

STATE OF IOWA
DEPARTMENT OF COMMERCE
BEFORE THE IOWA UTILITIES BOARD

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IN RE: INTERSTATE POWER AND LIGHT COMPANY	DOCKET NO. GCU-07-1 COPY
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PUBLIC

INITIAL BRIEF OF THE OFFICE OF CONSUMER ADVOCATE

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February 11, 2008

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TABLE OF CONTENTS

TABLE OF CONTENTS	i
TABLE OF AUTHORITIES.....	iii
I. INTRODUCTION.....	1
II. IPL HAS THE BURDEN OF PROOF IN ALL RESPECTS IN THIS PROCEEDING.....	1
III. IPL HAS WHOLLY FAILED FUNDAMENTAL ASPECTS OF THE IOWA CODE CHAPTER 476A DECISIONAL CRITERIA.....	2
IV. IPL DOES NOT KNOW WHAT THE CURRENT COST FOR SGS UNIT 4 IS, AND PROSPECTIVELY ESTIMATES THE MOST ECONOMICAL AND LOWEST COST FOR SGS UNIT 4 HAS AN IN-SERVICE DATE OF 2016, NOT AN IN-SERVICE DATE OF 2013 AS IPL PROPOSES IN THIS PROCEEDING.....	2
V. IPL IS IMPROPERLY AND WITHOUT JUSTIFICATION SHIFTING THE RISKS OF SGS UNIT 4 TO IPL' RATEPAYERS	5
A. Applicable Statutory, Board and Supreme Court of Iowa Precedents.....	5
B. The Risks Proposed by IPL to Be Shifted from IPL's Stockholders to IPL's Captive Ratepayers with Respect to SGS Unit 4 Are Unjustified.....	7
VI. IPL'S JUSTIFICATION FOR SGS UNIT 4 IS FUNDAMENTALLY AND FATALLY FLAWED.....	12
A. IPL's EGEAS Computer Modeling is Fundamentally and Fatally Flawed.....	12
B. IPL Modeling of Energy Efficiency - Demand Side Management.....	24
C. IPL Modeling of Wind Generation Resources.....	37

TABLE OF CONTENTS
(Continued)

VII. IPL’S SGS UNIT 4 APPLICATION IS INCONSISTENT WITH PRUDENT RISK MANAGEMENT ANALYSIS AND IGNORES SCIENTIFIC CONSENSUS ON GLOBAL CLIMATE CHANGE THAT IS DRIVING PUBLIC POLICY.....46

VIII. REASONABLE AND COST EFFECTIVE ALTERNATIVES TO SGS UNIT 4 SHOULD BE IMPLEMENTED FIRST.....53

 A. Expanded Demand Side Management.....58

 B. Expanded Wind Generation.....65

IX. CERTAIN DESIGN FEATURES OF SGS UNIT 4 ARE INAPPROPRIATE.....75

X. CONCLUSION.....76

CERTIFICATE OF SERVICE.....78

TABLE OF AUTHORITIES

<u>Case Law and Administrative Decisions</u>	<u>Pages(s)</u>
<i>Inquiry Into Fossil Fuel Generation Efficiency</i> , Docket No. NOI-07-1 “Order Adopting PURPA Standard 12 and Initiating Inquiry into PURPA Standard 13, Fossil Fuel Generation Efficiency,” (IUB, May 7, 2007).....	57
<i>Inquiry into PURPA Interconnection Standard</i> Docket No. NOI-06-4.....	63
<i>Interstate Power Company</i> , Final Decision and Order Docket No. EEP-04-40, (IUB June 28, 2000).....	25, 35
<i>Interstate Power and Light Company</i> , (Ratemaking Principles Wind-based Generation) Docket No. RPU-07-5.....	53, 71, 73
<i>Interstate Power and Light Company</i> , 2005-2020 Electric Resource Plan, “Order Accepting Resource Plan, Finding Compliance with Renewable Energy Objective Statute, and Setting Filing Requirements” Docket No. E-001/RP-05-2029 (MN PUC, April 17, 2007).....	30
<i>Iowa-Illinois Gas and Electric Co. v. Iowa State Commence Commission</i> 347 N.W.2d 423 (Iowa 1984)	5
<i>Iowa-Illinois Gas and Electric Co. v. State Com. Com’n</i> 412 N.W.2d 600 (1987).....	5
<i>MidAmerican Energy Company</i> Docket No. RPU-03-1.....	73
<i>MidAmerican Energy Company</i> Docket No. RPU-04-3.....	73
<i>MidAmerican Energy Company</i> Docket No. RPU-05-4, (IUB, Apr. 18, 2006)	40, 57, 73
<i>MidAmerican Energy Company</i> Docket No. RPU-07-2.....	73

TABLE OF AUTHORITIES
(Continued)

<u>Case Law and Administrative Decisions (Continued)</u>	<u>Pages(s)</u>
<i>Minnesota PUC</i>	
Docket No. E-999/CI-06-159, “Order Taking Action Under Federal Energy Policy Act of 2005” (Aug. 10 th , 2007).	61
<i>Office of Consumer Advocate v. Commerce Com’n</i> , 432 N.W.2d 148, 156 (Iowa 1988)	1
<i>In the Matter of the Application of PacifiCorp for Approval of a 2009 Request for Proposals for Flexible Resource, Oregon PUC, Docket No. UM 1208 (“Notice of Withdrawal of Rocky Mountain Power’s Motion to Amend its 2012 Request for Proposals” (Utah P.S.C. Docket No. 05-035-47) (Nov.28,2007))</i>	8

Statutory Law

Iowa Code Ch. 476A	1, 6,
Iowa Code § 476A.6	2, 67
Iowa Code § 476A.6(1).	2, 77
Iowa Code § 476A.6(3)	2, 4, 6, 77
Iowa Code § 476.4.	1
Iowa Code § 476.53	2, 6
Iowa Code § 476.53(2)	2, 3, 4, 6, 77
Iowa Code § 476.6(22).	6

I. INTRODUCTION.

On July 2, 2007 Interstate Power and Light Company (IPL) filed with the Iowa Utilities Board (Board) an Application for a Certificate under Iowa Code Chapter 476A to construct and operate the proposed 630 MW coal-fired Sutherland Generating Station Unit Number 4 (SGS Unit 4) in Marshalltown, Iowa. After the filing of pre-filed testimony and exhibits by the parties, an evidentiary hearing was held in Marshalltown, Iowa the week of January 14, 2008. Pursuant to the Board's August 16, 2007 Procedural Schedule Order, the Office of Consumer Advocate (OCA) files this Initial Brief.

II. IPL HAS THE BURDEN OF PROOF IN ALL RESPECTS IN THIS PROCEEDING.

One of the most important legal considerations when the Iowa Utilities Board (Board) considers an application by an Iowa public utility is that the Iowa public utility has the burden of proof in all respects. As the Supreme Court of Iowa stated in *Office of Consumer Advocate v. Commerce Com'n*, 432 N.W.2d 148, 156 (Iowa 1988):

On the other hand, we believe the board erred in its application of the law by assuming that, because OCA had not cited any authority to the contrary, the reserve for uncollectibles would be allowed in the rate base, even if it was customer-created.

Iowa Southern had the burden to prove the reasonableness of its rates. Iowa Code § 476.4. Allowing Iowa Southern to prevail on this issue on the ground that the opponents of the proposed rate had failed to produce support for their position is inconsistent with that rule . . .

III. IPL HAS WHOLLY FAILED FUNDAMENTAL ASPECTS OF THE IOWA CODE CHAPTER 476A DECISIONAL CRITERIA.

Iowa Code § 476A.6 sets forth the decisional criteria the Board must apply in this proceeding.

§ 476A.6 (1) states in part:

1. The services and operations resulting from the construction of the facility are consistent with legislative intent as expressed in section 476.53 . . .

§ 476.53 states in part:

2. The general assembly's intent with regard to the development of electric power generating and transmission facilities, as provided in subsection 1, shall be implemented in a manner that is cost-effective and compatible with the environmental policies of the state, as expressed in Title XI.

§ 476A.6(3) states:

3. The construction, maintenance, and operation of the facility will be consistent with reasonable land use and environmental policies and consonant with reasonable utilization of air, land, and water resources, considering available technology and the economics of available alternatives.

As will clearly be established in the remainder of this Initial Brief, IPL has wholly failed fundamental aspects of Iowa Code §§ 476A.6(1), 476.53 and 476A.6.(3).

IV. IPL DOES NOT KNOW WHAT THE CURRENT COST FOR SGS UNIT 4 IS, AND PROSPECTIVELY ESTIMATES THE MOST ECONOMICAL AND LOWEST COST FOR SGS UNIT 4 HAS AN IN-SERVICE DATE OF 2016, NOT AN IN-SERVICE DATE OF 2013 AS IPL PROPOSES IN THIS PROCEEDING.

It is clear that IPL has wholly failed to establish the cost effectiveness requirement of Iowa Code § 476.53(2) with respect to SGS Unit 4. IPL witness Beer's direct testimony, exhibits, and the portions sponsored by Mr. Beer of the Cost and Construction Schedule in IPL's Siting Application are totally irrelevant to this issue. For example, IPL issued a Request For Proposals (RFP) during the spring of 2007 for plant construction of SGS Unit 4 as an Engineer, Procure and Construct (EPC) project. (Tr. 123). This arrangement will obligate one contractor to be responsible for achieving plant schedule and construction milestones. IPL sent out a RFP on May 16, 2007. Bids from prospective EPC bidders were received on June 13, 2007. IPL was in the process of evaluating these bids, which are one of the major costs of SGS Unit 4, with final negotiations and selection of the EPC contractor intended to be completed by December 15, 2007. (Tr. 123).

All of this scenario no longer exists. The May 16, 2007 RFP and EPC contractor selection by December 15, 2007 fell completely apart (Tr. 113). [REDACTED]
[REDACTED]
[REDACTED]. (Tr. 133-135; Confidential OCA Ex. 118). Both IPL and OCA have recognized the likelihood of substantially increasing construction costs. (IPL Ex. 2; Con. Tr. 972).

[REDACTED]
[REDACTED]
[REDACTED]. (Tr.113; Confidential OCA Ex. 118). No one knows, including IPL, what the ultimate cost increase for SGS Unit 4 will be as a result of this

bidding process. Accordingly, IPL has completely failed to establish in any manner whether SGS Unit 4 is at all cost effective under Iowa Code § 476.53(2) or is consistent with available technology and the economics of available alternatives under Iowa Code § 476A.6(3).

[REDACTED]

These facts based upon IPL's own current analysis of the most economic and lowest cost SGS Unit 4 in-service date, *i.e.*, 2016 not 2013, can lead to only one result in this proceeding - the Board must deny IPL's Application for a Certificate to Construct SGS Unit 4 because IPL's own current analysis conclusively shows SGS Unit 4 is not cost effective under Iowa Code § 476.53(2) and is not consistent with available technology and the economics of available alternatives under Iowa Code § 476A.6(3) at this time, if ever.

V. IPL IS IMPROPERLY AND WITHOUT JUSTIFICATION SHIFTING THE RISKS OF SGS UNIT 4 TO IPL'S RATEPAYERS.

A. *Applicable Statutory, Board and Supreme Court of Iowa Precedents.*

Prior to 2001, the law concerning the placement of risks between the electric utility and its ratepayers of constructing and operating an electric generating unit was well settled. In a series of Supreme Court of Iowa decisions culminating in *Iowa-III. Gas & Elec. v. State Com. Com'n*, 412 N.W.2d 600 (1987), the Supreme Court affirmed the Iowa Utilities Board's (formerly the Iowa State Commerce Commission) allocation of such risks.

The Supreme Court cited an earlier case, *Iowa-Illinois Gas and Electric Co. v. Iowa State Commerce Commission*, 347 N.W.2d 423 (Iowa 1984), involving a due process challenge to the commission's refusal to fix a rate which would allow the utility to recapture its cost of constructing expanded generating facilities. The Supreme Court stated:

It was shown that, when it was made, the decision to expand generating capacity was prudent. But at the ratemaking stage when the enlarged capacity was in place, the commission found a substantial excess in usefulness and adjusted the rate to disallow recapture of the excess. We rejected Iowa-Illinois due process challenge.

The Supreme Court went on to quote from its earlier *Iowa-Illinois* decision:

Nothing in the constitutional requirement that a utility receive a fair return on its investment prohibits a lower return from the ratepaying public upon a part of the investment which turns out to be unnecessary, even when the utility's decision to make the investment was prudent. The issue for the Commission was how to allocate the burdens created by a management investment mistake between ratepayers and

utility common stockholders. Utility investors are not insulated from the consequences of diseconomies resulting from a management decision that was prudent when made but which later events prove to have been mistaken.

347 N.W.2d at 429.

The Supreme Court concluded that “[a]s in the previous Iowa-Illinois case, the utility’s consumers should not be required to absorb parts of the Louisa investment which later events have proved unnecessary and excessive”

Iowa-III. at 608.

In 2001, the Iowa Legislature passed House File 577 (now codified as § 476.53) which gave the Board additional authority with respect to the siting, ratemaking treatment, and emissions plans and budgets for proposed new electric generating plants. While the above Supreme Court of Iowa precedents are still valid and applicable, the additional powers given to the Board in 2001 are also applicable. Under Iowa Code Chapter 476A, the generation siting law, the Board can issue a certificate to construct if the proposed new electric generating plant comports with available technology and the economics of available alternatives, and is cost effective. See Iowa Code §§ 476A.6(3) and 476.53(2), respectively. Under Iowa Code § 476.53, the Board can grant advance ratemaking principles before the electric generation plant is built that will be applicable during the entire life of the plant. Under § 476.6(22), the Board can approve in advance an emissions plan and budget for the fleet of an electric utility’s electric generating plants and assure cost recovery. The potential certainties which may be given to electric utilities by the Board under these provisions have the potential to greatly shift the risks

associated with proposed new electric generating plants from electric utility investors to electric utility ratepayers. The Board must carefully weigh and balance the risks to which it will subject IPL's ratepayers who have no other protections than those afforded by the Board.

This proceeding, at its heart, deals with whether the unjustified and unwarranted risks of SGS Unit 4 should be allowed to be passed on from IPL's investors to IPL's captive ratepayers, or whether reasonable and cost effective alternatives to SGS Unit 4 should be implemented.

B. The Risks Proposed by IPL to Be Shifted from IPL's Stockholders to IPL's Captive Ratepayers with Respect to SGS Unit 4 Are Unjustified.

IPL has not considered the risks associated with building a new coal-fired generating unit. It is fundamentally important for IPL to consider such risks when evaluating the economics and environmental impacts of building or not building SGS Unit 4. (Tr. 969-70).

These enormous economic, as well as environmental, risks associated with building a new coal-fired generating unit can not be underestimated. The most significant uncertainties and risks associated with IPL's proposed SGS Unit 4 are the potential for future restrictions on carbon dioxide emissions, also referred to as greenhouse gases or GHG, and further substantial increases in SGS Unit 4's currently projected capital costs. (Tr. 972). IPL witness Beer fully acknowledges the potential for substantial increases in SGS Unit 4's currently projected capital costs. (IPL Ex. 2). Other potential uncertainties and risks for new coal plants include the potential for fuel

supply disruptions that could affect plant operating performance, escalating fuel prices, and the potential for increasing stringency of regulation of current criteria pollutants. (Tr. 972).

