BEFORE THE PUBLIC SERVICE COMMISSION OF WYOMING

In the Matter of the Application of Rocky Mountain Power, for Approval of a General Rate Increase of Approximately $36.1 Million per Year for Retail Electric Utility Service in Wyoming, and for Approval of a New Renewable Resource Mechanism and Marginal Cost Pricing Tariff	)))))))	Docket No. 20000-277-ER-07 Record No. 11249

PRE-FILED DIRECT TESTIMONY OF

Thomas L. Wilson, Jr.

On Behalf of the Office of Consumer Advocate

Testimony Filed: January 7, 2008

Hearing Begins: March 3, 2008

Q. PLEASE STATE YOUR NAME, ADDRESS AND OCCUPATION.

A. My name is Thomas L. Wilson, Jr. My business address is 2515 Warren Avenue, Suite 304, Cheyenne, Wyoming 82002. I am an analyst with the Wyoming Office of the Consumer Advocate ("OCA").

Q. WHAT IS THE FUNCTION OF THE OCA?

A. Pursuant to W.S. § 37-2-401,

> The office of consumer advocate shall represent the interests of Wyoming citizens and all classes of utility customers in matters involving public utilities. In the exercise of its powers the office of the consumer advocate shall consider all relevant factors, including, but not limited to, the provision of safe, efficient and reliable utility services at just and reasonable prices.

Q. ARE THE ANALYSES AND RECOMMENDATIONS OF THE OCA, IN THIS OR ANY OTHER CASE BEFORE THE WYOMING PUBLIC SERVICE COMMISSION ('COMMISSION") INFLUENCED OR DIRECTED BY THE COMMISSION?

A. No. Although the OCA is a division within the Commission according to W.S. § 37-2-401, it is a separate division with no reporting or supervisory links to the Commission and the OCA has the right under W.S. § 37-2-402(ii), to appeal decisions of the Commission that it does not find in the public interest.

Q. ON WHOSE BEHALF DO YOU APPEAR HERE TODAY?

A. I appear here today on behalf of the OCA. As I indicated previously, the OCA is an independent party in this proceeding, separate and apart from the Commission or its advisory staff.

Q. AS A MEMBER OF THE OCA, DO YOU ADVOCATE THE INTERESTS OF CERTAIN GROUPS OF CONSUMERS OVER OTHERS?

A. No. As a member of the OCA, it is my statutory obligation to advocate the best interest of all citizens in the state. Specifically, W.S. § 37-2-401 states that the

OCA "shall represent the interests of Wyoming citizens and all classes of utility customers in matters involving public utilities." This public interest standard requires the OCA to represent the broadest possible utility consumer constituency, even though some of those consumers may also be independently represented. The OCA is responsible for balancing the positions and recommendations of the Company, and of other parties, to arrive at a set of recommendations that serve the overall long term public interest.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I have a master's degree in economics (1986) and a bachelor's degree in agricultural economics (1984) from the University of Wyoming. I have completed the Sixth Annual Western Utility Rate Seminar, co-sponsored by the National Association of Regulatory Commissioners ("NARUC") Water Committee, the Utah Public Service Commission and the Division of Continuing Education, University of Utah. I have also completed the Annual Regulatory Studies Program, co-sponsored by NARUC and the Graduate School of Business Administration and Lifelong Education Programs at Michigan State University. I have completed additional continuing education coursework in finance, accounting, and negotiation skills at the University of Washington, Graduate School of Business.

I have been employed at the OCA since May 7, 2007. Until then, I worked as an economist for the Washington Utilities and Transportation Commission ("WUTC") since January of 1986 where I retired as a senior member of the staff. In my tenure at the WUTC, I also served as a policy adviser to the commissioners. I reviewed filings, testified, and oversaw various regulatory projects. Among other duties, I worked on rulemakings and policy interpretation, worked on assignments to NARUC subcommittees, and on several federal-state joint board activities.

As an experienced regulatory analyst I have been intimately involved in the ratemaking process across the regulated industries, including energy matters for 21 years. I was the lead witness and team leader in several unprecedented WUTC cases involving a rate case, compliance cases, regulatory streamlining, cost of service ratemaking, and alternative forms of regulation other than traditional, rate base/rate of return regulation. I have performed market share analyses, pursuant to U.S. Department of Justice Antitrust/Merger Guidelines.

