BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In Re: Petition for Determination of Need of Hines Unit 2 Power Plant.	))))	DOCKET NO. 00164-EI Submitted for Filing: September 25, 2000

REBUTTAL TESTIMONY
OF
CHARLES J. CICCHETTI, Ph.D.

PACIFIC ECONOMICS GROUP

DOCKET NO. 00164-EI

On behalf of

FLORIDA POWER CORPORATION

Robert A. Glenn
Director, Regulatory Counsel Group
FLORIDA POWER CORPORATION
P.O. BOX 14042
St. Petersburg, Florida 33733
Telephone: (727) 820-5184
Facsimile: (727)820-5519

Gary Sasso
Florida Bar No. 622575
James Michael Walls
Florida Bar No. 706272
Jill H. Bowman
Florida Bar No. 057304
(727) 820-5519
CARLTON, FIELDS, WARD,
EMMANUEL, SMITH & CUTLER P.A.
Post Office Box 2861
St. Petersburg, Florida 33731
Telephone: (727) 821-7000
Facsimile: (727) 821-3768

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Charles J. Cicchetti. My address is Pacific Economics Group, 201 South Lake Street, Suite 400, Pasadena, California 91101.

Q. WHAT IS YOUR POSITION WITH PACIFIC ECONOMICS GROUP?

A. I am a Co-Founding Member of Pacific Economics Group.

Q. WHAT ARE YOUR DUTIES AS A MEMBER OF PACIFIC ECONOMICS GROUP?

A. I actively consult with clients on price, costs, environmental, natural gas and electricity market issues and antitrust policies, particularly as those policies relate to regulated industries.

Q. DO YOU HOLD ANY OTHER POSITIONS?

A. I am the Jeffrey J. Miller Professor of Government. Business and the Economy at the University of Southern California.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I attended the United States Air Force Academy and I received a B.A. degree in Economics from Colorado College in 1965 and a Ph.D. degree in Economics from Rutgers University in 1969. From 1969 to 1972 I engaged in post-doctoral research at Resources for the Future.

Q. PLEASE SUMMARIZE YOUR PROFESSIONAL EXPERIENCE.

A. I served as chief economist for the Environmental Defense Fund and was a faculty member at the University of Wisconsin from 1972 to 1985, ultimately earning the title of Professor of Economics and Environmental Studies. From 1975 through 1976 I served as the Director of the Wisconsin Energy Office and as Special Energy Counselor for the Governor. In 1977 I was appointed by the Governor as Chairman of the Public Service Commission of Wisconsin and held that position until 1979 and served as a Commissioner until 1980. In 1980 I co-founded the Madison Consulting Group, which was sold to Marsh & McLennan Companies in 1984. In 1984 I was named Senior Vice President of National Economic Research Associates and held that position until 1987. From 1987 until 1990 I served as Deputy Director of the Energy and Environmental Policy Center at the John F. Kennedy School of Government at Harvard University and from 1988 to 1992 I was a Managing Director and ultimately Co-Chairman of the economic and management consulting firm, Putnam, Hayes & Bartlett, Inc. In 1992 I formed Arthur Andersen Economic Consulting, a division of Arthur Andersen, LLP. In 1996, I left Arthur Andersen to co-found Pacific Economics Group.

Q. HAVE YOU PUBLISHED ANY PAPERS OR ARTICLES?

A. Yes. I have published a number of articles on energy and environmental issues, public utility regulation, competition and antitrust. A complete listing of my publications is included in Exhibit____(CJC-1).

Q. HAVE YOU EVER GIVEN EXPERT TESTIMONY IN A COURT OR ADMINSTRATIVE PROCEEDING?

A. Yes. A list of the proceedings in which I have provided expert testimony since 1980 is also included in Exhibit____(CJC –1).

