

STATE OF IOWA
DEPARTMENT OF COMMERCE
UTILITIES BOARD

IN RE: INTERSTATE POWER AND LIGHT COMPANY	DOCKET NO. GCU-07-1
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FINAL DECISION AND ORDER

(Issued August 25, 2008)

SYNOPSIS¹

In this order, the Utilities Board (Board) grants Interstate Power and Light Company's (IPL) request for a certificate to construct and operate a 630 MW coal-fired power plant near Marshalltown, Iowa, subject to certain conditions, including a requirement that IPL burn biomass fuels at the plant as IPL says the plant is designed to do and a requirement that IPL add new renewable energy sources (in addition to 200 MW of new wind resources already proposed) to its generation mix over the next 20 years. These requirements are intended to mitigate the company's future greenhouse gas emissions and the exposure of IPL and its customers to cost risks associated with those emissions.

¹ This synopsis is provided only for the convenience of the reader. It is not the Board's order and cannot be relied upon as a substitute for the full order.

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I. PROCEDURAL HISTORY

On July 2, 2007, IPL filed with the Board an application pursuant to Iowa Code chapter 476A for a generating facility certificate to construct and operate a 630 MW coal-fired electric generating unit. Specifically, 350 MW will be allocated to IPL, while Central Iowa Power Cooperative (CIPCO) and Corn Belt Power Cooperative (Corn Belt) will each own 100 MW. The remaining 80 MW will be available to IPL unless sold. The proposed unit will be called the Sutherland Generating Station Unit Number 4 (SGS Unit 4) and is to be located adjacent to IPL's existing Sutherland Generating Station (SGS) in Marshalltown, Iowa. IPL held the informational meeting required by 199 IAC 24.7 on May 21, 2007. Proof of publication of the notice of the informational meeting was filed on March 1, 2007.

The Board accepted IPL's application on August 16, 2007, in an "Order Accepting Filing, Requiring Additional Information, Setting Procedural Schedule, and Setting Intervention Deadline." Notice of the filing was mailed to all owners and lessees of real property located within 1,000 linear feet of the proposed site pursuant to Iowa Code § 476A.4(2)"c," as listed in IPL's application. In accordance with § 476A.4(3), notice was published and proof of publication was filed. The Board's order set an October 22, 2007, deadline for intervenors to file direct testimony.

On September 13, 2007, CIPCO and Corn Belt filed separate petitions with the Board to intervene in Docket No. GCU-07-1. On September 21, 2007, Community Energy Solutions, Iowa Environmental Council, Iowa Farmers Union, Iowa Physicians

for Social Responsibility, and Iowa Renewable Energy Association (collectively, the Coalition) jointly filed a petition to intervene. There are no other intervenors in this proceeding.

On September 17, 2007, IPL filed additional information requested by the Board, which included 11 items: (1) a quantitative analysis of the potential impact on the proposed SGS Unit 4 if federal legislation regarding carbon taxes or a carbon-trading program is implemented; (2) a list of the transmission enhancements needed in Marshalltown area with or without SGS Unit 4; (3) the projected costs of the potential transmission enhancements; (4) information about IPL's site selection process; (5) whether the proposed site for SGS Unit 4 would be feasible without the transmission enhancements; (6) how the transmission enhancements and transmission-related costs were considered in the first phase of IPL's site selection methodology; (7) a breakdown of the total projected cost of the power plant; (8) a copy of IPL's 2007 Resource Plan EGEAS output and supply alternatives and costs considered in electronic CD format; (9) clarification on how the addition of SGS Unit 4 affects the reliability of the electric system that serves IPL's Iowa ratepayers; (10) the expected hours of operation of the plant; and (11) the expected operating characteristics of SGS Unit 4.

IPL filed the direct testimony of eight witnesses with its application. On October 22, 2007, the Consumer Advocate Division of the Department of Justice

(Consumer Advocate) filed the testimony of seven witnesses and the Coalition filed the testimony of four witnesses.

On December 13, 2007, IPL, Corn Belt, CIPCO, Consumer Advocate, and the Coalition filed a joint statement of issues, describing generally the issues to be addressed during the hearing.

On December 14, 2007, IPL filed a supplement to section 1 of its application for a generating facility.

On January 9, 2008, Consumer Advocate filed supplemental direct testimony from its witnesses Schlissel and Hausman.² On January 10, 2008, the Coalition submitted supplemental or rebuttal testimony from its witnesses Harl and Sanzillo.³ On January 11, 2008, IPL submitted a motion to strike the additional testimony of both Consumer Advocate and the Coalition on substantially the same grounds. On the same day, Corn Belt and CIPCO joined IPL's motion to strike. Also on the same day, Consumer Advocate and the Coalition each filed resistances to IPL's motion to strike.

On January 14 through 18, 2008, a hearing was held in Marshalltown, Iowa. On the first day of the hearing, the Board, from the bench, issued its decision regarding IPL's motion to strike additional testimony, determining that the additional testimony offered by Consumer Advocate and the Coalition was outside the scope of

² David A. Schlissel, Senior Consultant, Synapse Energy Economics, and Ezra D. Hausman, PhD, Senior Associate, Synapse Energy Economics.

³ Dr. Neil E. Harl, Economist, self-employed, and Thomas Sanzillo, Senior Associate, TR Rose Associates.

the procedural schedule and 199 IAC 7.10, which allows updates and corrections to prefiled testimony, but does not permit addition of entirely new testimony a few days before hearing. (Tr. 108).

Initial briefs were filed by IPL, Consumer Advocate, the Coalition, CIPCO, and Corn Belt on February 11, 2008, and reply briefs were filed by the parties on February 25, 2008.

On February 20, 2008, the Coalition filed a motion to dismiss IPL's application on the grounds that IPL introduced new evidence subsequent to the hearing by holding a press conference and issuing a press release stating IPL's intention to retire and convert certain older power plants if SGS Unit 4 is approved. On February 26, 2008, IPL filed a resistance to the Coalition's motion to dismiss, and on February 28, 2008, Corn Belt and CIPCO filed a resistance to the Coalition's motion. On February 27, 2008, Consumer Advocate filed a joinder in the Coalition's motion.

On March 5, 2008, IPL filed a response to Consumer Advocate's joinder and on March 5, 2008, the Coalition replied to IPL's resistance. On March 21, 2008, the Board issued an order denying the Coalition's motion to dismiss, but striking the sections of IPL's brief mentioning its intention to retire and convert certain older power plants upon approval of SGS Unit 4.

On April 30, 2008, the Board held an open meeting to render an oral decision in this docket, as reflected in this order.

II. STATUTORY ANALYSIS

The action of the Board in this proceeding is governed by Iowa Code chapter 476A. Section 476A.6 requires the Board to issue a generating certificate if the Board finds the following:

1. The services and operations resulting from the construction of the facility are consistent with legislative intent as expressed in section 476.53 and the economic development policy of the state as expressed in Title I, subtitle 5, and will not be detrimental to the provision of adequate and reliable electric service.
2. The applicant is willing to construct, maintain, and operate the facility pursuant to the provisions of the certificate and this subchapter.
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.

Iowa Code § 476A.6(1) requires that the services and operations resulting from the construction of the proposed facility be consistent with legislative intent as expressed in § 476.53 and the economic development policy of the state as expressed in Title I, subtitle 5, and not be detrimental to the provision of adequate and reliable electric service. The individual elements of this provision bear closer examination.

Iowa Code § 476.53 states that it is the intent of the General Assembly to attract the development of electric power generating and transmission facilities within

the state in sufficient quantity to ensure reliable electric service to Iowa consumers and provide economic benefits to the state to the extent it is cost effective and environmentally permissible to do so. Specifically, §§ 476.53(1) and (2) provide as follows:

1. It is the intent of the general assembly to attract the development of electric power generating and transmission facilities within the state in sufficient quantity to ensure reliable electric service to Iowa consumers and provide economic benefits to the state.

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.

The requirement of a "sufficient quantity" and the cost-effectiveness test relates to whether the company and its customers need the proposed facility. Thus, the need for the proposed plant is one critical issue to consider in this case, and the timing of the proposed plant is part of that analysis. In these statutes, the General Assembly expresses a policy in favor of capturing the benefits of building and operating electric power generating and transmission facilities in Iowa to meet Iowa's electric power needs. These statutes express no preference for any particular type of generation, but they represent a legislative recognition that if needed facilities are built in Iowa, the state will receive significant benefits. Further, the requirement for cost-effective implementation serves to emphasize the focus on whether the specific

facility under consideration must enable the company to provide adequate and reliable service at a reasonable cost.

Furthermore, the phrase "provide economic benefits" means that the Board must make a determination as to whether economic benefits will be derived from the proposed plant. This is answered, in part, by considering the jobs created in the construction and the operation of the proposed plant, but, more importantly, by evaluating the long-term effect of the proposed plant on the company's ability to provide adequate and reliable power at reasonable cost to accommodate growth in demand.

Iowa Code § 476.53(2) states that "[t]he 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." The phrase "cost effective" in this statute has at least two possible interpretations in this context: (1) the cost of building the proposed plant is outweighed by the benefits or (2) the cost of building the proposed plant is expected to be lower than any reasonable alternative. In this situation, the Board's interpretation is guided by the 2001 amendments to § 476A.6, which eliminated the requirement that an applicant show the proposed facility is the lowest-cost alternative available to serve customers. (See Iowa Code § 476A.6(6) (Code 1999)). The elimination of that requirement indicates a legislative intent that the proposed plant must be a reasonable alternative

with a positive benefit-to-cost ratio, but it does not have to be the lowest-cost alternative.

Iowa Code § 476.53(2) also requires § 476.53(1) to be implemented in a manner that is "compatible with the environmental policies of the state, as expressed in Title XI" of the Iowa Code. Title XI is the section of the Iowa Code that establishes environmental policy. Title XI gives the Board guidance on the basic environmental policies regulated by other agencies and sets the floor on regulated environmental policy; a proposed plant cannot be approved if it fails to meet the requirements of Title XI. However, this environmental policy clause also leaves room for the Board to determine whether the issuance of a generation certificate is compatible with environmental policies that are not specifically delineated in Title XI, pursuant to § 476A.6(3), discussed later in this order.

Iowa Code § 476A.6(1) states that the proposed facility's service and operations must be "consistent with ... the economic development policy of the state as expressed in Title I, subtitle 5." Subtitle 5 addresses the economic policy of the state of Iowa. The mission of the Iowa Department of Economic Development (IDED) is described there; in part, it is to "enhance the economic development of the state and provide for job creation and increased prosperity." Iowa Code § 15.101. The Board concludes that the IDED's mission statement in Iowa Code § 15.101 is relevant and related to the sections in Iowa Code § 476A.6(1) regarding the economic development policy of Title I, subtitle 5. However, part of the Board's

responsibility is to make sure the proposed plant is consistent with the economic policy of the state, and it is also the Board's responsibility to consider the proposed plant as it relates to the attraction of other types of businesses to the state of Iowa.

Iowa Code § 476A.6(1) also requires that "[t]he construction of the facility ... will not be detrimental to the provision of adequate and reliable electric service." This means, among other things, that the existing transmission network will have the capability to reliably support the proposed additional generation to the network or that the transmission network will be upgraded as necessary to deliver electric power from the proposed plant.

Iowa Code § 476A.6(2) states in part that "[t]he applicant is willing to construct, maintain, and operate the facility pursuant to the provisions of the certificate and this subchapter." This section allows the Board discretion in imposing reasonable conditions for issuance of a siting certificate.

Iowa Code § 476A.6(3) requires that "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." This required finding must be parsed carefully to avoid overlapping, and potentially conflicting, decisions by different state agencies.

The phrase "consistent with reasonable land use and environmental policies" refers to the terms and conditions in licenses and permits which are issued by other

regulatory agencies, including the authority of the Iowa Department of Natural Resources (DNR) to issue certain environmental licenses and permits, so long as those policies are reasonable.