Many other proposed coal-fired generating projects have been cancelled in the United States as a direct result of concerns with the potential for federal regulation of greenhouse gas emissions, increasing construction costs, or both. (Tr. 972). Other utilities are factoring CO₂ regulation risks into business planning and deciding that the risks of implementing base load coal in the 2012 to 2014 time frame are simply too great. (Ex. 121¹).

A number of proposed coal-fired generating plants have been cancelled within the past year because of concern over rising construction costs and climate change. Tenaska Energy cancelled plans to build a coal-fired generating plant in Nebraska because of rising steel and construction prices. Moreover, Tenaska's general manager stated coal prices had also gone up "dramatically" since Tenaska started planning the plant more than a year ago. Because of escalating steel and equipment costs, the Tenaska general manager concluded it just wouldn't be a prudent decision to build the plant. (Tr. 972-3).

TXU cancelled 8 of 11 proposed coal-fired generating plants in large part because of concern over global warming caused by greenhouse gases and the potential for federal legislation restricting greenhouse gas emissions. (Tr. 973).

¹ Filing in Oregon PUC Docket No. UM 1208 (*In the Matter of the Application of PacifiCorp for Approval of a 2009 Request for Proposals for Flexible Resource*, "Notice of Withdrawal of Rocky Mountain Power's Motion to Amend its 2012 Request for Proposals" ¶¶ 6-7 (Utah P.S.C. Docket No. 05-035-47)(Nov. 28, 2007)).

Westar Energy in December 2006 deferred site selection for a new 600 MW coal-fired generating plant due to significant increases in the facility's estimated capital costs. (Tr. 973).

Tampa Electric recently cancelled a proposed integrated gasification combined cycle generating plant, or IGCC, due to uncertainty related to CO₂ regulations, particularly capture and sequestration issues, and the potential for related cost increases. Tampa Electric stated in a press release that “[b]ecause of the economic risk of these factors to customers and investors, the company believes it should not proceed with an IGCC project at this time.” (Tr. 973).

Four public power agencies suspended permitting activities for a coal-fired Taylor Energy Center because of growing concerns about greenhouse gas emissions. Other electric utilities have withdrawn as participants in proposed jointly owned coal-fired generating plants because of concern over increasing construction costs and potential CO₂ emissions regulation and resulting costs. (Tr. 973-4).

State regulatory commissions have also fully recognized the immense risks of rising construction costs and likely federal CO₂ emissions regulation. Many commissions have rejected proposed coal-fired generating plants on these grounds. (Tr. 974).

Just since December 2006, proposed coal-fired generating plants have been rejected by the Oregon Public Utility Commission, the Florida Public Service Commission, and the Oklahoma Corporation Commission. The North Carolina Utilities Commission rejected one of the two coal-fired generating plants proposed by Duke Energy for its Cliffside Project. (Tr. 974).

Similarly, on October 18, 2007, the Kansas Department of Health and Environment rejected an application to build two 700 MW coal-fired generating plants at an existing power plant site. The Kansas Secretary of Health and Environment stated:

I believe it would be irresponsible to ignore emerging information about the contribution of carbon dioxide and other greenhouse gases to climate change and the potential harm to our environment and health if we do nothing.
(Tr. 974).

Furthermore, IPL has concluded that “commercially - available back-end CO₂ emissions control technologies do not currently exist.” (Tr. 1002). Carbon capture and sequestration technology may be proven and commercially viable from optimistically as early as 2015 to more realistic 2030 or later. (Tr. 1003).

On the cost side, recent studies estimate that the cost of carbon capture and sequestration could increase the cost of producing electricity at coal-fired generating plants by 60-80 percent on a \$ / MWh basis. These studies range from a low of \$28/ton to a high of \$68/ton. (Tr. 1003-4).

IPL has not reflected any costs associated with employing carbon capture and sequestration technologies in any of its economic analyses of SGS Unit 4. Moreover, IPL has not included any carbon capture and sequestration equipment or features in the current design or cost estimate for SGS Unit 4. Finally, IPL has not reflected in its economic analyses any of the performance penalties that can be expected to be experienced as a result of the addition and use of carbon capture and sequestration technologies at SGS Unit 4. (Tr. 1005).

It is also unreasonable to assume that SGS Unit 4 would be grandfathered under federal climate change legislation or favored with the provision of extra CO₂ emission allowance allocations that could mitigate or offset the impact of CO₂ regulations. (Tr. 1014-15). It is unrealistic to expect that many or all of the new coal-fired generating plants currently being proposed will be grandfathered because of the substantial reductions in CO₂ emissions from current levels that have to be made by 2050 just to stabilize atmospheric concentrations of CO₂ to 450 ppm to 550 ppm. It is not reasonable to expect that a new supercritical coal-fired generating plant like SGS Unit 4, which will substantially increase the emissions of CO₂ into the atmosphere, will receive significant emission allowances under any U.S. carbon regulation plan. (Tr. 1014-15).

For example, the National Commission on Energy Policy has recently recommended that “new coal plants built without [carbon capture and sequestration] not be “grandfathered” (*i.e.*, awarded free allowances) in any future regulatory program to limit greenhouse gas emissions.” A report of an interdisciplinary study at the Massachusetts Institute of Technology on *The Future of Coal* similarly noted that:

There is the possibility of a perverse incentive for increased early investment in coal-fired power plants without capture, whether SCPC or IGCC, in the expectation that the emissions from these plants would potentially be “grandfathered” by the grant of free CO₂ allowances as part of future carbon emissions regulations and that (in unregulated markets) they would also benefit from the increase in electricity prices that will accompany a carbon control regime. Congress should act to close this “grandfathering” loophole before it becomes a problem.

IPL fully agrees that *all of the risks* of the potentially immense costs and consequences of forthcoming CO₂ regulation of SGS Unit 4 will be entirely borne by IPL's captive ratepayers. IPL witness Guelker made this crystal clear:

Q: (By Mr. Stead) I have one last area I would like to cover with you, Mr. Guelker. It also has been touched upon by Chairman Norris, and that is whether IPL ratepayers, captive ratepayers assume the risk of CO₂ regulation or not.

Under IPL's proposal in this proceeding, the risks and costs of CO₂ regulation will be borne by IPL captive customers, not by IPL, isn't that correct?

A: (By Mr. Guelker) Yes, that's correct. (Tr. 1719).

Depending on what the Board does in the SGS Unit 4 ratemaking principles proceeding and subsequent emissions plan and budget proceedings in the event the Board issues a Certificate to construct SGS Unit 4 in this proceeding, Mr. Guelker could be in whole or in part correct which would be an unconscionable result for IPL's current and future captive ratepayers.

VI. IPL'S JUSTIFICATION FOR SGS UNIT 4 IS FUNDAMENTALLY AND FATALLY FLAWED.

A. *IPL's EGEAS Computer Modeling is Fundamentally and Fatally Flawed.*

The computer modeling analysis on which IPL relies to support the need for SGS Unit 4 is fundamentally and fatally flawed and unreasonably limited, causing the modeling results to be clearly biased and unreasonably favors adding a new coal-fired generating plant in 2013. (Tr. 965-967). These flaws are addressed in detail by several OCA witnesses and can be summarized as follows:

- Mr. Parker testified that IPL failed to allow the model to select any additional energy efficiency to meet its projected capacity and energy needs.
- Mr. Schlissel testified that: 1) IPL did not use a reasonable range of CO₂ emissions allowance prices in its 2007 Resource Plan modeling; 2) IPL failed to reflect the very real risk that power plant capital costs could increase significantly above the figures assumed in its 2007 EGEAS modeling; 3) IPL unrealistically assumed that its new coal unit could operate at an extremely high capacity for all of the years of the study period; and 4) IPL failed to reflect the very real risk that power plant capital costs could increase significantly above the figures assumed in its 2007 EGEAS modeling; and 5) IPL assumed that its new coal unit could operate at an extremely high capacity for all of the year of the study period.
- Mr. Drunic testified that IPL set the maximum number of so called “superfluous units” that the model could select at two (that is, the model was set at SU=2). This unreasonably limited the amount of wind capacity that the model could add in early years beyond that needed to meet the chosen system reserve margin, even if adding more wind resources would result in lower cost plans.
- Mr. Fagan testified that IPL assumed an unnecessarily high, and unsupported, 18 percent reserve margin.
- Witness Fagan also testified IPL unreasonably limited the total amount of new wind that IPL can add through the year 2022.

(Tr. 1032).

OCA witness Drunic did an exhaustive analysis of EGEAS modeling.

(Tr. 674-5). Mr. Drunic was assisted at all times by OCA witness Shi who is an expert in all aspects of EGEAS and EGEAS modeling. (Tr. 676-7).

Mr. Drunic discussed technical modeling errors in the electric system capacity expansion modeling presented by IPL in this proceeding using the

EGEAS model in IPL's failed attempt to support SGS Unit 4. In summary, IPL did not conduct its capacity expansion modeling appropriately. IPL unnecessarily and unreasonably constrained the EGEAS model, and this prevented the EGEAS model from generating the least cost expansion plans in the scenarios which included CO₂ prices. The capacity expansion modeling conducted by IPL is not a comprehensive economic analysis. IPL's capacity expansion modeling consisted of three flawed runs that only looked at a narrow range of sensitivities.

Had IPL conducted its analysis properly, IPL would have identified a least cost resource plan which is dramatically different from the one that IPL has sponsored in this proceeding. SGS Unit 4 would not be proposed. The correct EGEAS modeling would have led to lower costs for consumers and would have reduced the environmental impact of electricity generation in the state of Iowa through use of increased energy efficiency and wind power rather than IPL's proposed coal-fired plant SGS Unit 4. (Tr. 674-5).

IPL's EGEAS modeling placed artificial constraints on EGEAS by limiting superfluous units to two rather than a higher number. This inappropriately and effectively eliminated consideration of the risks and costs associated with future potential federal regulations of CO₂ emissions and rising power plant construction capital costs. On the other hand, IPL's fundamentally and fatally flawed EGEAS modeling artificially limited the availability of energy efficiency and renewable resources such as wind power which, when modeled correctly, provide cost effective and environmentally friendly electric generation, unlike the electric generation from SGS Unit 4. (Tr. 676-679).

EGEAS has several options for constraining the model to minimize computer resource usage and running time. One of these options relates to the number of “superfluous units” that the model will allow. The default value for the input is only two which is what IPL used. When the “superfluous unit” value is increased to ten in the “IPL Low CO₂” and “High CO₂” scenarios, EGEAS produced optimal plans that had lower total costs associated with the selection of energy efficiency and wind power than the plan IPL produced using only two unjustifiably constrained “superfluous units” which erroneously selected SGS Unit 4. Under the simple change to ten “superfluous units” from IPL’s artificially constrained two, EGEAS produced lower cost generation capacity plans that either delay SGS Unit 4 until 2019 or do not select SGS Unit 4 at all. (Tr. 676-77).

IPL was fully warned about using only two “superfluous units” and the uneconomic results that could occur. [REDACTED]

[REDACTED]
(Tr. 681).

IPL should have considered a substantially wider range of possible costs associated with future restrictions on carbon dioxide emissions. IPL has acknowledged the likelihood of future greenhouse gas regulations. Alliant, IPL’s parent corporation, has stated that “[r]ecent events indicate that mandatory requirements to stabilize and reduce greenhouse emissions are likely.” Further, Alliant has stated:

[REDACTED]
(Tr. 982).

Incredibly, the base case analysis on which IPL primarily relies to support the need for SGS Unit 4 in 2013 assumes no greenhouse gas regulation costs whatsoever. (Tr. 971). In its computer modeling of the proposed SGS Unit 4, IPL did not assume any annual carbon or CO₂ emissions cost for the base case of its purported 2007 Electric Resource Plan. IPL did prepare two cursory sensitivity analyses assuming what IPL calls low CO₂ and high CO₂ emissions allowance prices. (Tr. 990).

It is unquestionably imprudent and unreasonable under current circumstances to assume no CO₂ emissions allowance prices in IPL's base case.

It is not prudent to project that there will be no regulation of greenhouse gas emissions at any point over the next thirty or more years. As discussed above and as Alliant Energy has acknowledged, federal regulation of greenhouse gas emissions is highly likely in the near future. States also have started to take actions to reduce greenhouse gas emissions both on their own and as part of regional initiatives. Iowa Governor Culver recently joined just such a regional compact. (Ex. 16; OCA Ex. 133; Tr. 1726-28). A comprehensive list of state and regional actions in this regard is found at Tr. 988. Given all of IPL's public statements and private observations about the likelihood, indeed the inevitability, of federal requirements for reducing greenhouse gas emissions and that the time for action is now, it is very hard to accept that IPL believes that no CO₂ regulation is a reasonable scenario on which to base decisions about future coal-fired generation alternatives. (Tr. 990).

The carbon dioxide emissions prices used in IPL's sensitivity analysis are outdated and reflect an unreasonably low range of possible future costs for carbon dioxide emissions. IPL based its low CO₂ price forecast on a 2003 MIT analysis of Senate Bill 139, the original McCain - Lieberman climate change legislation. IPL based its high CO₂ price forecast based on an analysis of the same legislation by DOE's Energy Information Administration. (Tr. 996).

In deriving its low and high CO₂ price sensitivity analyses in this proceeding (IPL's base case had no CO₂ costs included), IPL relied exclusively on United States Senators McCain and Lieberman's 2003 Senate Bill S-139, which expired in 2004, or analyses thereof, as the basis for its low and high CO₂ price sensitivity analyses. (Tr. 996; 1708-9).

Expired Senate Bill S-139 would have put a CO₂ cap at 2000 levels from 2010 to 2015, and would put a CO₂ cap at 1990 levels beyond 2015. (Tr. 1709). IPL witness Guelker's Schedule A shows there are now a number of newer proposals in the current U.S. Congress that require far more stringent reductions in CO₂ emissions, for example by 2030 and subsequent years, than in the expired Senate Bill S-139 upon which IPL based its CO₂ price analyses in this proceeding. (Tr. 990; 1708-9).

One of the new pieces of proposed legislation is again sponsored by Senators McCain and Lieberman. This new proposal is far more stringent on CO₂ emissions than the expired Senate Bill S-139. Instead of capping all post-2015 CO₂ emissions at 1990 levels, the new McCain / Lieberman bill would require reductions to 20 percent below 1990 levels by 2030 and to 60 percent below 1990 levels by 2050. (Tr. 1710).

In two recent studies of Senate Bill S-280, the new McCain / Lieberman bill, a July 2007 EPA Study and a November 2007 Energy Information Administration of the U.S. Department of Energy's study both concluded that CO₂ prices would be substantially higher than the expired Senate Bill S-139 upon which IPL based its CO₂ price analyses in this proceeding. (Tr. 1711). The Massachusetts Institute of Technology did a comprehensive April 2007 review of all current CO₂ regulation proposals in the U.S. Congress and concluded that there was a wide range of CO₂ prices many of which were substantially higher than expired Senate Bill S-139. (Tr. 1711-1714).

IPL witness Guelker acknowledged that as the evidence regarding the dangers caused by CO₂ and climate change continues to mount and the severity of climate change becomes greater, it is possible the U.S. Congress may not only not moderate current legislative proposals, but may make such proposals even more stringent. (Tr. 1714).

IPL witness Guelker stated that the Minnesota PCU had proposed using on an interim basis a \$9 per ton CO₂ cost estimate. (Tr. 1717). However, in a recently issued Minnesota PUC Order, the Commission stated that it currently:

... estimates that CO₂ regulation of electricity generation will cost between \$4 per ton and \$30 per ton for CO₂ emitted in 2012 and thereafter. (Tr. 1718; OCA Ex. 132).