Q. WHO RETAINED YOU FOR THIS TESTIMONY?

A. Florida Power Corporation (FPC) has retained me.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked to analyze the testimony and recommendations made by Florida Public Service Commission (FPSC or Commission) staff economist Billy R. Dickens. I will address Mr. Dickens' discussion of the proposed Hines 2 generating station and whether it should be included in FPC's rate base for surveillance purposes upon its commercial in-service date. I will also discuss his ideas concerning a prudence review every five years based on then current market conditions to determine whether FPC should be allowed continued rate base tariff recovery of the plant. In my testimony, I explain why Mr. Dickens' conclusions and asymmetrical recommendations are contrary to both regulatory principles and competitive markets, and fail to achieve best cost. Therefore, I conclude that his proposals should not be followed by the FPSC.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I review briefly the essential facts underlying FPC's proposal with regard to Hines 2 and Mr. Dickens' related conclusions and policy recommendations. Second, I discuss the applicable economic and regulatory principles that lead me to conclude that the FPSC should not follow Mr. Dickens' recommendation. Finally, I summarize my conclusions.

Q. WHAT IS YOUR UNDERSTANDING OF WHAT FPC WANTS TO DO?

A. The Hines 2 power plant will be a state-of-the-art, natural gas-fired, combined cycle power plant with a nominal rating of 530 MW. FPC proposes to build the plant at the Hines Energy Complex (HEC) site in Polk County, Florida. The plant would be operational by November 30, 2003. The plant will have dual fuel capability, using distillate oil as a backup fuel source. The plant will be highly energy efficient, with a projected average heat rate of 6,975 Btu/kWh. The estimated total direct cost for building Hines 2 is $197.5 million. Estimated transmission and interconnection costs are $5.6 million. It is my understanding that FPC is not making any cost recovery proposals at this time.

Q. **DOES MR. DICKENS OPPOSE FPC'S PROPOSAL TO CONSTRUCT THE HINES 2 PLANT?**

A. No. The bulk of Mr. Dickens' testimony focuses on, however, the supposed "advent of electric generation restructuring" and the potential risks he perceives for consumers related to placing Hines 2 in rate base. Specifically, Mr. Dickens is concerned that if customers are committed to long-term assets, they might miss out on more efficient alternatives in the future. He asserts "Inferior choices typically result in sub-optimal outcomes and unnecessary burdens for ratepayers." He apparently would find it advantageous to make shorter-term decisions and thereby avoid long-term risks associated with "markets turning south."

I find his conclusions to be at odds with the very real possibility that market values can both "rise and fall." Accordingly, Mr. Dickens focuses falsely on outcomes where technology, fuel choice, location, etc. might cause a generating station to be worth less in the future than it was projected to be worth at that future point in time. He fails to consider, either in his example or his logic, that some generating stations may, in the future, be worth more than their original cost less depreciation values.

I do not question that economic and rate base depreciation rates may not match up consistently. I do, however, question the perception that any differences are asymmetric, and always favor lower future market values relative to their underlying original cost less depreciation value.

Q. DOES MR. DICKENS ALLEGE THAT HINES 2 IS AN INFERIOR CHOICE?

A. No. He does not seem to quarrel with FPC's characterization of Hines 2 as a state-of-the-art generating plant. Thus, he seems to agree that this generating station currently is <u>not</u> an inferior choice. He does, however, identify what he perceives to be three risks associated with according Hines 2 traditional full regulatory treatment (i.e., effectively placing Hines 2 in rate base). These are: (1) cost overruns or failure to meet in-service dates; (2) plant under-performance; and (3) risks associated with building a long-lived asset, as well as having fuel costs exceed forecast scenarios.

Mr. Dickens then admits that the first two risks are either minimal and/or that incentives are readily available to protect consumers from these risks. It is the third risk that seems to trouble him the most. In essence, Mr. Dickens is concerned that in the future with new technology and/or competition, the Hines 2 plant might not be the least cost alternative for customers and that if allowed in rate base, the customers will be "liable" for these costs. He does not use the term "stranded costs". Nevertheless, Mr. Dickens seems to worry that the Hines 2 unit might have stranded costs in the future. This would mean that the Hines 2 unit's future economics or market value might turn out to be lower than its original cost less depreciation (i.e., rate base). Mr. Dickens is, therefore, worried that if Hines 2 is allowed in rate base, retail customers would be "liable" for these costs.

