

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

In the Matter of the Complaint by
Oak Tree Energy LLC against
NorthWestern Energy for refusing to enter
into a Purchase Power Agreement

EL 11-006

NorthWestern Energy's Post-Hearing Response Brief

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Introduction

NorthWestern Corporation d/b/a NorthWestern Energy (“NorthWestern”) submits this response to Oak Tree Energy, LLC’s Post-Hearing Opening Brief (“Oak Tree Br.”) and the Commission Staff’s Post-Hearing Brief (“Staff Br.”).

In a document reminiscent of a Jackson Pollock painting, Oak Tree throws out chaotic assertions, arguments, and misrepresentations, many of which have no relevance to the issues before the Commission. Rather than follow Oak Tree’s twisted path that confuses or conflates resource planning and determination of avoided cost, NorthWestern responds to Oak Tree’s main arguments as follows:

- Montana electric resource planning considerations are not relevant to and do not show that NorthWestern’s South Dakota customers will benefit from high-priced wind production.
- NorthWestern’s witnesses are qualified and credible.
- Mr. Lauckhart is not credible.
- NorthWestern’s hybrid methodology is both legal and appropriate for a utility with NorthWestern’s resources and load characteristics.
- Oak Tree and NorthWestern share any responsibility for the negotiation process; NorthWestern did not refuse to negotiate with Oak Tree.
- A legally enforceable obligation (LEO) was not created.

NorthWestern also responds to the Commission Staff’s recommendations.

In addition to the above responses, NorthWestern reiterates, without repeating, its arguments regarding issues with respect to capacity, legally enforceable obligation, types of rates, and length of contract.

Response to Oak Tree's Brief

An overriding fact in this proceeding is that the Commission is being asked to determine an avoided cost rate for a resource that will displace existing resources, not one that will allow NorthWestern to avoid new resources. All of Oak Tree's arguments must be tested against this fact.

I. NorthWestern's South Dakota customers will not benefit from a wind power purchase contract rate that exceeds NorthWestern's avoided cost.

Oak Tree argues that the Oak Tree project, at the rates it requests, will benefit NorthWestern's South Dakota ratepayers. (Oak Tree Br. 4-7.) Oak Tree relies on testimony in a Montana docket seeking advanced approval to build and include in rate base the Spion Kop Wind Project. (Oak Tree Br. 5-6.¹)

Oak Tree's reliance on NorthWestern's compliance with Montana's electric resource planning statutes and regulations is misplaced. In acquiring new electric resources in Montana, NorthWestern must comply with Montana statutes and regulations. ADMIN.

R. MONT. 38.5.8204(1) provides:

- 1) In order to satisfy its electricity supply service responsibilities, a utility should pursue the following objectives in assembling and managing an electricity supply resource portfolio:

¹ Oak Tree cites to the testimony of John Hines in Montana PSC Docket No. D2011.5.54. There is no Montana PSC Docket No. D2011.5.54. Montana PSC Docket No. D2011.6.54 deals with NorthWestern's QFLT-1 rate for grandfathered QFs. NorthWestern believes that Oak Tree means Montana PSC Docket No. D2011.5.41 that dealt with the Spion Kop Wind Project. NorthWestern notes that Mr. Hines's testimony is not part of the record in this proceeding, is hearsay, and is not admissible to show the truth of the statements asserted. The Commission admitted the Spion Kop testimony of Todd Guldseth. (Hr'g Tr. 51:23-52:1.) The Commission also admitted the Montana Public Service Commission's Order 7159I from the Spion Kop proceeding. (*Id.*) Oak Tree did not seek to have Mr. Hines's testimony or the transcript from Montana PSC Docket No. D2011.5.41 admitted into the record in this proceeding. NorthWestern requests that references to Mr. Hines's testimony be stricken.

- (a) provide customers adequate and reliable electricity supply services, stably and reasonably priced, at the lowest long-term total cost;
- (b) design rates that are equitable and promote rational, economically efficient consumption decisions;
- (c) assemble and maintain a balanced, environmentally responsible portfolio of electricity supply resources coordinated with economically efficient cost allocation and rate design that most efficiently provides electricity supply services to customers over the planning horizon;
- (d) maintain an optimal mix of electricity supply resources with respect to underlying fuels, technologies, and associated environmental impacts, and a diverse mix of long, medium, and short duration power supply contracts with staggered start and expiration dates; and
- (e) maximize the dissemination of information to customers regarding the mix of resources and the corresponding level of emissions and other environmental impacts associated with electricity supply service through itemized labeling and reporting of the portfolio's energy products.

Much of the evidence in the Montana Spion Kop Wind Project docket dealt with demonstrating that NorthWestern's acquisition of the new resource, which would replace, in part, expiring power purchase agreements, would be part of "a balanced, environmentally responsible portfolio" and part of "an optimal mix of electricity supply resources with respect to underlying fuels, technologies, and environmental impacts."

There are no similar requirements related to qualifying facilities ("QFs"). Furthermore, NorthWestern needed to persuade the Montana Public Service Commission

that approval of a wind resource with a levelized cost of \$53.15/MWh was in the public interest even though short-term market prices were substantially lower.²

When, as is the case in this proceeding, a QF will displace the output from existing base load generation and short-term market purchases, resource planning is not a relevant issue. There is no future planned resource that Oak Tree would allow NorthWestern to avoid. Consequently, the asserted benefits in Montana will not accrue to South Dakota consumers. If the Commission orders a rate that exceeds the incremental cost that NorthWestern will avoid, NorthWestern's South Dakota customers will be harmed and PURPA will be violated.

II. NorthWestern's estimate of incremental cost, not Oak Tree's estimate of avoided cost, is the more credible estimate.

In a rambling, unfocused discourse, Oak Tree (a) attacks the credibility of NorthWestern's witnesses, (b) attempts to bolster Mr. Lauckhart's credibility, and (c) attacks the validity of NorthWestern's avoided cost methodology. (Oak Tree Br. 7–31.) The Commission should reject each of Oak Tree's arguments.

A. NorthWestern's witnesses are credible.

Oak Tree attacks the credibility of Bleu LaFave (Oak Tree Br. 10–11), Richard Green (Oak Tree Br. 11), and Steven Lewis (Oak Tree Br. 10). A person is qualified as an expert by special knowledge, experience, or training. *State v. Bittner*, 359 N.W.2d 121, 125 (S.D. 1984). Each of the three named individuals has special knowledge, experience, or training that qualifies him as an expert.

² Oak Tree seems to approve of Todd Guldseth's market analysis in the Montana Spion Kop Wind Project docket. (See Oak Tree Br. 14.) NorthWestern finds this somewhat surprising, as Mr. Guldseth used exactly the same methodology to forecast electric market prices in the Montana docket as Mr. Lewis used in this docket. Apparently, Oak Tree believes a methodology is valid if it supports its conclusions, but not otherwise.

1. *Bleau LaFave is a credible expert.*

Bleau LaFave is NorthWestern's Director of Long-Term Resources. Mr. LaFave has been employed by NorthWestern or its predecessor since 1994. During his employment, Mr. LaFave has gained significant experience in operations management, procurement, and contracts, to name a few. Mr. LaFave holds a Bachelor of Science in mechanical engineering. During his employment, Mr. LaFave has gained the special knowledge and experience that qualify him as an expert on NorthWestern's system and calculation of its incremental cost. This special knowledge and experience is necessary for Mr. LaFave to fulfill his responsibilities for NorthWestern.

Oak Tree's assertions concerning a legal requirement regarding the time period for which a utility must calculate an avoided cost do not negate Mr. LaFave's qualifications. First, NorthWestern disagrees with Oak Tree's assertions about the scope of FERC's requirement. Second, this Commission has not provided regulated utilities in South Dakota any guidance as to the length of QF contract it will authorize or the term for which a utility should calculate its avoided cost. Contrary to Oak Tree's assertion (Oak Tree Br. 11), Mr. LaFave's position is not plainly incorrect.

2. *Richard Green is a credible expert.*

Richard Green has been an independent consultant since 2000. He has provided services to NorthWestern regarding coal-fired steam plant operations, oil- and gas-fired peaking plants, power plant fuel supply, electric energy supply, system control, and planning related to those areas. For approximately 27 years prior to becoming an independent consultant, Mr. Green was employed by NorthWestern or its predecessor, Northwestern Public Service. Mr. Green holds a Bachelor of Science in mechanical

engineering. Mr. Green's nearly 40 years in the utility industry and his education qualify him as an expert regarding NorthWestern's load, resources, and the costs that can be avoided if NorthWestern receives energy from Oak Tree.