The above testimony by Mr. Guelker was substantively and independently confirmed by Ms. La Seur's cross examination of Mr. Guelker. (Tr. 1740-50).

It is unreasonable and imprudent to base current CO₂ price forecasts on just these two analyses of a single piece of proposed legislation that was introduced in the U.S. Congress in 2003. Synapse, OCA's consulting firm in this proceeding, looked at the

results of these same two analyses when it developed its comprehensive CO₂ price forecasts in the spring of 2006. However, Synapse also considered the results of another eight analyses of both the 2003 McCain - Lieberman bill as well as other proposed climate change legislation that had been introduced in the U.S. Congress between 2003 and 2006. Consequently, a much wider range of inputs were examined when Synapse developed its price forecasts in 2006. It is necessary to do a comprehensive analysis because of the uncertainties associated with the design, timing and implementation of federal greenhouse gas regulations. IPL, in contrast, has based its sensitivity analysis' projected CO₂ prices on only two optimistic and minimal CO₂ regulation scenarios involving a single outdated bill. (Tr. 990; 1708-9).

The emissions targets assumed by IPL in its CO₂ forecast allow for far higher emissions than emissions target levels in the bills that have been introduced in the current U.S. Congress. The emissions levels considered in the 2003 McCain - Lieberman legislation in Senate Bill 139 upon which IPL based its sensitivity analysis' CO₂ price forecasts are significantly less stringent than would be required under the great majority of the bills currently under consideration in the U.S. Congress. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. (Tr. 997).

Consequently, IPL's sensitivity analysis' projected range of CO₂ prices is not consistent with, and is substantially noncompliant with, the full range of emissions

reductions that the U.S. Congress is currently considering. Moreover, although IPL's high CO₂ price forecast sensitivity analysis is marginally more reasonable than IPL's unrealistic low CO₂ price forecast sensitivity analysis, the former is still far too low to be considered a realistic high end of a reasonable range of possible future CO₂ emissions allowance prices. Specifically, IPL's high CO₂ price forecast does not reflect the emissions allowance prices that could result from several of the bills that have been introduced in the U.S. Congress in 2007 which propose very significant emissions reductions. (Tr. 998). Synapse's 2006 forecast of future carbon dioxide emissions prices is far more realistic than IPL's low and high CO₂ sensitivity analyses and conservatively reflects in all likelihood the results of future emissions prices enacted by the U.S. Congress. (Tr. 998-01). A comprehensive analysis of current the U.S. Congress pending legislation on CO₂ regulation is found at Tr. 983-85.

OCA ran numerous EGEAS runs with numerous reasonable and cost effective inputs. (Tr. 1037-38). Fifteen different scenarios were modeled, none of which selected SGS Unit 4. In evaluating the need for any coal-fired plant for IPL, sixteen scenarios were modeled. (Tr. 1039). When IPL's high CO₂ prices were included, the EGEAS model added a new coal-fired plant only as part of the lowest cost plan in one of the sixteen scenarios (other than in IPL's fundamentally flawed base case model run which included zero costs for future inevitable CO₂ regulation). Even in this one case, which was fatally flawed by assuming an unrealistic and inflated ten percent higher natural gas prices, SGS Unit 4 still was not added to IPL's generation portfolio until 2019, or six years later than IPL proposed in this proceeding. (Tr. 1040).

As for inflated natural gas and wind prices in its EGEAS analysis in this proceeding, other than experiential analysis and experience in the PPA development of self-built projects, IPL witness Friedman had no independent and objective studies, analyses or other documentation to support his and IPL witness Kitchen's specific wind and natural gas prices utilized in conjunction with IPL's high CO₂ prices, or that such prices and Synapse CO₂ prices were "conservative estimates based on recent experience with the prices of these energy sources." (Tr. 1625-6). Mr. Friedman acknowledged there have to date been no CO₂ prices established and that there is no historical evidence of such prices whatsoever. (Tr. 1626). Mr. Friedman also acknowledged the following:

Q: (By Mr. Stead) Mr. Friedman, if you would look at OCA Exhibit 129, we asked, "Provide copies of all studies and analyses prepared by or for IPL or any affiliated company, or reviewed by IPL Witnesses Friedman or Guelker, which have examined or addressed the impact of adoption of federal CO₂ legislation, emissions limits, or regulations will have on the U.S. economy." Would you please read your response there?

A. (By Mr. Friedman) My response is, "No such studies have been prepared by or for IPL. Papers or studies that support this directional assumption are attached as exhibits to Mr. Friedman and Guelker's testimony. IPL has not performed an exhaustive literature search for all possible studies and papers that provide analysis for this topic, nor retained a record of all studies that have ever been reviewed, either in part or in total.

Mr. Friedman cited NYMEX data and EIA publications. (Tr. 1628). However, Mr. Friedman acknowledged that neither source indicates in any manner what relationship, if any, there might be between CO₂ prices and natural gas prices. (Tr. 1629). Similarly, Mr. Friedman cited a Charles River Associates 2004 study.

However, this study was funded by Exxon Mobil (Tr. 1630) which has a self interest in, and a history of, funding studies that are critical of the concept of global warming or global climate change. Moreover, the Charles River Associates 2004 study has been fully discredited by independent analyses. (OCA Ex. 126). Mr. Friedman had never reviewed any critiques of any of the studies upon which he relied. (Tr. 1630).

Another study, the CRA study published in November 2007, relied upon by Mr. Friedman was funded by the American Petroleum Institute, and suffers from the same biases, self interest, and conflict of interests as the Exxon Mobil funded study discussed above which was also relied upon by Mr. Friedman. (Tr. 1631). The same is true of the last study relied upon by Mr. Friedman, an October 2007 Natural Gas Council Study, whose founding members are the American Gas Association, the Independent Petroleum Association of America, the Interstate Natural Gas Association of America, and the Natural Gas Supply Association. (Tr. 1632).

As for inflated wind power prices utilized by IPL in its EGEAS analysis, IPL witness Vossberg acknowledged a substantial additional number of wind manufacturers developing or placing in service new facilities (Tr. 1600-2) which will likely lead to substantially lower, not higher wind power prices.

At the hearing, OCA witness Schlissel addressed several of the above subject matters. (Tr. 1105-1155). OCA witnesses ran a number of EGEAS scenarios where all capital costs were increased by 20 percent or 40 percent, so such scenarios did allow for higher wind costs. The same factors which would increase the cost of wind would also increase the cost of SGS Unit 4. (Tr. 1106). The same was done for a 10 percent

increase in natural gas prices which clearly increased the cost of gas-fired alternatives to SGS Unit 4. (Tr. 1106).

IPL's assumption of a coal-fired power plant capacity factor greater than 90 percent and closer to 93 percent is not achievable over a 20, 30, or 40 year period. There is no evidence according to Mr. Schlissel that a coal plant is going to do this on a sustained basis over decades like IPL assumed in its EGEAS analysis. A more realistic capacity factor for SGS Unit 4 will lead to substantially higher costs to be paid by IPL's captive ratepayers. (Tr. 1113-5).

IPL witness Friedman's belief that natural gas prices will increase 10 percent or more is grossly inflated according to Mr. Schlissel. The 2003 McCain / Lieberman SB S-139 reflected the change in natural gas prices to be 0.4 percent in 2010, 0.2 to 0.5 percent in 2015, and 0 percent to 0.6 percent in 2020. (Tr. 1117-1121).

Finally, the following exchange occurred:

- Q. (By Ms. La Seur) Okay. So just to put the very blunt point on it, is it cheaper for consumers, in a world where we're going to see carbon regulation in the very near term, to build a plant like this and then shut down or retrofit older dirtier plants or not build now and to wait for some future technological improvement?
- A. (By Mr. Schlissel) Well, I would echo what Dr. Hausman said within the context of first you do what's the cheapest, which is energy efficiency. Then you do renewables, which I believe our EGEAS runs show are less expensive. To the extent possible, those can allow you to retire some older coal plants.

While you're doing that cheap stuff, you wait for the studies to be done on carbon capture and sequestration. There are

any number of pilot projects going on on both IGCC and pulverized coals carbon capture and sequestration.

Once you know the technologies and the costs, then you build your coal plants.

It seems to me that going and building a coal plant and not knowing what the technology is that you're going to have to implement, because whether it's this year, next year, five years, 10 years, something's going to have to be done to reduce emissions of CO₂ into the atmosphere.

So it seems to me the smart way, from a business point of view and a ratepayer point of view, is wait for the technology to be developed, study it, do pilot projects, and then implement it on a wide scale. Don't build your plant when you don't know what you're going to have to do and how much you're going to have to spend to make it conform to future regulations.

(Tr. 1125-26)

B. *IPL Modeling of Energy Efficiency – Demand Side Management*

IPL maintains that by using EGEAS, “all combinations of existing resources *and future resources* are considered when determining the most reasonable expansion plan” to meet its customers’ capacity and energy needs. (Tr. 557 [emphasis added]). IPL witness Kitchen indicated that IPL “evaluates many different resource alternatives, both traditional and nontraditional, including . . . demand-side management (load management and conservation) resources.” (Tr. 558). IPL purports to seek an expansion plan “that minimizes the cumulative present value of revenue requirements” (Tr. 558), *i.e.*, one that is least cost, while meeting IPL’s system energy and capacity needs. In furtherance of this objective, IPL states that it considered “all appropriate costs.” (Tr. 558). Contrary to these assertions, IPL did not evaluate any additional incremental Demand Side

Management (DSM) resource “alternatives” (or the costs that would be associated with more aggressive DSM objectives) in the analysis submitted in support of SGS Unit 4. (Tr. 1173, 1176-77). IPL’s resource planning analysis submitted in support of SGS Unit 4 did not evaluate whether increased DSM, beyond levels approved in IUB Docket No. EEP-02-38, would be selected as part of an optimal least cost expansion plan. (Tr. 1176-77). Rather, IPL reflects its current DSM goals approved in Docket No. EEP-02-38 implicitly through its load forecast. (Tr. 569; Ex. 105, Sch. A).

IPL does not model annual or cumulative non-load management DSM as an independent variable in the load forecast utilized in its long-term resource planning. Instead, DSM is implicitly embedded in IPL’s load forecast. (Tr. 1193; 1850, 1859). IPL uses historical actual loads and, according to Mr. Hillberry, “look[s] at the relationship of loads to things like population and economic growth, then because the economic - - to the degree that the economics and the population are related to DSM, and forecasted, then [IPL has] forecasted DSM in the resulting forecast.” (Tr. 1867). The assumption that DSM would exhibit growth based on the relationships that influence load is unsupported by historical DSM growth rates depicted in Ex. 105, Sch. K. Rather, it is recognized that DSM growth is significantly impacted by DSM program design, budget, promotion and incentives. (Tr. 1796); *Interstate Power Company*, EEP-04-40, “Final Decision and Order” at 4 (IUB, June 28, 2000) (“Interstate reduced its promotion budget in 1998 by 95 percent and program results suffered.”).

IPL does not adjust its load forecast for observed variations in actual versus planned DSM results (Tr. 1896-97), and does not attempt to adjust its forecast to capture

actual DSM variations or anticipated DSM-specific growth (Tr. 1857, 1865). Likewise, IPL's load forecaster does not attempt to distinguish load reductions associated with its internal programs versus load reductions attributable to appliance standards or building code requirements. Instead, IPL's method of modeling DSM assumes that future program kW and kWh impacts are not expected to be different than impacts from past or current programs. (Tr. 1857-58; Ex. 123; IPL ERP pp. 2-4, 2-16, 7-1 ("In the next five years, the peak demand reduction per year and the annual energy reduction per year due to DSM programs are projected to be relatively constant.")).

Mr. Hillberry expressed the opinion that "going forward an accurate representation of what's in the forecast would be what Bob Holmes plans for in his DSM plan." (Tr. 1858). Dr. Holmes confirmed that Mr. Parker's Schedule K accurately reflected IPL's DSM projections. (Tr. 1794)². IPL's incremental DSM energy savings in 2006 were .82% of retail electric sales, which is more than double the level of energy savings projected in 2008 and beyond. (Tr. 1782, Ex. 105, Sch. K). Witness Hillberry represents that he could make a one-time adjustment to his load forecast to reflect a large actual or anticipated change in DSM. IPL has not implemented such DSM adjustment to its load forecast. (Tr. 1865).

Witness Parker explained the significant drawbacks to IPL's technique for modeling DSM in its long-term planning analysis:

Modeling DSM as an adjustment to load forecast is a confusing and imprecise methodology. It may seem adequate to IPL because it is consistent with its overall approach to

² The transcript incorrectly indicates Schedule A.

supply planning, but it does not make for clear inputs or facilitate thoughtful analysis. For instance, this method does not allow for the treatment of DSM as an independent variable that can be adjusted, tested, and targeted to particular needs and opportunities. It tends to confuse 'current recorded load' with DSM effects by not supporting separate analysis of other factors that affect load. It does not reflect the costs of DSM in any way (since no costs for DSM are included in the modeling), and clearly not in a manner that permits a full and fair comparison to supply options.

(Tr. 1193). Consequently, IPL's resource planning process fails to appropriately evaluate demand side management resource options, which, if pursued, could lower IPL's costs, improve IPL's environmental performance, reduce cost risks to IPL and its customers, and increase overall economic benefits throughout IPL's service territory. (Tr. 1171).

The pervasive disconnect between DSM and IPL's resource planning process is exemplified in the following line of questioning:

Q: (By Ms. Easler) Does IPL invest in energy efficiency for the very purpose of reducing load in order to defer or reduce the need for electric resource additions?

A: (By Mr. Kitchen) You'll have to ask that question of Bob Holmes.

Q: You're not familiar with that concept?

A: Just somewhat, but he would be the correct person to ask energy efficiency questions to.

Q: Do you model energy efficiency in your resource planning?

A: No. It only comes in through the load forecast.

Q: If IPL could further reduce its load growth so as to make replacement of base load capacity unnecessary, isn't that a good thing?

A: Maybe and maybe not, because need is only part of whether you - - load - - reflecting load growth is only part of whether you need a resource like Sutherland 4, because Sutherland 4 provides us options in flexibility with respect to going forward and CO₂ regulations and what we can and can't do with the existing resources, so we may need it for other reasons than just load growth.

Q: Is part of your justification for this plant meeting the needs of load growth?

A: It's both meeting incremental load as well as existing load.

Q: If the most likely replacement of Duane Arnold capacity is a market-based PPA with off-peak pricing that is influenced by future CO₂ prices, isn't it preferable to avoid such costs by controlling load growth through energy efficiency that has no associated CO₂ risk?

A: I don't believe you can get enough energy efficiency to replace Duane Arnold.

* * *

Q: My question, though, is that you don't allow EGEAS to make that selection?

A: No. We do - any energy efficiency variations are modeled through scenarios.

(Tr. 616-18). IPL conducted no analysis of Iowa energy efficiency variations in the EGEAS analysis submitted in support of SGS Unit 4 or in the EGEAS scenarios included in its approved 2005 ERP. (Ex. 105, Sch. A, Part B).