I have been a repeat guest lecturer at an annual seminar, "The Basics of Regulation," sponsored by NARUC and the Center for Public Utilities, New Mexico State University. I presented material for beginners from the public and private sectors on policy issues and on methods for estimating the cost of service. I have also testified before the Washington State Legislature, and I testified at the Federal Communications Commission concerning marginal cost estimation methods.

From 2001 to 2002, I took a leave of absence from the WUTC and I worked for Washington State University as a founding partner and assistant director of the Center to Bridge the Digital Divide, which is in the Colleges of Agriculture and Cooperative Extension. While I was at the Center I managed various projects with partner universities and over fifty government and industry leaders, domestically and internationally, building knowledge and skills capacity to address supply, demand, and policy issues in information communications technology.

Q. HAVE YOU TESTIFIED BEFORE THIS COMMISSION IN PREVIOUS PROCEEDINGS?

A. Yes, in October of 2007 I provided cost of capital testimony before the Commission in Docket Nos. 20003-90-ER-07 and 30005-112-GR-07 concerning

requests by Cheyenne Light, Fuel and Power Company for general rate increases for gas and electric utility services. I have previously testified before the WUTC in 23 dockets.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The first purpose of my testimony is to discuss Rocky Mountain Power's ("Company" or "RMP") proposed marginal cost pricing tariff and to propose the scope of a collaborative process which the OCA believes would be helpful in developing a better concept, design, and application for rates to address rapid new large load growth issues. The second purpose is to offer an alternative proposal for inverted block rates to promote energy conservation.

Q. DOES THE OCA AGREE WITH RMP'S ALTERNATIVE MARGINAL COST PRICING PROPOSAL?

A. No. The OCA is not philosophically opposed to the concept of addressing anticipated significant growth on the basis of marginal cost based pricing. However, RMP's proposal for the design of an incremental or marginal cost pricing is not well supported and the application of RMP's proposal also raises issues. Before the Commission takes the step toward marginal cost based pricing to address anticipated significant growth, alternative strategies should be given consideration.

Q. DOES THE OCA HAVE ALTERNATIVE RECOMMENDATIONS CONCERNING PRICING CHALLENGES IN AN ERA OF ANTICIPATED SIGNIFICANT GROWTH?

A. Yes. We have two alternative recommendations.

First, RMP's marginal cost pricing proposal is not ready for adoption. However, if the Commission finds RMP's concept is in the public interest, the OCA

recommends that RMP be directed to initiate a collaborative process with Wyoming customers and interested parties to reach an agreement on an appropriate pricing response, if any. The OCA recommends that the results of that discussion should be reported back to the Commission within 180 days. My testimony provides the OCA's scoping suggestions regarding that collaborative process.

Second, we recommend consideration of an alternative inverted block rate design that promotes conservation. Conservation is a relatively cost-effective way of adjusting to growing energy demands. If the Commission finds the current rate design is not in the public interest, RMP should be directed to provide alternative inverted block rate design proposals for all customer classes in its next rate case. As an option, the OCA suggests that the Commission find it in the public interest to require alternative inverted block rate design proposals for all customer classes in the Company's next DSM filing.

Q. PLEASE EXPLAIN YOUR ANALYIS OF RMP'S MARGINAL COST PROPOSAL.

A. My analysis considers three aspects of the proposal: 1) the concept at issue for policy-making; 2) the tariff design that RMP proposes to implement the concept; and 3) the application of that tariff.

Q. PLEASE PROVIDE YOUR UNDERSTANDING OF THE BASIS FOR RMP'S PROPOSAL.

A. The issue as I understand it is two-fold. First, RMP believes that the marginal cost of producing power for new large loads is greater than the embedded historical average costs of overall power production. If I understand it correctly, RMP believes that this cost structure coupled with the second issue, which is anticipated significant large load growth, creates the potential for upward pressure on prices for all ratepayers. It is my understanding that RMP is also faced with

supplying electricity to growing demand in various other customer classes as well, so I think there is some question whether customers expecting loads larger than 5 MW are the only customers who will be contributing to anticipated significant load growth for RMP.