Oak Tree asserts that Mr. Green testified that FERC only required a five-year avoided cost forecast. (Oak Tree Br. 11 (citing Hr'g Tr. 434:13-436:2).) Oak Tree mischaracterizes Mr. Green's testimony. Mr. Green testified that the pertinent FERC regulation, 18 C.F.R. § 292.302, requires a utility to file its estimate of avoided energy costs for the current and next five years. (Hr'g Tr. 435:1-4.) Mr. Green never said that FERC only required a five-year avoided cost forecast. Oak Tree also challenged Mr. Green's testimony because he had not prepared an avoided cost forecast before this docket. (Oak Tree Br. 10.) That challenge is not well taken. As described above, Mr. Green possesses the special knowledge and experience necessary to determine NorthWestern's avoidable energy costs for the current and next five years.

3. *Steven E. Lewis is a credible expert.*

Mr. Lewis is a principal and employee with Lands Energy Consulting ("Lands Energy"). Lands Energy is a national consulting firm specializing in energy management, utility operations, and resource planning. Mr. Lewis has been with Lands Energy since 2011 and has 22 years' experience in the electric industry, including work at the Bonneville Power Administration, Puget Sound Energy, and Seattle City Light. He has extensive experience in energy markets, particularly the electric markets. Mr. Lewis had developed long-range electric price forecasts and has advised clients regarding resource acquisition. Mr. Lewis has facilitated numerous resource solicitations for NorthWestern Energy in both

South Dakota and Montana. Mr. Lewis holds a Bachelor of Science in physics with a mathematics minor. He is familiar with various modeling techniques.

Oak Tree attacks Mr. Lewis's credibility by stating "he has never testified before on that methodology and the methodology itself has never been approved by any regulatory authority as a valid approach to forecasting electric prices." (Oak Tree Br. 10 (citing Hr'g Tr. 405:17-25).) Again, Oak Tree mischaracterizes the testimony. Mr. Lewis's actual testimony as recorded in the transcript is as follows:

Q. Okay. And am I correct in understanding that you have never before testified as an expert on your electric price forecasting methodology?

A. Other than what we had discussed about presentations to the ETAC in Montana, I have not testified, no.

Q. Right. You've never been qualified in court or before a state commission on electric price forecasting methodology?

A. That is correct.

(Hr'g Tr. 405:17-25.) Nothing in Mr. Lewis's testimony supports Oak Tree's assertion that "the methodology itself has never been approved by any regulatory authority as a valid approach to forecasting electric prices." As described above in note 2, the Montana Public Service Commission implicitly approved the same methodology for forecasting prices when it approved the Spion Kop Wind Project based in part on Mr. Guldseth's analysis that used identical methodology. Furthermore, the mere fact that Mr. Lewis has not appeared as a witness does not diminish his qualifications as an expert in this field.

B. The Commission should discount the testimony of J. Richard Lauckhart.

Oak Tree presents Mr. Lauckhart as a well recognized, national expert. (Oak Tree Br. 13.) In fact, analyses of Mr. Lauckhart’s testimony in this proceeding and in other proceedings demonstrate that in many ways Mr. Lauckhart is not credible.

In this proceeding, Mr. Lauckhart overstated his own knowledge. At one point, Mr. Lauckhart stated, “As far as I know, they were shutting it down because of the light load day, because they decided to uncommit it.” (Hr’g Tr. 74:20–22.) When asked if he had any facts to support that statement, he replied, “No. We don’t know. We have no facts why that plant was not running on that day.” (Hr’g Tr. 75:1–2.)

In a series of questions and answers, Mr. Lauckhart first stated positive knowledge about NorthWestern’s resources in Montana, and then could not describe the resources with which he claimed to be familiar. This series is as follows:

- Q. Are you familiar with NorthWestern’s resource portfolio [in] Montana?
- A. Yes.
- Q. Does NorthWestern have significant low cost base load generation available to serve its load in Montana?
- A. Well, NorthWestern has some coal plants. If I recall, they still have a little bit of hydro. And they’ve got some gas plants. And they have a market all available to them.
- Q. Mr. Lauckhart, let’s explore some of the things you just said. First off, do you know how big NorthWestern’s load is in Montana?
- A. You know, I recall its around – there’s a balancing authority load, and then there’s a utility load. I’m

believing the utility load is around 1,100 or 1,200 megawatts peak, I think.

Q. How big is the coal plant that NorthWestern has in Montana?

A. Well, NorthWestern owns a piece of the coal plants, and then they purchase from whoever owns a big share of the [Colstrip] plant. So a bunch of additional coal. I can't really say off the top of my head how much – you know, I'm thinking it's in the 400 megawatt level approximately total.

Q. That NorthWestern owns?

A. No. I'm saying is available to them to meet their load.

Q. Mr. Lauckhart, I'm trying to ask you about NorthWestern's owned resources in Montana in their portfolio that you just said you were familiar with.

A. Uh-huh. Okay. So they have coal. Some of it's purchase power. Some of it's owned.

Q. And do you know how much coal they own?

A. I'm thinking that's in the neighborhood of 100. You know, I can't – you know, if you have a number, I'd accept that subject to check.

Q. Would you accept that NorthWestern's share of [Colstrip] 4 is approximately 222 megawatts?

A. I'd accept that, subject to check.

(Hr'g Tr. 77:5-78:18.) Clearly, although he testified otherwise, Mr. Lauckhart was not familiar with NorthWestern's resource portfolio in Montana. This became even more apparent when Mr. Lauckhart discussed NorthWestern's hydro facilities in Montana.

Q. You indicated you thought NorthWestern had some hydro, owned some hydro in Montana?

- A. You know, my recollection is they still have some hydro at Montana, yes.
- Q. Can you identify any Montana hydro project that NorthWestern owns?
- A. I can't come up with a name here off the top of my head.

(Hr'g. Tr. 79:4-11.) Mr. Lauckhart's answers are illuminating because NorthWestern does not own any hydroelectric facility in Montana.

Mr. Lauckhart did not perform his usual analysis in determining the amount of any capacity credit for Oak Tree. In this proceeding Mr. Lauckhart merely assumed that Oak Tree would qualify for a capacity payment equal to 20% of its nameplate capacity. This mere assumption is in contrast to Mr. Lauckhart's demonstrated practice in another forum. Mr. Lauckhart was a witness on behalf of JD Wind Companies in a complaint before the Texas Public Utility Commission. In that proceeding, Mr. Lauckhart evaluated the projects' Effective Load Carrying Capability and concluded that the projects were entitled to receive a capacity payment on 9.52% of their nameplate capacity. *Complaint of JD Wind 1, LLC, et al.*, PUC Docket 34442, 2009 WL877921, *10, (TX. St. Off. Admin. Hqs. Mar. 25, 2009). Mr. Lauckhart did not perform a similar evaluation in this docket.

Mr. Lauckhart's national experience appears to be limited. A Westlaw[®] search on the All Administrative Decisions and Guidance database for "Lauckhart" revealed 37 orders in which Mr. Lauckhart's name was mentioned. Ten of these dockets date from Mr. Lauckhart's employment at Puget Sound Power & Light; 18 of the dockets appear to be California rules dockets regarding implementing renewable energy standards; three are

contested cases in California; two are QF dockets in Texas; and four are QF dockets in Montana.

In cases before the Montana Public Service Commission, Mr. Lauckhart's testimony has been found to be not credible or not persuasive.

In a NorthWestern rate case, at a hearing on a stipulation between NorthWestern and the Montana Consumer Counsel, Mr. Lauckhart, representing CELP, a QF, testified that a part of the stipulation providing for the sale of 21 MW of power from an unregulated source at \$19 below the Mid-Columbia price was problematic. *In re NorthWestern Energy*, Docket No D2007.7.82, 267 P.U.R. 4th 151, 161 (Mont. P.S.C. July 8, 2008). The Commission found "CELP's criticism of the Colstrip 4 dedication of 21 MW lacks merit." 267 P.U.R 4th at 164.

In a petition by Two Dot Wind, LLC, to have the Montana Public Service Commission determine the wind integration charge for a small QF, Mr. Lauckhart provided rebuttal testimony on behalf of the QF. *In re Two Dot Wind, LLC*, Docket No. D2007.12.152, 2008 WL 2486536 (Mont. P.S.C. Apr. 23, 2008). Mr. Lauckhart asserted that wind integration proposals should not be litigated in the proceeding. *Id.* at

*10. The Montana commission stated:

Contrary to Lauckhart's assertion that this is not the proper forum for litigating NWE's integration proposal, Order No. 6501g specifically contemplates this forum for determining integration rates when a QF and NWE are unable to negotiate the rate. In that regard, Lauckhart's contention that TDW did not intend this proceeding to be about wind integration costs is not persuasive.