At the time of the DAEC sale, Mr. Kitchen expressed the possibility that IPL would not even need to replace this capacity due to significant load reductions, yet hoped that would not be the case. (Tr. 615). Although Mr. Kitchen was unable to testify about

the objectives or characteristics of energy efficiency in integrated resource planning (Tr. 616, 641) and does not know how much DSM is implicitly represented in IPL's load forecast (Tr. 619), he nevertheless forecloses the possibility of IPL reducing its load growth through expanded DSM in order to defer or eliminate the need to replace a PPA that expires in February 2014. (Tr. 617). In contrast to Mr. Kitchen's views, the more aggressive DSM to which Iowa and the investor-owned utilities have committed is predicated on "making energy efficiency a high priority resource," and treating energy efficiency like other traditional resources in energy plans, which if fully implemented could help defer the need for 40 new 500-MW power plants. (Ex. 135). IPL's customers fund tens of millions of dollars of energy efficiency each year, yet IPL does not evaluate DSM (exclusive of load management) on a level basis with other resources in its Iowa long-term planning process. The time for doing so is now – when IPL is proposing a billion-dollar plus investment in a coal plant at a time of great uncertainty about Iowa's and the nation's energy future. (Tr. 1174-75, 1227).

That IPL's resource planning process for Iowa does not treat DSM like other traditional supply resources is clearly demonstrated in the following passage from IPL's 2005-2020 approved electric resource plan (ERP):

3.4 DSM Scenario Development and Analysis

Because IPL does not explicitly model DSM as a resource to be selected in the IRP modeling, the question remains whether the amount of DSM implemented by IPL is an optimum amount from the resource planning perspective. Since the DSM that IPL implements in Iowa is determined by the Iowa Utilities Board's administration of Iowa statute, any variation would need to be in Minnesota.

To address this issue, IPL commissioned a study in 2003 to examine the variation in [Minnesota] plan impacts relative to plan spending. This study was updated earlier this year to consider the new time frame of the 2005 IRP and to incorporate the Order point requiring DSM to be extended through the entire IRP planning period. . . .

IPL does not attempt to derive an optimum level of investment in Iowa from its EGEAS expansion plan analysis.

IPL does utilize EGEAS to analyze optimal DSM investment in Minnesota. Like Iowa, Minnesota establishes DSM goals through formal energy efficiency [CIP] programs. However, unlike Iowa, IPL in Minnesota specifically evaluates whether different levels of DSM are called for in a long-term least cost resource planning analysis. (ERP, pp. 6-10 through 6-12 (The Minnesota High, Medium and Low DSM scenarios “were developed for the evaluation of what level of DSM is most appropriate for Minnesota.”)). The Minnesota requirements are designed “to strengthen the utilities’ long term planning processes” and “ensure that utilities give adequate consideration to factors whose public policy importance has grown in recent years, such as the environmental and socioeconomic impact of different resource mixes.”³

The Minnesota PUC’s review of IPL’s current resource plan did not implement higher DSM, but it couched this determination in consideration of current circumstances including that IPL anticipated no capacity deficits or major resource acquisitions before

³ *Interstate Power and Light Company’s 2005-2020 Electric Resource Plan*, Docket No. E-001/RP-05-2029, “Order Accepting Resource Plan, Finding Compliance with Renewable Energy Objectives Statute, and Setting Filing Requirements” p. 2 (MN PUC, Apr. 17, 2007).

its next resource plan filing.⁴ Indeed, in IPL's next resource plan, among other requirements, IPL has been directed to:

- Focus on potential greenhouse gas regulation risk, both in the next resource plan and in other proceedings before the Commission.
- Work with stakeholders to further discuss the Company's CO₂ risk analysis and work with parties to develop a more comprehensive CO₂ risk analysis strategy to be applied in the next resource plan.
- Incorporate into the contingency plan the information necessary to assess the financial exposure of Interstate and Minnesota ratepayers to future CO₂ regulations, modeling the comparative impact of future regulations on the Company's preferred plan and several other resource mixes, including those required by law or by Commission order to be included in the plan.
- Participate in any Commission-sponsored technical workshops concerning the distributed generation of heat and power, addressing the components of a more comprehensive distributed generation strategy and a technical evaluation of opportunities, technical potential and economics of distributed generation with the IPL system.

To be assured that IPL is giving full and adequate consideration to its lowest cost, environmentally responsible resource alternative, IPL must be required to analyze its Iowa resource needs on a similar basis – taking into account, specifically higher investment levels in DSM. The IUB should be allowed to consider and provide guidance to these full resource plan results *before* giving IPL authority to move ahead with SGS Unit 4.

⁴ *Id.* @ 8-9.

IPL criticized OCA for not identifying new energy efficiency programs to justify its assertion that IPL should model additional energy efficiency potential. First, this criticism is inaccurate because OCA *did* propose that IPL integrate their programs more comprehensively with the gas efficiency programs, and *did* suggest the potential for much greater efficiency through combined heat and power (CHP) opportunities.

(Tr. 1171, 1180-85, 1223). As indicated above, IPL will be evaluating CHP opportunities for the Minnesota PUC in its upcoming resource plan filing, including:

- Evaluation of large customer sites to determine appropriateness and willingness to consider distributed generation, including possible combined heat and power initiatives with the ethanol industry and other industries.
- Determination of total technical distributed generation potential.
- Calculation of grid benefits of distributed generation.
- Economic screening to determine the total economic impact of distributed generation, under either utility ownership or customer ownership of distributed generation.

Id. at p. 10. IPL has not evaluated this potential in Iowa since 2001. (2005 ERP, Sec. 4)⁵.

IPL's discussion of CHP in its 2005 ERP is only preliminary, and its current estimate of CHP resource potential is not credible. (Tr. 1181). IPL has not included any estimate of CHP potential in its EGEAS modeling either in the 2005 ERP or the modeling for SGS Unit 4. (Tr. 1183; Ex. 105, Sch. E). In the ongoing assessment of

⁵ IPL's 2003 updated assessment of Distributed Generation potential for Minnesota indicated nearly thirty-three times greater DG potential (52.6 MW v. 1.6 MW) in the five year or less payback category than did the report for the 2001 ERP, with almost 60% of that attributable to wind. The 2003 update focused on Minnesota only.

energy efficiency potential, IPL is limiting its consideration of CHP to anaerobic digesters and industrial biomass. As a combination gas and electric company, IPL should be proactively evaluating synergistic benefits from strategic CHP investments in customer facilities, particularly if the generation benefits included line loss savings, increased customer satisfaction, emissions reduction, transmission and distribution deferral and load management opportunities. (Tr. 1183). The ethanol and biodiesel industries are particularly good candidates for CHP. (Tr. 1183-85).

With the need for SGS Unit 4 predicated in large part on expanding ethanol and biofuels industries, CHP opportunities should be fully evaluated, as Mr. Parker explained:

Q: (By Ms. La Seur) Do you see systematic barriers to increased use [CHP] or co-generation on IPL's system?

A: (By Mr. Parker) Well, I've been here throughout the testimony, and I did submit testimony on this issue as well, evaluating the performance and sort of the planning related to [CHP], and what's interesting to me is that I think it's very clear from the record in this case already that IPL does not systematically or comprehensively treat [CHP] as a resource that it could use strategically.

It simply didn't model [CHP], although it may have modeled natural gas units, and this is very pertinent because it's - - for instance, IPL has lost a large chunk of load, to my understanding, to the ADM plant. I think it's in the range of a hundred megawatts of power when it went offline.

It's interesting that an ethanol or biofuels plant, which I believe is a unique area with significant opportunity for [CHP] to - - that there's the potential that they can go to self-generation and actually move off the system.

So there's a sense in which I believe that at the least, IPL is not actively pursuing combined heat and power as a resource acquisition strategy, as an efficiency strategy. It has the

potential to lower greenhouse gases, and I think actually it could be a strategy that is very key to Iowa's specific situation that would lower the risk to the other Iowa ratepayers.

If you build a coal plant to meet that ethanol production or biofuels production load, but then they find it's more effective to do [CHP] and go off the system, then you may well be stuck with a coal plant that is not meeting the needs of the utility service territory or the members.

On the other hand, if you aggressively sought, as businesses seek to come online, to do ethanol or to partner in developing a [CHP] strategy – it could be coal, it could be natural gas, it could be biofuels, because sometimes there are residuals that can actually be a feedstock or a combustion resource for that combined biomass heat and power - - so they developed a strategy or policy that said we will focus on those large increments of load growth which we have been using as a justification for the SGS 4 plant, but if we take those and work with them one by one to make them self-generation or [CHP] resources, they could become a part of a very cost-effective and, I think, more economically viable way of meeting the load that is proposed to be met by the SGS 4 unit.

(Tr. 1227-29).

Second, IPL's criticism that OCA did not identify additional cost-effective energy efficiency program opportunities is without merit because it erroneously assumes that more efficiency savings cannot be generated through existing programs. The fact that IPL is delivering all cost-effective energy efficiency programs of which it is aware does not mean that more energy efficiency within these programs cannot be achieved. (Tr. 1222-23, 1231). IPL does not contend that there is not energy efficiency potential available to justify higher levels of DSM investment than are reflected in its load forecast. (Tr. 1178). Indeed, witness Holmes seems to acknowledge that increased energy efficiency

participation and results can be achieved by greater DSM investment and promotion of measures delivered through existing programs. (Tr. 1796). Regardless, IPL's actual experience bears out this point. (Tr. 1224-25, Ex. 105, Sch. K); *Interstate Power Company*, EEP-04-40, "Final Decision and Order" at 4 (IUB, June 28, 2000).

Witness Holmes further acknowledged that 2006 is likely more representative of IPL's future DSM savings potential than prior years and that there are several key areas for further DSM savings over what is represented in the 2006 figures. (Tr. 1797, 1810-13). Non-residential programs generate a large percentage of IPL's kWh DSM savings. IPL's non-residential new construction and performance contracting program were significantly below goal in 2006. However, this under-performance was anticipated and linked to program changes that will better position these programs to meet and exceed program goals in the future. (Tr. 1810-12). Witness Holmes attributed the good performance of IPL's DSM electric programs to the Change-a-Light-Change-the-World compact fluorescent light bulb promotional program. (Tr. 1804, 1811-12). The performance evaluation for this 2006 campaign reveals that Iowa's programs are just scratching the surface in terms of future potential for this program. (Tr. 1812).

IPL's EGEAS forecast assumes that DSM will be realized at about the same rate throughout the forecast period. (2005 ERP 2-4, 2-16, 7-1). Historical experience shows otherwise. (Ex. 105, Sch. K). IPL has implemented no exogenous adjustment to DSM forecasting to recognize recent higher DSM achievements. (Tr. 1865). IPL's resource planning ignores the potential for greater DSM potential in the future (discussed above) as well as the increased potential associated with Iowa's recently announced

commitments to the more aggressive pursuit of DSM. (Ex. 133, 135; Tr. 1728, 1730; Iowa Plan for Energy Independence). IPL's suggestion that it is somehow bound by previously approved DSM goals ignores that the IUB has generally been receptive to energy efficiency program modifications and increased cost-effective efficiency spending. (Tr. 1175-76). For all of these reasons, IPL's EGEAS modeling significantly under-represents the role that cost-effective DSM can and should play in the future. Thus, IPL does not accurately represent its future demand and energy needs and materially understates the extent to which these needs can be met via DSM.

It is important to pursue increased efficiency as a first option before coal because efficiency is less costly, less risky and the most economically and environmentally beneficial choice. If IPL's load grows more slowly than forecast, efficiency spending can be scaled back. This is not possible with a coal plant, the cost-effectiveness of which is based on the generation of large amounts of power. (Tr. 1197-99, 1201). DSM can be modified to meet varying levels of indicated future demand. If IPL moves ahead with SGS Unit 4 and IPL's load growth projections do not fully materialize, IPL's ratepayers will be stuck with an enormous coal plant investment and associated environmental risks.

The potential for lower load growth than anticipated is quite real. IPL was facing this situation just a few years ago. (Tr. 613-15). Ethanol and biofuels industries that do locate in IPL's service territory will be eligible for interruptible service in which case IPL will not need to plan to serve such interruptible load. (Tr. 1814). Additionally, these industries are exploring self-generation opportunities as well. (Tr. 185). For these

reasons, as well as those cited by Plains Justice witness Harl, future load growth associated with this industry is highly speculative.

IPL's flawed planning approach leading to its selection of SGS Unit 4 will produce increased risks, higher electric rates, and substantial negative environmental impacts. (Tr. 1172, 1196-98). It is unwise to expose IPL's customers to the risks associated with a new base load coal plant at a time of great uncertainty about Iowa's and the nation's energy future. (Tr. 1174). The IUB should deny approval for construction of SGS Unit 4 at this time and, instead, order IPL to adopt an energy resource planning approach that considers energy efficiency strategies (including distributed energy resources) on an equal footing with conventional supply options, accounting for CO₂ avoidance and value in risk reduction. As part of this ramp-up, IPL should proactively promote distributed resources, including CHP applications, where they are most cost effective for customers and provide a viable resource option. (Tr. 1172).

This shift in resource planning accompanied by aggressive ramp-up of energy efficiency will defer the need for a coal plant and thereby allow for better information (through the passage of time) about carbon regulation costs, plant construction costs, trends in energy prices, the actual demand from proposed ethanol plant, and ultimately whether a new coal plant is the best option for IPL and its customers. (Tr. 1131).

C. *IPL Modeling of Wind Generation Resources*

IPL imposed unnecessary and inappropriate assumptions and limitations in its EGEAS model that prevents it from fully evaluating the extent to which wind generation resources would be selected as part of an optimal least cost expansion plan. (Tr. 732).

Thus, IPL analytically misrepresents the ability of wind power to economically serve a significant fraction of IPL's incremental energy needs.

IPL's EGEAS base case filed to support SGS Unit 4 includes no carbon cost, and it includes two artificial constraints on the amount of wind power that can be selected by EGEAS. (Tr. 739-40). First, IPL limits the amount of economic wind power plants the model can choose and thus artificially forecloses the model's ability to choose resources with the lowest system cost to IPL. (Tr. 739). Second, IPL caps the overall amount of wind the model has access to at 800 MW of new wind over the 15 year planning period. (Tr. 740). Even under a scenario of minimal CO₂ costs, the EGEAS model would choose the maximum amount of wind available as an economic selection. (Tr. 740).

The EGEAS base case on which IPL relies to support SGS Unit 4 calls for IPL to install 400 MW of wind that would meet 9.1% of its projected needs by 2022. (Tr. 739). In the two alternative EGEAS runs submitted by IPL (IPL's low and high carbon-constrained cases) in its direct case, IPL's installed wind capacity in 2022 is 1,018 MW, producing 15.5% of projected energy needs. (Tr. 739). The 800 MW cap on new wind that IPL allows its EGEAS model to select over the planning period is far below the level of wind power that can be reliably accommodated on IPL's system. (Tr. 740). IPL believes it can accommodate 20% to 25% of its retail energy needs with wind. (Tr. 741, Ex.101(DR 162)).

OCA modeled a cap of 1,400 MW of additional wind (compared to IPL's 800 MW cap), which, if fully selected by EGEAS, would approximately equal meeting 25% of IPL's retail energy need in 2022. EGEAS selected all of this 1,400 MW of new wind

as economic, for a total wind resource of 1,618 MW in 2022. The constraints on getting this amount of wind in place on IPL's system are institutional rather than technical (Tr. 792). There is good reason to believe that these institutional impediments – shortage of wind generators relative to demand and backlog in Midwest ISO interconnection queue – can be overcome in time to implement this amount of wind. (Tr. 793-94, 1600-02, 1639-40). Even at IPL's too-low capacity crediting level of 10%, the amount of wind needed to meet 20% to 25% of IPL's energy needs in 2022 would bring an additional 71 to 104 MW of accredited capacity to IPL's system. (Tr. 742).