At the same time, I believe that RMP has identified substantial amounts of predicted new growth that could require enough power to justify construction of several new generation resources to meet the demand. Based upon my reading of the discovery requests made by various parties in the case, there seem to be some questions about just how much new load is expected to actually occur, when it will occur and which customers are likely to be the major cost drivers for new generation resources.

It is my understanding that some of the new demand may not exist as long as the expected lives of the plant investments. If all of the costs associated with the new investments are spread across all of the ratepayers according to accepted cost allocation weighting factors, then all customers will have to bear a portion of the expenses that may only be attributable to a few large and rapidly growing customers. Many of the new investments have not been made and are not accounted for in the test year that is being used for ratemaking in this docket.

RMP estimates that due to the high load growth and increasing costs, if the customers who are primarily responsible for that do not pay directly for the additional generation resources that will be required, then all ratepayers will face substantial rate increases. It is my understanding that most of the customers who are responsible for the new, large, and rapidly growing demand require electricity as an input to oil and natural gas production. Additionally, growth in other customer classes is also expected, but in terms of the amount of energy involved, it is the large general service customers that are expected to require so much new

power that significant investment in new power plants to supply that demand will be necessary.

Wyoming has seen boom and bust cycles before. Thus, the challenge that RMP says it is facing carries risk. The expected new investment to serve large industrial customers bears some amount of additional risk because large industrial customers might be able to choose between market-priced natural gas and regulated electricity as a power source in their own production processes. Industrial customers also have a choice of diesel, solar, and wind power alternatives, as well as energy efficiency and DSM to mitigate their power costs.

A large industrial customer's business enterprise may not last for the entire depreciable life of the investment in generation, transmission and distribution facilities that RMP says that it expects to have an obligation to provide. The transmission facilities necessary to serve new large loads may not be able to be shared with other customers because the large industrial customers operations are often far away from other customers who might also utilize the assets. If the assets needed to serve new large loads are sufficiently fungible or collocated close enough to other customers to allow sharing of the asset, it might be possible to avoid stranded costs if/when the large industrial operation ends. However, Wyoming's oil and gas fields and mines are often located far away from other potential electric utility customers.

Q. THE CRUX OF THE PROPOSAL HAS TO DO WITH THE MARGINAL COST/EMBEDDED COST DIFFERENTIAL. IF THE AVERAGE COST BASED PRICE IS GOING TO EQUAL MARKET PRICES DUE TO, FOR EXAMPLE, A FUTURE CARBON TAX, COULD MARGINAL COSTS EVENTUALLY BE LOWER THAN EMBEDDED COSTS?

A. Yes. This highlights the notion that part of the problem with RMP's proposal is that it seems to be a permanent solution for what may or may not be a permanent

problem. Once the new regime is implemented, the problem with it is that it may not always be fair as other external factors change over time. Of course, mid-course adjustments could be addressed as necessary, but it does not make sense to start out with what is perceived as a flaw to begin with, knowing that down the road it may have to be fixed.

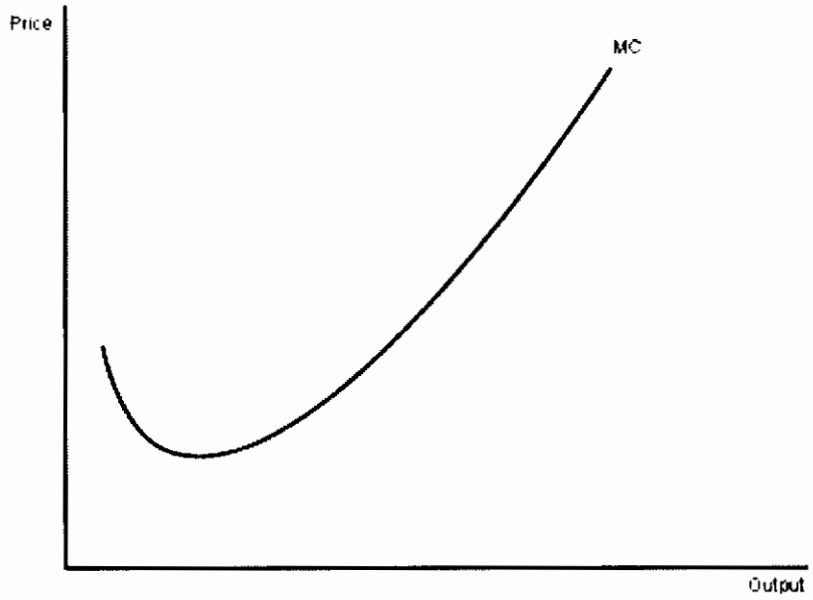
Q. FROM A THEORETICAL PERSPECTIVE, DO YOU AGREE WITH DR. MCDERMOTT'S RECOMMENDATIONS SUPPORTING THE USE OF MARGINAL COST BASED PRICING?