Id. at *15.

Mr. Lauckhart also advocated that small wind resources did not cause significant integration costs and should not be charged for wind integration. *Id.* The Montana commission stated, “The PSC rejects as fundamentally flawed TDW’s argument that the relatively small size of its projects, their relatively smaller output range compared to larger wind projects, or their relative contribution to NWE’s need for within-hour balancing services justifies setting a zero integration rate.” *Id.* Generally, the Montana commission rejected all of Mr. Lauckhart’s advocacy in the *Two Dot Wind* proceeding.

In one Texas QF case, either Mr. Lauckhart or his client, John Deere Wind Energy, recycled his testimony from a previous docket. The Texas commission stated, “Finally, the testimony of Richard Lauckhart in Docket No. 34442, a case filed in June 2007, just four months after [Southwest Power Pool] began operating the EIS market, may have little reference today. That such sources may be available to SPS and to require SPS to rely on the pricing of that power is highly questionable.” *Application of Southwestern Public Service Company for Authority to Revise its Tariff for Purchase of Non-Firm Energy from Qualifying Facilities*, PUC Docket No. 37361, 2010 WL 2619319, *19, (TX St. Off. Admin. Hgs. June 24, 2010).

C. NorthWestern’s hybrid methodology is both legal and appropriate given NorthWestern’s resources and load characteristics.

Oak Tree argues that NorthWestern’s methodology is illegal, apparently because it is not a pure application of one of the methodologies identified in Mr. LaFave’s Direct Testimony. Oak Tree offers no legal citation to support its claim. Contrary to Oak Tree’s apparent assertion, no statute or regulation requires a utility or a state to use just the methods identified.

The methods are approaches adopted by various states to most accurately reflect the avoided cost of the utilities in that state. For example, the market-estimate method, advocated by Mr. Lauckhart, was developed and is appropriate for states that have deregulated and in which load-serving utilities do not have rate-based generating assets. In its pure form, it is not appropriate for South Dakota.

In its initial Post-Hearing Brief, NorthWestern explained why the hybrid method that it used is the most appropriate method to determine its incremental cost. NorthWestern will not repeat that discourse here. However, NorthWestern will address the criticism of both Oak Tree³ and Commission Staff that NorthWestern's estimate is based on too low estimates of natural gas prices. The chart below compares Mr. Lewis's estimate of natural gas prices for electric generation with those of the Energy Information Administration, all in nominal dollars.⁴

Source	2008	2009	2012	2015	2020	2025	2030	2035	Annual Growth Rate
AEO 2010	9.09			6.77	7.85	9.17	11.66	14.22	1.7%
AEO 2011	9.02	4.82		5.10	6.05	7.62	9.00	10.86	3.2%
AEO 2012 Early Release				4.89	5.83	7.50	8.89		3.2%
Lewis			3.87	4.90	5.61	6.43	8.71		2.7%

Although EIA projected increasing nominal rates, those increases are not spread uniformly over the period and did not accurately predict the level to which natural gas

³ Oak Tree references another docket before the Commission, EL12-027. (Oak Tree Br. 24.) This docket, involving a petition filed by Otter Tail Power Company on March 30, is not part of the record in this case, as the Commission has not taken administrative notice of any of the filings in EL12-027. While NorthWestern has moved to intervene in EL12-027, NorthWestern has not expressed any opinions regarding Otter Tail's petition. Oak Tree's assumptions regarding NorthWestern's position in the *Otter Tail* docket should be disregarded.

⁴ Oak Tree's estimate of natural gas prices is not included in the chart because it was not provided. The estimate was an undisclosed input into the Black & Veatch black box model.

prices would fall by 2012. Mr. Lewis's estimates are very close to the EIA 2011 projections. It is important to note that in 2010, EIA projected real natural gas prices to decline for 2008 to 2035, and that only after the price of natural gas fell from \$9.09 to \$4.82 did EIA project a real annual growth rate for 2009 to 2035 of 1.3%. In the AEO 2012 - Early Release, EIA projects an annual growth rate in real natural gas prices for electricity generation to be 0.3% from 2010 to 2035.

NorthWestern notes that it projects an annual growth in the nominal price of electricity to be 2.7%, while EIA, in the AEO 2011, projected an annual growth rate of 1.6% for retail electricity prices to all users. This information is presented in Table A3 to the Annual Energy Outlook publications and is attached as Attachment 1.

III. Oak Tree and NorthWestern share any responsibility for the negotiation process; NorthWestern did not refuse to negotiate with Oak Tree.

Oak Tree asserts that NorthWestern simply refused to negotiate with it. (Oak Tree Br. 40.) Oak Tree seems to base this argument on NorthWestern's insistence that it could not pay more than its avoided cost. (*Id.*) NorthWestern would be at risk of a disallowance if it paid Oak Tree more than its avoided cost. See *Consumers Power Co. v. Public Service Comm'n*, 189 Mich. App. 151, 178 (Mich. Ct. App. 1991) (utility may pay more than avoided cost so long as it realizes costs will not be passed through to ratepayers). At all times prior to filing the 18 C.F.R. § 292.302 data on November 15, 2011, NorthWestern believed that its published tariff accurately reflected its avoided costs.

With this background, a review of the actions taken by both parties demonstrates that each bears responsibility for the negotiating impasse. Oak Tree was engaged in two negotiations at the same time—one with NorthWestern's transmission group for

interconnection and another totally separate negotiation with NorthWestern's South Dakota supply group related to a possible power purchase agreement. For purposes of this proceeding, it is important to focus on the second negotiation.

In April 2010, Oak Tree self-certified as a QF and indicated that it had a planned operational date of September 2012. Subsequently, Oak Tree asked for information about NorthWestern's avoided cost. In July 2010, NorthWestern and Oak Tree exchanged a series of letters regarding NorthWestern's avoided cost, its lack of need for capacity through 2012, and the South Dakota Renewable Energy Objective. Throughout this period, although Oak Tree asked for information about avoided cost, it did not indicate a desire to sell to NorthWestern as a QF. After July 30, 2010, NorthWestern's South Dakota supply group did not hear from Oak Tree for nearly six months, until January 25, 2011. Oak Tree offered to sell its energy and capacity for 20 years at \$54.40/MWh escalating at 2.5% per year. NorthWestern responded on February 2, 2011, explaining its position and rejecting Oak Tree's offer.

Oak Tree decided to treat the rejection of its unsolicited offer as a statement that NorthWestern had no interest in further negotiations and served notice of establishment of an LEO. Oak Tree now projected a commercial operation date of May 2012, earlier than it represented in its FERC Form 556. Oak Tree claimed to base its offer on Black & Veatch's estimate of market prices and on NorthWestern's build option. Oak Tree did not explain in any way how the market-estimate option or the build option reflected NorthWestern's avoided cost. NorthWestern replied by again explaining its position and

offering to discuss any cost-effective renewable resources that would not increase costs to customers. Oak Tree then filed the Complaint in this action.

From the communications between the parties, it is clear that Oak Tree did not consider NorthWestern's resources or loads and that it determined a price that would make its project financially feasible—and demanded that or more. It is also clear that NorthWestern believed it could not pay more than its published avoided cost rate without risking a disallowance and did not recalculate its incremental cost until after the Complaint was filed. Further, it is clear that neither Oak Tree nor NorthWestern made an effort to negotiate any terms of a power purchase agreement because they were so far apart on price.

By the QF offering a rate that is above the avoided cost and the utility refusing to accept the offer that is above the avoided cost does not constitute a refusal to negotiate. An LEO requires an attempt by the QF to negotiate. The only negotiation that was offered or discussed between Oak Tree and NorthWestern was the price of the electricity. Since this was above the avoided cost, NorthWestern could not execute a contract with Oak Tree and still be in compliance with PURPA. Oak Tree never offered to discuss any other terms. NorthWestern's refusal to execute a rate not allowed under PURPA does not constitute a failure to negotiate, creating an LEO.

Under these circumstances, both parties share responsibility for the impasse. At an early stage Oak Tree determined its position and did not budge from it. NorthWestern acted similarly. Either party could have taken action to move negotiations forward, but neither did. The conduct of the negotiations, while regrettable, does not lead to an LEO.

Response to Staff's Brief

Commission Staff recommends that the Commission order the parties to use the model developed by NorthWestern to determine the proper avoided cost. (Staff Br. 18.)

NorthWestern agrees with Staff's recommendation.

Commission Staff recommends that the Commission order capacity credits to be incorporated into the avoided cost calculation starting in 2012. (Staff Br. 13.)