IPL's new wind capacity credit values of 10% are too low and cause the planning capacity contribution of wind to be significantly understated. (Tr. 738). IPL provides no analytical foundation for this 10% capacity factor. (Tr. 808-09). After considering the realized annual capacity factors of IPL's recent (historically based) wind plant installations (Ex. 101, DR 104) and recently proposed Buffalo Creek wind development, OCA witness Fagan determined a 20-25% range for planning purposes to be far more reasonable than the 10% capacity credit assumed by IPL. (Tr. 735-37, 799-800, 805-07, 839). Using a more reasonable capacity credit value of 25% for just the 400 MW of wind called for in IPL's base case EGEAS results in an additional 60 MW of accredited capacity, a significant amount given the level of indicated resource need. (Tr. 738). An additional 707 to 1039 MW of wind power beyond what IPL has in its base resource case would be needed if IPL were to meet 20% to 25% of IPL's projected energy needs in 2022. Employing a more reasonable capacity credit of 20% to 25% to this additional

wind (beyond the 400 MW indicated in IPL's base resource case) results in 142 to 260 MW of additional accredited capacity. (Tr. 742).

It is commonly understood that wind is a very good energy source and not a very good capacity source. (Tr. 809). Still, wind provides capacity that can be accredited and should be fully recognized in resource planning efforts, especially given the relatively small capacity deficit projected by IPL in comparison to the capacity of proposed SGS Unit 4. The reasonableness of a 20 percent capacity credit for wind generation is further confirmed by the recent ratemaking principles application by MidAmerican Energy Company:

First, MidAmerican indicates it is facing a 235 MW capacity deficiency for regulated load (hot weather) by 2010 and a 104 MW deficiency (normal weather) in 2011. The proposed project is to be in service by 2007, three years before the projected capacity deficit. If load growth is greater than expected, there could be a capacity deficit based on hot weather or normal weather prior to 2010. The proposed wind project will contribute up to approximately 109 MW toward MidAmerican's accredited capacity, because approximately 20 percent of wind capacity is generally accredited to contribute toward system peak. Thus, the proposed facility would eliminate the projected 104 MW deficiency in 2011 (based on normal weather conditions).⁶

The 10 percent capacity credit for wind assumed by IPL has been demonstrated to be too low by comparison to the actual historical capacity factors of IPL's existing modern wind facilities and the projected capacity factors of planned wind additions. (Tr. 808-11).

OCA specifically evaluated the actual wind performance of existing and planned

⁶ *MidAmerican Energy Company*, Docket No. RPU-05-4, "Order Approving Stipulation and Agreement" at 6-7 (IUB, Apr. 18, 2006).

facilities in its analysis. (Tr. 736-38, 799-800, 808-11, 839-40; Ex.101 (DR 104); IUB Docket No. RPU-07-5, IPL Ex. RMV-1, Sch. B).

Wind turbine size, performance and reliability have steadily improved since the 1980s, allowing the capture of scale economics and contributing significantly to improved capacity and lower per unit costs. (Tr. 749-50, 809). MISO's increased coordination ability and authority enables greater technical penetration of wind resources onto the bulk power system compared to what would be achievable absent such broad regional coordination. (Tr. 751-56). The MISO energy markets, proposed ancillary service market development and general trends toward greater regional coordination further enable the integration of wind generation in the Midwest. (Tr. 756-57).

IPL criticizes OCA's reliance on the cost of wind assumed in IPL's resource planning model submitted to support SGS Unit 4. Even though the wind cost assumed by IPL in this model is at an unprecedented high and has no actual basis in IPL's wind contracting experience (1637-38), OCA did not take issue with the assumed cost in IPL's EGEAS model. This issue pertains more directly to the issue of IPL first more aggressively pursuing cost-effective DSM and wind energy, before base load coal alternatives, and will therefore be addressed under section VII below.

The 18% reserve margin utilized by IPL in its computer modeling is excessive and unsupported. (Tr. 742-47). For this purpose, IPL selected an 18% planning reserve margin, the upper limit of the 15% to 18% range noted in the current MAIN (Mid-America Interconnected Network) Guide #6. (Tr. 743). IPL's asserted need for utilizing the highest level of this range, to account for the fact it plans for normal weather, is

unfounded. Load forecast uncertainty is already accounted for in the range given by MAIN Guide #6, and it states that such uncertainty is modest. (Tr. 744). The Midwest Reliability Organization, successor to MAIN and MAPP, is in the process of determining a new planning reserve margin. (Tr. 746). MRO will use load developed from the expected 50:50 probability load forecast. The use of “normal” loads is common in loss of load expectation (LOLE) studies. (Tr. 746).

IPL’s use of an exaggerated planning reserve margin will cause the need for new capacity to be exaggerated. (Tr. 746). Assuming a reserve margin of 16.2%, the upper end of the value determined by the LOLE studies contained in the MAIN Guide 6, IPL’s capacity need in 2013 is 56 MW less than what is indicated by an 18% reserve margin. IPL’s own internal planning analyses confirm the reasonableness of OCA’s 15% planning reserve assumption. An IPL internal strategy report dated April 4, 2006 notes the use of an 18% planning reserve margin in IPL’s “currently filed Resource Plan (filed 12-05),” but reveals that IPL’s internal planning process assumes a 15% planning reserve margin. (Tr. 303, 305; Ex. 101, DR. 22, Att. A, p. 1-2). A subsequent internal strategy report dated May 11, 2007 reveals that IPL’s resource planning process will employ sensitivity analyses using 15% and 12% planning reserve margins. (Ex.101, DR 22, Att. A, p. 83, 86). These sensitivity analyses were not included in the EGEAS analyses submitted by IPL in support of SGS Unit 4.

OCA’s assumed reserve margin is also consistent with the reserve margins utilized by the Midwest ISO and PJM. (Tr. 745). A 15% reserve capacity obligation (RCO) was deemed optimal by the Mid-Continent Area Power Pool (MAPP) to ensure system

reliability. (Ex. 119; Tr. 307) (MAPP RCO Review Final Report prepared for MAPPCOR by GE Power Systems Energy Consulting, Nov. 2003). Specifically, this study reports:

The results of this study indicate the need for installed reserves in the range of 9.96 (no internal transmission limitations) to 12.75 percent. (Load forecast Uncertainty) in the MAPP-US thermal portion of the system in order to maintain a reliability level of 0.1 day per year. The results suggest that a reserve level of 10% to 13% may be justifiable for the MAPP-US thermal system considering load forecast uncertainty, and forced outage rate increases for generating units. However, because deliverability, integrated hydro with thermal and hydro-dominant issues were not specifically or adequately addressed, the present 15% thermal RCO and 10% hydro RCO values are still considered valid and no changes are being recommended. Specific recommendations to address these issues, and more, in subsequent RCO studies are made in the Recommendations section of this report.

The Strategic Energy Assessment Report accompanying IPL witness Bauer's rebuttal testimony (Ex. 9, Sch. D) reveals that Wisconsin is reviewing the propriety of 18% reserve margin given the implementation of the Day 2 Market and other developments focused on better pooling of generation resources regionally. The Wisconsin Public Service Commission will analyze whether other states within the MISO footprint with lower reserve planning margins are "leaning" on Wisconsin to make up the difference and will look to see if reliability can be maintained for Wisconsin customers at a lower reserve margin and help to lower costs. (Ex. 9, Sch. D at p. 10 of 100).

Mr. Bauer contends that this Wisconsin document was offered to rebut Mr. Fagan's claim that IPL's Wisconsin affiliate WPL utilized a 15% planning reserve margin. (Tr. 323). IPL itself represents WPL as utilizing a 15% planning reserve

margin. (Ex. 101, Sch. A, DR 21, Att. A p. 2 of 212). If IPL deems a 15% reserve margin appropriate for its internal planning purposes, as this document also represents (Tr. 305), and IPL has an obligation to serve its electric retail customers as IPL brought out in its cross-examination of various OCA witnesses (Tr. 688, 773, 901, 1083-84), then the Board may fairly rely on this 15% reserve margin as persuasive evidence of a reasonable planning reserve margin.

IPL's computer modeling also fails to consider the very real risk that power plant capital costs could increase significantly from IPL's projections. The estimated cost of SGS Unit 4 at this time of filing IPL's Application in this proceeding, without AFUDC or any other financing cost, is [REDACTED]. It is reasonable to expect that the actual cost of the SGS Unit 4 will be substantially higher than IPL now estimates. The costs of building generating plants have soared in recent years as a result of the worldwide demand for generating plant design and construction resources and commodities. This trend is expected to continue, if not accelerate. For example, Duke Energy Carolinas' originally estimated cost for the two unit coal-fired Cliffside Project was approximately \$2 billion. In the fall of 2006, Duke announced that the cost of the Project had increased by approximately 47 percent, or an extra \$ 1 billion. After cancelling one of the two units, the remaining unit's estimated cost again accelerated up to \$1.8 billion. (Tr. 1017-19).

Numerous other proposed coal-fired generating plants have also experienced similar huge cost increases. For example, Westar's proposed coal-fired generating plant in Kansas, originally estimated at \$1 billion increased by 20 percent to 40 percent over

just 18 months. Similarly, the now cancelled Taylor Energy Center in Florida increased by 25 percent, \$400 million, in just 17 months between November 2005 and March 2007. (Tr. 1019).

The worldwide competition for generating plant design, construction resources, commodities, and equipment is driven mainly by huge demands for generating plants in China and India and by a rapidly increasing demand for generating plants and generating plant pollution control modifications in the United States to meet SO₂ and Nox Emission Standards. This is fully confirmed by a wide range of energy, construction, and financial industry studies. (Tr. 1020-23).

Finally, IPL unrealistically assumed in its computer modeling that SGS Unit 4 could operate at an extremely high capacity factor for all the years of the life of the generating plant. IPL's, engineering firm, Black and Veatch, assumed that the average net generation of a 600 MW supercritical coal-fired generating plant would be 4,470,000 MWh. This translates into an 85 percent average annual capacity factor. Such information within the industry on existing generation plants is maintained as confidential. However, the owners of the proposed Big Stone II generating plant in South Dakota have publicly announced an 88 percent capacity factor, and Entergy Louisiana has publicly stated an 85 percent capacity factor for its Little Gypsy Unit 3 in Louisiana. According to data supplied by IPL, coal-fired generating plants sized between 600 - 799 MWs achieved an average 75.75 percent net capacity factor during the years 2001- 2005. These same units achieved an 87 percent availability factor and an 84.4 percent equivalent availability factor reflecting deratings during the same five year period.

(Tr. 1033). Despite these reasonable estimates and actual results of operations, IPL uses a [REDACTED] percent annual average capacity factor in its computer modeling for SGS Unit 4. This high annual average capacity factor is unrealistic and overly optimistic, especially during SGS Unit 4's immature breaking-in years of its 40 to 60 year life. Moreover, SGS Unit 4 operational constraints caused by such things as lower than expected coal shipments and other resource supply disruptions could further compound SGS Unit 4's efficient operation. (Tr. 1033-36).

VII. IPL'S SGS UNIT 4 APPLICATION IS INCONSISTENT WITH PRUDENT RISK MANAGEMENT ANALYSIS AND IGNORES SCIENTIFIC CONSENSUS ON GLOBAL CLIMATE CHANGE THAT IS DRIVING PUBLIC POLICY

OCA witness Hausman provided testimony concerning the environmental impact of SGS Unit 4, the scientific basis for global climate change, the factors contributing to global climate change, and the degree of scientific consensus pertaining to these matters. Dr. Hausman is well-qualified to address these topics. IPL presented no evidence in rebuttal to Dr. Hausman's assessment of scientific evidence on global warming. Despite scientific evidence clearly documenting the need for reductions in greenhouse gas (GHG) emissions as quickly as possible and over a sustained period of time (Tr. 881), IPL apparently embracing an "act, then learn, then act" philosophy (Tr. 1703), seeks to move ahead with SGS Unit 4, which will unquestionably incrementally increase IPL's CO₂ emissions. (Ex. 11, Sch. I, p. 2). IPL offers no plan for addressing its increasing CO₂ emissions profile and the associated risk. Because IPL has no plan, IPL's customers and the public generally are exposed to the costs and risks of IPL committing to a course that

will increase its CO₂ emissions. IPL acknowledges the potential for this cost to be significant. (Tr. 1705). There is enough known about climate change and its causes, that IPL should not be allowed to act on SGS Unit 4 without a plan for addressing CO₂ emissions. The claimed flexibility benefit that SGS Unit 4 will bring is meaningless and valueless to ratepayers without a plan to address IPL's resulting higher CO₂ emissions levels.

According to Dr. Hausman, the most significant environmental impact of SGS Unit 4 would be its contribution to atmospheric CO₂, the "greenhouse effect" and global climate change. (Tr. 850). Greenhouse gases, including CO₂, trap the earth's radiant heat, causing the "greenhouse effect." For all of recorded human history, the greenhouse effect has remained within a fairly narrow range, producing the relative climate stability that has allowed complex human civilizations to form and develop. During periods of geological history that had different abundances of GHG, the earth had a very different climate. (Tr. 852).

Human induced climate change is a grave and increasing threat to the environment and to the human societies around the globe. (Tr. 850). The effects of this process are already observable and documented in the scientific literature, and are consistent with those predicted by computer models of the global climate. These same models predict much more severe effects to come, including rising sea levels leading to inundation of coastal areas, dramatic changes in patterns of precipitation around the globe, accelerated loss of habitat and species extinctions, and migration of pest species and disease vectors with associated human health and agricultural impacts. This path, if unchanged, will

likely bring about a climate well outside the range of anything ever experienced by our species, with the potential for severe and irreversible changes that will forever alter our environment, our economies and our way of life. (Tr. 850).

Human activities have increased the atmospheric concentration of several GHGs, most notably CO₂. This increase has come primarily from burning fossil fuels, of which coal emits the most CO₂ per unit of energy obtained. (Tr. 852). The background level of CO₂ in the air has increased by roughly one third since preindustrial times. (Tr. 853). This means that the lower atmosphere does not lose heat to space as efficiently as it otherwise would, so the surface of the earth is generally warming. (Id.). This phenomenon is referred to as “global warming.” Global warming will affect different areas differently, changing the distribution of rainfall, warming many areas but cooling some others, and changing the length of growing seasons. (Id.).

There is an unequivocal scientific consensus on many aspects of the issue of global climate change including, including the following:

- The fact that CO₂ content of the earth’s atmosphere is increasing rapidly – at a rate that is unprecedented in at least the past 200,000 years and probably much longer;
- The fact that the primary source of the CO₂ increase is combustion of fossil fuels by human industrialized societies;
- The fact that the increased abundance of atmospheric CO₂ has a direct radiative forcing effect on climate by altering the heat transfer characteristics of the atmosphere, which will impact earth’s climate;
- The fact that the climate of the earth is currently changing in ways that are consistent with model predictions, which include increased sea surface temperatures, increased sea

level, loss of arctic permafrost, loss of mountain and polar glacier mass, and destruction of arctic habitat;

- The fact that observed changes in the earth's climate cannot be ascribed to any known natural phenomenon;
- The fact that the magnitude of climate impacts will increase with increasing atmospheric CO₂ content;
- The fact that once the atmospheric abundance of CO₂ has been increased, it can only return to equilibrium levels through natural processes on a timescale of several centuries; and
- The fact that many of the anticipated and modeled climate impacts occurring now and within the next few decades will be irreversible for centuries to come.