Q. DO YOU CONCUR WITH MR. DICKENS' CONCLUSIONS ASSOCIATED WITH FUTURE MARKET RISK?

A. No. Long-term assets can be good for customers. No one can predict with absolute certainty what the future will hold for fuel prices. Not long ago, national decisions were made based on oil price projections that exceeded $100 per barrel. Those high prices never materialized. Instead, world oil prices have generally fluctuated in the $10 to $40 per barrel range. Indeed, oil and natural gas prices over the last twelve months have experienced swings that match this twenty-year range in energy prices

Mr. Dickens admirably would like to protect consumers from the risk of long-run decisions that with perfect "20/20" hindsight turn out to be more costly that they needed to be. The problem with this approach is that it is equally necessary to guard against price movements that swing in the opposite direction. Competitive markets often provide a combination of symmetric hedges and levels of return commensurate with any inherently unavoidable risks. Regulation performs a similar task by combining integrated resource planning and contemporaneous or current prudence reviews.

Q. MR. DICKENS ASSERTS THAT LONG TERM FIXED-PRICE CONTRACTS RETARD MARKET EFFICIENCY. DO YOU AGREE WITH HIM?

A. No. Mr. Dickens' entire premise appears to be based on electric industry restructuring and the advent of a competitive market. Such a market does not yet exist in Florida. Thus, I find Mr. Dickens' suggestion that granting Hines 2 rate base treatment would retard competition is inapplicable in Florida.

Q. DOES MR. DICKENS RECOMMEND THAT THE COMMISSION NOT ALLOW FPC TO PLACE HINES 2 IN RATE BASE?

A. No. Even though Mr. Dickens advocates short-run contracts because he thinks that such contracts minimize the risks associated with future changes in technology and fuel costs, as I understand Mr. Dickens' proposal, he would have FPC build Hines 2. He would then permit FPC to recover the "prudent costs" of Hines 2 in rate base or regulated tariffs for about five years. After this relatively brief cost recovery, Mr. Dickens would require FPC to show that Hines 2 and any related fuel cost, technology, etc. is still the prudent choice. If the answer remains "yes", he would recommend that the Commission reauthorize the "still prudent" cost recovery.

However, if the future brings forth less costly alternatives, he would recommend a "buyers' market-out clause" and refuse to permit FPC to recover the annual revenue requirements for Hines 2 based on traditional cost-of-service principals (i.e., the original cost less depreciation regulatory standard).

Apparently, over a 35 to 40 year plant life, Mr. Dickens would repeat these future "prudence" reviews every five years. If the plant fails to sustain its original approval, Mr. Dickens would disallow full cost recovery in the future. Presumably, if the opposite conditions occur and the future market value of Hines 2 exceeds its cost-of-service value, these "savings" would asymmetrically flow to ratepayers.

Q. DO YOU AGREE WITH MR. DICKENS SUGGESTION THAT A "BUYER-OUT" CLAUSE MIGHT BE APPROPRIATE IF THE FPSC WERE TO ALLOW HINES 2 INTO RATE BASE?

A. No. Mr. Dickens, as I have already explained, ignores the fact that markets go up and markets go down. Mr. Dickens proposes a long-term contract where only the buyer has the option to opt out. One-way market-out clauses only occur when one party has vastly unequal bargaining power. For example, in the early 1970s, natural gas supply was critically short. Producers had a great advantage over pipelines desperate to secure long-term natural gas supplies. In those situations, the producers were able to insert market-out clauses where they could effectively demand higher gas prices for their product when and if natural gas was deregulated. Pipelines had little option but to accept these asymmetric contract clauses. Fundamentally, such symmetry was only available in contracts for the very highest priced natural gas. In Florida, demand is growing and new generation must be built to meet this need. Mr. Dickens suggests a long-term lease where the buyer gets to decide at a specific point whether the deal originally signed is still a good one. This is totally one-sided and asymmetric.