NorthWestern disagrees. First, Oak Tree never had any real intention of being operational before September 2012 and never guaranteed that it would deliver capacity at any time.

NorthWestern could not wait to see if Oak Tree actually went into production before acquiring capacity needed for reliability and compliance purposes. Given the uncertainty and the pendency of this proceeding, NorthWestern reasonably acquired capacity that it needed for 2012 through 2015. A utility is not required—and should not now be required—to pay for capacity it does not need.

Second, Staff claims that Oak Tree was offering capacity at \$17/kW-year.⁵ The record is clear that Oak Tree did not ever provide any offer to sell capacity separate from its over-priced energy. Nor did Oak Tree reveal the price for any capacity until after it filed the Complaint in this Docket. NorthWestern could not have purchased capacity from Oak Tree as of February 25, 2011.

Staff recommends that the Commission reject NorthWestern's electric and natural gas price forecasts as too low and that NorthWestern failed to include carbon as a market cost component. (Staff Br. 14.) NorthWestern urges the Commission to reject Staff's

⁵ Staff places this in a confidential section of its Brief. However, Oak Tree publicly cites the same value in its Brief. (Oak Tree Br. 32.)

recommendation. As explained above, NorthWestern's model inputs are consistent with current forecasts, including EIA's. Staff's concern about real increases in the cost of natural gas does not reflect the true situation. Even EIA is projecting a minor real increase through 2035, and has not fully reflected the decline in market prices since 2009. Further, Staff's recommendation regarding carbon is somewhat at odds with the testimony of Staff's witness. Mr. Rounds testified that he did not know what the carbon cost could be (Hr'g Tr. 462:24-463:7) and that the way to include a carbon cost is to estimate the carbon cost and to estimate the probability that it is imposed, and to multiply the two. (Hr'g Tr. 484:4-12.) Given the speculative nature of any carbon cost, it should not be included in calculation of NorthWestern's avoided cost for a fixed or escalating price 20-year contract.

Staff also made recommendations with respect to the term of the contract and the LEO issue. NorthWestern disagrees with both of those recommendations as explained in its initial Post-Hearing Brief. NorthWestern will not repeat those arguments here.

Finally, Staff recommends that the Commission request additional information and schedule additional proceedings. NorthWestern disagrees. NorthWestern asserts that the Commission has ample evidence before it from which it may determine NorthWestern's avoided cost, and that the avoided cost is \$35.85/MWh.

Conclusion

For the foregoing reasons and the reasons stated in NorthWestern's Post-Hearing Brief, NorthWestern requests that the Commission dismiss Oak Tree's Complaint.

Dated at Sioux Falls, South Dakota, this 24th day of April, 2012.

Respectfully submitted,

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Reference Case

Table A3. Energy Prices by Sector and Source
(2008 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2008-2035 (percent)
	2007	2008	2015	2020	2025	2030	2035	
Residential								
Liquefied Petroleum Gases	26.25	29.35	28.03	30.29	31.55	32.81	34.65	0.6%
Distillate Fuel Oil	20.30	24.47	21.08	24.10	25.23	26.61	28.66	0.6%
Natural Gas	12.94	13.48	11.56	11.95	12.29	13.44	14.40	0.2%
Electricity	31.82	33.29	31.43	31.84	32.26	33.46	34.71	0.2%
Commercial								
Liquefied Petroleum Gases	20.65	26.15	24.77	27.02	28.26	29.50	31.32	0.7%
Distillate Fuel Oil	17.48	21.50	18.72	21.60	22.72	24.11	26.13	0.7%
Residual Fuel Oil	8.39	15.52	13.13	15.46	16.54	17.54	18.84	0.7%
Natural Gas	11.20	11.94	9.99	10.35	10.70	11.78	12.66	0.2%
Electricity	28.81	30.47	26.55	27.12	27.72	28.99	30.37	-0.0%
Industrial¹								
Liquefied Petroleum Gases	22.01	24.20	22.49	24.86	26.12	27.38	29.25	0.7%
Distillate Fuel Oil	18.07	22.31	19.00	21.83	22.97	24.40	26.48	0.6%
Residual Fuel Oil	8.84	16.31	16.47	18.20	19.23	20.27	21.72	1.1%
Natural Gas ²	7.58	9.11	6.45	6.70	7.02	7.98	8.73	-0.2%
Metallurgical Coal	3.69	4.49	5.08	5.32	5.24	5.11	5.06	0.4%
Other Industrial Coal	2.48	2.84	2.69	2.66	2.63	2.66	2.71	-0.2%
Coal to Liquids	--	--	1.42	1.46	1.49	1.44	1.51	--
Electricity	19.02	20.21	17.37	17.92	18.50	19.58	20.71	0.1%
Transportation								
Liquefied Petroleum Gases ³	23.83	29.93	27.88	30.13	31.36	32.58	34.38	0.5%
E85 ⁴	27.43	26.93	25.55	26.95	28.86	30.64	32.23	0.7%
Motor Gasoline ⁵	23.66	26.76	25.37	27.59	28.87	30.42	32.33	0.7%
Jet Fuel ⁶	15.77	22.71	19.04	21.69	22.92	24.51	26.48	0.6%
Diesel Fuel (distillate fuel oil) ⁷	21.55	27.65	22.93	25.60	26.63	27.96	29.96	0.3%
Residual Fuel Oil	9.19	14.49	13.58	14.99	15.93	17.10	18.60	0.9%
Natural Gas ⁸	13.84	15.96	13.37	13.44	13.43	14.19	14.78	-0.3%
Electricity	32.03	33.73	28.79	28.55	28.63	31.01	33.26	-0.1%
Electric Power⁹								
Distillate Fuel Oil	15.75	19.37	17.36	20.25	21.35	22.71	24.70	0.9%
Residual Fuel Oil	9.04	14.56	15.53	17.22	18.30	19.55	21.12	1.4%
Natural Gas	7.26	9.09	6.08	6.42	6.75	7.73	8.46	-0.3%
Steam Coal	1.80	2.05	2.01	1.98	1.99	2.03	2.09	0.1%
Average Price to All Users¹⁰								
Liquefied Petroleum Gases	18.94	20.19	20.30	22.15	23.34	24.55	26.37	1.0%
E85 ⁴	27.43	26.93	25.55	26.95	28.86	30.64	32.23	0.7%
Motor Gasoline ⁵	23.55	26.54	25.36	27.59	28.87	30.41	32.32	0.7%
Jet Fuel	15.77	22.71	19.04	21.69	22.92	24.51	26.48	0.6%
Distillate Fuel Oil	20.71	26.27	22.03	24.79	25.89	27.29	29.34	0.4%
Residual Fuel Oil	9.07	14.77	14.26	15.81	16.80	17.96	19.46	1.0%
Natural Gas	9.19	10.53	8.14	8.44	8.75	9.74	10.54	0.0%
Metallurgical Coal	3.69	4.49	5.08	5.32	5.24	5.11	5.06	0.4%
Other Coal	1.84	2.10	2.05	2.02	2.02	2.06	2.12	0.0%
Coal to Liquids	--	--	1.42	1.46	1.49	1.44	1.51	--
Electricity	27.25	28.81	25.95	26.51	27.17	28.49	29.87	0.1%
Non-Renewable Energy Expenditures by Sector (billion 2008 dollars)								
Residential	241.67	254.66	230.89	245.14	258.70	280.40	301.11	0.6%
Commercial	176.61	191.19	176.90	193.15	210.07	234.79	261.07	1.2%
Industrial	219.69	244.81	213.14	234.86	241.75	253.51	267.18	0.3%
Transportation	613.37	705.86	655.77	729.77	782.71	846.64	908.01	0.9%
Total Non-Renewable Expenditures	1251.35	1396.52	1276.69	1402.91	1493.23	1615.34	1737.37	0.8%
Transportation Renewable Expenditures	0.05	0.17	0.21	7.12	15.06	25.05	56.42	24.1%
Total Expenditures	1251.39	1396.69	1276.90	1410.03	1508.29	1640.39	1793.79	0.9%