A. Yes. From the standpoint of microeconomics, of course I agree that the theoretical concept of marginal cost based pricing sends welfare optimizing pricing signals in a perfectly competitive market. However, the concept of RMP's Schedule 500 marginal cost pricing proposal is flawed because the market for RMP's services is characterized as a quasi-exclusive monopoly. Since RMP is not in a perfectly competitive market, benefits of efficiency concepts based on marginal cost pricing theory would not be obtained.

Q. PLEASE EXPLAIN THE CONCEPT OF MARGINAL COST IN MICROECONOMIC THEORY.

A. Marginal cost is the infinitesimally small change in total cost when the quantity produced is changed likewise infinitesimally. Marginal cost is made up of the cost of all of the additional inputs necessary to produce one more infinitesimally small unit. In practice, it is usually nearly impossible to estimate a theoretically infinitesimally small change in either total cost or in the quantity produced. Therefore, in my regulatory experience, marginal cost is usually estimated based upon some increment of units of production. For example, if producing one more toaster requires building a new factory, the marginal cost of that toaster includes the cost of the new factory. However, since fixed costs do not vary in the short run, fixed costs would not be included in the concept of marginal cost in the short run.

For regulatory policymaking, long run marginal cost is the more relevant theoretical concept. In the long run all costs can vary. In my opinion, long run marginal cost should not include any common costs of production. An example of common costs would be the cost of the desk of the president of the company. Mathematically, the marginal cost (MC) function is expressed as the slope of the total cost curve, and it is also expressed as the first derivative of the total cost function (TC) with respect to quantity (Q). The following illustration shows that marginal cost changes with volume, and so at each level of production, the marginal cost is the cost of the next unit produced.



Economists assume that the firm is rational and so it should only continue producing more output as long as the price consumers will pay is greater than marginal cost. From this basis flows the economic theory that in a competitive market price equals marginal cost. As Dr. McDermott testifies, marginal cost and marginal cost pricing play a central role in economic definitions of efficiency.

Q. PLEASE DESCRIBE THE DESIGN OF RMP'S MARGINAL COST PRICING PROPOSAL FOR NEW LARGE LOADS.

A. RMP witness William Griffith presents the proposal on behalf of the Company. My understanding is as follows: RMP proposes a surcharge on large general service customers with new loads greater than 5 MW and on new loads of existing customers that grow by more than 5 MW over the next 36 months.

Q. HOW WOULD THE SURCHARGE RATE BE CALCULATED?

A. The surcharge would be calculated using the same model that is used to calculate avoided cost pricing for large qualifying facilities using the generation dispatch model approved by the Commission in Docket No. 20000-250-EA-06. Two production dispatch model studies are conducted, with one study applying an additional 250 MW of new large industrial load. The estimates are made for the test period ending August 2008, and the difference between the two is assumed to represent the impact of 250 MW of new large industrial load based on RMP's costs and existing resources.