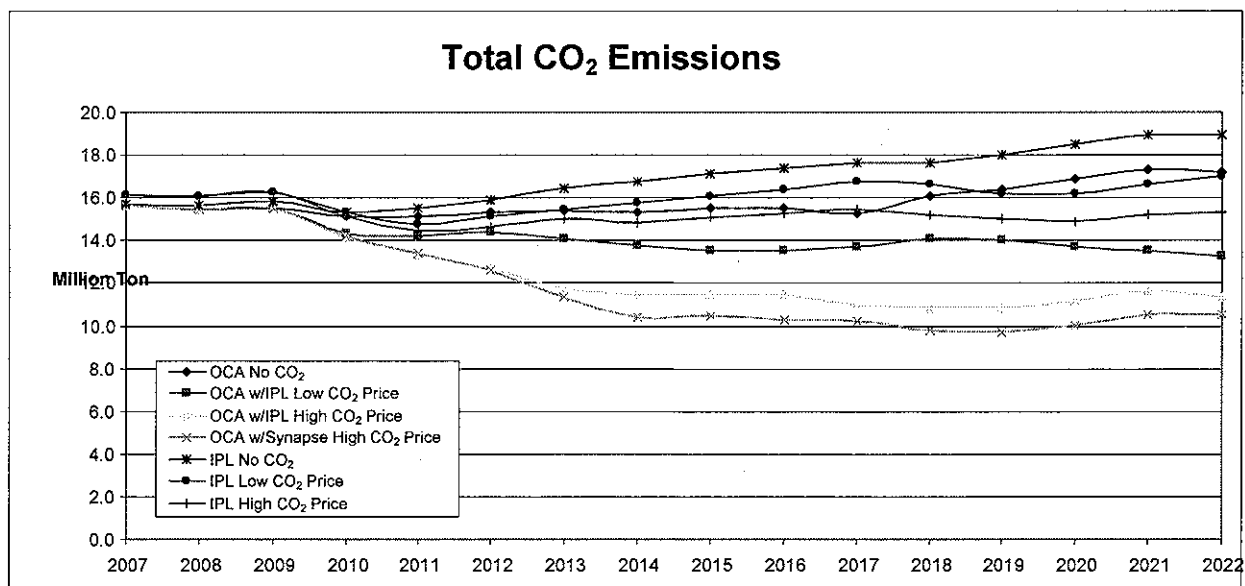
(Tr. 857-58).

There is general agreement, if not yet consensus, that global climate change will lead to generally more extreme weather patterns across the globe, including more intense storms and rainfall events and more extreme dry spells. (Tr. 858, 870-78). The impacts would likely extend to Iowa. (Id.).

The most important and cost-effective way to mitigate global warming impacts is by limiting or curtailing the burning of fossil fuels in the decades ahead. To do this, we must make infrastructure investment choices which lead to electricity production by less carbon-intensive or zero-carbon means. (Tr. 851). DSM and wind are effective ways of meeting energy needs with little to no environmental impact. (Tr. 882). Coal-fired power plants are unquestionably a major and growing source of greenhouse gases, and thus represent a significant cause of global climate change. (Tr. 879-80). Construction of SGS Unit 4 would result in the injection of enormous amounts of CO₂ into the

atmosphere for 50 years or more, and to a worsening of the dangerous buildup of GHG in the atmosphere. (Tr. 851, 880). SGS Unit 4 would directly contribute to a problem that is likely to cause dramatic environmental and economic harm to societies around the world, including communities in Iowa. (Tr. 851, 870-81).

The risks of doing nothing to address human-induced GHG emissions are enormous. (Tr. 861-81). IPL’s “business as usual” preferred resource case assumes there will be no future regulation of the most intensive contributor of human-induced CO₂ emissions – coal generating plants. This assumption is patently unreasonable. IPL witness Vesperman acknowledges that SGS Unit 4 will result in incremental increases in IPL’s emissions profile, as documented in Ex. 11, Sch. I, p. 2. The CO₂ profiles derived from IPL’s EGEAS scenarios runs⁷ and OCA’s preferred combination scenario⁸ are plotted below:



⁷ Electronic files accompanying IPL’s Additional Information (Sept. 17, 2007).

⁸ OCA’s combination scenario is reflected in the last row of witness Schlissel’s Table 7 (Tr. 1039) (electronic files accompanying Dr. Shi’s Direct Testimony (Oct. 22, 2007).

Even though acknowledging the lack of technology for controlling emissions from fossil fuel generation as a significant driver of the risk presented by CO₂ reduction policy (Tr. 1705) yet apparently holding out the potential for such technological breakthroughs (Tr. 506-08, 1705), IPL nonetheless rejects an approach that would buy it time to incorporate in its planning the technological breakthroughs that can be expected to occur under a carbon-constrained environment. (Tr. 1703-04: “delaying decisions to build a [coal plant] . . . “until the desired certainty or clarity emerges is not a viable and sustainable regulatory response”; Tr. 1704: “It would be futile and ultimately imprudent for utilities to adopt a ‘wait-and-see approach.’”). Clearly, IPL wishes to move ahead with SGS Unit 4 because it will be profitable for IPL to do so under IPL’s assumption that any associated CO₂ risk is shifted to its customers. (Tr. 1759, 1944). IPL’s plans contemplate shifting all CO₂ risks to customers; therefore, IPL is in no position to offer opinions about the prudence or viability of delaying its base load coal plans. Unless and until IPL is held accountable or otherwise accepts responsibility for CO₂ risks, its opinions about the prudence and wisdom of investing SGS Unit 4 given significant CO₂ risks have little or no value or relevance.

Other utilities are factoring CO₂ regulation risks into business planning case and deciding that the risks of implementing base load coal in the time frame proposed by IPL are simply too great:

[D]ue to the current uncertainty in the ability to quantify in any meaningful way the cost of compliance with potential federal CO₂ legislation, Bridger 5 as a supercritical unit is no longer a viable option for 2014. Within the last few months, it has become apparent that Congress will enact some

restrictions upon carbon emissions, but the projected cost impact upon new coal generation is currently within such a wide range as to make meaningful risk assessment futile. On November 13, 2007, the National Association of Regulatory Utility Commissioners adopted its first resolution acknowledging that climate change legislation addressing carbon emissions will occur. Within the last few months, most of the planned coal plants in the United States have been cancelled, denied permits, or been involved in protracted litigation. Accordingly, the Company submits that IPP 3, Bridger 5, and the IGCC option at Jim Bridger, are no longer viable options for 2102 RFP for the 2012 and 2014 time frame, respectively.

While the Company is not excluding new coal generation ownership from its 20 year options, absent some change in conditions, it cannot be determined at this time whether new coal generation ownership will satisfy the least cost, least risk standards that would enable us to consider it as a viable option within our ten year plans.

(Ex. 121⁹). While IPL believes that its desired SGS Unit should not be put on hold due to uncertainties in future CO₂ emissions requirements, other utilities believe it is imprudent to implement coal plants in the time frame envisioned by IPL for SGS Unit 4 precisely due to CO₂ regulation uncertainties. (OCA Br. Section V, p. 8).

IPL acknowledges that the Midwestern Greenhouse Gas Accord is “a seemingly comprehensive and well-defined signed accord,” but contends that requirements, costs and needed actions as a result of this accord are uncertain. (Tr. 1703). Actually, the Platform Agreement accompanying the accord (Ex. 133), omitted from Mr. Guelker’s testimony, sets forth measurable goals for energy efficiency and renewable energy that IPL could readily evaluate if it were so inclined. (Ex. 133, pp. 6, 14). IPL’s preferred

⁹ Filing in Oregon PUC Docket No. UM 1208 (*In the Matter of the Application of PacifiCorp for Approval of a 2009 Request for Proposals for Flexible Resource*, “Notice of Withdrawal of Rocky Mountain Power’s Motion to Amend its 2012 Request for Proposals” ¶¶ 6-7 (Utah P.S.C. Docket No. 05-035-47)(Nov. 28, 2007)).

EGEAS scenario for SGS Unit 4 and associated increasing CO₂ profile, predicated on unchanged DSM investment and wind additions totaling less than 10% of projected energy needs in 2022, is inconsistent with the Midwestern Greenhouse Gas Accord, the Plan for Energy Independence issued by the Iowa Office for Energy Independence in December 2007¹⁰ (Tr. 1730-31), and the numerous claimed benefits associated with wind development relied on by IPL in its ratemaking principles application for wind generation, IUB Docket No. RPU-07-5. (Tr. 1634-37)¹¹.

VIII. REASONABLE AND COST EFFECTIVE ALTERNATIVES TO SGS UNIT 4 SHOULD BE IMPLEMENTED FIRST

IPL implies that OCA is proposing a futile “wait-and-see” approach that will cause IPL’s generation planning and construction process to cease or be put on hold due to uncertainties in future CO₂ emissions requirements. (Tr. 1704). This is inaccurate. OCA asserts that IPL should seize the opportunity, while it still has time (Brief Section IV), to modify (*not cease*) its resource planning process in order to correct clearly evident deficiencies as necessary to enable more aggressive implementation of cost-effective and environmentally prudent DSM and wind energy resources. This modified resource planning action (*not inaction*) will defer the need for base load generation and allow IPL to take advantage of technological developments, which IPL and OCA apparently agree are likely (Tr. 1704; Tr. 925-26), without committing to a base load unit today that may or may not be cost-effectively adaptable to these future technological developments.

¹⁰ <http://www.energy.iowa.gov/OEI/plan.html>

¹¹ Witness Friedman agreed to accept, subject to verification, the public policies, considerations and benefits associated with wind generation asserted by IPL in IUB Docket No. RPU-07-5 (Direct Testimony of Kim Zuhlke, pp. 5-6. (Sept. 28, 2007)).

While disclaiming expertise concerning the validity of various GHG reduction scenarios (Tr. 1695), IPL suggests that actual GHG reduction requirements will be more moderate than those under consideration when policy makers realize the limitations of renewable energy sources and DSM in reducing GHG. (Tr. 1697). However, as discussed more fully below, IPL is nowhere near tapping the full potential of DSM and renewable energy resources. The modeling submitted by IPL in this case did not evaluate the impact of increased DSM investment and goals. IPL actually constrained the amount of wind energy that could be selected by EGEAS to a level far below what could be reliably integrated in its system. Had IPL evaluated the impact of increased investment in DSM and more reasonable wind integration objectives, IPL would have realized a more cost-effective resource plan that results in a declining CO₂ emissions profile. In light of current CO₂ reduction goals and impending CO₂ reduction regulations, the Board should require IPL to demonstrate its full consideration of cost-effective and DSM and renewable energy resources before approving the siting of a base load coal plant and its long-term CO₂ risks.

IPL has not shown the proposed coal plant to be a reasonable alternative to meeting energy and capacity needs. Correcting the fundamental flaws and undue limitations in IPL's modeling analysis, OCA's computer modeling analysis employing least cost and cost effective resource planning objectives shows that IPL can defer or eliminate the need for SGS Unit 4 for at least several years beyond 2013. At a minimum, after first obtaining all cost-effective energy efficiency resources, building or buying

more wind-powered supplies is a more economical and environmentally sound approach to meeting incremental energy supply needs than building a new coal plant.

Simply taking into account IPL's sensitivity analysis' unreasonably low carbon dioxide emissions price forecast in a proper modeling analysis postpones the need for SGS Unit 4 or any other coal-fired generating plant beyond IPL's 2013 planned operational date for SGS Unit 4. When IPL's high CO₂ price was included, the computer modeling added a new coal-fired generating plant only as part of one of the scenarios, (excluding IPL's fundamentally flawed based case model run which had no CO₂ regulation being recognized.) Even in that case, which unreasonably assumed ten percent higher natural gas prices, SGS Unit 4 still was not added until 2019, or six full years later than IPL proposes to add SGS Unit 4. (Tr. 1040). When IPL's low CO₂ prices were used, the installation date for SGS Unit 4 was delayed a minimum of between three and six years, *i.e.*, 2016 to 2019. These delays occurred in the scenarios which included increased wind availability, or increased DSM availability, or higher capital costs, or the target reserve margins being reduced from 18 percent. When energy efficiency and wind energy resources are more fully considered, OCA's modeling analysis demonstrates that base load generation such as SGS Unit 4 can be deferred for a greatly extended period of time. Indeed, when combined sensitivities reflecting increased wind and increased DSM were modeled, SGS Unit 4 was not even selected as part of the lowest cost effective plan, even with IPL's low CO₂ prices reflected. (Tr. 1040).

Contrary to IPL's claim, IPL has not shown that adding SGS Unit 4 is the lowest risk option, in terms of economic or environmental factors, for its ratepayers. (Tr. 1040).

OCA's thorough computer modeling clearly demonstrates that IPL can more cost effectively meet its long term electric resource needs through reasonable additional investment in energy efficiency and renewable energy resources. (Tr. 1036-39).

Another risk completely ignored by IPL in its base case to attempt to justify SGS Unit 4 is IPL's disregard for the costs associated with future CO₂ emissions regulation. This is imprudent, unreasonable and contrary to the public and IPL's ratepayers' interests. The growing scientific understanding and evidence of climate change attributable to greenhouse gas emissions such as CO₂ mean that establishing federal policy requiring greenhouse gas reductions is just a matter of time. The question is not whether the United States will develop a national policy addressing climate change, but when and how. The electric utility sector will be a fundamental and focal component of any regulatory or legislative approach to reducing greenhouse gas emissions such as CO₂ both because of this sector's immense contribution to total national greenhouse gas emissions and because of the comparative ease of regulating large readily identified point of origin sources. (Tr. 968-72).

Another risk IPL has ignored which is associated with building a new coal-fired generating plant is the potential for costs to substantially escalate from current estimates for design and construction. (Tr. 1017-25). The worldwide competition for generating plant resources of all types is one of the main driving forces for skyrocketing design and construction costs. (Tr. 1020). IPL failed to conduct any sensitivity analysis to evaluate the risk of potential cost increases associated with designing and constructing SGS Unit 4. (Tr. 1017-25). Even in IPL's last Electric Resource Plan in 2005, IPL evaluated a

capital cost for a coal-fired generating plant that was approximately 32 percent higher than IPL's base case capital cost. (Tr. 1025). While these types of cost increases may also in varying degrees have impacts on other types of generation resources, *e.g.*, wind, combustion turbines, nuclear, there is no evidence of similar cost increases for energy efficiency measures. Consequently, it can be expected that higher coal-fired generating plant capital costs substantially increase the relative economics and attractiveness of energy efficiency to meet future IPL electric needs. (Tr. 1025).