Reference Case

Table A3. Energy Prices by Sector and Source (Continued)
(Nominal Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2008-2035 (percent)
	2007	2008	2015	2020	2025	2030	2035	
Residential								
Liquefied Petroleum Gases	25.67	29.35	31.23	37.02	42.82	49.52	58.23	2.6%
Distillate Fuel Oil	19.86	24.47	23.49	29.45	34.24	40.16	48.16	2.5%
Natural Gas	12.66	13.48	12.88	14.61	16.68	20.29	24.20	2.2%
Electricity	31.12	33.29	35.02	38.92	43.78	50.50	58.33	2.1%
Commercial								
Liquefied Petroleum Gases	20.20	26.15	27.61	33.02	38.35	44.53	52.64	2.6%
Distillate Fuel Oil	17.10	21.50	20.86	26.39	30.83	36.38	43.92	2.7%
Residual Fuel Oil	8.21	15.52	14.63	18.90	22.45	26.47	31.66	2.7%
Natural Gas	10.96	11.94	11.14	12.65	14.53	17.78	21.27	2.2%
Electricity	28.18	30.47	29.58	33.15	37.62	43.75	51.04	1.9%
Industrial¹								
Liquefied Petroleum Gases	21.53	24.20	25.06	30.38	35.45	41.33	49.15	2.7%
Distillate Fuel Oil	17.68	22.31	21.18	26.68	31.18	36.83	44.51	2.6%
Residual Fuel Oil	8.65	16.31	18.35	22.24	26.10	30.60	36.50	3.0%
Natural Gas ²	7.41	9.11	7.18	8.19	9.52	12.04	14.67	1.8%
Metallurgical Coal	3.61	4.49	5.66	6.50	7.11	7.72	8.50	2.4%
Other Industrial Coal	2.43	2.84	3.00	3.26	3.56	4.01	4.55	1.8%
Coal to Liquids	--	--	1.58	1.79	2.02	2.18	2.53	--
Electricity	18.60	20.21	19.36	21.90	25.11	29.55	34.80	2.0%
Transportation								
Liquefied Petroleum Gases ³	23.31	29.93	31.07	36.82	42.56	49.17	57.77	2.5%
E85 ⁴	26.83	26.93	28.47	32.94	39.17	46.25	54.17	2.6%
Motor Gasoline ⁵	23.15	26.76	28.27	33.72	39.18	45.91	54.33	2.7%
Jet Fuel ⁶	15.42	22.71	21.21	26.51	31.10	36.99	44.51	2.5%
Diesel Fuel (distillate fuel oil) ⁷	21.08	27.65	25.56	31.28	36.13	42.20	50.35	2.2%
Residual Fuel Oil	8.99	14.49	15.13	18.32	21.63	25.81	31.26	2.9%
Natural Gas ⁸	13.54	15.96	14.90	16.43	18.23	21.42	24.84	1.7%
Electricity	31.32	33.73	32.08	34.89	38.86	46.80	55.89	1.9%
Electric Power⁹								
Distillate Fuel Oil	15.41	19.37	19.35	24.75	28.98	34.28	41.52	2.9%
Residual Fuel Oil	8.84	14.56	17.30	21.05	24.83	29.50	35.49	3.4%
Natural Gas	7.10	9.09	6.77	7.85	9.17	11.66	14.22	1.7%
Steam Coal	1.76	2.05	2.24	2.42	2.69	3.06	3.51	2.0%

Reference Case

Table A3. Energy Prices by Sector and Source (Continued)
(Nominal Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2008-2035 (percent)
	2007	2008	2015	2020	2025	2030	2035	
Average Price to All Users¹⁰								
Liquefied Petroleum Gases	18.53	20.19	22.62	27.06	31.68	37.05	44.32	3.0%
E85 ⁴	26.83	26.93	28.47	32.94	39.17	46.25	54.17	2.6%
Motor Gasoline ⁵	23.03	26.54	28.27	33.71	39.17	45.90	54.32	2.7%
Jet Fuel	15.42	22.71	21.21	26.51	31.10	36.99	44.51	2.5%
Distillate Fuel Oil	20.26	26.27	24.55	30.30	35.14	41.20	49.31	2.4%
Residual Fuel Oil	8.87	14.77	15.89	19.33	22.80	27.11	32.70	3.0%
Natural Gas	8.99	10.53	9.07	10.32	11.88	14.70	17.71	1.9%
Metallurgical Coal	3.61	4.49	5.66	6.50	7.11	7.72	8.50	2.4%
Other Coal	1.80	2.10	2.28	2.47	2.74	3.11	3.56	2.0%
Coal to Liquids	--	--	1.58	1.79	2.02	2.18	2.53	--
Electricity	26.66	28.81	28.92	32.40	36.87	43.00	50.19	2.1%
Non-Renewable Energy Expenditures by Sector (billion nominal dollars)								
Residential	236.38	254.66	257.29	299.59	351.09	423.22	506.03	2.6%
Commercial	172.75	191.19	197.13	236.05	285.09	354.37	438.74	3.1%
Industrial	214.89	244.81	237.51	287.03	328.09	382.62	449.00	2.3%
Transportation	599.94	705.86	730.78	891.87	1062.24	1277.85	1525.95	2.9%
Total Non-Renewable Expenditures	1223.96	1396.52	1422.72	1714.54	2026.51	2438.06	2919.72	2.8%
Transportation Renewable Expenditures	0.04	0.17	0.24	8.70	20.44	37.81	94.81	26.5%
Total Expenditures	1224.00	1396.69	1422.95	1723.24	2046.94	2475.87	3014.53	2.9%

¹Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

²Excludes use for lease and plant fuel.

³Includes Federal and State taxes while excluding county and local taxes.

⁴E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

⁵Sales weighted-average price for all grades. Includes Federal, State and local taxes.

⁶Kerosene-type jet fuel. Includes Federal and State taxes while excluding county and local taxes.

⁷Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

⁸Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes and estimated dispensing costs or charges.

⁹Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

¹⁰Weighted averages of end-use fuel prices are derived from the prices shown in each sector and the corresponding sectoral consumption.

Btu = British thermal unit.

-- = Not applicable.

Note: Data for 2007 and 2008 are model results and may differ slightly from official EIA data reports.

Sources: 2007 and 2008 prices for motor gasoline, distillate fuel oil, and jet fuel are based on prices in the Energy Information Administration (EIA), *Petroleum Marketing Annual 2008*, DOE/EIA-0487(2008) (Washington, DC, August 2009). 2007 residential and commercial natural gas delivered prices: EIA, *Natural Gas Annual 2007*, DOE/EIA-0131(2007) (Washington, DC, January 2009). 2008 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2009/07) (Washington, DC, July 2009). 2007 and 2008 industrial natural gas delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey* and industrial and wellhead prices from the *Natural Gas Annual 2007*, DOE/EIA-0131(2007) (Washington, DC, January 2009) and the *Natural Gas Monthly*, DOE/EIA-0130(2009/07) (Washington, DC, July 2009). 2007 transportation sector natural gas delivered prices are based on: EIA, *Natural Gas Annual 2007*, DOE/EIA-0131(2007) (Washington, DC, January 2009) and estimated State taxes, Federal taxes, and dispensing costs or charges. 2008 transportation sector natural gas delivered prices are model results. 2007 and 2008 electric power sector natural gas prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, April 2008 and April 2009, Table 4.13.B. 2007 and 2008 coal prices based on: EIA, *Quarterly Coal Report, October-December 2008*, DOE/EIA-0121(2008/4Q) (Washington, DC, March 2009) and EIA, AEO2010 National Energy Modeling System run AEO2010R.D111809A. 2007 and 2008 electricity prices: EIA, *Annual Energy Review 2008*, DOE/EIA-0384(2008) (Washington, DC, June 2009). 2007 and 2008 E85 prices derived from monthly prices in the Clean Cities Alternative Fuel Price Report. Projections: EIA, AEO2010 National Energy Modeling System run AEO2010R.D111809A.

Table A3. Energy prices by sector and source
(2009 dollars per million Btu, unless otherwise noted)