The first clause of § 476A.6(3), is related to the clause in Iowa Code § 476.53(2) that requires the development of electric power generating facilities to be "compatible with the environmental policies of the state as expressed in Title XI." This reinforces the notion that the first clause requires the Board to consider the environmental policies of other agencies.

The second clause, "consonant with reasonable utilization of air, land, and water resources ..." can be considered separately and gives the Board authority to consider environmental issues that are not addressed by other regulatory bodies. This clause must be read with the last clause of Iowa Code § 476A.6(3), which states "considering available technology and the economics of available alternatives." This language provides the standard the Board must apply when considering environmental issues that are not regulated by other agencies.

III. DISCUSSION OF THE EVIDENCE

ISSUE 1 **Are services and operations of the proposed facility consistent with legislative intent per Iowa Code § 476.53 and the economic development of Iowa and not detrimental to adequate and reliable service?**

A. Introduction

The proposed SGS Unit 4 will be a 630 MW coal-fired generating facility. IPL will have a 350 MW ownership interest. The facility will be built in Marshalltown, Iowa. The proposed SGS Unit 4 will be able to use either western or eastern coal. (Tr. 119, 213). IPL's Electric Generation Expansion Analysis System (EGEAS) computer model, which will be discussed in greater detail later in this order, selects 350 MW of coal unit in 2013, the first year in which a coal plant can be selected, as the lowest-cost alternative for serving IPL's projected customer needs. (Tr. 559).⁴ EGEAS also projects that SGS Unit 4 will be economically dispatched most of the time it is available. (Tr. 601). IPL maintains that SGS Unit 4 will incur approximately 7 percent in planned outages on an annualized basis and a capacity factor for the plant of greater than 90 percent is achievable. (Tr. 598-600).

B. Economic Development

IPL's position

IPL maintains that SGS Unit 4 will foster economic development by creating jobs and generating significant expenditures and tax revenues in Iowa. (Tr. 372).

⁴ In fact, IPL's EGEAS-based resource plans have for sometime indicated a need for additional coal-fired generation in the 2012-13 time frame, as shown by IPL's 2001, 2003, and 2005 resource plans. (Tr. 569).

During the peak construction period, SGS Unit 4 will employ approximately 1,400 workers and potentially generate \$140 million in wage earnings. (Tr. 183, 244-48). IPL witness Otto⁵ estimates that the secondary effects of construction will mean a total of 5,535 jobs, \$425 million in income, and a contribution of \$330 million to the State's economy. (Ex. 3 (DMO-1); Tr. 183). When fully operational, SGS Unit 4 will have an estimated 85 full-time employees and the facility will pay approximately \$2.9 million annually in property replacement taxes. (Tr. 372). Iowa's electric consumption is increasing at approximately 1.4 percent per year due to increases in population, income, and employment in the Iowa economy, and the Iowa economic base will increase demand for electricity due to ethanol and biofuel industries. The construction and operation of SGS Unit 4 will provide temporary and long-term benefits on a statewide basis increasing the ability of IPL to handle residential and industrial load growth. (Tr. 181-82).

Consumer Advocate's position

The costs and environmental risks posed by SGS Unit 4 do not advance, and may jeopardize, economic expansion in Iowa. IPL witness Otto erroneously assumes that baseload generation is the only means by which future electric load can be reliably met. Consumer Advocate witness Fagan⁶ argues that a wind farm producing the same amount of energy as SGS Unit 4 would have greater and more beneficial economic impacts. (Tr. 734, 747-48).

⁵ Daniel M. Otto, Professor of Economics, Iowa State University.

⁶ Robert M. Fagan, Senior Associate, Synapse Energy Economics.

Coalition's position

IPL failed to rebut the following key points made by Coalition witness Harl:

(1) Present and future economic uncertainties in the biofuels sector call into question the alleged growth of demand on IPL's system from existing and proposed biofuels facilities.

(2) The future viability of ethanol and biodiesel facilities in IPL's service territory is highly uncertain in the face of short-term market adjustments and competing fuel sources and technologies.

(3) IPL's proposal does not take into account all relevant cost externalities that result from coal-fired generation.

(Tr. 1442-53).

The report submitted by IPL witness Otto projecting that the biofuel sector will continue to grow is not an analysis of the long-term outlook for biofuels, but an analysis of the hypothetical potential growth of biofuels that was completed for the purpose of modeling the potential effects on U.S. grain, oilseed, and livestock markets. As such, the report may overstate the real long-term outlook.

Coalition witness Sanzillo testified there are serious flaws in IPL's demand and cost projections, as well as IPL's financing model. (Tr. 1381-91). IPL's forecast estimates are "not credible" and SGS Unit 4 is not necessary. The Coalition also

argues that IPL is "rent-seeking."⁷ The Coalition cites *The Stern Review on the Economics of Climate Change*, as referenced by Consumer Advocate's witness Hausman, stating: "if we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5 percent of global GDP each year, now and forever." (Tr. 878).

More sustainable economic benefits can be obtained by developing wind. In particular, locally-owned wind generation and energy efficiency measures would produce equal or greater macroeconomic benefits for the state.

CIPCO and Corn Belt's position

SGS Unit 4 would produce substantial additional property replacement taxes to be shared by the local government and school district. The Board has previously found that the creation of new jobs during the construction of a power plant, as well as the provision of permanent employment and tax revenue, is consistent with the economic development policy of the state.

CIPCO reiterates the testimony of IPL witness Otto, who states that "SGS Unit 4 will accommodate electric consumption increases due to increases in population, income, and employment, that would otherwise potentially be displaced to other geographic regions and provide reliable cost effective supplies of electricity

⁷ The Coalition asserts that rent-seekers attempt to maximize profits by manipulating the economic or legal environment, rather than by making a profit through trade or the production of wealth. Rent-seeking imposes a high transaction cost on the economy with little or no offsetting benefit.

currently stimulating, and required in increasing amounts by, the expanding biofuels and wind energy industries in Iowa." (Tr. 181).

Analysis

Proposed SGS Unit 4 is consistent with the statutory policy in favor of reaping the economic benefits that are associated with using Iowa generation to serve Iowa's electric power needs. The construction and operation of the plant will create jobs and local and state economic benefits. (Tr. 183, 244-48, 372). However, similar benefits could also result from constructing and operating wind or other renewable generation facilities and installing energy efficiency measures in Iowa, so this evidence is not, by itself, determinative of this criterion.

The more important considerations are whether SGS Unit 4 is needed to serve customer's demands; whether SGS Unit 4 is the right type of generation for those needs; and, in the end, whether the proposed facility appropriately and reasonably meets the projected long-term needs of existing and future customers. A reliable and adequate supply of long-term electric power at a reasonable overall cost will have a greater effect on Iowa's economy than comparatively short-term construction jobs.

IPL has provided evidence, including a study, tending to show that construction of SGS Unit 4 will generate significant economic activity in Iowa. Consumer Advocate argues that the construction of wind-driven generating facilities could lead to even more economic activity and benefit. The Coalition questions the need for new generation and raises issues regarding the cost externalities associated

with coal-fired generation and the possible superiority of wind-driven generation and energy efficiency as alternatives. All of these positions are based on projections, estimates, and assumptions regarding future conditions, so no single party's position can be declared, at this time, to be true or correct in an absolute sense.

Taken together, however, they illustrate the need to diversify Iowa's approach to meeting its future energy needs, balanced with the relative certainty that comes from relying on proven alternatives. The evidence clearly shows that SGS Unit 4 has a place in IPL's generation mix. IPL's customers need baseload generation and SGS Unit 4 is a reasonable way to serve that need. IPL is projected to be short of capacity in a few years, before SGS Unit 4 will be available, causing IPL to have to purchase capacity in the market to meet its customers' needs. By helping IPL to serve those needs, SGS Unit 4 will help support economic development in Iowa and help IPL to provide adequate and reliable service.

The evidence also shows that renewable generation sources, including wind-driven generation, have an important place in IPL's generation portfolio. SGS Unit 4 is expected to have a high capacity factor and will run when needed, while wind-generated electricity already offers economic benefits to Iowa and even greater potential benefits if the government enacts a program that creates an economic cost for carbon emissions. The two power sources therefore have different strengths and weaknesses and should be viewed as complementing each other rather than competing with each other. To attract new industries in Iowa and to serve existing

electric load, communities need to develop a dependable infrastructure that includes stable electric service at affordable cost.

Thus, the Board agrees with Consumer Advocate and the Coalition that there are real economic benefits to be gained from developing renewable power sources and energy efficiency. Those benefits will be realized as a result of this order and the Board's continuing review of IPL's energy efficiency plans. At the same time, the reliability of coal-fired generation makes SGS Unit 4 a viable part of the generation mix. Considering all of these elements together, the Board finds that IPL has met the economic development requirement of §§ 476A.6(11) and 476.53.

C. Adequate and Reliable Service

IPL's position

IPL maintains that the proposed SGS Unit 4 will contribute significantly to the provision of reliable electric service to IPL's customers by adding 350 MW of needed generating capacity to IPL's resources to meet growing energy and demand requirements. In addition, by locating the new plant adjacent to the existing SGS, existing and readily upgradeable electric transmission facilities will easily accommodate the operation, maintenance requirements, and energy output of SGS Unit 4. Finally, SGS Unit 4 will assist IPL in meeting the multi-pollutant emission standards that are expected in the future. (Application, Section 5; Tr. 562-63).

SGS Unit 4 will not be detrimental to the provision of adequate and reliable service. IPL projects it will be capacity deficient beginning in 2010 and will need to

purchase power on a short-term basis until SGS Unit 4 comes on-line. IPL will utilize 350 MW of SGS Unit 4 to provide reliable electric service to its consumers. (Tr. 118). IPL's resource plans demonstrate that a baseload facility is the most effective resource to add to IPL's generation mix at this time. (Tr. 373). The additional transmission infrastructure needed to support the proposed SGS Unit 4 provides additional reliability that also benefits the region and the state of Iowa. (Tr. 374-75).

Analysis

Pursuant to Iowa Code § 476A.6(1), this record establishes that SGS Unit 4 will not be detrimental to the provision of adequate and reliable service and will contribute to the provision of reliable electric service. IPL is projected to be capacity deficient beginning in 2010. IPL will own 350 MW of the proposed 630 MW of SGS Unit 4. This will contribute materially to IPL's ability to provide adequate and reliable service to its consumers. (Tr. 118). Additionally, the proposed transmission improvements in the Marshalltown area in association with SGS Unit 4 will make a contribution towards improving reliable electric service for Iowans.

A diverse resource portfolio that relies on a variety of fuels is increasingly important to affordable and reliable electric service. A comprehensive resource mix protects electric utilities and their customers from contingencies such as fuel unavailability and price fluctuations. Rather than run all plants all the time, which results in economic inefficiencies, a comprehensive resource plan allows utilities to

operate a mix of generators (baseload, intermediate, or peaking) to minimize costs while meeting environmental standards.

In this connection, it is important to understand the differences among baseload, intermediate, and peaking plants. Generally speaking, baseload plants tend to be capable of sustained, reliable operation at a comparatively low fuel cost, so that they can be run at a high annual capacity factor (for example, as much as 90 percent of the hours in a year). Peaking plants, in contrast, are often units that have a relatively low capital cost, but higher fuel costs, and they are used to serve periods of peak demand and to meet other relatively short-term needs (local system support, for example). Intermediate generators, not surprisingly, tend to occupy a middle ground between baseload and peaking plants, in terms of capital cost, operating cost, and annual hours of operation.

Traditionally, the plants described above would all share one characteristic: they would be capable of providing power when it is needed, more or less on demand. A baseload plant that does not run at a high capacity factor is not really a baseload plant; a peaking plant that cannot be called upon during periods of peak demand is not serving its function.

Wind-driven generation does not fit neatly within these categories. It tends to have relatively high capital costs and lower operating costs, which are characteristics of baseload plants, but it is not reliable in the sense of generally being available whenever needed. If the wind is not blowing, a wind farm will not provide power, no

matter how much the market may demand it. For this reason, wind-driven generation is not properly characterized as baseload, intermediate, or peaking capacity; it is primarily a source of energy, at least when compared to more traditional electric generating facilities.