Merchant plant owners that possess a needed commodity that is in short supply are not likely to accept such conditions. Consequently, it is not reasonable to foist such an unacceptable contract clause upon the incumbent utility. Florida remains a regulated cost-of-service jurisdiction. It is imperative that the FPSC keep this clearly in sight as they balance consumer and shareholder interests. My advice is that deregulation, if it comes, should not ignore the relationship between supply, demand, and entry. In the meantime, consumers' needs must be met in a fair and balanced manner. Hines 2, built under cost-of-service regulation, would do just that.

Neither competitive markets nor regulation typically allow one-sided (i.e.. buyer-only) market-out rights. If they did, the price paid to willing sellers that might freely accept such risks would be very costly.

Consider an automobile lease. The car buyer and seller agree on a purchase price, a turn in or residual value, and finance costs (i.e., interest rate and term of the lease). No automobiles with which I am familiar are leased without stipulating a residual value. The residual value, once agreed to by the lessor and lessee, cannot be changed unilaterally be either party. It is not possible to imagine an automobile dealer accepting a lease contract that allowed the lessee to unilaterally reset the residual value to reflect the car's then current market value at the end of the lease, allowing the lessee to capture all the potential upside of changing market conditions.

Similarly no bank would ever lend money to a home purchaser if the purchaser demanded the right to continue living in the home while unilaterally reducing the amount of the loan if home values drop at some point in the future. Similarly, no one would sell a house to a buyer that could demand a refund if the buyer's requirements change and a house with different characteristics turns out to be better in the future. Mr. Dickens' proposal would result in such treatment for Hines 2.

Q. ARE THERE ANY CONDITIONS UNDER WHICH A MERCHANT PLANT OWNER MIGHT ACCEPT A ONE-WAY MARKET OUT CLAUSE IN FAVOR OF THE BUYER IN FLORIDA?

A. In a marketplace with supply shortages, a generating plant owner not obligated to serve might accept such a one-sided contract clause, but only if the owner is well compensated for the additional one-sided risk such a contract clause engenders. Such additional compensation would mean that prices to consumers would be higher than they would otherwise be under traditional cost-of-service regulation because the required rate of return necessary to compensate for the increased risk is higher. There is no reason a regulated utility should also not receive a higher rate of return to compensate it for this increased risk if it were forced to accept such an asymmetrical contract clause. This would serve to increase unnecessarily the price paid by customers.

Q. SHOULD THE COMMISSION ACCEPT MR. DICKENS' RECOMMENDATION TO ALLOW HINES 2 IN RATE BASE WITH PERIODIC PRUDENCE REVIEWS?

A. No. First, Mr. Dickens' recommendation effectively to reopen a prudence review every five years or so is out of sync with his testimony, which primarily touts the consumer benefits associated with short-term contracts for power. Mr. Dickens seems to assume that Florida is moving towards a more competitive environment for generation. This issue is far from decided. And given the troubles currently roiling the California retail market, I suspect that legislators in Florida and elsewhere will be extremely cautious in moving forward to deregulate markets that are functioning well and protecting consumers from the vicious price spikes that were present in San Diego this past summer. At the very least, Florida would benefit by taking the time to determine what went wrong in California, a state with similar location issues and needs, transmission and capacity needs and how to remedy the problems.

Second, Mr. Dickens assumes that electricity prices will fall with both competition and advances in technology. Thus, he is opposed to putting long-term assets, such as Hines 2, into rate base because he believes this would foreclose the opportunity for consumers to take advantage of these lower prices and new technology. Prices respond to supply and demand. The only relative certainty is that excess supply, not tight markets, will push prices to fall. Prices go up and prices go down in competitive markets. Inexplicably, Mr. Dickens seems willing to let consumers bear the risks of this volatility in competitive markets, but not under the less volatile traditional regulatory system.