Sector and Source	Reference Case							Annual Growth 2009-2035 (percent)
	2008	2009	2015	2020	2025	2030	2035	
Residential								
Liquefied Petroleum Gases	29.46	24.63	29.79	32.21	33.90	34.87	35.01	1.4%
Distillate Fuel Oil	24.75	18.12	21.14	24.27	25.92	26.93	27.53	1.6%
Natural Gas	13.62	11.88	10.12	10.88	11.83	12.51	13.39	0.5%
Electricity	33.16	33.62	31.80	31.36	31.20	31.21	31.67	-0.2%
Commercial								
Liquefied Petroleum Gases	26.70	21.49	26.32	28.74	30.41	31.36	31.48	1.5%
Distillate Fuel Oil	21.81	15.97	19.28	22.33	24.02	24.99	25.52	1.8%
Residual Fuel Oil	15.80	13.45	13.25	15.19	17.05	17.67	18.13	1.2%
Natural Gas	11.99	9.68	8.37	8.95	9.77	10.29	10.96	0.5%
Electricity	30.50	29.51	26.67	26.52	26.65	26.60	26.99	-0.3%
Industrial¹								
Liquefied Petroleum Gases	24.95	20.59	23.31	25.82	27.52	28.41	28.52	1.3%
Distillate Fuel Oil	22.57	16.66	19.34	22.43	24.20	25.14	25.66	1.7%
Residual Fuel Oil	16.26	12.05	14.80	16.65	18.19	18.61	18.73	1.7%
Natural Gas ²	9.08	5.25	4.96	5.36	6.17	6.58	7.21	1.2%
Metallurgical Coal	4.53	5.43	6.01	6.33	6.46	6.51	6.58	0.7%
Other Industrial Coal	2.93	3.05	2.91	2.94	2.99	3.05	3.14	0.1%
Coal to Liquids	--	--	1.79	1.91	1.78	1.98	2.05	--
Electricity	19.97	19.79	17.68	17.74	17.99	18.25	18.73	-0.2%
Transportation								
Liquefied Petroleum Gases ³	30.23	25.52	30.56	32.96	34.62	35.56	35.66	1.3%
E85 ⁴	35.36	20.50	26.38	28.79	29.49	30.34	30.93	1.6%
Motor Gasoline ⁵	27.06	19.28	25.97	28.15	29.49	30.33	30.90	1.8%
Jet Fuel ⁶	23.30	12.59	19.02	22.03	23.56	24.70	25.28	2.7%
Diesel Fuel (distillate fuel oil) ⁷	27.97	17.79	22.50	25.69	27.19	27.98	28.39	1.8%
Residual Fuel Oil	14.57	10.57	12.65	14.54	16.02	16.70	16.44	1.7%
Natural Gas ⁸	17.20	12.71	11.97	12.25	12.84	13.14	13.57	0.3%
Electricity	34.68	34.92	29.16	28.07	29.49	30.86	32.37	-0.3%
Electric Power⁹								
Distillate Fuel Oil	19.56	14.33	16.84	19.78	21.20	22.31	22.84	1.8%
Residual Fuel Oil	14.75	8.96	13.17	14.76	16.26	16.87	16.71	2.4%
Natural Gas	9.10	4.82	4.87	5.01	5.76	6.21	6.80	1.3%
Steam Coal	2.07	2.20	2.11	2.15	2.24	2.32	2.40	0.3%
Average Price to All Users¹⁰								
Liquefied Petroleum Gases	20.70	17.43	21.67	23.87	25.43	26.40	26.62	1.6%
E85 ⁴	35.36	20.50	26.38	28.79	29.49	30.34	30.93	1.6%
Motor Gasoline ⁵	26.88	19.23	25.97	28.15	29.49	30.33	30.90	1.8%
Jet Fuel	23.30	12.59	19.02	22.03	23.56	24.70	25.28	2.7%
Distillate Fuel Oil	26.53	17.51	21.83	25.03	26.61	27.48	27.93	1.8%
Residual Fuel Oil	14.89	10.53	13.07	14.88	16.39	17.01	16.85	1.8%
Natural Gas	10.56	7.28	6.45	6.95	7.81	8.26	8.91	0.8%
Metallurgical Coal	4.53	5.43	6.01	6.33	6.46	6.51	6.58	0.7%
Other Coal	2.12	2.25	2.16	2.20	2.28	2.35	2.43	0.3%
Coal to Liquids	--	--	1.79	1.91	1.78	1.98	2.05	--
Electricity	28.65	28.69	26.04	25.91	26.11	26.33	26.93	-0.2%
Non-Renewable Energy Expenditures by Sector (billion 2009 dollars)								
Residential	256.17	238.63	223.20	231.22	242.45	253.75	267.49	0.4%
Commercial	191.84	174.64	169.68	183.13	198.28	212.87	231.11	1.1%
Industrial	249.51	179.22	224.19	244.20	258.44	260.69	261.51	1.5%
Transportation	717.39	474.91	664.86	736.37	773.10	817.07	866.49	2.3%
Total Non-Renewable Expenditures	1414.92	1067.41	1281.92	1394.92	1472.27	1544.39	1626.60	1.6%
Transportation Renewable Expenditures	0.04	0.06	0.23	9.16	27.48	35.74	37.93	28.3%
Total Expenditures	1414.96	1067.47	1282.15	1404.08	1499.75	1580.13	1664.53	1.7%

Table A3. Energy prices by sector and source (continued)
(nominal dollars per million Btu, unless otherwise noted)

Sector and Source	Reference Case							Annual Growth 2009-2035 (percent)
	2008	2009	2015	2020	2025	2030	2035	
Residential								
Liquefied Petroleum Gases	29.18	24.63	32.51	38.92	44.84	50.56	55.86	3.2%
Distillate Fuel Oil	24.52	18.12	23.07	29.32	34.28	39.05	43.93	3.5%
Natural Gas	13.49	11.88	11.05	13.13	15.65	18.14	21.37	2.3%
Electricity	32.85	33.62	34.72	37.89	41.27	45.25	50.54	1.6%
Commercial								
Liquefied Petroleum Gases	26.45	21.49	28.73	34.72	40.22	45.46	50.23	3.3%
Distillate Fuel Oil	21.61	15.97	21.04	26.98	31.77	36.23	40.72	3.7%
Residual Fuel Oil	15.66	13.45	14.47	18.35	22.55	25.62	28.93	3.0%
Natural Gas	11.88	9.68	9.14	10.81	12.92	14.92	17.52	2.3%
Electricity	30.22	29.51	29.12	32.04	35.25	38.56	43.06	1.5%
Industrial¹								
Liquefied Petroleum Gases	24.72	20.59	25.45	31.19	36.40	41.18	45.52	3.1%
Distillate Fuel Oil	22.38	18.56	21.12	27.10	32.01	36.45	40.95	3.5%
Residual Fuel Oil	16.11	12.05	16.15	20.11	24.05	26.98	29.88	3.6%
Natural Gas ²	9.00	5.25	5.42	6.47	8.15	9.54	11.50	3.1%
Metallurgical Coal	4.49	5.43	6.56	7.65	8.54	9.44	10.50	2.6%
Other Industrial Coal	2.90	3.05	3.17	3.55	3.96	4.43	5.01	1.9%
Coal to Liquids	--	--	1.96	2.30	2.36	2.87	3.27	--
Electricity	19.79	19.79	19.30	21.43	23.79	26.45	29.88	1.6%
Transportation								
Liquefied Petroleum Gases ³	29.95	25.52	33.36	39.83	45.80	51.56	56.90	3.1%
E85 ⁴	35.03	20.50	28.80	34.79	39.01	43.98	49.35	3.4%
Motor Gasoline ⁵	26.81	19.28	28.35	34.01	39.01	43.98	49.31	3.7%
Jet Fuel ⁶	23.09	12.59	20.76	26.62	31.16	35.80	40.35	4.6%
Diesel Fuel (distillate fuel oil) ⁷	27.71	17.79	24.56	31.04	35.96	40.57	45.30	3.7%
Residual Fuel Oil	14.43	10.57	13.80	17.57	21.19	24.21	26.24	3.6%
Natural Gas ⁸	17.04	12.71	13.06	14.80	16.98	19.05	21.66	2.1%
Electricity	34.36	34.92	31.83	33.91	39.01	44.74	51.66	1.5%
Electric Power⁹								
Distillate Fuel Oil	19.38	14.33	18.38	23.89	28.04	32.34	36.45	3.7%
Residual Fuel Oil	14.61	8.96	14.37	17.83	21.50	24.46	26.66	4.3%
Natural Gas	9.02	4.82	5.10	6.05	7.62	9.00	10.86	3.2%
Steam Coal	2.05	2.20	2.31	2.60	2.96	3.36	3.83	2.2%

Table A3. Energy prices by sector and source (continued)
(nominal dollars per million Btu, unless otherwise noted)

Sector and Source	Reference Case							Annual Growth 2009-2035 (percent)
	2008	2009	2015	2020	2025	2030	2035	
Average Price to All Users¹⁰								
Liquefied Petroleum Gases	20.51	17.43	23.65	28.84	33.64	38.28	42.49	3.5%
E85 ⁴	35.03	20.50	28.80	34.79	39.01	43.98	49.35	3.4%
Motor Gasoline ⁵	26.63	19.23	28.35	34.00	39.01	43.98	49.31	3.7%
Jet Fuel	23.09	12.59	20.76	26.62	31.16	35.80	40.35	4.6%
Distillate Fuel Oil	26.28	17.51	23.83	30.24	35.20	39.83	44.57	3.7%
Residual Fuel Oil	14.75	10.53	14.27	17.98	21.67	24.66	26.88	3.7%
Natural Gas	10.46	7.28	7.04	8.39	10.33	11.98	14.21	2.6%
Metallurgical Coal	4.49	5.43	6.56	7.65	8.54	9.44	10.50	2.6%
Other Coal	2.10	2.25	2.36	2.66	3.02	3.41	3.89	2.1%
Coal to Liquids	--	--	1.96	2.30	2.36	2.87	3.27	--
Electricity	28.38	28.69	28.43	31.30	34.53	38.17	42.97	1.6%
Non-Renewable Energy Expenditures by Sector (billion nominal dollars)								
Residential	253.79	238.83	243.63	279.35	320.68	367.88	426.84	2.3%
Commercial	190.06	174.64	185.21	221.24	262.27	308.62	368.78	2.9%
Industrial	247.19	179.22	244.72	295.03	341.84	377.94	417.29	3.3%
Transportation	710.71	474.91	725.73	889.64	1022.56	1184.56	1382.69	4.2%
Total Non-Renewable Expenditures	1401.75	1067.41	1399.29	1685.26	1947.34	2239.00	2595.61	3.5%
Transportation Renewable Expenditures	0.04	0.06	0.25	1.06	36.34	51.81	60.53	30.6%
Total Expenditures	1401.79	1067.47	1399.54	1696.32	1983.68	2290.81	2656.14	3.6%

¹Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

²Excludes use for lease and plant fuel.