1. EGEAS Modeling

IPL's position

IPL states that its decision to move forward with its application for the proposed plant was based, in part, on its EGEAS runs conducted as part of its 2007 Resource Plan. That plan included numerous scenarios that indicated the need for additional coal-fired generation. (Tr. 575). Its base case EGEAS run demonstrates that 200 MW of IPL-owned wind generation in 2010, 50 MW of short-term market capacity in 2011, 100 MW of short-term market capacity in 2012, and the proposed SGS Unit 4 in 2013 are all selected as the most economic resource additions between now and 2013. (Tr. 560-61).

For consistency, IPL developed its base case resource plan using assumptions that are based on existing regulations. This means that the base case does not include any analysis of potential regulation of greenhouse gasses, including carbon dioxide (CO₂) emission. The parties generally agreed that some form of CO₂ regulation (cap and trade or a carbon emissions tax) is likely in the future. Because there are no CO₂ regulations currently applicable to IPL's operation, IPL notes that potential CO₂ regulations were considered in the sensitivity runs and were not

included in the EGEAS base case. (Tr. 582). Several sensitivity runs including potential CO₂ regulations were conducted as part of IPL's 2005 and 2007 Resource Plans and SGS Unit 4 continued to be selected as the most economical resource for IPL's customers under all scenarios.

Consumer Advocate's position

IPL's EGEAS modeling fails to consider numerous potential alternatives and is weighted in favor of new coal-fired capacity. For example, IPL's modeling does not consider the risk that plant capital costs at the time IPL filed its application could increase significantly by the time IPL actually commences construction. It is reasonable to expect the actual cost of SGS Unit 4 will be substantially higher than IPL has estimated. IPL does not know the current capital cost for SGS Unit 4. (Tr. 133-35; Ex. 118). If SGS Unit 4 is more expensive than IPL has projected, it is possible that EGEAS would no longer select it as the most economical choice in 2013.

Next, Consumer Advocate witness Parker⁸ argues that IPL failed to allow its modeling to use additional energy efficiency programs to meet IPL's projected capacity and energy needs. (Tr. 965-67). Because of this, additional energy efficiency programs were not adequately evaluated as a potential alternative to SGS Unit 4 or as a means to delay the need for the plant.

A November 2007 document prepared for IPL's investors concerning the prospect of a 20 percent national renewable portfolio standard, in which IPL stated

that meeting that standard would require "an additional 1,100 MW of wind over and above what is currently planned and that IPL's service territory is well positioned for the siting of additional wind resources." (Ex. 122, p. 37). This shows the viability of wind generation as an alternative to the proposed unit. The document does not mention any limitations on equipment supply or transmission impediments that would make it difficult to expand the amount of wind generation in IPL's base plan, as IPL now claims.

IPL has not included any estimate of combined heat and power (CHP) opportunities in its EGEAS modeling for SGS Unit 4. (Tr. 1183; Ex. 105, Sch. E). These opportunities could help defer or eliminate the need for the new unit. IPL should be proactive in evaluating benefits from strategic CHP investments in customer facilities. Consumer Advocate witness Parker stated that IPL's need for SGS Unit 4 is in large part based on expanding ethanol and biofuel industries and there is significant potential in these industries for distributed generation opportunities.

IPL's flawed planning approach leads to its selection of SGS Unit 4 and will produce increased risks, higher electric rates, and substantial adverse environmental impacts. (Tr. 1172, 1196-98). If IPL had modeled additional energy efficiency efforts on an equal footing with other resource alternatives, IPL would have secured significant benefits for consumers, the environment, and Iowa's economy. (Tr. 1171).

⁸ Scudder H. Parker, Scudder Parker Consulting.

Consumer Advocate witness Schlissel argues that IPL did not use a reasonable range of CO₂ emissions allowance prices in its modeling, that IPL failed to reflect the risk that power plant capital costs could increase above the figures in its EGEAS modeling, and that IPL assumed its new coal plant could operate at an unrealistically high capacity factor. Consumer Advocate witness Drunsic⁹ argues that setting the maximum number of "superfluous units" in the EGEAS model at two artificially limited the amount of wind capacity the model could add in early years, and with a change to ten superfluous units, the EGEAS model did not add SGS Unit 4 until 2019. (Tr. 679-80).

IPL unnecessarily and unreasonably constrained the EGEAS model, which prevented the EGEAS model from identifying the least-cost plan in scenarios which included CO₂ emission costs. Based on the EGEAS model runs that Consumer Advocate conducted, SGS Unit 4 is not part of a least-cost generation expansion plan. (Tr. 674-75).

By correcting the flaws and limitations in IPL's modeling, IPL can defer or eliminate the need for SGS Unit 4 for at least several years beyond 2013. Under Consumer Advocate's analysis using IPL's high CO₂ price, a new coal-fired generating plant was only a part of one of the scenarios and, even assuming an unreasonable 10 percent increase in projected natural gas prices, SGS Unit 4 still was not added until 2019.

⁹ Michael W. Drunsic, Research Associate, Synapse Energy Economics.

Coalition's position

Coalition witness Fagan argues that IPL misrepresents wind's ability to meet energy needs economically by using an unrealistic base case that excludes CO₂ cost impacts, underestimates the capacity value of wind, artificially and unnecessarily constrains the EGEAS resource-planning model from choosing economic wind power options as resource alternatives, and caps the availability of new wind resources at 800 MW over the planning period, far below the level of wind that can be accommodated on the regional power network. (Tr. 740).

Coalition witness Sanzillo identified what he believed were unsupported assertions, incorrect assumptions, flawed modeling, and a lack of transparency in IPL's load forecasts. The Coalition agrees with Consumer Advocate witness Drunic's assertion that IPL did not identify a true least-cost capacity expansion plan because of the artificial constraints that IPL placed on the EGEAS model. (Tr. 739-42). Furthermore, Consumer Advocate's modeling shows that wind is the cheapest available energy resource to meet customer needs in Iowa, even using IPL's low carbon price scenario.

SGS Unit 4 will be an unreasonable obstacle to the development of renewable energy and improved energy efficiency in Iowa and will create excess capacity on the IPL system in 2013. IPL has not provided any information regarding the need for the extra 80 MW of coal-fired capacity that will be sold to an as-yet-unidentified joint owner or through purchased power agreements.

SGS Unit 4 will unnecessarily drain capital and market share from wind generation, even setting aside the new plant's excess capacity and rising capital costs, and the best evidence available demonstrates that wind energy can constitute a substantial portion of IPL's systemwide capacity without sacrificing reliability.

CIPCO and Corn Belt's position

CIPCO and Corn Belt argue that the EGEAS analysis used for IPL's 2007 Resource Plan correctly selected a capacity addition of 350 MW of coal in 2013; the first year coal could be selected. No evidence was introduced that would suggest that the addition of the proposed new baseload generating resource would be detrimental to the provision of adequate and reliable electric service, which is what the statute requires.

Analysis

IPL's EGEAS modeling is consistent with IPL's overall resource plan. The result of the EGEAS model is affected by the inputs used, just like any other computer model, and there is a range of reasonable choices for each of the inputs. In this case, it appears that each party chose many, if not all, of its inputs from the reasonable range based on the number that would produce a favorable outcome for each party's particular case. This is not unexpected in a contested case proceeding, and it is the Board's duty to sort out those inputs and identify one or more reasonable projections to use for making its decision. In this case, the Board finds that IPL's EGEAS modeling is the most reliable in the record and shows the need for SGS

Unit 4, a baseload coal-fired plant that can be expected to operate at a relatively high capacity factor. Examination of some of the disputed assumptions and inputs will help illustrate this point.

IPL's analysis in its 2005 Resource Plan¹⁰ included numerous scenarios that support the need for additional coal-fired generation. (Tr. 575). IPL developed its base case resource plan assuming no CO₂ regulations. IPL's resource plan could have included potential CO₂ regulations in the base case, as every party agrees that some form of CO₂ regulation is likely to be implemented in the near future. However, no CO₂ regulations currently exist, so it was not unreasonable for IPL to model a range of projected CO₂ costs as a part of its sensitivity runs instead. (Tr. 582). If IPL had modeled only the low-cost projections, it might have unreasonably biased the model in favor of coal-fired generation, but IPL did not make that mistake. Instead, it modeled low-cost and higher-cost CO₂ projection, providing a more complete set of sensitivity runs.

With respect to the projected cost of SGS Unit 4, IPL used a reasonable cost estimate in its EGEAS runs. It is possible that the actual cost of the plant may be higher as argued by Consumer Advocate, but the cost estimate used by IPL is not so low as to be unreasonable for planning purposes, based on this record.

¹⁰ IPL's application in this docket was based on both its 2005 Resource Plan and the preliminary results of its 2007 Resource Plan. This reflects both the need for time to prepare the application and the desire to use the most up-to-date information available and appears to be a reasonable balancing of these competing interests, but it sometimes makes the record more complicated.

Similarly, IPL's modeling of additional wind generation, additional energy efficiency and demand side management (DSM), its projected capacity factor for SGS Unit 4, and IPL's use of the default setting in EGEAS (calling for two superfluous units) represent a series of reasonable individual inputs. In many cases, IPL chose to use an input that was reasonable but was also tended to cause the EGEAS model to select baseload coal-fired capacity as an economical generation option in the near future. The completeness and credibility of IPL's EGEAS analysis might have been enhanced if IPL had selected some of its inputs from the other end of the range of reasonableness or if IPL had chosen more inputs from the middle of the various ranges, but these are not fatal flaws in the analysis.

Further, the Board understands that IPL has an obligation to provide reliable service to its customers at a reasonable price and that obligation creates an incentive to plan for the scenario where all of the factors favor construction of additional generating capacity. In other words, while it would be useful to see the results of modeling that used mid-range inputs or a mix of inputs (some that favor new coal-fired generation and some that do not), it is understandable that the company is especially interested in the scenario in which all of the inputs are in the range of reasonableness but tend to require the addition of new capacity, because that is a possible future outcome that the company must consider. This need to plan for the maximum reasonable future customer need is partially addressed by the reserve margin, but it is still an incentive to conservative planning that emphasizes having

enough capacity to serve all foreseeable needs in an economical manner.

Considering all of these factors and balancing these sometimes-conflicting needs and policies, the Board finds IPL's inputs in its base case and its sensitivity runs were reasonable.

2. Load Forecast

IPL's position

The load forecast used in IPL's EGEAS modeling is reasonable because it has produced consistent results for many years. IPL projects increased peak demand and increased energy demands on IPL's system. The peak forecast model forecasts an average annualized peak load growth of 1.4 percent between 2007 and 2022, with slower growth in the short term and somewhat higher growth rates in the long term. (Tr. 1841-43). IPL's load forecast methodology relies on population, economic, industrial, and technological growth projections, rather than a simple population growth projection. Because the forecasted peak is based on historical peak, the forecasted peak includes historical savings from DSM and energy efficiency programs and projected DSM and energy efficiency savings at a similar rate. (Tr. 1841-43).

Consumer Advocate's position

IPL did not evaluate any additional DSM in its analysis, beyond the levels approved in Docket No. EEP-02-38. (Tr. 1176-77). IPL did not adjust its load forecast for observed variation in actual versus planned DSM results. (Tr. 1896-97).

Since IPL did not input the cost of DSM into its EGEAS analysis as an independent resource or consider varying levels of DSM in its EGEAS analysis, the option of additional DSM has not been evaluated on a level playing field with other resource alternatives. (Tr. 1178, 1193). IPL's assertion that Consumer Advocate double-counts the effect of DSM on IPL's load forecast is unreliable because during the hearing the IPL witness did not know how much DSM, exclusive of load management and direct load control, was reflected in IPL's load forecast. (Tr. 1178). If IPL does not know how much is included in its own forecast, it cannot claim that Consumer Advocate is double-counting it.