Third, Mr. Dickens also assumes that plants built today will be less economic than plants built in the future. This is not necessarily true. As plants are depreciated throughout their useful life, they can become extremely valuable assets to consumers. For example, consider the value of older, depreciated coal-fired base and intermediate plants now that natural gas prices are heading north of $5/mmcf. Mr. Dickens' proposal would trade this solid value for the speculative upside potential associated with new technology and competition. Worse, he would appear to support asymmetry in which consumers would always win and shareholders would always lose.

Regulation believes in both the interests of consumers and utilities. The principle doctrine of the regulatory concept is achieving a "just and reasonable" or "fair and balanced" outcome. If regulation veers too much in one direction, the result is almost always higher future costs and prices and/or poor service quality.

Markets perform a similar balancing between producers (supply) and consumers (demand). No competitive market would or could give one group the power to dominate the other for any sustained period. Regardless of the conceptual or organizational framework, the policy Mr. Dickens proposes is not economically efficient, fair or reasonable.

Q. IS IT EVEN NECESSARY FOR ANY BUSINESS, REGULATED OR NOT, TO HOLD AND USE AN ASSET IN THE FACE OF A BETTER, MORE PRODUCTIVE/PROFITABLE TECHNOLOGY?

A. No. Competitive business, as the saying goes, "knows when to fold them and knows when to hold them." I include a lecture in the finance course I teach at the University of Southern California that explains precisely how businesses make this decision with, and without, technological and other changes (e.g., load factors, factor input price changes, location, inflation, efficiency, etc.).

Regulation uses integrated resource planning, demand side management, and utility diversity/coordination to consider very much the identical set of things. Hines 2 would not, as Mr. Dickens avers, simply lock Florida into what now would be a state-of-the-art, efficient combined cycle natural gas fired unit. If other technologies become available, Hines 2 would slip down in the supply stack. But it would still be used under either regulation or competition.

Given current technological advantages, competitive producers would recover much of their investment on the front end. Traditional original cost straight-line depreciation recovers more of the plant's return "on" and "of" investment in the early years, while establishing a fixed annual charge, or "of" component (i.e., depreciation expense) equal to the plant's original cost divided by the plant's expected life. Other methods of cost recovery such as sinking fund depreciation can also be used by regulators if they think it is more appropriate to recover a plant's investment sooner.

Q. ARE THERE ANY OTHER REASONS WHY YOU DISAGREE WITH MR. DICKENS' RECOMMENDATION TO REVISIT PERIODICALLY, BASED ON THEN CURRENT MARKET CONDITIONS, THE PRUDENCE OF INCLUDING HINES 2 IN RATE BASE?

A. Yes. Mr. Dickens is proposing an *ex post* prudence review. There is absolutely no regulatory precedent for such an approach. Rates should reflect the prudent investment standard and the regulatory compact:

1. Risk should be consistent with rewards; and
2. "Best-cost" generation policies should be pursued.

Under the prudent investment standard, a regulated firm is entitled to recover from its ratepayers costs that the firm prudently incurs to fulfill its service obligations to those customers. In evaluating whether an expense should be reflected in rates, the prudent investment standard requires determining whether a "reasonable person" would have pursued the same course of action, considering the information known or reasonably knowable at the time the decision was made, and taking into account the prevailing industry opinions and practices.

It is possible that, in retrospect, some decision other than the one actually made by the regulated firm would have produced a more (or less) favorable outcome. Nonetheless, the possibility that a different decision might have produced a more (or less) favorable outcome should not be the test of whether the regulated firm will be allowed to recover less (or more) than the costs actually expended for its customers. To require a regulated firm to suffer the consequences of reasonable decisions that turn out, *ex post,* to be less (more) advantageous to consumers violates the bargain inherent in the conventional regulatory system. Under this regulatory system, regulated firms realize neither the "upside" gain nor the "downside" loss for decisions that turn out to be more (or less) beneficial than anticipated. From an economic or consumer cost viewpoint, any one sided, asymmetrical regulation where consumers always win would increase the underlying risk to investors and the cost of capital required by investors, to the direct detriment of consumers.