³Includes Federal and State taxes while excluding county and local taxes.

⁴E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

⁵Sales weighted-average price for all grades. Includes Federal, State and local taxes.

⁶Kerosene-type jet fuel. Includes Federal and State taxes while excluding county and local taxes.

⁷Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

⁸Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes and estimated dispensing costs or charges.

⁹Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

¹⁰Weighted averages of end-use fuel prices are derived from the prices shown in each sector and the corresponding sectoral consumption.

Btu = British thermal unit.

-- = Not applicable.

Note: Data for 2008 and 2009 are model results and may differ slightly from official EIA data reports.

Sources: 2008 and 2009 prices for motor gasoline, distillate fuel oil, and jet fuel are based on prices in the U.S. Energy Information Administration (EIA), *Petroleum Marketing Annual 2009*, DOE/EIA-0487(2009) (Washington, DC, August 2010). 2008 residential and commercial natural gas delivered prices: EIA, *Natural Gas Annual 2008*, DOE/EIA-0131(2008) (Washington, DC, March 2010). 2009 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2010/07) (Washington, DC, July 2010). 2008 and 2009 industrial natural gas delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey* and industrial and wellhead prices from the *Natural Gas Annual 2008*, DOE/EIA-0131(2008) (Washington, DC, March 2010) and the *Natural Gas Monthly*, DOE/EIA-0130(2010/07) (Washington, DC, July 2010). 2008 transportation sector natural gas delivered prices are based on: EIA, *Natural Gas Annual 2008*, DOE/EIA-0131(2008) (Washington, DC, March 2010) and estimated State taxes, Federal taxes, and dispensing costs or charges. 2009 transportation sector natural gas delivered prices are model results. 2008 and 2009 electric power sector distillate and residual fuel oil prices: EIA, *Monthly Energy Review*, DOE/EIA-0035(2010/09) (Washington, DC, September 2010). 2008 and 2009 electric power sector natural gas prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, April 2009 and April 2010, Table 4.2. 2008 and 2009 coal prices based on: EIA, *Quarterly Coal Report, October-December 2009*, DOE/EIA-0121(2009/4Q) (Washington, DC, April 2010) and EIA, AEO2011 National Energy Modeling System run REF2011.D020911A. 2008 and 2009 electricity prices: EIA, *Annual Energy Review 2009*, DOE/EIA-0384(2009) (Washington, DC, August 2010). 2008 and 2009 E85 prices derived from monthly prices in the Clean Cities Alternative Fuel Price Report. Projections: EIA, AEO2011 National Energy Modeling System run REF2011.D020911A.

Table A3. Energy prices by sector and source
(2010 dollars per million Btu, unless otherwise noted)

Sector and source	Reference case							Annual growth 2010-2035 (percent)
	2009	2010	2015	2020	2025	2030	2035	
Residential								
Liquefied petroleum gases	24.84	27.02	30.64	31.19	32.33	33.25	34.55	1.0%
Distillate fuel oil	18.35	21.21	27.17	28.78	30.17	31.53	33.11	1.8%
Natural gas	11.95	11.08	10.28	11.06	12.11	12.66	13.86	0.9%
Electricity	34.01	33.69	33.22	32.46	32.31	31.76	32.47	-0.1%
Commercial								
Liquefied petroleum gases	21.76	23.52	27.36	27.90	29.02	29.93	31.21	1.1%
Distillate fuel oil	16.16	20.77	23.87	25.39	26.87	28.31	29.52	1.4%
Residual fuel oil	13.66	11.07	16.11	17.58	18.23	19.04	18.86	2.2%
Natural gas	9.82	9.10	8.59	9.21	10.12	10.53	11.55	1.0%
Electricity	30.06	29.73	28.07	27.78	27.74	26.98	27.99	-0.2%
Industrial¹								
Liquefied petroleum gases	20.05	21.80	27.35	27.91	29.27	30.38	31.99	1.5%
Distillate fuel oil	16.74	21.32	24.10	25.62	27.26	28.88	29.89	1.4%
Residual fuel oil	12.16	10.92	19.12	20.45	21.14	21.63	21.99	2.8%
Natural gas ²	5.33	5.51	4.85	5.30	6.12	6.48	7.41	1.2%
Metallurgical coal	5.49	5.84	7.17	7.54	8.08	8.58	9.05	1.8%
Other industrial coal	2.99	2.93	3.26	3.30	3.38	3.50	3.62	0.8%
Coal to liquids	--	--	1.25	2.03	2.11	2.21	2.35	--
Electricity	20.05	19.63	18.36	18.45	18.84	18.87	20.00	0.1%
Transportation								
Liquefied petroleum gases ³	25.83	26.89	31.88	32.28	33.41	34.26	35.60	1.1%
E85 ⁴	20.76	25.21	28.94	27.91	31.86	31.77	32.91	1.1%
Motor gasoline ⁵	19.52	22.70	29.17	31.22	32.27	33.62	34.08	1.6%
Jet fuel ⁶	12.75	16.22	23.62	25.15	26.47	27.59	29.39	2.4%
Diesel fuel (distillate fuel oil) ⁷	18.02	21.87	27.46	29.06	30.50	32.06	32.77	1.6%
Residual fuel oil	10.61	10.42	18.17	19.33	20.31	20.93	21.28	2.9%
Natural gas ⁸	14.13	13.21	12.38	12.69	13.32	13.57	14.39	0.3%
Electricity	35.37	32.67	29.97	29.41	30.49	30.69	32.01	-0.1%
Electric power⁹								
Distillate fuel oil	14.67	18.77	22.67	24.11	25.31	26.37	28.13	1.6%
Residual fuel oil	9.03	12.34	22.59	23.86	24.86	25.56	26.03	3.0%
Natural gas	4.85	5.14	4.54	4.91	5.70	6.13	7.08	1.3%
Steam coal	2.22	2.25	2.36	2.46	2.56	2.70	2.83	0.9%
Average price to all users¹⁰								
Liquefied petroleum gases	16.11	17.29	22.87	23.14	24.21	25.15	26.48	1.7%
E85 ⁴	20.76	25.21	28.94	27.91	31.86	31.77	32.91	1.1%
Motor gasoline ⁵	19.47	22.59	29.17	31.22	32.26	33.62	34.08	1.7%
Jet fuel	12.75	16.22	23.62	25.15	26.47	27.59	29.39	2.4%
Distillate fuel oil	17.73	21.64	26.80	28.40	29.88	31.43	32.26	1.6%
Residual fuel oil	10.55	10.89	18.84	20.08	21.01	21.66	22.01	2.9%
Natural gas	7.37	7.16	6.43	6.95	7.85	8.22	9.18	1.0%
Metallurgical coal	5.49	5.84	7.17	7.54	8.08	8.58	9.05	1.8%
Other coal	2.26	2.29	2.41	2.51	2.61	2.75	2.87	0.9%
Coal to liquids	--	--	1.25	2.03	2.11	2.21	2.35	--
Electricity	29.01	28.67	27.41	27.05	27.22	26.90	27.97	-0.1%
Non-renewable energy expenditures by sector (billion 2010 dollars)								
Residential	240.88	251.69	241.74	247.99	260.34	269.79	288.66	0.5%
Commercial	177.13	179.11	174.58	184.99	197.22	205.36	225.27	0.9%
Industrial	184.39	199.24	221.06	246.03	261.79	267.85	283.68	1.4%
Transportation	479.50	573.77	747.91	790.02	814.47	844.32	871.69	1.7%
Total non-renewable expenditures	1081.91	1203.81	1385.30	1469.03	1533.83	1587.32	1669.31	1.3%
Transportation renewable expenditures	0.07	0.08	0.25	7.35	12.78	28.56	43.16	28.8%
Total expenditures	1081.98	1203.89	1385.55	1476.38	1546.60	1615.88	1712.46	1.4%