IPL's assertion that it is delivering all cost-effective energy efficiency programs that it is aware of does not mean that more energy efficiency within these programs cannot be achieved. (Tr. 1222-23, 1231). Moreover, IPL's witness Holmes¹¹ testified that IPL's non-residential new construction and performance contracting program were significantly below goal in 2006. This underperformance was anticipated and resulted in program changes that will better position these programs to meet and exceed program goals in the future, meaning that IPL's own testimony is that the future energy efficiency savings rate should be higher than the historical rate. (Tr. 1810-12).

Analysis

The Board finds that IPL's load forecast is reasonable. The evidence demonstrates that IPL's load forecast methodology has been the same for many

years, so there can be no allegation that IPL altered its forecast methods for this case to produce a desired result. Also, the factors relied upon by IPL are reasonable for determining a load forecast. IPL considers population, economic, industrial, and technological growth rates in its forecasting. (Tr. 1841).

Consumer Advocate argued that IPL failed to evaluate any incremental DSM in its analysis in support of SGS Unit 4. The specific issue of DSM will be discussed in greater detail below, but as it relates to IPL's overall forecast methods, it is sufficient to note IPL's forecast is based on historical data that includes actual savings from DSM. Future increases in DSM and energy efficiency savings are at least partially accounted for in the forecasting, which implicitly assumes that DSM savings will increase at the same rate as demand. This is a reasonable approach.

3. Reserve Margin

IPL's position

One of the inputs to IPL's EGEAS modeling is a planning reserve margin of 18 percent. IPL says that it must meet the actual demand of its customers and have an additional 18 percent reserve capacity over and above the actual peak demand. (Tr. 279). An 18 percent reserve margin is consistent with "MAIN Guide # 6 Generation Reliability Study 2005-2014,"¹² which recommends a 14 percent reserve margin for short-term planning and 15 to 18 percent for long-term planning. Because IPL forecasts capacity and energy needs assuming normal weather, IPL uses an

¹¹ Robert R. Holmes, Senior Regulatory Planning Consultant, Alliant Energy.

¹² MAIN – Mid-America Interconnected Network.

18 percent reserve margin to better ensure its reliability is not compromised in hot or extreme weather conditions. (Tr. 559). If the company used a lower reserve margin in its planning, it might need to use a hot weather or extreme weather demand forecast, which would tend to offset any reduction of projected capacity needs resulting from the lower reserve margin.

Consumer Advocate's position

The 18 percent reserve margin selected by IPL is the upper limit of the 15 to 18 percent range in the current MAIN Guide # 6 and that the Midwest Reliability Organization (MRO) is in the process of determining a new planning reserve margin. The use of normal weather loads is common in loss of load expectation (LOLE) studies and, assuming a reserve margin of 16.2 percent (the upper end of the value determined by the LOLE studies contained in MAIN Guide # 6), IPL's capacity need in 2013 is 56 MW less than what is indicated by an 18 percent reserve margin. IPL's internal planning process assumes a 15 percent planning reserve margin and a IPL internal strategy report dated May 11, 2007, reveals that IPL's resource planning process will employ sensitivity analyses using 12 to 15 percent reserve margins. (Tr.

303, 305; Ex. 101, DR. 22, Att. A. pp. 1-2). Based on these statements, IPL's choice of the highest peak reserve margin that can possibly be justified overstates the need for SGS Unit 4.

Analysis

Adequate planning reserve margins help to ensure that sufficient power is available to provide service and maintain the proper functioning of the transmission grid. A utility must plan to serve its customers' projected demands plus a reasonable margin, so that customers can anticipate receiving reliable service even if there is an unscheduled generator or transmission outage at the time of peak demand. This does not mean that service is guaranteed at all times, such as during extreme weather conditions, or that customers on interruptible service rates will not be interrupted; it means the utility must plan and prepare for a reasonable range of events. With that in mind, the Board finds that IPL's 18 percent planning reserve margin with a normal weather forecast is reasonable. Reserve margins are typically based on LOLE studies. These studies determine a target reserve margin based on large single-contingency events in a pool of interconnected utilities, e.g., loss of a large generator. The idea is that the pool can continue to provide service even if one member experiences such a loss. In this case, the evidence supports a planning reserve margin in the range of 15 to 18 percent to achieve that result. (Tr. 279, 550, 2395-96).

Utilities often perform three levels of load forecast that correspond to normal, high, and extreme weather scenarios. The extreme weather forecast corresponds to hot summer days in the Midwest when the temperatures (and electric demands) are high. Utilities that use an extreme weather forecast may use 15 percent as the reserve margin, while utilities that use a normal weather forecast might use 18 percent as the planned reserve margin. (Tr. 559). IPL uses a normal weather forecast, so it is reasonable for it to also use a reserve margin at the high end of the range for planning purposes.

Furthermore, 199 IAC 20.1(3) defines "operating reserve" as generating capacity required to ensure reliability of generation resources. Subrule 199 IAC 20.5(3), which addresses adequacy of supply and reliability of service, requires that a utility's generating capacity, supplemented by the electric power regularly available from other sources, must be sufficient to meet all normal demands for service and provide a reasonable reserve for emergencies. IPL satisfies these Board rules with its planning reserve requirement and there is no persuasive evidence that its use of an 18 percent margin is unreasonable in this docket. IPL's reserve margin assumption is reasonable.

4. Wind Resources Modeling

IPL's position

The parties disagree over the appropriate capacity credit to use when modeling wind turbine generator projects. Consumer Advocate questions IPL's

10 percent capacity credit for wind resources, arguing it is too low. IPL responds that Consumer Advocate confuses a generating unit's projected capacity factor with its capacity credit. The capacity factor represents the annual generation of a generating unit compared to its maximum possible generation in the same time period. A capacity credit, in contrast, is the percentage of a unit's total nameplate capacity that is accredited as being available at times of peak demand. IPL has consistently assumed a 10 percent capacity credit for new wind resources. IPL is a summer peaking utility and data from July and August for IPL's existing wind purchased power agreements support a 10 percent capacity credit.

This issue is not of great significance because the difference between a 10 percent capacity credit for the 200 MW wind generation project that IPL is planning to build by 2013 and a 25 percent capacity credit is only 30 MW (20 MW versus 50 MW). This is far below IPL's projected capacity deficit of 173 MW in 2013, so the difference is not significant for this case.

Further, the wind cannot reliably serve baseload capacity needs and if IPL relies on wind for any portion of its baseload capacity and the wind is not blowing, then IPL will be forced to enter into the marketplace to make up the shortfall at the expense of its customers. Finally, IPL has a concern regarding the manufacture of gearing and turbine hubs and the availability of enough wind turbine generators to meet its projected needs using wind generation. (Tr. 1652).

Consumer Advocate's position

IPL's wind capacity credit of 10 percent is too low and causes wind resources to be undervalued in the EGEAS runs. A 20 percent capacity credit is reasonable, as confirmed by the recent ratemaking principles application filed by MidAmerican Energy Company. (Tr. 738; Docket No. RPU-05-4, "Order Approving Stipulation and Agreement" pp. 6-7, issued April 18, 2006). IPL unreasonably limits the number of wind power plants the EGEAS model can choose and caps the overall amount of wind the model has access to at 800 MW of new wind generation over the 15-year planning period; that cap is far below the level of wind that can be reliably accommodated on IPL's system. (Tr. 740). Consumer Advocate's own analysis sets a cap of 1,400 MW on the amount of wind generation that EGEAS could select, which represents approximately 25 percent of IPL's projected retail energy need in 2022. IPL's decision to limit wind additions to 800 MW is out of step with current public policy calling for greater renewable energy investment and the economic development effects associated with DSM and wind power are likely to be greater than those associated with the proposed plant. (Tr. 747-48, 1201-02).

Coalition's position

Modeling errors caused IPL to miss up to 1,039 MW of economic wind power available for installation from 2007 to 2022. IPL should be able to use the improved transmission services of ITC Midwest LLC (ITC Midwest) to achieve expansion of IPL-owned wind resources by 1,000 MW over the next 15 years.

Analysis

The evidence in the record shows that IPL's wind modeling is reasonable. July and August are peak months for many Iowa electric utilities and the historical data shows that utilities cannot rely on having full-rated capacity available from wind generators during peak demand hours in the summer. The 10 percent capacity credit used by IPL is supported by historical data and is not unreasonable for modeling purposes.

IPL's 800 MW cap over the 15-year EGEAS planning period is also reasonable for modeling purposes, even though it is possible to add more. Consumer Advocate proposes that the cap be set at 1,400 MW, which would serve approximately 25 percent of IPL's projected retail energy need in 2022. Consumer Advocate points to a 2006 wind resource penetration study by the Minnesota Public Utilities Commission that shows 25 percent wind penetration may be possible for IPL's system.

As will be discussed in greater detail later in this order, the Board agrees that IPL should be expected, and required, to add more than 800 MW of renewable energy generation to its system over the next 20 years. Based on the economics of existing renewable energy alternatives, it is likely that most of this new generation will be wind-driven. As such, it is not a substitute for the baseload generation IPL's customers need. Accordingly, while the Board agrees that IPL should add more

renewable energy generation (in order to reduce emissions), the Board finds that IPL's modeling of renewable generation was reasonable.

5. Energy Efficiency

IPL's position

IPL has reviewed all commercially-available energy efficiency measures and implemented all cost-effective energy efficiency programs that are available and known to IPL. For 2006, IPL was above the state average for energy efficiency spending at \$39.26 per person. (Tr. 1778; Ex. 18, Sch. L). Consumer Advocate has not identified any energy efficiency programs IPL has not yet pursued but could or should implement to reduce demand for electricity. Further, Consumer Advocate does not present any evidence that any utility has ever achieved the energy efficiency goals that Consumer Advocate would obligate IPL to achieve.

Energy efficiency does not have to compete as an independent variable in IPL's resource planning process as it is already considered the highest priority resource in Iowa. IPL's load forecast considers recent increases in DSM savings that were actually experienced by IPL in 2006, as well as savings from previous years, and projects that this increased level of savings will continue each year into the future. Consumer Advocate's suggestion that an aggressive ramp-up of energy efficiency will defer the need for SGS Unit 4 is without merit and, under all realistic and reasonable assumptions, 350 MW of SGS Unit 4 is needed in 2013 to reliably serve IPL's customers.

Consumer Advocate's position

IPL's statement that it is delivering all cost-effective energy efficiency programs that it is aware of does not mean that more energy efficiency within these programs cannot be achieved. (Tr. 1222-23, 1231). As an example, IPL's witness Holmes testified that IPL's non-residential new construction and performance-contracting programs were significantly below goal in 2006 and have been revamped to produce better results. Moreover, IPL has not applied an adjustment to its DSM forecasting to recognize recent higher DSM achievement. (Tr. 1810-12, 1865).

Expanded investment in DSM would allow IPL to defer construction of SGS Unit 4 for at least five years beyond the planned operational date. (Tr.1190, 1192, 1249). IPL's load forecast adjustment is flawed because it recognizes gains and losses of large customers and includes an ethanol plant that has not yet been constructed, but fails to adjust for DSM incentives. IPL's analysis ignores the likelihood that existing ethanol and biodiesel projects will choose to use interruptible service or self-generation options and therefore should not figure into IPL's resource planning requirements.

Coalition's position

IPL witness Holmes acknowledged he is unaware of any IPL strategy to evaluate the potential for CHP at any of the biofuels facilities IPL serves, in spite of the cost benefits and efficiencies of this technology. (Tr. 1818-19). IPL's inability to answer basic questions about energy efficiency relate to the fact that IPL did not

model expanded energy efficiency as a potential alternative to SGS Unit 4. IPL has significant room in its resource portfolio for expanded energy efficiency measures and more aggressive renewable energy development.

Analysis

IPL's use of results from its existing energy efficiency programs to produce its load forecast is reasonable and consonant with Iowa Code § 476A.6(1). IPL has implemented all cost-effective energy efficiency programs known to it. No party has identified any significant, unimplemented programs. At best, they assert that IPL should get more results from the programs it already has, but offer few if any specific steps for IPL to take to achieve better results. IPL continues to improve its programs, as in its non-residential new construction program, but without identification of specific unimplemented DSM or specific program improvements, IPL cannot reasonably be expected to rely on hoped-for DSM improvements to serve its customers.