Q. WHAT INFORMATION HAS RMP PROVIDED COMPARING THE PRICE IMPACT OF THIS PROPOSAL?

A. The following table is based upon RMP witness Griffith's Exhibit No. WRG-5.

	Large General Service		
	Secondary	**Primary**	**Transmission**
Average Proposed Embedded Price per kWh	**$0.04928**	**$0.04228**	**$0.03932**
Average Proposed Price per kWh **Including Schedule 500** Surcharge	$0.07250	$0.07120	$0.06510
% Surcharge	**47%**	**68%**	**66%**
Marginal Cost Based on 20 Year Nominal Levelized Avoided Cost Study	$0.08056	$0.06912	$0.06427
% Change to Bring Embedded to Marginal Cost	**63%**	**63%**	**63%**

RMP's witness Griffith explains that the large difference between embedded costs and increasing marginal costs multiplied by anticipated significant load growth drives the Company's proposal.

Q. THE SURCHARGE ON LARGE NEW GENERAL SERVICE LOADS IS RMP'S PROPOSAL TO ADDRESS GENERATION RESOURCE COST ISSUES. WILL THERE BE ADDITIONAL TRANSMISSION OR DISTRIBUTION COSTS ASSOCIATED WITH THE ANTICIPATED SIGNIFICANT LOAD GROWTH?

A. Yes. RMP also proposes to implement a new large customer contract, but did not propose contract language, although RMP witness Griffith states that methods such as contract minimums will be implemented. Another RMP proposal would be to require take or pay agreements over the projected duration of new large load requirements greater than 5 MW.

Q. DO YOU VIEW THE PROXY USE OF AVOIDED COST BASED PRICES AS AN INTERMEDIATE STEP TOWARD A MARGINAL COST BASED RATE?

A. Maybe. However, I do not believe that RMP has sufficiently shown whether this proxy is the right amount of money that should be charged to recover actual investments and expenses that would otherwise be recovered under accepted ratemaking practices.

There also seems to be a disconnect between the actual demand that is reliably forecasted to manifest itself and the assumptions that RMP has employed in running the avoided cost methodology. There are a variety of growth estimates and there is no reliable evidence to show what the growth forecast would be assuming some unknown level of price elasticity and without knowledge of how potential customers would react to the proposed Schedule 500 surcharge.

For example, the avoided cost methodology used to calculate the Schedule 500 surcharge assumes 250 MW of new load and a 20 year nominal levelized period to calculate rates for the 12 months ending August 2008. But RMP predicts 560 MW in new load over the next few years.

Q. DOES RMP'S MARGINAL COST PROPOSAL ACCOUNT FOR RATEMAKING EFFECTS?

A. Yes and no. Yes, the Company's expressed philosophy is that the proposal is necessary to avoid rate impact on its other customers. No, the proposal does not jibe with ratemaking practices because for one thing, it proposes to collect a surcharge to recover the cost of resources that have not yet been incurred. In fact, the additional investments and expenses that will be incurred to serve the anticipated significant new loads will not appear before regulators until the next rate case or maybe not even until after that. Yet, RMP proposes to begin charging the surcharge before such costs have been incurred.

Q. DID RMP CONSIDER OTHER ALTERNATIVES TO ITS MARGINAL COST BASED PRICING PROPOSAL?

A. According to RMP witness Griffith, (p. 14 ,line 6) the Company was able to contrast its proposal with market pricing or real-time pricing.

Q. PLEASE COMMENT ON THOSE ALTERNATIVES.

A. Mr. Griffith only mentioned that the company was able to make a comparison of its proposal with market pricing. He did not provide any additional testimony concerning the outcome of that analysis except to imply that the market price approach would lead to price instability.

Q. DO YOU THINK THAT APPLICATION OF RMP'S ALTERNATIVE MARGINAL COST PRICING DESIGN IS LIKELY TO ACHIEVE THE CONCEPTUAL BENEFITS OF MARGINAL COST PRICING?

A. No, because the design is flawed, the application is not likely to achieve the benefits imagined.

Q. PLEASE EXPLAIN YOUR CONCERNS ABOUT THE APPLICATION OF THE CONCEPT AND THE DESIGN.

A. Aside from the other concerns that I have expressed, I am concerned that the 5 MW threshold may not be correct, that the growth forecasts are not readily understood and may not be accurate, that the rate impact of the design may be too large, and that the proposal is discriminatory.

