper*, December 2015.

"Electric Power Resource Planning Under Uncertainty: Critical Review and Best Practices," *BRG White Paper*, November 2014.

"Lessons from the Gulf Oil Spill: Black Swan or Black Sheep?" (& Gregory Hamm), *Risk Management Magazine*, April 2011.

"Biocoal Options: A New Future for Small Coal-Fired Plants," (& Gregory Hamm & Philip Narodick), *Public Utilities Fortnightly*, December 2010.

"How To Manage Risk (After Risk Management Has Failed)" (& Gregory Hamm), *Sloan Management Review*, Fall 2010.

"Prediction Markets: A New Tool for Strategic Decision Making," (& Gregory Hamm), *California Management Review*, Summer 2010.

"The Rush to Coal: Is the Analysis Complete?" (& Gregory Hamm), *The Electricity Journal*, January 2008.

"Dirty, Old Coal Plants: Silk Purse or Sow's Ear?" (& Gregory Hamm), *The Electricity Journal*, April 2007.

"Forecasting Long-Run Electricity Prices," (& Gregory Hamm), *The Electricity Journal*, Aug-Sep 2006.

"Better Power Contracts: Using Flexibility to Increase Value," (& Gregory Hamm), *The Electricity Journal*, Nov-Dec 2005.

"Real Options: Where Are the Emperor's Clothes?," *Journal of Applied Corporate Finance*, Spring 2005.

"Real Options: State of the Practice" (& Alex Triantis), Journal of Applied Corporate Finance, Sum 2001.

"The Future of Electric Power" (& Gregory Hamm), Energy Decisions, Sep 2001.

"Risk-Based Decision-Making: Integrating Risk Management into Business Planning" (& D. Brooks) in R.V. Kolluru (ed.) et al., Risk Assessment and Management Handbook for Environmental, Health and Safety Professionals, New York, McGraw-Hill, 1995.

"Oglethorpe Power Corporation Decides About Investing in a Major Transmission System," Interfaces, Mar-Apr 1995.

SELECTED PRESENTATIONS

"21st Century IRP" presented at Western Energy Institute IRP Forum, April 24, 2017.

"Uncertainty in IRP" presented at Indiana Utility Regulatory Commission Contemporary Issues Conference, March 22, 2016.

"Sustainable Bioenergy for Haiti: Assessment and Action Plan" (& Kathryn Leininger) presented at UNDP program on Bioenergy, Clean Cookstoves and Sustainable Development, March 13, 2014.

"Biomass without Borders: Lessons from International Ventures" (& Liliana Diaz) presented at Biomass 2012, Washington, DC, July 10, 2012.

"Managing Energy Risk: Going Beyond the Market" presented at Energy Risk USA, in Houston, TX, May 19, 2009.

"Clean Energy: An In-Depth No-Hype Introduction" presented in San Diego, Cambridge UK, Washington DC, and Singapore.

"Green Business Strategy," presented at Rotterdam School of Management, November 2007.

"Valuing Energy Companies as a Portfolio of Real Options" and "Real Option Valuation: A Practitioner's Overview" presented at various conferences, 1996-2001.

SELECTED TESTIMONY

Written testimony prepared on behalf of Portland General Electric, PGE 2016 Integrated Resource Plan proceeding before the Oregon Public Utilities Commission, 2016.

Written and oral testimony submitted on behalf of Manitoba Hydro, "Need for and Alternatives To" proceeding before the Manitoba Public Utilities Board, 2014.

Written testimony prepared on behalf of Warburg Pincus, Frankel Offshore Energy v. Warburg Pincus proceeding before Texas District Court, 2010.

Written testimony prepared on behalf of DNO International ASA, Galbraith v. DNO proceeding before the London Court of International Arbitration, 2010.

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