Iowa law requires utilities to offer extensive energy efficiency and load management programs outside of their generation resource planning process, pursuant to § 476.6. Proposed generating unit additions are granted a certificate through proceedings under chapter 476A, based largely on whether the unit is a reasonable alternative to meet projected load requirements. Thus, this proceeding is not the only docket in which IPL's energy efficiency plan can, and will be, reviewed. To the extent that there is room for IPL to expand its energy efficiency programs in

the future, that issue can be fully explored in the Energy Efficiency Plan (EEP) dockets. In this docket, based on the record evidence, IPL's approach to projecting DSM savings in the future is reasonable.

6. Wind Resource Cost and Natural Gas Cost

IPL's position

This issue involves the projected costs of wind generation resources and natural gas-fired generation. IPL maintains that CO₂ emissions regulation would lead to an increased demand for carbon-neutral resources, such as wind power, and increased demand will drive up prices for new wind turbines. As such, IPL expects a high CO₂ price scenario (increasing the projected overall cost of SGS Unit 4) would also significantly increase the cost of new wind resources. Wind power costs are also likely to increase because of the potential loss of the federal production tax credit, scarcity of equipment, increases in demand, and transmission upgrade costs. A high CO₂ price scenario would potentially lead to a 50 percent cumulative increase in cost of new wind energy over the next five years, or around 10 percent per year. In fact, the cost of wind generation has doubled over the last five years, which equates to an escalation rate of approximately 15 percent per year.

Consumer Advocate over-estimates the viability of wind and natural gas-fired generation resources. Consumer Advocate witness Drunsic acknowledges the increasing demand for wind resources and natural gas-fired resources, but he made no changes to IPL's low and high CO₂ runs to reflect the effect of increased demand

on the cost of these alternatives. The only change he made was to the number of superfluous units.

Furthermore, it would be impossible to interconnect 800 MW of wind generation on IPL's system by 2013, as suggested by Consumer Advocate witness Drunic, because of the time required to process interconnection requests at the Midwest Independent Transmission System Operator, Inc. (MISO), and also because of the cost and time needed to construct the transmission infrastructure needed to accommodate that level of generation. (Tr. 1616).

Similarly, Consumer Advocate witness Fagan's assertion that it is reasonable for IPL to install over 1,000 MW of new wind generation by 2022 is unlikely to be accomplished due to limitations on equipment supply and transmission access. (Tr. 1618).

Increasing demand for natural gas will result in significant increases in the cost of natural gas and, therefore, the cost of electric power and energy to consumers. IPL's sensitivity runs assume a one-time increase in natural gas prices of 10 percent under IPL's high CO₂ price forecast. Increases of as much as 20 percent are not unreasonable, particularly if carbon emissions regulation cause increased usage of natural gas-fired generation. For all of these reasons, Consumer Advocate has overstated the viability of these alternatives to SGS Unit 4.

Consumer Advocate's position

Consumer Advocate ran 16 scenarios in its EGEAS analysis and 15 of the scenarios did not select SGS Unit 4 as an economical new source of power. The one case which selected a new coal-fired plant as part of the lowest cost resource plan was flawed because of an unrealistic assumption: a 10 percent increase in the cost of natural gas. Even under this scenario, SGS Unit 4 was not proposed to be added to IPL's generation portfolio until 2019, six years later than IPL's projections indicate. (Tr. 1040).

IPL witness Friedman has no support for the wind generation and natural gas prices IPL utilizes in its high CO₂ price scenario. IPL witness Vosberg¹³ acknowledged a substantial additional number of wind manufacturers are developing or placing new facilities in service, which will likely lead to lower, not higher, prices for new wind turbine generators. (Tr. 1600-02). Witness Friedman was unfamiliar with ITC Midwest's proposal in another docket, identified as Attachment FF, in which IPL asserted that ITC Midwest's ownership of IPL's transmission facilities would significantly enhance transmission access and reduce obstacles to interconnecting renewable energy resources. This IPL argument cannot be reconciled with witness Friedman's opinion that backlogs in the interconnection queue process and transmission upgrade costs would present a significant obstacle to the addition of future wind generation. (Tr. 1640-41).

¹³ Robert M. Vosberg, Manager, Technical Sales Support, Alliant Energy.

Coalition's position

IPL witness Friedman stated that for large wind farms planned in constrained areas of the system, it would be reasonable to assume a lead time of five to ten or more years from the time of the initial interconnection request to MISO until transmission construction could be completed. This testimony does not support his conclusion that construction of 1,000 MW of new wind generation by 2022 might not be technically feasible for IPL.

Witness Friedman offers no explanation for his estimates of disproportionately higher projected costs for wind transmission facilities compared to the estimated cost for the transmission facilities of proposed SGS Unit 4, which equals only 2 percent of the total cost of the project. In contrast, Consumer Advocate's EGEAS modeling runs show that wind is the cheapest supply-side energy resource available to meet Iowa's incremental electric energy needs.

Further, witness Friedman's exhibits do not support the 10 to 20 percent natural gas price increase assumed by IPL and the increased cost estimates for natural gas used by witness Friedman include the cost of CO₂ allowances. This is inconsistent because IPL's analysis does not model the same price for CO₂ emitted from SGS Unit 4 that it attaches to natural gas.

Analysis

IPL's inputs regarding future wind energy cost and natural gas generation costs are reasonable. IPL and Consumer Advocate have offered various EGEAS

runs with inputs based on increased costs for wind resources and increases in natural gas costs due to increased demand on non-coal resources. It is reasonable to conclude that if carbon emissions are regulated, increasing the cost of carbon-emitting sources like coal-fired generation, then the demand for, and value of, lower-emitting or non-emitting generation resources will increase. IPL's modeling reasonably reflects these anticipated market forces.

At the same time, the creation of a tax or other cost on carbon emissions will directly increase the cost of coal-fired generation. To protect customers from this risk of increased operating cost, the Board will require IPL to diversify its resources, as described later in this order.

7. Modeling of Power Plant Cost Increases

IPL's position

The parties disagree over the projected cost of SGS Unit 4 and the potential cost of delaying its construction. Timely construction of the proposed SGS Unit 4 is critical based on IPL's projected load, rising construction costs, and rising costs of alternative baseload power resources, all of which support on-line operation of SGS Unit 4 by 2013.

Capital costs for power plant construction continue to rise. A June 2007 Standard & Poor report states that with declining reserve margins, it is possible that electric utilities could end up building generation at a time when increases in the cost of standard materials will cause capital costs to rise even faster. (Tr. 135, 1021). For

all these reasons, IPL believes that the most economical time to build SGS Unit 4 is now.

Consumer Advocate's position

IPL's computer modeling fails to consider the risk that projected capital costs could increase significantly from IPL's projections. It is reasonable to expect that the actual cost of SGS Unit 4 will be substantially higher than IPL's current estimates.

Coalition's position

Coal-fired electric generation represents one of the most expensive available options for meeting Iowa's energy needs and the costs of construction and operation of coal-fired power plants are steadily increasing. Furthermore, coal is increasing in price and is expected to continue to do so for the foreseeable future.

Analysis

Many of these issues will be addressed in Board Docket No. RPU-08-1, IPL's ratemaking principles case involving SGS Unit 4. In this docket, the parties appear to agree that the capital cost of new coal-fired baseload generation is likely to increase at a relatively rapid rate in the next several years. This could make deferral of SGS Unit 4 an expensive gamble. If, for example, the Board were to defer a decision in this docket in order to gather more information about the likely cost of carbon emissions regulation or possible changes in reserve margin recommendations, the result could well be that SGS Unit 4 will still be needed and will cost much more. Even this gamble might be worthwhile if the time required to

obtain meaningful new information was short, but there is no guarantee that information that is more reliable will be available any time soon. Under these circumstances, the Board finds that the capital costs used by IPL in its modeling are reasonable and the possibility that the cost will be higher does not support rejection of the application, although it may be an issue in the ratemaking principals case.

8. Transmission Upgrades

IPL's position

IPL is committed to the construction of the transmission infrastructure needed to support SGS Unit 4 and necessary network upgrades will benefit the state's overall grid reliability. (Tr. 374). The existing transmission network in the Marshalltown area will require enhancement either with or without the construction of SGS Unit 4. (Tr. 275). According to IPL's filing, the upgrades for SGS Unit 4 will utilize existing transmission corridors and require only additional right-of-way width. (Tr. 273).

IPL is proposing to build SGS Unit 4 near the existing SGS. Building the plant at that location will allow easier interconnection with existing transmission and the use of existing infrastructure, which reduces the overall environmental impacts when compared to a new site. (Tr. 485).

Analysis

This issue is not directly contested. However, because transmission is one of the main criteria analyzed by IPL in choosing the Marshalltown site over the other sites for the proposed unit, the subject merits discussion.

The Marshalltown area needs transmission work (line rebuild with some voltage upgrades and some new additions) even without the addition of proposed SGS Unit 4. IPL witness Bauer testified that transmission improvements in the Marshalltown area would be paid for by ITC Midwest and the cost and construction of the substation transformer are still being negotiated with ITC Midwest. A 50/50 split between the plant owner and the transmission provider is anticipated and IPL's likely 50 percent share is included in SGS Unit 4 cost estimates. (Tr. 350-51). Based on these representations, the Board finds IPL's proposed transmission upgrades do not detract from IPL's application in this docket. However, the Board understands that various transmission studies are still underway, so IPL will be required to file all final transmission-related studies (such as system impact and facilities studies) associated with this project with the Board as they become available. IPL will also be required to file a status report once the transmission additions associated with SGS Unit 4 are completed. The status report should include detailed information regarding completed transmission work, including, but not limited, to interconnection details and Marshalltown area modifications.

ISSUE 2 Is IPL willing to construct, maintain, and operate the facility pursuant to the provisions of the certificate and subchapter 1 of Iowa Code chapter 476A?

IPL's position

IPL is committed to complying with any provision the Board might include in the granting of a generation facility-siting certificate. (Tr. 376-77). IPL has agreed to

acquire all local, state, and federal permits and licenses in a timely manner and comply with these permits and licenses. (Tr. 375). IPL is committed to using good engineering practices in the construction and operation of SGS Unit 4, as expressed in the Iowa Electrical Safety Code (199 IAC ch. 25), the National Electrical Safety Code, and the Power Piping – ANSI¹⁴ standard B31.1-2004. (Tr. 377).

SGS Unit 4 will comply with all regulatory agency and zoning authority requirements. (Application, Table 2.2-1). SGS Unit 4 will be subject to and will meet stringent air emission and wastewater effluent discharge limits imposed by the DNR through DNR's air and water permit programs. By meeting DNR requirements, SGS Unit 4 will be in compliance with and consistent with applicable environmental policies. (Application, Sections 1.6.3, 1.6.4, 1.6.5, 1.6.6, 2.1, 2.1.1, and 2.1.2; Tr. 448). IPL's wastewater permit for cooling tower blow down will follow DNR rules, regulations, and requirements. There are multiple proven technologies to reduce total dissolved solids (TDS) if that is necessary. (Tr. 452-53).

Coalition's position

IPL failed to define what Iowa Code § 476A.6(2) requires and, as the party with the burden of proof, IPL is obligated to make a substantive showing under this decision criterion. Because the company has not adequately defined the requirement, it cannot show it has been satisfied.

¹⁴ American National Standards Institute, also a standard of the American Society of Mechanical Engineers (ASME).

Analysis

Iowa Code § 476A.6(2) is straightforward and the applicable engineering and technical requirements will be written into IPL's contractor bid specifications, construction drawings, and related documents. IPL has provided sufficient evidence in the record to support a finding that it is willing to construct, operate, and maintain the proposed facility as required by § 476A(2). This includes compliance with the provisions of the certificate, a subject that will be discussed later in this order.

ISSUE 3 Will SGS Unit 4 be consistent with reasonable land use and environmental policies and utilization of air, land, and water resources considering availability and economics of alternatives?