Q. DO YOU AGREE WITH THE COMPANY'S RATIONALE FOR CHOOSING NEW LOADS GREATER THAN 5 MW AS OPPOSED TO SOME OTHER LOAD SIZE?

A. No, because in my opinion RMP has no rationale. Mr. Griffith testifies that RMP considered three factors in choosing the 5 MW criteria.

First, Mr. Griffith states that new large loads can have a significant immediate effect on RMP's system. By way of supporting this view, I think that Mr. Griffith overstates his case by referring to Bonneville Power Administration's (BPA) new large load rule when he says that the BPA has acknowledged the significant effect of new large loads. The fact is that BPA's new large load rule applies to new loads over 10 MW, not 5 MW. To me this is saying that RMP could have just as readily picked 1 MW as the threshold on the presumption that 1 MW can have a significant effect on the system. Like Mr. Griffith, I too am interested in hearing from RMP's customers about the 5 MW load size threshold.

Second, Mr. Griffith speaks about the desirability of the 5 MW threshold because he says it is administratively more efficient to single out the customers with new

loads greater than 5 MW and apply the surcharge, than it is to calculate surcharges for all customers. My reaction to that philosophy is that I still do not understand why administrative efficiency led RMP to select a 5 MW threshold as opposed to some other random level like 3.14, or 6.3, or 7, or even a percentage.

Third, Mr. Griffith speaks about the unprecedented size of anticipated new large loads as a factor that RMP considered in selecting a 5 MW threshold. Mr. Griffith testifies that traditional forecast test periods can reflect associated system cost impacts "fairly reasonably" when growth is 3 % but that the impact of 85% growth "clearly" calls for a solution to the "problem" of these new large loads. Unfortunately Mr. Griffith stops far short of explaining how that bit of information helped the Company to choose a 5 MW threshold rather than some other level.

Q. WHAT ARE RMP'S GROWTH FORECASTS?

A. The following forecasts for MW, number of customers and revenues by rate class comes from RMP's response to WIEC Data Request 7.10.

MWh Sales by Rate Class for Wyoming

	Budget 2007	Forecast 2008	Change
Residential	977,932	997,416	1.99%
Commercial	1,368,675	1,402,891	2.50%
Industrial	6,184,163	6,531,126	5.61%
PS&HL	13,474	13,474	0.00%
Irrigation	16,115	16,116	0.01%
Total	8,560,359	8,961,023	4.68%

Number of Customers by Rate Class for Wyoming

	Budget 2007	Forecast 2008	Change
Residential	104,509	106,228	1.64%
Commercial	22,260	22,617	1.60%
Industrial	2,109	2,076	-1.56%
PS&HL	404	419	3.71%
Irrigation	562	567	0.89%
Total	129,844	131,907	1.59%

Revenues by Rate Class for Wyoming

	Budget 2007 (millions)	Forecast 2008 (millions)	Change
Residential	$74,850	$78,089	4.33%
Commercial	$88,058	$89,378	1.50%
Industrial	$251,675	$271,680	7.95%
PS&HL	$2,029	$2,073	2.17%
Irrigation	$1,251	$1,279	2.24%
Total	$417,863	$442,499	5.90%

In addition, RMP's most current long term load forecast by year for new industrial load from existing and new customers was provided in response to Cimarex' data request number 1.21. The table below shows that RMP is forecasting over 500 MW in new load in the next twenty years. I have added columns to the data to show the rate at which the new load is forecast to come on line. As the far right-hand column shows, the five year average new load increase is highest in the first five years, about a 54% average increase. After that, the rate of increase diminishes substantially and eventually growth becomes negative. This tells us that RMP expects most of the load growth to occur in the relatively near term, so the Company is asking for a significant response to what it says is a quickly approaching but short-lived problem. If the forecast is wrong, it could become an overly radical response to what isn't such a big problem after all. Or maybe the growth is going to occur at a slower, but steadier rate, in which case a more step-wise and deliberate or moderate approach would possibly be merited.