Finally, adding SGS Unit 4 will substantially reduce the diversity in IPL's generation supply and make IPL more heavily dependent on coal-fired generation than it is already is. (Ex. 122). Supply diversity is a very important consideration.¹² Reducing IPL's current heavy dependence on fossil-fired generation, especially coal-fired generating plants, and moving toward greater use of renewable resources and energy efficiency, should be a major policy goal given the threat posed by global climate change and the inevitability of federal regulation of greenhouse gas emissions, especially CO₂, in the near future. Building SGS Unit 4 would be a major step in the wrong direction. Indeed, █████ of the energy supplied by IPL in the year 2022 would be generated at coal-fired generating plants. On the other hand, investments by IPL in DSM and renewable resources would provide real tangible benefits in terms of prudent supply diversity by reducing IPL's over-dependency on coal, oil, and natural gas as fossil fuel sources which

¹² The Board has recognized that generation siting proceedings provide a forum for its consideration of fuel diversity objectives. *Inquiry Into Fossil Fuel Generation Efficiency*, "Order Adopting PURPA Standard 12 and Initiating Inquiry into PURPA Standard 13, Fossil Fuel Generation Efficiency," p. 4 (IUB, May 7, 2007); *see also*, *MidAmerican Energy Co.*, Docket No. RPU-05-4, "Order Approving Stipulation and Agreement," pp. 7-8 (recognizing that fuel diversity is more important than ever, given price fluctuations and price projections for fossil fuels, and that wind provides an immediate hedge against the price fluctuations of fossil fuels) (Apr. 18, 2006).

will soon be stringently regulated. Moving towards greater use of renewable resources and energy efficiency should be a major goal given the threat posed by potentially disastrous global climate change and the inevitability of federal regulation of greenhouse gases, especially CO₂, in the near future. (Tr. 1026-29).

A. *Expanded Demand Side Management*

If IPL modeled energy efficiency on an equivalent footing as other resource alternatives, and if it aggressively invested in cost-effective efficiency and distributed resources, it would secure significant additional benefits for consumers, the environment and for Iowa's economy. (Tr. 1171). To provide an example of what is possible, OCA generated the following three 10-year efficiency scenarios, exclusive of load management, that were modeled in IPL's EGEAS generated resource plan (1190-91):

- Low Efficiency – assumes the continuation of IPL's actual 2006 efficiency program savings and investments increasing at the rate of 2.2%/year. Spending for this scenario ranges from \$19.1 to \$23.4 million per year.
- Mid Efficiency – assumes 3-year ramp-up of programs to achieve annual savings of 1.75 times actual 2006 performance, which represents a maximum savings of 1.2% of energy and 1.7% of peak demand in 2011. The additional savings (above 2006 efficiency level and associated costs) are achieved at a cost of approximately 3 cents per life time kilowatt-hour, with spending ranging from \$19.1 million to \$59.9 million per year. IPL says it is now securing efficiency at about 0.9 cents per kWh.
- High Efficiency – assumes a 4-year ramp-up of programs to achieve annual savings of 2.5 times actual 2006 performance, which represents a maximum savings of 1.7% of energy and 2.4% of peak demand in 2011. The additional savings (above 2006 efficiency level and associated costs) are achieved at a cost of approximately 3 cents per life time kilowatt-hour, with

spending ranging from \$19.1 million to \$96.4 million per year.

The model was run with all three efficiency scenarios available for EGEAS to select under the three CO₂ price scenarios. When High Efficiency was removed as an option, the Mid Efficiency case was selected for all CO₂ price scenarios. In the no-CO₂ price case, the Mid Efficiency option delayed the need for the coal plant until 2018; for the low CO₂ case, it delayed the need for the plant until 2019. In the IPL high CO₂ case and the Synapse High CO₂ case, the coal plant is not selected during the planning period. The EGEAS modeling results suggest that the High Efficiency case is selected when it is available because it is lower cost than either the Mid or Low Efficiency cases – meaning that least cost resource planning selected the highest level of energy efficiency available. (Tr. 1192).

IPL witness Kitchen maintained that its EGEAS expansion plan considers “all combinations of existing resources and future resources.” (Tr. 557). Mr. Kitchen indicated that IPL “evaluates many different resource alternatives, both traditional and nontraditional, including . . . demand-side management (load management and conservation) resources.” (Tr. 558). However, as explained in section VI, IPL did not evaluate different or varying DSM objectives (or associated costs) in the EGEAS modeling submitted to support SGS Unit 4. (Ex.105, Sch. A). IPL has undertaken this analysis for its Minnesota jurisdiction with the goal of seeking to analyze the optimal level of DSM investment. (2005 ERP at 3-18). The scenario of increased DSM investment (above Commission-approved levels) for just IPL’s relatively small

Minnesota jurisdiction, produces a materially lower cost expansion plan than the DSM base case that continues DSM at current levels. (2005 ERP at Appendix 6E).

Witness Kitchen asserts that OCA double counts the effect of DSM on IPL's load forecast to the extent that OCA's proposed new level of DSM is not wholly incremental to the DSM approved in Docket No. EEP-02-38. This charge is limited to non-load management DSM as OCA proposals excluded load management programs. (Tr. 1190).

Witness Kitchen did not know how much DSM, exclusive of load management and direct load control, was reflected in IPL's load forecast. (Tr. 638). Mr. Hillberry relies on DSM numbers from Dr. Holmes but was unable to identify the amount of DSM, exclusive of load management and direct load control, embedded in his forecast.

(Tr. 1857-60). IPL's "method" for incorporating DSM implicitly, rather than as an independent variable, in its EGEAS resource planning analysis essentially precludes the modeling of additional increments of DSM (beyond that approved in Docket No. EEP-02-38) on a level basis with other resource alternatives (See Brief section VI), without running into IPL's charge of double counting.

Taking account of IPL's claims (yet not conceding these points due to the numerous problems in IPL's method for modeling DSM discussed above and in section VI), OCA witness Parker extracted the kW and kWh from IPL's load forecast associated with IPL's planned DSM for 2008 and beyond (Ex. 105, Sch. K). (Tr. 1245-47). The result is that Mr. Parker's High Efficiency case, net of base DSM, is roughly equivalent to the EGEAS results produced for the Mid Efficiency case. The ramped-up DSM alone

still defers the coal plant to 2018 assuming no CO₂ costs, and until 2019 assuming IPL's low CO₂ costs. (Tr. 1249, 1190, 1192).

Despite the weakness in IPL's modeling of DSM discussed above and in Section VI, IPL's analysis of High Efficiency for just its Minnesota jurisdiction confirms OCA's conclusions that greater investment in cost-effective DSM will produce a lower cost resource expansion plan. (2005 ERP, section 3.4.1 (p. 3-19) and Appendix 6E). IPL's 2007 Electric Resource Plan with all sensitivity analyses, including the modeling of different levels of energy efficiency for its Minnesota jurisdiction through varying energy forecasts and other expanded reporting requirements concerning CO₂ risk (Brief Section VI), is scheduled to be completed in time for filing with the Minnesota Public Utilities Commission on or before July 1, 2008.¹³

IPL's criticisms also do not change the validity of Mr. Parker's point that many states, including several who are recognized leaders in DSM, are boosting targeted DSM savings to levels above what witness Parker modeled for IPL. (Tr. 1186-87). Minnesota recently enacted legislation that targets DSM savings in line with Mr. Parker's Mid-to-High DSM scenarios. (Ex. 105, Sch. L, Ex. 18, Sch. M, p. 21). Accordingly, these efforts are not limited to states with higher retail electric rates.

Drawing on his extensive experience in this area, Mr. Parker testified that IPL could increase its investment in energy efficiency significantly, yet at reasonable cost, to levels that utilities in other states are now securing and many others are actively planning

¹³ The Minnesota PUC will also be evaluating fossil fuel efficiency of IPL's existing generating plans. Docket No. E-999/CI-06-159, "Order Taking Action Under Federal Energy Policy Act of 2005" MN PUC (Aug. 10th, 2007). (IPL will be documenting efforts to maintain or improve efficiency of existing plants). (Tr. 620).

to achieve. Mr. Parker's High-Efficiency scenario still captures efficiency at a cost of less than 3 cents per kWh, which compares favorably to the cost of new generation. (Tr. 1198). Expanded investment in DSM would allow the company to defer construction of SGS Unit 4 for at least 5 years beyond the planned operational date. (Tr. 1249, 1190, 1192). A number of utilities are now reliably securing energy efficiency at a rate of 1% or more per year while spending between 2% and 2.5% of annual revenues (exclusive of load control programs). (Tr. 1186, 1194). In addition, plans are either in place or under consideration to significantly surpass these historic levels of effort. (Tr. 1186, 1194-95).

OCA incorporates by reference discussion in Section VI concerning the many ways in which increased DSM investments holds the potential to offset more of IPL's future energy and demand requirements. IPL witness Holmes contends that IPL's programs must be cost-effective, achieving at a minimum a 1.0 societal benefit-cost result, but neglects to discuss the IPL's most recently reported benefit-cost results. IPL's 2006 electric DSM programs achieved following results under the Societal Benefit-Cost test:

<u>Total Electric Societal Benefit-Cost:</u>	2.98
Residential Electric:	3.17
Nonresidential Electric:	2.22
Load Management:	3.27
Other (Low Income/Ag)	1.98

(Tr. 1809-10). Clearly, IPL is nowhere near exhausting its electric DSM potential.

Additionally, there is significant potential for increased energy efficiency potential through mostly untapped distributed generation opportunities (also discussed in Section VI). Distributed resources includes energy efficiency opportunities, which are

“distributed” by their nature in that they are in the buildings and facilities of customers throughout a utility service territory. The term also refers to smaller-scale supply options (less than 100 kW), including net metering installations of renewable energy generation resources, combined heat and power (CHP) applications on customer sites with distributed heating and cooling systems, and strategically located smaller generation units installed primarily for peaking purposes or as part of an integrated strategy of least cost transmission and distribution investment. (Tr. 1179).

CHP is a proven technology. Efficiency levels of CHP installations can reach 80% or higher, well in excess of the efficiency of even the most sophisticated conventional generation. (Tr. 1180; Ex. 105, Sch. D). Encouragement of distributed resources can be enhanced through reasonable interconnection standards, tariffs, and incentives to promote actively both CHP and strategically valuable distributed generation. (Tr. 1185). Standardized interconnection procedures are currently under consideration in IUB Docket No. NOI-06-4.

IPL has a solid DSM foundation on which to build. (Tr. 1225-26). The plans and results of leading DSM programs confirm OCA’s recommendations. (Tr. 1241-42; Ex. 127). IPL’s performance has been showing good results and a general trend of improvement over the course of its current DSM plan. IPL should be commended for undertaking a thorough evaluation of its DSM plans in 2005 and implementing changes to enable more aggressive DSM goals. IPL suggests that it is performing on par with Vermont. When the decay factor unique to Vermont is removed from Efficiency Vermont’s reported DSM savings, it reveals that Vermont secured annual efficiency

savings of roughly 1 percent of total sales from 2000 to 2006. (Ex. 127). Preliminary results indicate that Efficiency Vermont achieved 1.6 or 1.7 percent of retail sales in 2007. (Tr. 1242). IPL's DSM results, while good from a historical standpoint and especially given the fact that IPL does not integrate its DSM investment with its energy resource plans, are not at the level of Efficiency Vermont. The results from Vermont and goals from other states are presented as an indicator of *what is possible when DSM is placed on a level playing field with other traditional supply resources*. These benchmarks are necessary because IPL's current method of determining DSM investment does not place DSM on a level footing with other resource alternatives.

OCA's DSM recommendations are consistent with Iowa's past and continuing leadership in the area of energy efficiency. Iowa is taking leadership on energy issues that demonstrate an integrated and least cost approach to its energy future. (Tr. 1174). This is evident in the Iowa Plan for Energy Independence that calls for achieving greater energy efficiency through integrated resource planning, by directing energy providers to increase energy efficiency efforts, and through enforcement of building energy codes¹⁴; in the National Action Plan on Energy Efficiency (Ex. 135); in the Midwest Governors' GHG Accord Platform establishing a measurable goal of least 2 percent of regional annual retail sales of natural gas and electricity through energy efficiency improvements by 2015, with additional 2 percent in efficiency improvements every year thereafter (Ex. 133, p.6); and in the January 2008 report of the Iowa Climate Change Advisory Council,

¹⁴ <http://www.energy.iowa.gov/OEI/plan.html> "Iowa Plan for Energy Independence" at pp. 8-9 submitted by Iowa Office of Energy Independence (December 2007)

finding: “[w]ithout our full analysis, it is clear to the Council that it is necessary to develop scenarios that slow, stop, and reverse the growth of Iowa’s GHG emissions soon.” (Ex. 134). These initiatives make it imperative to evaluate what more can be achieved from DSM. We are not operating under the status quo that IPL assumes for DSM in its resource plan supporting SGS Unit 4. OCA properly undertook to fill this gap in IPL’s planning analysis in order to provide some indication of the role additional DSM can play in IPL’s future resource needs. Ultimately, however, this analysis must be performed by IPL.

B. *Expanded Wind Generation*

OCA’s analysis remedies the wind modeling errors present in IPL’s EGEAS modeling analysis. First, IPL limits the amount of economic wind power plants the EGEAS model can choose and thus artificially forecloses the model’s ability to choose resources with the lowest system cost to IPL. Second, IPL caps the overall amount of wind the model has access to at 800 MW of new wind over the 15 year planning period. (Tr. 739-40). When this artificial constraint is removed from the scenarios modeling IPL’s minimal CO₂ costs, the EGEAS model chooses the maximum amount of wind available as an economic selection. (Tr. 740).

The 800 MW of new wind that IPL allows its EGEAS model to select over the planning period is far below the level of wind power that can be reliably accommodated on IPL’s system. (Tr. 740). IPL believes that it can accommodate 20% to 25% of its retail energy needs with wind. (Tr. 741). However, IPL’s preferred reference case calls for adding 400 MW of additional wind. When combined with IPL’s existing wind

resources, IPL's reference scenario would provide about 9.1% of IPL's projected retail energy needs in 2022. IPL's installed wind capacity in 2022 under its low and high carbon-constrained cases is 1,018 MW, which would meet 15.5% of its projected retail energy needs in 2022. (Tr. 739). OCA's analysis imposes a cap of 1,400 MW on wind that EGEAS may select, which represents approximately 25% of IPL's projected retail energy need in 2022. In OCA's analysis all of the 1,400 MW of new wind was selected as economic for a total wind resource of 1,618 MW in 2022. (Tr. 740). The amount of additional wind needed to satisfy a 20% RPS standard is confirmed in a recent report by Alliant to the investment community in which IPL is projected to need more than 1,100 MW of wind (above and beyond the 200 MW of wind generation that IPL currently intends to add) to meet a 20% renewable portfolio standard. (Ex.122, pp. 33-37). This document reports that Alliant is well situated to add wind in its service territory. (Id., pp. 29-32, 37).

IPL criticizes OCA's reliance on the cost of wind that IPL itself assumed in the resource planning model components submitted to support SGS Unit 4. Even though the wind cost assumed by IPL in this model is at an unprecedented high and has no actual basis in IPL's wind contracting experience (Tr. 1613-14, Tr. 1637-38), OCA accepted the assumed cost in IPL's EGEAS model. IPL's past resource plans and avoided cost determinations have been based on actual observed PPAs. (Tr. 626). In order to attempt to justify its commitment to base load coal, IPL rolled out in its rebuttal case new higher escalation rate assumptions for wind under its low and high CO₂ scenarios. IPL explains that it did not incorporate such assumptions in its direct case filing because its proposed

plan didn't call for adding large amounts of wind energy. (Tr. 580). IPL's explanation is not credible and seriously undermines the review process contemplated in section 476A.6 and the purpose for IPL submitting any planning scenarios beyond its preferred reference case. Section 476A.6 directs consideration of other feasible resource alternatives taking into account environmental policies of the state. Presumably IPL's purpose for submitting the low and high CO₂ scenarios was to comply with the section 476A.6 directive. However, there is no point in submitting any alternative modeling scenarios if IPL is going to wait until its rebuttal filing to include what it deems the relevant assumptions for these scenarios.