A. Reasonable Site Choice (land use)

IPL's position

IPL identified candidate sites from existing generation sites. The benefits of using an existing site include use of existing infrastructure and underutilized space in a manner that diminishes the environmental impact when compared to a new site. (Tr. 485). As a part of IPL's site selection process, impacts on air, water, and fuel supply, available transmission, the environment, and the community were considered and seven potential sites were narrowed down to three. IPL chose SGS because it could be approved and constructed in the necessary time frame; the transmission upgrades involved a minimal amount of new right-of-way; there was strong community support; there is adequate existing and attainable space; there are no

significant environmental permitting obstacles; and there is a robust cooling water supply from Marshalltown Water Works.

Coalition's position

The location of the proposed facility is not reasonably justified from an economic, technical, and social standpoint and placing the facility at this site will result in severe adverse impacts that IPL has not analyzed. For example, IPL says the proposed plan will have minimal impact on agricultural land, but the Coalition says that 680 acres of land currently devoted to row crops have been rezoned as M-2 industrial for this plant. Also, the State Archeologist recommended an in-depth evaluation of the site and no finding regarding the effect of the plant on historic resources can be made until that evaluation is completed. Finally, Marshalltown's community will be adversely affected by the plant, which the Coalition describes as a serious social injustice.

Analysis

IPL's proposed site complies with zoning requirements and the community impact of the plant will be reasonable. Each of the Coalition's arguments was fully addressed on the record. It is true that Marshalltown annexed 680 acres of land and re-zoned it for the plant, but the record also shows that of the total 1,087 acres at the site, approximately 457 acres will be used as a permanent buffer zone. (Tr. 248). Thus, part of the reason that 680 acres was re-zoned was to reduce the impact of the

plant on surrounding property owners; the re-zoning therefore supports a finding that this criterion is satisfied.

Similarly, the Coalition's argument regarding the State Archeologist's recommendation for further study ignores the fact that IPL performed additional study in response to that letter. The resulting report is included in the record as Exhibit 7 (ACB-2), Schedule A.

Finally, there is no basis in the record to deny a certificate based on the demographics of Marshalltown or alleged social injustice. The proposed site is adjacent to an existing power plant site. Using a preexisting site, where surrounding land uses have developed in a manner that accommodates the existence of a power plant, normally tends to reduce the environmental and community impacts when compared to locating the plant at a brand new site.

The Board finds that the evidence in the record is sufficient to establish compliance with the requirements of 199 IAC 24.10(2)"b"(2) and 24.10(2)"b"(3).

B. Design Considerations and Characteristics of SGS Unit 4

1. Use of Condenser Technology

IPL's position

The wastewater permit for cooling tower blow down will comply with DNR rules, regulations, and requirements. DNR analyzes new projects using a waste load allocation model taking into account the worst-case scenarios, including low flow conditions of the river and high flow discharge from the cooling tower blowdown to model its effluent and, specifically, the TDS discharge. The results predict that the discharges anticipated at SGS Unit 4 will be well under accepted TDS levels. There are multiple commercially-proven technologies to further reduce TDS, if that becomes necessary. (Tr. 452-53). Given these results and the projected TDS levels, it was unnecessary to test for chronic toxicity. (Tr. 473). IPL is continuing to evaluate TDS, including simulated cooling tower blow down, to ensure there is no acute or chronic toxicity impact. (Tr. 474).

Consumer Advocate's position

IPL does not know the TDS concentration in the Iowa River, either during the periods of normal flow or extreme low flow, and this lack of technical analysis regarding the impact of SGS Unit 4 cooling tower blow down discharges on aquatic life in the Iowa River is a significant deficiency in IPL's application. (Tr. 941-42). An air-cooled condenser (ACC) should be considered instead of a water-cooled unit because the plant efficiency penalty for an air-cooled condenser for SGS Unit 4

would be only 2 percent on an annual basis and less than 4 percent on hot summer days. (Tr. 942-44).

Analysis

IPL's selection of a water-cooled condenser is reasonable and in accordance with Iowa Code § 476A.6(3). An ACC is undesirable because the greater backpressure on the turbine exhaust will limit plant capacity (especially on peak days), reduce plant availability factor, and reduce plant efficiency which results in burning more coal to produce the same power. In terms of efficiency, the ACC will cause an annual heat rate efficiency penalty of between 1.5 to 3.5 percent. At the hearing, Consumer Advocate witness Powers, the ACC proponent, estimated that the plant with ACC would require 50,000 additional tons of PRB coal per year. (Tr. 946). This would increase coal and transportation costs, CO₂ emissions, and other air emissions. Meanwhile, the modeling of the water-cooled condenser discharge indicates the TDS levels will not be excessive and will meet all environmental permitting requirements; further, IPL has committed to taking additional steps to reduce TDS levels, if necessary. Balancing the offsetting environmental effects, the Board finds that IPL's choice of a water-cooled condenser is reasonable.

2. Water Usage Requirements

IPL's position

IPL's water usage at SGS Unit 4 will not unduly tax Marshalltown's water supply. Marshalltown Water Works has an underutilized well capacity of 19.5 million

gallons per day and will be able to provide a consistent supply to IPL without detriment to its other customers for the next 40 years. (Tr. 221).

Consumer Advocate's position

SGS Unit 4 water consumption from Marshalltown Water Works will be immense and will be greater than the usage of Marshall County's entire population. No analysis was provided by Black & Veatch, an IPL engineering consultant, to demonstrate whether under extreme conditions of low water availability there will be adequate makeup water for SGS Unit 4 without compromising agricultural or potable water supply uses. SGS Unit 4 could drain Marshalltown Water Work's aquifer at an alarming rate.

Analysis

Marshalltown Water Works has agreed to supply IPL design requirements for SGS Unit 4 for the next 40 years. The agreement of the Marshalltown Water Works, which has the primary responsibility to provide adequate water supplies to its customers, is evidence that the plant's water requirements are not projected to be a problem. When combined with the Black & Veatch report, there is evidence in the record to establish that IPL conducted a reasonable investigation of the water usage issue, sufficient to meet all legal requirements. Therefore, the Board finds water usage for SGS Unit 4 is reasonable and in accordance with Iowa Code § 476A.6.

3. Potential Carbon Capture and Sequestration

IPL's position

The proposed SGS Unit 4 is being designed to allow ease in retrofitting for CO₂ capture technology as it develops. (Tr. 503). IPL has also performed an initial screening study of the areas in the state of Iowa that may have potential for sequestration of CO₂.

Coalition's position

IPL has failed to show any genuine likelihood of economic retrofit for carbon capture and sequestration (CCS).

Analysis

IPL has reasonably considered the potential for CCS. At this time, CCS technology is not commercially available for utility-scale coal plants. Research is underway, however, and the likely implementation of carbon emission regulation will provide impetus to that research. If carbon emissions regulations are enacted, existing plants will retrofit with CCS systems if it is economical to do so and the technology is commercially available. That demand increases the likelihood that those systems will be developed. Under these circumstances, IPL has prudently committed to taking reasonable steps that will facilitate the installation of carbon capture technology when available.

However, the cost of CCS retrofit may be substantial. The CCS technologies that currently appear to be most likely for future use at SGS Unit 4 will have large

steam and electric loads of their own, likely reducing the efficiency and capacity rating of the plant. These adverse effects of a CCS retrofit could provide an incentive to delay the retrofit beyond the time when it should be installed, especially if the costs of carbon emissions regulation are being passed through to customers in some manner. To alleviate this concern, the Board will include a condition in the certificate for SGS Unit 4 requiring periodic review of the availability and economics of CCS technology (or its equivalent) and reserving the authority to order installation of the technology whenever the Board finds, after notice and opportunity for hearing, it is reasonable to do so.

4. Regulated Wastes and Emissions

a. Reducing mercury emissions

IPL's position

IPL will acquire all necessary federal, state, and local permits necessary for the removal of wastes resulting from the operation of SGS Unit 4, including mercury emissions.

Coalition's position

Mercury emissions and discharge from SGS Unit 4 will cause unreasonable adverse impacts. If SGS Unit 4 emits the maximum amount of mercury beginning in 2013 as anticipated, then within five years mercury emissions from SGS Unit 4 will represent over 83 percent of Iowa's annual mercury emission budget as allocated by the U.S. Environmental Protection Agency (EPA). The Coalition also argues that

human health impacts from mercury have been detected at levels below 10 milligrams. (Ex. KWH-1, Sch. W, p. 4).

Analysis

Mercury emissions are regulated by agencies other than the Board. IPL's certificate will include a condition requiring that IPL obtain all necessary federal, state, and local permits. Upon receipt of those permits, the proposed unit will be consistent with established environmental policies that have not been shown to be unreasonable, satisfying that portion of § 476A.6(3).

b. Potential CO₂ regulation

IPL's position

IPL developed its base case resource plan using assumptions based on existing regulations. Because there are no CO₂ emissions regulations applicable to IPL's current operation, IPL did not consider potential CO₂ costs for its EGEAS base case. However, IPL considered potential CO₂ emissions costs in its sensitivity runs. (Tr. 582). IPL conducted several sensitivity runs as part of its EGEAS analysis, assuming low and high carbon price forecasts. IPL states that SGS Unit 4 continued to be selected as the optimal resource for IPL's customers under all scenarios when reasonable assumptions were used in the modeling.

IPL maintains that its expansion plan with SGS Unit 4 will reduce overall customer costs by \$751 million when compared to a scenario with no new resource additions in 2013. The plan also reduces IPL's systemwide CO₂ emissions by

487,518 tons per year beginning in 2013. SGS Unit 4 will produce 20 to 30 percent less CO₂ emissions per unit of energy produced than many of the older, less efficient existing coal units in the Midwest. (Tr. 502, 606). Thus, to the extent SGS Unit 4 displaces operation of older units, it represents a net reduction in CO₂ emissions.

In making these assertions regarding its overall expansion plan, IPL is relying upon its plans to add 200 MW of new wind turbine generation by 2010 (Tr. 560-61) and plans to burn biomass fuel in SGS Unit 4, initially at 5 percent of the total heat input value, the plant will be designed to burn up to 10 percent. These renewable, CO₂-neutral measures are important to reduce IP's systemwide CO₂ emissions.

Consumer Advocate's position

DSM and wind turbine generation are effective ways of meeting customer's energy needs with little or no environmental impact. Coal-fired power plants, in contrast, are a major and growing source of greenhouse gases and therefore represent a significant cause of global climate change. (Tr. 882).

The consideration of a generating certificate must not ignore the risks to ratepayers. Iowa Code § 476.53 provides for Board-approved advance ratemaking principles that will apply for the lifetime of the plant, while Iowa Code § 476.6(22) provides for a Board-approved advance emission plan and budget with assured cost recovery. Giving these assurances to the utility will potentially shift the CO₂ risks of this plant from investors to ratepayers. Consumer Advocate cites various studies for the proposition that new coal plants built without CCS are unlikely to be

"grandfathered" or awarded any free CO₂ emissions allowances when CO₂ emissions regulations are adopted. Thus, there is a substantial risk to customers from potential CO₂ emissions regulations on SGS Unit 4.

IPL's base case analysis assumes no greenhouse gas regulation costs and, although IPL did prepare two sensitivity analyses based on low CO₂ and high CO₂ emissions allowance prices, IPL relied on outdated information in determining those prices. It is unreasonable to rely on IPL's two sensitivity analyses. (Tr. 971, 990, 996).

Coalition's position

SGS Unit 4 will be a major contributor to global warming and will increase IPL's total corporate emissions. Federal CO₂ emissions regulations will soon be passed and IPL will pass the cost of these regulations directly to consumers. IPL wants the generating certificate to be issued now because IPL believes it is too risky to wait until regulations have been enacted to make new generation choices. IPL's failure to plan and invest more vigorously in anticipation of a carbon-constrained economy will directly harm Iowa ratepayers.

If SGS Unit 4 and similar plants are built, utilities will lobby for lower CO₂ costs in the name of their ratepayers, thereby actually allowing greater emissions.

Therefore, if the goal were to reduce emissions, approval of SGS Unit 4 would be a step backwards because it locks in a large emitter and provides additional incentive to lobby for weak regulation.