This does not mean that all decisions made by a utility manager are acceptable. Rather, utility managers should be held responsible for their decisions. Both fairness to consumers and sound economic incentives for regulated firms require that the cost consequences of an imprudent decision not be reflected in rates. Conversely, fairness to investors and the desirability to consumers for the utility to obtain capital at a reasonable cost imply that the costs associated with a decision that "made sense" at the time it was made, considering the prevailing conditions at the time the decision was made, should not result in financial penalties to shareholders. This is true even where hindsight demonstrates that a different decision or course of conduct would have resulted in a better outcome for consumers. To do otherwise would violate the regulatory compact and would lead to uneconomic decisions.

Included within the regulatory compact is the principle that regulators do not use hindsight to judge outcomes of past prudent decisions made by utility managers. This principle protects both customers and shareholders.

The example of past problems that Mr. Dickens discusses is the prices some utilities paid under the Public Utility Regulatory Policies Act (PURPA). I find this example to be a noteworthy exception. In my opinion, the fault does not lie with failed regulation. I place the blame on legislation that went too far and required "buyers" to purchase qualifying energy (QF power) regardless of the underlying economics of the transaction. Neither competitive markets nor regulation as I know it would have condoned this outcome, tied as it was to flawed legislation, not regulation, gone awry.

Q. WHAT DO YOU MEAN BY "BEST COST" GENERATION POLICIES?

A. Under the regulatory compact, regulated firms like FPC have a regulatory, economic, and ethical responsibility to generate electricity in a way that best suits the interests of their customers. This implies that their forecast policies should adhere to a "best cost" rather than a "least cost" approach. Best cost planning means that sometimes it is necessary to pay more to lock in some factors (e.g., a long-term fuel supply) in order to avoid the risk associated with shortages and/or higher future spot prices. Of course, businesses, families, and regulators do this. When they do not do this, they often learn the lesson that "markets go up as well as down." Hines 2 will represent the state-of-the-art in generation plants when it is constructed. As is clear from the Need Petition filed by FPC, the planned capacity is needed in Florida. The decision to build Hines 2 is certainly the best-cost solution that exists for FPC and its customers at this time.

Q. WHO SHOULD BEAR THE RISK THAT, IN THE FUTURE, A LOWER PRICED POWER SUPPLY MIGHT BECOME AVAILABLE?

A. Any risk that at some unspecified time in the future there might be a more economical power source should be borne by those who now receive the benefits of reliable, low-priced sources of supply. The direct and major beneficiaries are the customers. Therefore, it is appropriate that customers bear a portion of the slim potential risk that this plant might be more costly than newer technology at some point in the future. Mr. Dickens' recommendation raises the specter that the FPSC would deny

FPC that right to recover costs that were prudent when made. This would impose the downside risks on FPC while keeping the upside gains for customers. This asymmetrical risk allocation would violate the economic principle that risk and reward should be symmetrical.

Q. WOULD YOU SUMMARIZE YOUR CONCLUSIONS?

A. Yes. Mr. Dickens performs a very useful service by reminding everyone that regulation needs to protect consumers. However, he goes too far in this direction when he proposes to abandon the regulatory prudence and "just and reasonable" principles. His approach is one sided and asymmetric. If consumers paid the price necessary to compensate investors for these assurances and proposed rights, the prices consumers would pay would be much more expensive than traditional cost-of-service prices.

FPC has demonstrated the need for additional capacity and relied upon traditional integrated least cost planning to demonstrate this need. The objectives are well known. The current process is built on making the "best" decisions while incorporating relative certainty and minimal risk. Mr. Dickens seems to believe that this well-honed balance can be nudged in one direction, making the outcome take on some characteristics that he generally believes a competitive market would have. However, Mr. Dickens' regulatory concepts and ideas are in direct conflict with widely accepted regulatory principles and practices, and therefore, should be rejected. Further, Mr. Dickens' notion of competitive markets ignores the important symmetry that exists in such markets (e.g., prices go up and down). He bases much of what he proposes on an unreasonable asymmetric view of competition in which the market always improves on the past. He is wrong about competitive market performance; and, therefore these ideas should be given short shrift.