Table A3. Energy prices by sector and source (continued)
(nominal dollars per million Btu, unless otherwise noted)

Sector and source	Reference case							Annual growth 2010-2035 (percent)
	2009	2010	2015	2020	2025	2030	2035	
Residential								
Liquefied petroleum gases	24.55	27.02	33.02	37.06	42.49	48.19	54.85	2.9%
Distillate fuel oil	18.14	21.21	29.29	34.20	39.66	45.70	52.55	3.7%
Natural gas	11.82	11.08	11.08	13.14	15.91	18.35	22.00	2.8%
Electricity	33.62	33.69	35.80	38.58	42.47	46.03	51.54	1.7%
Commercial								
Liquefied petroleum gases	21.51	23.52	29.49	33.16	38.15	43.37	49.53	3.0%
Distillate fuel oil	15.97	20.77	25.73	30.17	35.32	41.04	46.85	3.3%
Residual fuel oil	13.51	11.07	17.36	20.89	23.96	27.60	29.94	4.1%
Natural gas	9.70	9.10	9.26	10.95	13.31	15.25	18.33	2.8%
Electricity	29.71	29.73	30.25	33.01	36.46	39.10	44.43	1.6%
Industrial¹								
Liquefied petroleum gases	19.82	21.80	29.48	33.17	38.48	44.04	50.78	3.4%
Distillate fuel oil	16.55	21.32	25.98	30.45	35.83	41.86	47.45	3.3%
Residual fuel oil	12.02	10.92	20.60	24.30	27.79	31.34	34.91	4.8%
Natural gas ²	5.27	5.51	5.23	6.30	8.05	9.39	11.76	3.1%
Metallurgical coal	5.43	5.84	7.73	8.96	10.62	12.44	14.37	3.7%
Other industrial coal	2.96	2.93	3.51	3.92	4.45	5.07	5.74	2.7%
Coal to liquids	--	--	1.35	2.41	2.77	3.20	3.73	--
Electricity	19.83	19.63	19.79	21.92	24.76	27.35	31.74	1.9%
Transportation								
Liquefied petroleum gases ³	25.54	26.89	34.36	38.36	43.92	49.65	56.52	3.0%
E85 ⁴	20.52	25.21	31.19	33.17	41.87	46.04	52.25	3.0%
Motor gasoline ⁵	19.29	22.70	31.44	37.10	42.41	48.72	54.10	3.5%
Jet fuel ⁶	12.61	16.22	25.45	29.89	34.79	39.99	46.65	4.3%
Diesel fuel (distillate fuel oil) ⁷	17.82	21.87	29.60	34.53	40.09	46.46	52.01	3.5%
Residual fuel oil	10.49	10.42	19.58	22.97	26.69	30.33	33.78	4.8%
Natural gas ⁸	13.97	13.21	13.35	15.08	17.51	19.67	22.84	2.2%
Electricity	34.97	32.67	32.30	34.95	40.08	44.49	50.82	1.8%
Electric power⁹								
Distillate fuel oil	14.50	18.77	24.43	28.65	33.27	38.23	44.65	3.5%
Residual fuel oil	8.93	12.34	24.35	28.36	32.68	37.04	41.31	5.0%
Natural gas	4.80	5.14	4.89	5.83	7.50	8.89	11.25	3.2%
Steam coal	2.19	2.25	2.54	2.93	3.37	3.92	4.49	2.8%

Table A3. Energy prices by sector and source (continued)
(nominal dollars per million Btu, unless otherwise noted)

Sector and source	Reference case							Annual growth 2010-2035 (percent)
	2009	2010	2015	2020	2025	2030	2035	
Average price to all users¹⁰								
Liquefied petroleum gases	15.93	17.29	24.65	27.50	31.83	36.45	42.04	3.6%
E85 ⁴	20.52	25.21	31.19	33.17	41.87	46.04	52.25	3.0%
Motor gasoline ⁵	19.25	22.59	31.44	37.10	42.41	48.72	54.10	3.6%
Jet fuel	12.61	16.22	25.45	29.89	34.79	39.99	46.65	4.3%
Distillate fuel oil	17.52	21.64	28.88	33.75	39.27	45.55	51.21	3.5%
Residual fuel oil	10.43	10.89	20.31	23.84	27.62	31.39	34.93	4.8%
Natural gas	7.28	7.16	6.93	8.26	10.31	11.92	14.57	2.9%
Metallurgical coal	5.43	5.84	7.73	8.96	10.62	12.44	14.37	3.7%
Other coal	2.23	2.29	2.60	2.99	3.43	3.98	4.56	2.8%
Coal to liquids	--	--	1.35	2.41	2.77	3.20	3.73	--
Electricity	28.68	28.67	29.54	32.14	35.78	38.99	44.40	1.8%
Non-renewable energy expenditures by sector (billion nominal dollars)								
Residential	238.13	251.69	260.55	294.69	342.21	391.02	458.20	2.4%
Commercial	175.11	179.11	188.17	219.83	259.24	297.64	357.58	2.8%
Industrial	182.29	199.24	238.26	292.36	344.11	388.20	450.30	3.3%
Transportation	474.02	573.77	806.11	938.80	1070.59	1223.70	1383.66	3.6%
Total non-renewable expenditures	1069.55	1203.81	1493.09	1745.67	2016.15	2300.56	2649.74	3.2%
Transportation renewable expenditures	0.07	0.08	0.27	8.73	16.79	41.39	68.51	31.2%
Total expenditures	1069.62	1203.89	1493.36	1754.40	2032.95	2341.95	2718.25	3.3%

¹Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

²Excludes use for lease and plant fuel.

³Includes Federal and State taxes while excluding county and local taxes.

⁴E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

⁵Sales weighted-average price for all grades. Includes Federal, State and local taxes.

⁶Kerosene-type jet fuel. Includes Federal and State taxes while excluding county and local taxes.

⁷Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

⁸Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes and estimated dispensing costs or charges.

⁹Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

¹⁰Weighted averages of end-use fuel prices are derived from the prices shown in each sector and the corresponding sectoral consumption.

Btu = British thermal unit.

-- = Not applicable.

Note: Data for 2009 and 2010 are model results and may differ slightly from official EIA data reports.

Sources: 2009 and 2010 prices for motor gasoline, distillate fuel oil, and jet fuel are based on prices in the U.S. Energy Information Administration (EIA), *Petroleum Marketing Annual 2009*, DOE/EIA-0487(2009) (Washington, DC, August 2010). 2009 residential and commercial natural gas delivered prices: EIA, *Natural Gas Annual 2009*, DOE/EIA-0131(2009) (Washington, DC, December 2010). 2010 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2011/07) (Washington, DC, July 2011). 2009 and 2010 industrial natural gas delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey and industrial and wellhead prices from the Natural Gas Annual 2009*, DOE/EIA-0131(2009) (Washington, DC, December 2010) and the *Natural Gas Monthly*, DOE/EIA-0130(2011/07) (Washington, DC, July 2011). 2009 transportation sector natural gas delivered prices are based on: EIA, *Natural Gas Annual 2009*, DOE/EIA-0131(2009) (Washington, DC, December 2010) and estimated State taxes, Federal taxes, and dispensing costs or charges. 2010 transportation sector natural gas delivered prices are model results. 2009 and 2010 electric power sector distillate and residual fuel oil prices: EIA, *Monthly Energy Review*, DOE/EIA-0035(2010/09) (Washington, DC, September 2010). 2009 and 2010 electric power sector natural gas prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, April 2010 and April 2011, Table 4.2, and EIA, *State Energy Data Report 2009*, DOE/EIA-0214(2009) (Washington, DC, June 2011). 2009 and 2010 coal prices based on: EIA, *Quarterly Coal Report, October-December 2010*, DOE/EIA-0121(2010/4Q) (Washington, DC, May 2011) and EIA, AEO2012 National Energy Modeling System run REF2012.D121011B. 2009 and 2010 electricity prices: EIA, *Annual Energy Review 2010*, DOE/EIA-0384(2010) (Washington, DC, October 2011). 2009 and 2010 E85 prices derived from monthly prices in the Clean Cities Alternative Fuel Price Report. Projections: EIA, AEO2012 National Energy Modeling System run REF2012.D121011B.