Analysis

The parties generally agree that CO₂ emissions are likely to have a cost in the near future. IPL has reasonably considered these potential costs in its planning. These costs cannot be ignored; events and activities such as the Midwest Greenhouse Gas Accord, various Iowa Office of Energy Independence plans, the activities of the Iowa Climate Change Advisory Council, and other statements and activities all make it clear that reducing greenhouse gas emissions is and will continue to be among the goals of the state of Iowa, and it is likely to be a national goal, as well.

The record demonstrates that SGS Unit 4 is part of a resource plan that provides IPL additional flexibility to meet future CO₂ emissions targets. Coal-fired baseload generation will continue to be a part of utility portfolios for the foreseeable future and this plant will be among the most efficient plants in the Midwest. Because it burns less coal to generate a given amount of electricity than in a less-efficient plant, SGS Unit 4 will also have lower emissions per kWh generated than a less-efficient plant would have. Thus, to the extent SGS Unit 4 is running in place of an older, less efficient unit, it is reducing the total amount of emissions associated with generating electricity to serve customers.

Moreover, SGS Unit 4 will be a baseload plant that can be run at a high capacity factor with relatively high reliability, compared to many other sources. This means that SGS Unit 4 will fill an important role in the company's overall generation

portfolio and will effectively support the company's renewable resources, particularly wind-driven generation, which is not always available when customers require electric power. By having a supply of efficient, reliable baseload generation, the company should be able to accommodate a larger supply of wind-based generation that has zero emissions, but is less reliable.

Further, SGS Unit 4 will be designed to accept a back-end CCS retrofit when it is economically available. While it is not possible at this time to predict when that may occur, the fact is that SGS Unit 4 will be well positioned for the retrofit and, therefore, can be one of the early adopters of CCS technology. These factors make SGS Unit 4 a valuable resource in a carbon-emissions-constrained environment.

In order to help IPL reduce its overall CO₂ emissions, the proposed plant must burn biomass. There is evidence in the record that IPL has burned about 2 to 3 percent biomass in another plant for a period of two to three months with some success, but the 5 percent and 10 percent continuous biomass levels proposed for this plant represent a substantial step forward from that performance. Co-firing with biomass is not simple and requires planning for the boiler and site, developing new biomass markets and IPL purchasing procedures, alternate fuel storage, alternate fuel handling procedures, time for the biomass to dry, and other operational challenges. IPL is designing the plant to burn up to 10 percent biomass.

Because IPL relies on the biomass co-firing to characterize the plant as being more environmentally responsible, the Board will impose conditions on the certificate

requiring IPL to follow through on its biomass proposal. For SGS Unit 4, the Board will require that 5 percent of the heat input value must come from biomass within two years of commercial operation and 10 percent of the heat input must come from biomass within five years of commercial operation (subject to the facility's DNR air permit requirements). The 5 percent and 10 percent biomass fuel input requirements apply to the heat value of the total fuel input to the proposed unit and, if the plant biomass input falls short, IPL's penalty (non-recovery of the increased coal fuel costs and increased CO₂ emissions cost resulting from failure to burn the required amount of biomass) will be based on IPL's proportional share of the plant's increased or incremental costs resulting from the biomass-fueled generation shortfall.

IPL will be required to file annual progress reports regarding biomass co-firing at SGS Unit 4 until the plant has been in commercial operation for at least ten years. Prior to commercial operation, the annual report shall specify potential sources and suppliers of biomass, locations, and anticipated delivered costs. After commercial operation, the report shall include actual data as well as potential. The reports should also identify any operational issues and costs and the differences, if any, associated with the various types of biomass available. Comparison of the cost of burning biomass versus burning coal should also be provided.

If IPL does not meet the established biomass requirements, IPL may not recover from its ratepayers any increased CO₂ emissions costs or increased coal costs resulting from the biomass performance shortfall. This is applicable to IPL's

share of the capacity (plus the undesignated share unless and until that share is sold or otherwise subject to a long-term commitment to another party).

The projected cost of the ten percent biomass co-firing requirement is not clear in this record. Many cost issues associated with the proposed plant will be considered in the advance ratemaking principles proceeding, Docket No. RPU-08-1, and the expected co-firing costs can be considered there, as well. Nonetheless, the Board is making a ten percent biomass burn a requirement of this certificate, based on IPL's representations that the plant will be capable of achieving that performance. The Board expects that this can be done at a reasonable cost, that is, that a plant that is described as capable of burning biomass is capable of doing so at a reasonable overall cost.

The Board understands that co-firing with biomass is likely to be somewhat more expensive, on a per-MWh basis, than burning coal, at least in the early years of the plant's life when IPL is developing a supply network and a biomass handling system. That extra expense represents an investment in the future of this plant and IPL's overall generation portfolio. Some level of extra expense is therefore a prudent expenditure. However, it is possible that unforeseen circumstances may cause that extra expense to become unreasonably high in a particular year; for example, a natural disaster could restrict supplies of biomass in the area in a manner that increases transportation and handling costs by a significant factor. If, in the opinion of IPL or another interested party, unusual events make the co-firing requirement

unreasonably expensive or difficult in a particular year, IPL or the other party can file a proposal for a one-year variance from the co-firing requirements of this order, which the Board will then consider.

This safety valve provision is intended to address unforeseen events or unusual circumstances, not to serve as a tool for wholesale modification of the co-firing requirement. For that reason, the Board intends to limit each variance to a single year. If the conditions that justify a variance continue over a period of two or more years, it is the Board's intention to require that a new variance be requested and issued each year

Further, in accordance with the state's policy to encourage development of alternate energy production (AEP) facilities (Iowa Code § 476.41), the Board will also condition the certificate to increase IPL's portfolio of renewable, carbon-neutral generation sources. IPL's overall plans contemplate addition of some wind turbine generators to reduce its carbon emissions. Those plans represent a good first step, but the record in this case shows that more is necessary. Therefore, the Board will require additional renewable generation sources to further reduce carbon emissions.

The Board will structure this condition similar to IPL's current requirements under Iowa Code §§ 476.41 through 476.45 and 199 IAC 15.11(1). The Board will require IPL to own or have rights to 500 MW of Iowa renewable generating capacity and associated energy production by 2013,¹⁵ with that amount increasing by 60 MW

¹⁵ In its AEP Annual Report for 2007 filed under 199 IAC 15.11(3), IPL reported energy purchases from Iowa renewable generating facilities with capacities totaling more than 240 MW (generating at an

per year to a total of 800 MW by 2018, and thereafter increasing by 80 MW per year to a total of 1,600 MW of Iowa renewable generating capacity and associated energy production by 2028. These targets are based on the amount of wind generation capacity (assuming an average 40 percent capacity factor¹⁶) that would be required to supply 10 percent of IPL's forecasted annual energy in 2013 (adjusted to a 92.6 percent Iowa share), 15 percent in 2018, and 23 percent in 2026. (Ex. 17, Sch. A, p. 9). However, IPL should not limit its options to wind generation and should continue to consider, evaluate, and implement other renewable options when appropriate and reasonable.

This renewable capacity requirement can be satisfied with IPL-owned renewable generation or through long-term purchase contracts for generation from Iowa renewable resources, including Iowa facilities currently dedicated to meeting IPL's AEP requirements under Iowa Code §§ 476.41 through 476.45 and 199 IAC 15.11(1). In addition, results achieved toward the 5 percent and 10 percent biomass

average capacity factor of approximately 28 percent). In Docket No. RPU-07-5, IPL received advance ratemaking principles under Iowa Code § 476.53 for a proposed Iowa wind project totaling up to 200 MW (with a projected average capacity factor of 41 percent).

¹⁶ Although IPL's current portfolio of AEP generation purchases has achieved a lower average capacity factor, recent projections for new wind projects are in the 40 percent range, and the Board expects to see continuation of this trend in wind generation technology. Also, a 40 percent average capacity factor allows for the possibility of IPL including other, non-wind renewable facilities, some of which can have capacity factors significantly higher than 40 percent.

fuel input requirements at SGS Unit 4 discussed above can be used to satisfy part of IPL's renewable capacity requirement. The percentage of SGS Unit 4 capacity eligible for this requirement will be based on the biomass fuel percentage input. For example, if the biomass fuel input percentage is 5 percent, then 5 percent of IPL's share of the SGS Unit 4 capacity will be eligible for satisfying this requirement.

Beginning September 1, 2012, and annually thereafter, IPL will be required to file reports designating specific renewable generating facilities (or fractional facilities) for meeting its renewable capacity and associated energy production requirements for the upcoming year pursuant to this order. The reports and any subsequent revisions or updates will be subject to Board review and approval and should be filed according to the following criteria:

1. The report should include the following information for each designated facility (or fractional facility) and associated capacity:
 - a. Facility location;
 - b. Facility owner;
 - c. Fuel or energy source;
 - d. Total facility nameplate MW capacity and estimated annual MWh production; and
 - e. Share of facility nameplate MW capacity and associated annual MWh production dedicated to complying with the requirements of this order.

2. The designated facilities and associated capacity and energy should not include capacity and energy that is:

- a. Net metered or net billed;
- b. Dedicated to IPL's Alternate Energy Purchase Program under Iowa Code § 476.47 and 199 IAC 15.17; or
- c. Dedicated to meeting renewable requirements in any other jurisdiction.

3. The energy production associated with the designated facilities and capacities should include all associated bundled renewable and environmental attributes.

On January 1, 2013, and annually thereafter, following Board approval of the designated facilities and associated capacities, energy, and renewable attributes filed pursuant to this order, IPL will be required to:

1. Have its designated facilities and associated capacities registered with the Midwest Renewable Energy Tracking System (M-RETS),¹⁷ identifying the facilities and capacities as related to IPL's requirements under Iowa Code §§ 476.41 through 476.45; and

2. Begin transferring M-RETS Certificates associated with the energy produced from these facilities and capacities to an M-RETS retirement

¹⁷ Or such other tracking system as IPL may propose and the Board may approve.

subaccount specifically established to record IPL's compliance with its requirements under Iowa Code §§ 476.41 through 476.45.

These biomass burn requirements and additional renewable source requirements are based on IPL's energy forecast and other assumptions that could change significantly in future years. The Board does not intend to fine-tune the requirements from year to year in response to minor variations. However, neither does the Board intend to ignore major changes that might cause the requirements to be superseded, inappropriate, or impose an unreasonable financial burden on IPL customers in future years. If future circumstances or legal requirements depart from current conditions and assumptions in major unforeseen ways, the Board will consider petitions to revise the requirements described in this order or may initiate on its own motion proceedings to consider revisions.

Like the co-firing requirement described previously, the penalty for any failure to satisfy those renewable resource requirements will be that IPL will not be permitted to recover from Iowa customers the increased or incremental cost of emissions allowances resulting from the renewable generation shortfall.

In the event that IPL fails to fulfill the co-firing requirement, the renewable resource requirement, or any other requirement or provision of this order or the certificate, the Board may also consider assessing civil penalties or taking any other steps permitted by law.

IV. FINDINGS OF FACT

1. The proposed facility will make a significant contribution to the economic development of the state of Iowa by increasing baseload generation available to IPL's ratepayers and customers of the other joint owners, maintaining adequate and reliable service for Iowans, creating temporary and permanent jobs, and increasing the local tax base, such that the proposed facility is consistent with Iowa's energy and economic development policies.

2. IPL will comply with any and all provisions of the certificate authorizing construction, operation, and maintenance of the proposed facility, including but not limited to the conditions regarding the co-firing of biomass and additional renewable energy source requirements.

3. If the conditions in this order are satisfied, the proposed facility will have minimal land use and environmental consequences, considering available technology and the economics of available alternatives.

4. If final pre-construction permits are issued, the proposed facility will satisfy air quality and wastewater standards and have minimal environmental and land use consequences.

V. CONCLUSIONS OF LAW

1. The Board has jurisdiction of the parties and the subject matter of this proceeding pursuant to the provisions of Iowa Code chapter 476A (2007).