Mr. Dickens also overlooks the fact that even if new future technology is less expensive than Hines 2, the Hines 2 plant will simply move down a notch in the supply stack. It will still be used and useful to Florida consumers. Further, as Hines 2 is depreciated under traditional cost-of-service regulatory principles, its revenue requirement will be reduced, likely offsetting future modest technological advances. Mr. Dickens also overlooks this fact.

Finally, Mr. Dickens may be suggesting a mix of these two systems: regulation and competition. Some attempts to do so are in vogue. Nevertheless, there are numerous examples in which such mongrelized experiments go bad and consumers lose. The FPSC should stay the course and not be tempted to follow such an ill-fated path.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

Exhibit CJC-1

December 1999

CHARLES J. CICCHETTI

PROFESSIONAL EXPERIENCE

1998-present	Jeffrey J. Miller Professor in Government, Business, and the Economy, University of Southern California;
1996-present	Co-Founder, Pacific Economics Group;
1990-1997	Adjunct Professor of Economics, University of Southern California;
1992-1996	Managing Director, Arthur Andersen Economic Consulting;
1991-1992	Co-Chairman, Putnam, Hayes & Bartlett, Inc.;
1988-1991	Managing Director, Putnam, Hayes & Bartlett, Inc.;
1987-1990	Deputy Director, Energy and Environmental Policy Center, John F. Kennedy School of Government, Harvard University;
1984-1987	Senior Vice President, National Economic Research Associates;
1980-1984	Co-Founder and Partner, Madison Consulting Group;
1979-1986	Professor of Economics and Environmental Studies, University of Wisconsin-Madison;
1977-1979	Chairman, Public Service Commission of Wisconsin, Appointed by Governor Patrick J. Lucey (member until 1980);
1975-1976	Director, Wisconsin Energy Office and Special Energy Counselor for Governor Patrick J. Lucey, State of Wisconsin;
1974-1979	Associate Professor, Economics and Environmental Studies, University of Wisconsin-Madison;
1972-1974	Visiting Associate Professor, Economics and Environmental Studies, University of Wisconsin-Madison;
1972	Associate Lecturer, School of Natural Resources of the University of Michigan;
1969-1972	Resources for the Future, Washington, D.C.;
1969	Ph.D., Economics, Rutgers University;
1968-1969	Instructor, Rutgers University;
1965	B.A., Economics, Colorado College;
1961-1964	Attended United States Air Force Academy.

EDITORIAL BOARDS

Journal of Environmental Economics and Management;
Energy Systems and Policy, Former Member;
Land Economics, Former Editor.

ADVISORY BOARDS

Alliance for Energy Security;
Association of Environmental and Resource Economics, Executive Committee, Former Member;
Association of Environmental and Resource Economics, Contributing Members Program Committee;
Center for Public Policy Advisory Committee, Former Member;
Department of Energy, Fuel Oil Marketing Advisory Committee, Former Member;
Graduate School of Public Policy at the University of California, Berkeley;
Institute for the Study of Regulation;
National Association of Regulatory Utility Commissioners, Executive Committee and Chairman of the Ad Hoc Committee on the National Energy Act, Former Member;
Public Interest Economics Center, Board of Directors, Former Member;
Rutgers University, Energy Research Advisory Board;
U.S. Chamber of Commerce Energy and Natural Resources Committee.

PUBLICATIONS

Books and Monographs

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The Application of U.S. Regulatory Techniques to Spain's Electric Power Industry, with Irwin M. Stelzer, prepared for Unidad Electrica, S.A., Cambridge: Energy and Environmental Policy Center, Harvard University, March 1988.

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Exhibit CJC-1

December 1999

CHARLES J. CICCHETTI

PUBLICATIONS

Journal Articles

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"Mergers and the Convergence of the Electric and Natural Gas Industries," Natural Gas, March 1997.

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"Measuring the Effects of Natural Resource Damage and Environmental Stigma on Property Value," Environmental Law, September/October, 1995.

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December 1999

CHARLES J. CICCHETTI

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