IPL's plan did not call for adding large amounts of wind energy in part because IPL inappropriately constrained the ability of its model to select wind and unreasonably limited the planning capacity attributable to new wind. If IPL were truly interested in exploring the feasibility of wind to meet its resource needs, it would have allowed its model to select wind up to levels that IPL acknowledges can be reliably accommodated on its system and not imposed unrealistically low capacity credits for new wind resources. After OCA's filing, IPL revealed new cost assumptions to buttress its preferred course of action. In rebuttal, IPL asserts that in a scenario of GHG regulation, wind prices will be further driven up due to increased demand for wind generators and transmission interconnection costs and backlogs.

IPL's direct case filing, upon which OCA relied, already incorporates an unprecedented all-time high price for wind in its EGEAS modeling. This unprecedented all-time high price clearly reflects existing state and regional initiatives that are

increasing the demand for wind ahead of any national RPS or CO₂ restrictions.¹⁵ Moreover, OCA's EGEAS analysis does evaluate the potential for higher supply resource costs by incorporating capital cost increases of 20% and 40% for all supply resources. (Tr. 1105-1155). There are other reasons to be skeptical of IPL's newly revealed and unapproved wind escalation factors that were applied to unprecedented (and undocumented) high wind prices in IPL's low and high CO₂ cost scenarios in its rebuttal filing. IPL provided no direct evidence of the increased prices it claims to be experiencing (Tr. 1605, 1613-14). Wind generation manufacturers are ramping up supply to meet increased demand. (Tr. 1600-02). Witness Friedman acknowledged that the Midwest ISO is working, with FERC's assistance, to address the backlog in the transmission interconnection queue. (Tr. 1639-40). Finally, ITC Midwest, the purchaser of IPL's transmission facilities, made several significant commitments regarding processes and planning to accommodate increased wind resources in the Midwest.

Mr. Friedman's opinion that backlogs in the interconnection queue process and transmission upgrade costs would present a significant obstacles to future wind integration served as the basis for Mr. Kitchen incorporating revised significantly higher escalation rates for wind resources modeled in the high and low CO₂ scenarios submitted in IPL's rebuttal filing. (Tr. 1617-18). Mr. Friedman was unfamiliar with the Attachment FF proposed by ITC Midwest in the docket involving the sale of IPL's transmission facilities. (Tr. 1640-41). The joint initial brief submitted by IPL and ITC Midwest to the IUB in support of the transmission sale states as follows (pp. 74-76):

¹⁵ Alliant discusses the RPS standards of Iowa, Minnesota and Wisconsin in Ex.122 pp. 29-37.

Questions posed by counsel for the Environmental Coalition and the Sierra Club at the hearing showed how little those parties actually knew about **the major role ITC Midwest can play in facilitating new alternative energy projects.** For example, the Environmental Coalition's counsel had the following discuss with Mr. Welch:

Q: (By Ms. La Seur) What steps will ITC Midwest take to facilitate the interconnection of renewable energy in Iowa.

A: (By Mr. Welch) We're going to take as many as the people here want us to take.

As a company, we believe in the support of renewables, as witnessed by our filings, and, furthermore, as witnessed by our commitment to build a regional 765 kV overlay grid that will give renewables broader market access, and also make more efficient generation, which is not a renewable, but clearly for the betterment of all of us the most efficient generation getting access to the load is going to be the best for both the environment and the economy.

And so that 765 kV overlay is absolutely envisioned to provide that for all the customers.

Q: And would your answer be any different if I asked you what steps will ITC Midwest take to facilitate the interconnection of distributed generation facilities in Iowa?

A: The thing that's really critical about ITC and our independence is that we don't view any generation any differently. In fact we can't.

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A subsequent exchange occurred between the Sierra Club's counsel and

Mr. Welch:

Q: (By Mr. Taylor) The first question was, "Describe in detail how alternative energy production facilities will access

the transmission lines subject to the proposed sale at issue in this case if the sale is approved.”

And as I read the answer, it is that “regardless of generator or fuel type, new electric generation facilities will connect to the existing grid as in the Midwest ISO process for large or small generators under the Midwest ISO Transmission and Energy Markets Tariff.” So is it your understanding that alternative energy sources would have to go through MISO?

A: (By Mr. Welch) All generation interconnections have to go through MISO. That is the reason that the tariff that we filed in Michigan is called Attachment FF, it’s attachment to the MISO tariff; and so for us to make that filing, we also have to have MISO on board to make that filing.

And hopefully, you know, that’s our signal to everyone here that, you know, given the broad-based support in Iowa, and also in Minnesota, that we will make a similar filing for interconnection here too. (Tr. 849-850).

The brief of joint petitioners continues:

There is perhaps **no better evidence of the ITC’s abiding commitment to the development of the renewable resources industry in the Midwest than the “Attachment FF”** mentioned by Mr. Welch in response to the Sierra Club’s counsel. ITC recently filed Attachment FF under the Midwest ISO tariff for *ITCTransmission* and METC for the purpose of reducing the interconnection burden for renewable generators. (Tr. 826-27). Under current Midwest ISO rules, renewable generators are required to pay up to 50% of the interconnection costs. (Tr. 827). Under Attachment FF, however, renewable generators would be able to interconnect with *ITCTransmission* and METC without charge, which puts them on an equal footing with all existing generation in the Midwest ISO footprint. (Tr. 827). **At the hearing Mr. Welch made a commitment to extend the benefits of this Attachment FF to renewable generators interconnecting with ITC Midwest upon closing of this Transaction.** (Tr. 827).

The Environmental coalition and the Sierra Club should now understand that the Transaction not only will not harm alternative energy producers' access to the transmission grid but will actually enhance it.

(Jt. Init. Br., Docket No. SPU-07-11, pp. 74-76) (emphasis added).

IPL asserted in the transmission sale proceeding, within the last year, that ITC Midwest's ownership of IPL's transmission facilities will significantly enhance access and reduce obstacles to interconnecting renewable energy resources, yet now argues in the instant proceeding that OCA's analysis of wind potential fails to account for the significant transmission costs and impediments to interconnect renewable energy resources. The fact that Mr. Friedman had no knowledge of what ITC Midwest committed to in the transmission case in this regard is troubling given the subject matter of his testimony but seemingly emblematic of the overall disconnect in IPL's planning process.

The record indicates that Mr. Friedman also did not know whether transmission costs were included in the wind price proposed as a cost cap in IPL's wind ratemaking principles application, Docket No. RPU-07-5. (Tr. 1637). Witness Kitchen uses this price cap as a proxy for future wind in the EGEAS modeling accompanying IPL's direct filing. This proxy figure does include transmission costs, as defined in witness Zuelke's filed direct testimony (pp. 15-16): "IPL shall be permitted to include in rates the actual costs of a Wind Facility built as part of the IPL Wind Project and associated transmission, up to the Iowa jurisdictional portion of [Confidential \$] per kW installed (inclusive of associated costs necessary for the reliable interconnection of the Wind Facility into IPL

or other transmission providers' delivery systems and exclusive of AFUDC), without the need to establish prudence or reasonableness." Mr. Friedman's escalation factors are predicated in part on transmission interconnection costs, yet he fails to recognize that such costs are already included in IPL's wind proxy cost.

For all of these reasons, the escalation rates for wind incorporated by Mr. Kitchen upon Mr. Friedman's advice and recommendation are neither credible nor persuasive.

IPL's decision to limit wind additions to 800 MW with unreasonably low capacity credit attribution (with the result that wind would meet 9.1% of its energy needs in 2022 under the EGEAS reference case and 15.5% of its projected retail energy needs in 2022 under IPL's low and high carbon-constrained EGEAS cases (above)), is out-of-step with current public policy calling for greater renewable energy investment. The Midwest Governors' Association (MGA) Greenhouse Gas Accord was accompanied by an Energy Security and Climate Stewardship Platform. Ex. 133. Midwest Governors, including Iowa Governor Culver, committed to work through the MGA to support implementation of the platform and help ensure economic prosperity, energy security and a healthy environment in the Midwest for the decades to come. The Platform commits the respective states to implement a comprehensive, multi-pronged approach that establishes the following renewable energy goals, as a percent of electricity consumed in the region: 10 percent by 2015, 20 percent by 2020, 25 percent by 2025, and 30 percent by 2030. (Ex. 133, p. 14). The Platform's stated renewable energy objectives include actions to:

- Maximize cost-effective renewable electricity production in the region and its integration on the grid (relying on the 2006 Minnesota Wind Integration Study finding that higher

percentages of wind power can be incorporated reliably into electric power system (Ex. 133, p. 17).

- Make the most efficient use of existing transmission infrastructure and develop new infrastructure, as necessary, to accommodate the region's economical renewable electricity.
- Ensure retention of local economic benefits from wind and other renewable power development.
- Expand the region's domestic production of wind turbines, towers and blades, solar technologies, and other renewable energy technologies to provide high-paying manufacturing and operational support jobs.
- Create a stable regulatory environment for renewable energy development.

(Ex. 133, p. 14). IPL witness Guelker's concerns (Tr. 1703) about the lack of certainty in timing and scope of this initiative are unfounded.

Iowa is doing its part to meet these goals. Governor Culver's Condition of the State Address to the Iowa General Assembly on January 15, 2008 endorses a requirement that 25 percent of all energy produced in Iowa be from a renewable source by 2025. (Ex. 125). Iowa has attracted major manufacturers of wind turbine components. (Tr. 1600-02; Tr. 181). House File 577 has resulted in a stable regulatory environment for renewable energy development by Iowa's investor-owned utilities, as evidenced by the advanced ratemaking principles approved in IUB Docket Nos. RPU-07-2, RPU-04-3, RPU-05-4, RPU-03-1, involving MidAmerican Energy Company, and in RPU-07-5, involving Interstate Power and Light, which collectively support the addition of hundreds of megawatts of wind generation. IPL's application for ratemaking principles clearly recognizes the benefits of wind and is predicated on policy initiatives to encourage wind.

(Tr. 1634-37)¹⁶ Mr. Friedman acknowledged that bringing wind generation on line sooner rather than later is an effective way to address and contain the price risk that he maintains has been observed with wind. (Tr. 1638).

Given these sound public policy objectives and the numerous benefits of wind, which IPL acknowledges, IPL's 800 MW cap on wind (and unreasonably low capacity credit attribution) over the resource period is inexplicable and unjustified. OCA's modeling refinements better capture actual wind potential in Iowa and give due consideration to important public policy objectives.

IPL's flawed planning approach leading to its selection of SGS Unit 4 will produce increased risks, higher electric rates, and substantial negative environmental impacts. (Tr. 1172, 1196, 1198). IPL's modeling must be corrected to place DSM on a level equivalent to other resources and to remove unnecessary and inappropriate constraints on the selection of wind during the 15-year planning period. The economic development effects associated with DSM and wind power are likely greater than those associated with the proposed coal plant. (Tr. 747-48, 1201-02). The opportunity for directly lowering consumer costs, improving building and facility energy performance, reducing GHG and strengthening the Iowa economy will be diminished once the decision to build the plant is made. (Tr. 1175).

¹⁶ Witness Friedman accepted the public policies, considerations and benefits associated with wind generation asserted by IPL in IUB Docket No. RPU-07-5 (Direct Testimony of Kim Zuhlke, pp. 5-6. (Sept. 28, 2007)).

IX. CERTAIN DESIGN FEATURES OF SGS UNIT 4 ARE INAPPROPRIATE.

OCA witness Powers, a professional mechanical engineer, testified that IPL's engineering consulting firm, Black and Veatch, selected IPL's predetermined plant design rather than conducting an objective and independent analysis. For example, in a contemporaneous analysis for Florida Power and Light, Mr. Powers found:

These two B&V technology assessments were written at almost the same time by the same author. Yet the [Pulverized Coal] PC technologies evaluated is different in each case, and the most cost effective technology is different as well. Great detail on the existing status of [ultra supercritical PC] USC technology is provided in the FPL study as a precursor to identifying USC as decisively more cost effective than other alternatives. This detailed analysis of USC is missing from the Alliant Energy analysis. USC is not even identified as a separate category of PC in the B&V study prepared for Alliant Energy. (Tr. 940).

Similar manipulations also occurred. (Tr. 940-41).

IPL does not know the total dissolved solids (TDS) concentration in the Iowa River, either during periods of normal flow or extreme low flow. The lack of technical analysis of various curative technologies on the part of IPL regarding the impact of SGS Unit 4 cooling tower blowdown discharges on aquatic life in the Iowa River is a significant deficiency in IPL's Application in this proceeding. (Tr. 941-42).

SGS Unit 4's water consumption from the Marshalltown Municipal Water System is immense and is greater than Marshall County's entire population usage. No analysis was provided by B&V to demonstrate that under extreme but foreseeable conditions of low water availability in the immediate area there will be adequate makeup water available for SGS Unit 4 without potentially compromising higher use agricultural or

potable water supply uses. SGS Unit 4 could also drain Marshalltown Municipal Water System's aquifer at an alarming rate. In addition, with the 40% updated increase in SGS Unit 4's water usage, IPL's water cost could be immense as well as further substantially depleting the aquifer. (Tr. 942, 950).

Despite the TDS blowdown potential from SGS Unit 4's proposed cooling tower on the Iowa River, SGS Unit 4 will nonetheless use wet cooling and the aquatic life in the Iowa River will simply have to adapt to elevated salt concentrations when these organisms are already heavily stressed by high water temperature and reduced dissolved oxygen concentration. An air cooled condenser should clearly be considered. The average annual efficiency penalty of a properly designed air-cooled condenser for SGS Unit 4 would be 2 percent on an annual basis and less than 4 percent on hot summer days. (Tr. 942-44). This is a small price to pay for protecting an important part of the environment in the Marshalltown area.

X. CONCLUSION.

The IUB should deny approval for construction of SGS Unit 4 at this time and, instead, order IPL to conduct energy resource planning that allows for the selection of wind up to a level that represents 25% of IPL's projected energy needs and that considers energy efficiency strategies (including distributed energy resources) on an equal footing with conventional supply options, accounting for CO₂ avoidance and the value in risk reduction. Implementing these changes will likely call for expanded investment in DSM and wind. As part of this ramp-up, IPL should proactively promote distributed resources,

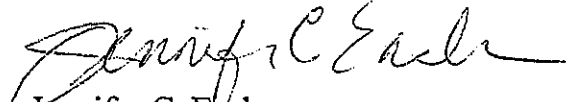
including CHP applications, where they are most cost effective for customers and provide a viable resource option.


It is unwise to expose IPL's customers to the risks associated with a new base load coal plant at a time of great uncertainty about Iowa's and the nation's energy future. IPL's will undoubtedly seek ratemaking principles that guarantee ratepayers are fully responsible to pay the full costs of the production they receive from the plant, including construction cost increases, future CO₂ mitigation costs, and increased coal prices. Moreover, under Iowa emissions plans and budget law, IPL will likely be allowed to pass along all cost increases of future state and federal environmental regulation of SGS Unit 4, including CO₂ regulation.

IPL has wholly failed to satisfy Iowa Code §§ 476A.6(1), 476.53(2), and 476A.6(3) for the reasons and on the grounds set forth above. IPL's Application therefore must be denied by the Board.

Respectively Submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing document has been served upon all parties of record in this proceeding in accordance with the rules of the Iowa Utilities Board on February 11, 2008.