2. Interstate Power and Light Company, on behalf of itself and the other joint owners, subject to the issuance of final pre-construction permits, has met the three statutory criteria contained in Iowa Code § 476A.6.

VI. ORDERING CLAUSES

IT IS THEREFORE ORDERED:

1. Pursuant to Iowa Code chapter 476A (2007), Interstate Power and Light Company's application for a certificate to construct and operate a generating unit is granted, subject to final pre-construction permits being issued and subject to the conditions contained in the body of this order. A certificate will be issued once IPL notifies the Board that final pre-construction permits have been issued. This order is the final decision of the Board in Docket No. GCU-07-1.

2. The Board retains jurisdiction of the subject matter in this docket to the extent provided in Iowa Code chapter 476A.

3. IPL will be required to file all final transmission-related studies (such as system impact and facility studies) associated with SGS Unit 4 with the Board as they become available. IPL will also be required to file a status report once the transmission additions associated with SGS Unit 4 are completed. The status report should include detailed information regarding completed transmission work,

including, but not limited to interconnection details and Marshalltown area modifications.

UTILITIES BOARD

/s/ John R. Norris

/s/ Krista K. Tanner

VII. DISSENT

I respectfully disagree with the decision of my colleagues because I believe the most prudent course for the Board would be to deny the certificate at this time. However, the differences between my views and the views of the other two Board members are, in my opinion, narrower than the divided final vote might imply. While I disagreed with the final decision, I want to commend my colleagues for the conditions they imposed on the certificate, which will help stimulate the growth of alternative and renewable energy in Iowa.

I do not disagree with the majority's interpretation of the relevant statutes presented in Section II of this order. Taken together, Iowa Code §§ 476A.6 and 476.53 require the Board to consider the need for this plant, the timing of construction, and the relative costs of the proposed plant compared to all reasonably available alternatives (including building no new generation capacity) before granting a certificate. The language of the two sections and the legislative history of § 476.53

make it clear that the applicant is not required to use the lowest cost alternative as long as the cost of the selected alternative is reasonable when weighed against its anticipated benefits. I believe it is important to note that while this interpretation gives the applicant some flexibility in choosing how to meet generation needs, it also gives the Board some flexibility in deciding where to draw the line between reasonable and unreasonable cost differences among alternatives. The Board members must also use their judgment to determine whether the costs of a proposal (including externalized costs) are reasonable when measured against need and economic benefits. This can be a much more subjective process than simply identifying the least-cost alternative for meeting a projected load requirement.

The element of future risk may be difficult to quantify, but it is nonetheless one component of the relative costs of alternatives that Board members must consider when determining if a proposal's cost is reasonable and implements the general assembly's intent "in a manner that is cost-effective." Assessing the potential future risks of each alternative and weighing those risks against potential future economic benefits requires the Board members to make untestable assumptions about future events and trends in addition to simply adding up the known dollar cost of each alternative.

I also agree that the statutes give the Board the responsibility to weigh the environmental and land use impacts of a proposed facility against the anticipated benefits of the facility, and to compare them with the impacts of reasonable

alternatives before approving a certificate. Furthermore, I agree that § 476A.6(3), in conjunction with § 476.53(2), authorizes the Board to consider environmental issues that are not addressed by other regulatory bodies, and even to be more restrictive (but not less restrictive) than the regulations of other state regulatory bodies if, in the Board's opinion, such an action would constitute "reasonable utilization of air, land, and water resources" However, a Board decision to adopt a more restrictive standard for pollutants already regulated by an expert agency such as the DNR should require a very high burden of proof. When considering environmental or land use impacts of a proposed facility, it is also clear that the Board is legally required to balance those impacts against the intent of the Legislature to stimulate the construction of generating facilities, the economic impact of the proposed facility, the need for generating capacity, and the options available with available technology. The law gives the Board the responsibility to consider environmental issues but does not allow the Board to base its decision on environmental impacts alone. For example, the Board has no legal authority to enact a blanket moratorium on new coal generators and must instead consider each application on its own merits as it is presented.

I concur with almost all of the conclusions concerning Issues 1 and 2 as they are stated in Section III of this order, including the conclusion that each individual variable chosen by IPL for its EGEAS modeling is reasonable. However, I do not agree with the majority's conclusion that "IPL's EGEAS modeling is the most reliable

in the record and shows the need for SGS Unit 4" (p. 29). I believe it is fallacious to assume that IPL's modeling, as a whole, is necessarily reasonable just because each individual input to the model is reasonable. For each variable in the model, there is a range of possible assumptions for which a persuasive argument can be made, and any assumed value within each of those ranges would have to be considered reasonable when examined in isolation. But as this order points out on page 30, "in many cases, IPL chose to use an input that was reasonable but was also tended to cause the EGEAS model to select baseload coal-fired capacity as an economical generation option in the near future." It is fair to say that IPL's base case assumptions make the case for the plant as strong as realistically possible. While I agree that each assumption is reasonable when considered individually, I do not believe that it is reasonable to rely on the output of the model when all of those assumptions are considered together.

This is not a criticism of any individual base case assumption or an insinuation that IPL deliberately skewed the model to select the option it preferred. IPL is legally obligated to serve its customers and has to plan well into the future to make sure it can meet that obligation, so it is natural that IPL's primary focus would be on guaranteeing an adequate power supply. Therefore, it is understandable that when each variable was chosen from a spectrum of reasonable alternative assumptions, IPL would have been inclined to make very safe assumptions from the perspective of a company with its legal obligations. For example, one would expect IPL to use a

load growth estimate on the high end of the range rather than in the middle or at the bottom of the range, because IPL has to meet its future load demand regardless of which point on the range turns out to be the actual result. However, the Board has a different responsibility than IPL, because the Code gives us more responsibility to balance reliability and availability with ratepayer impact and reasonable environmental policies. There is a risk of being wrong no matter which assumptions we choose to rely upon, so we have to decide which risks are more reasonable to accept. As a result, an approach to modeling that makes perfect sense for IPL does not necessarily meet the Board's needs.

The company did perform several sensitivity analyses to test the impact of changing key variables. Unfortunately, when sensitivity analyses are performed on just one variable at a time, or even two or three variables, the combined impact of all the unchanged "safe" assumptions can overwhelm the impacts of the few variables that are being measured. Evidence was presented in this docket that a number of IPL's modeling assumptions deal with policies, situations, or estimates that could change significantly within even a few years. Those potential changes include but are not limited to:

- Reduction in the 18 percent planning reserve margin;
- Congressional action to enact carbon costs;
- Less robust load growth than projected by IPL;

- More widespread deployment of wind generation in more locations, allowing a higher capacity credit for wind;
- Lower capacity factor for SGS-4 than projected by IPL;
- Higher rate of DSM savings in the future;
- Reduction in the administrative delays for wind interconnection;
- Lessening of production bottlenecks for wind turbines;
- Congressional action to make the production tax credit for wind energy permanent; and
- Larger increases in capital costs of building coal generation than projected by IPL.

It is frustrating that this decision is being made at a time when several of these variables are unusually unpredictable. For example, according to IPL's modeling, even a slight reduction in the planning reserve margin, coupled with moderate carbon costs, causes the EGEAS model to delay the selection of SGS Unit 4 for five years even when all other IPL base case assumptions are used. EGEAS did not choose SGS Unit 4 at all, either now or in the future, when the same slight reduction in the reserve margin was combined with IPL's high carbon cost scenario. There is a very realistic chance that these two potential changes could occur within the next few years. In fact, the record in this case indicates that MISO is currently considering lowering the recommended reserve margin. If even some of the base case assumptions had been set to values closer to the middle of the range of reasonable

alternative assumptions, it is very possible that the model's output would have been more sensitive to changes in other variables as well, and the perceived case for building the plant immediately could have been significantly weaker.

In my opinion, these uncertainties mean IPL's modeling does not provide sufficient evidence that SGS Unit 4 needs to be built at this time, when the strength of that evidence is weighed against the carbon emission issue that is addressed below.

Turning to Issue 3 in Section III of this order, the evidence in this record indicates that the specific site choice (III.A) and design considerations (III.B) are reasonable and I agree with the conclusions of the majority on those issues. However, the issue of carbon dioxide emissions (III.B(4)"b") is more difficult to resolve. Consumer Advocate presented compelling testimony that IPL may have underestimated the long run cost to consumers of SGS Unit 4 due to anticipated congressional action to reduce carbon emissions. The Coalition presented testimony about the potentially disastrous impact on our climate of continued carbon emissions from coal plants and the need to take immediate action to reduce those emissions. Nothing in this record challenges the testimony concerning the effect of greenhouse gasses on climate change, the contribution of coal-fired generation to the buildup of greenhouse gasses in the atmosphere, or the serious consequences if such emissions are allowed to increase or even remain at their present level.

All three Board members are clearly concerned about climate change and believe that action must be taken to reduce carbon emissions, but there is disagreement about the most effective way to address the issue in this docket. As summarized on pages 63-64 of this order, a case can be made that the construction of SGS Unit 4 will lead to a net reduction in greenhouse gas emissions from what would have occurred without the plant. This argument depends in part on the claim that SGS Unit 4 will allow IPL to retire or fuel switch older, less efficient coal units. Nowhere in this record does IPL actually commit to doing so, however, and the closest IPL came to committing to such actions was to describe how SGS Unit 4 would give them the flexibility to choose such actions in the future. Nonetheless, it is likely that a newer, more efficient generator will directly or indirectly displace generation from less efficient coal units somewhere else on the grid and therefore, possibly have the net effect of reducing future carbon emissions. However, an alternate scenario was also presented, in which SGS Unit 4 becomes an expensive legacy of pre-carbon cost days that IPL must operate for 40 or more years to recover its investment. In this scenario, SGS Unit 4 will increase the long-run carbon emissions of the IPL system because its capacity will crowd out possible investment in alternative forms of generation and reduce pressure for additional demand side management measures.

Based on the evidence in this record, I cannot conclude that SGS Unit 4 will have the effect of reducing net greenhouse gas emissions over the lifetime of the

plant, and I believe it is at least as likely that greenhouse gas emissions will be higher in the long run if this plant is built. Since I also conclude that IPL's modeling does not provide sufficient evidence of the need to approve the plant now, I conclude it would be more prudent to deny the certificate at this time.

I recognize the very real possibility that denying or deferring this application may be, as described on page 48 of this order, "an expensive gamble." If we waited for more complete information on the key variables discussed above, IPL would most likely need to increase its reliance on purchased power, increasing short-run costs to ratepayers. If the need for additional baseload generation can still be demonstrated four or five years from now and nothing has changed to make other alternatives more economical, the only things we will have accomplished is to make the plant more expensive than it would have been if we approved it now, and to delay the time when less efficient coal plants in IPL's system could be shut down or fuel switched.

However, approving the certificate could also turn out to be an expensive risk. If Consumer Advocate is correct about skyrocketing relative costs of building and operating coal plants, or IPL is wrong about the chances that carbon control legislation will be blocked for several years, or there are changes in other key variables in the modeling formula, we could be committing IPL customers to paying for electrical generation that is both more expensive and more environmentally damaging than necessary. By committing to this plant at this time, we could be discouraging the development and deployment of alternatives, missing the chance to

apply technological breakthroughs that could be made in the next few years, and locking ourselves into 40 or more years of greenhouse gas emissions.

When faced with such conflicting visions of the likely outcome of this decision, we must weigh the likelihood that either scenario will come true and the consequences of making the wrong choice. If we decide to reject this application now and our gamble does not pay off, the issue can be reconsidered and the plant can be built at a future time. There will be very real economic consequences if that happens, but those consequences will not be insurmountable. On the other hand, if we approve this application and we end up losing that bet, this docket's uncontested evidence on climate change and greenhouse gas emissions indicates that the environmental and economic costs will be very high and very difficult to mitigate. Given what I consider to be the weakness of the modeling data used to support the need for this application, I feel the risks involved in approving this plant at this time make the potential cost unreasonably high.

/s/ Darrell Hanson

ATTEST:

/s/ Judi K. Cooper
Executive Secretary

Dated at Des Moines, Iowa, this 25th day of August, 2008.