Rocky Mountain Power Forecast for New Industrial Loads for New and Existing Customers In Wyoming (in MW)

Year	East (MW)	East % Change	West (MW)	West % Change	Total State (MW)	Total % Change	5 Year Average
2008	38	↓	33	↓	71	-	↓
2009	78	107%	111	239%	189	168%	↓
2010	127	62%	140	26%	266	41%	↓
2011	158	24%	142	2%	299	13%	↓
2012	183	16%	180	27%	364	21%	↓
2013	206	13%	254	41%	460	27%	54%
2014	243	18%	264	4%	508	10%	↓
2015	278	14%	272	3%	549	8%	↓
2016	291	5%	275	1%	566	3%	↓
2017	305	5%	271	-2%	575	2%	↓
2018	313	3%	255	-6%	568	-1%	4%
2019	316	1%	251	-2%	567	0%	↓
2020	315	0%	240	-4%	555	-2%	↓
2021	317	1%	236	-2%	553	0%	↓
2022	316	0%	232	-2%	548	-1%	↓
2023	315	0%	228	-2%	543	-1%	-1%
2024	312	-1%	224	-2%	537	-1%	↓
2025	313	0%	220	-2%	533	-1%	↓
2026	313	0%	217	-2%	529	-1%	↓
2027	310	-1%	213	-2%	523	-1%	↓

RMP paints a picture of hyperbolic growth but at the same time, there seems to be a lot of questions about exactly how much growth there will be and when it will occur. This is critical to understanding how to design rates for this situation. Due to confusion about the amount of new growth, it is my recommendation that a collaborative needs to be undertaken to study the problem before decisions can be made to create new prices.

Q. WHAT IS RMP'S ESTIMATE OF HOW MANY PROJECTS POTENTIAL CUSTOMERS HAVE PUT ON HOLD DUE TO THE THREAT OF A NEW MARGINAL COST PRICING TARIFF?

A. RMP reports in response to WIEC 10.3 that it has been told that three projects are on hold. However, RMP says that customers have not specifically stated they put

them on hold due to the proposal. Rather, the customers seem to have indicated that these are phase-in projects they are currently evaluating.

Q. WHAT IS THE SIZE OF THESE PROJECTS?

A. RMP reports that the three projects are 65, 82 and 60 MW respectively and all three are related to the oil and gas sector.

Q. HAS RMP INDICATED HOW IT PLANS TO UPDATE THE NEW MARGINAL COST PRICING TARIFF?

A. Yes. RMP's witness Mr. Griffith states that RMP will revise the marginal cost pricing schedule annually based on the avoided cost methodology approved in Docket No. 20000-250-EA-06. RMP indicates in response to a question from WIEC about this issue (WIEC 10.6) that marginal generation and transmission costs will be calculated for a 20 year period based on two production cost studies, one with 250 MW of new load and one without. RMP proposes to use this method of analysis annually and to update it if the new load forecasts are significantly different. Mr. Widmer also provides additional detail on this analysis in his pre-filed, direct testimony.

Q. IN RESPONSE TO WIEC'S DATA REQUEST 10.1 RMP WAS ASKED TO QUANTIFY THE EFFECT ON GENERAL RATEPAYERS IF THE NEW MARGINAL COST PRICING TARIFF IS DENIED. PLEASE PROVIDE A SUMMARY OF THE RESULTS OF THAT ANALSYSIS.

A. RMP responded to the data request with an analysis calculating that effect. RMP indicates that the following caveats apply to the analysis:

1. The independent effect of the absence of the proposed New Marginal Cost Pricing tariff surcharge on other customer's rates
2. any other rate or revenue changes that might occur over this timeframe in Wyoming are not included

3. new load increases from 250 MW in Year 1 to a total of 560 MW of new load in Year 5
4. new load customers pay proposed embedded standard tariff rates
5. new load has a 90% load factor
6. service is provided primarily at transmission voltage delivery – 90% of customer load receives service at transmission voltage delivery and 10% at primary voltage

Based on these assumptions, RMP estimates that without the New Marginal Cost Pricing tariff surcharge, other Wyoming RMP customers' rates would have to increase by about $100 million. The chart below, prepared using data from RMP's response to WIEC 10.1, contains additional details.

Rocky Mountain Power
Estimated Rate Impacts on Other Customers in the Absence of Schedule 500 Revenue
($000's)

	Year 1	Year 2	Year 3	Year 4	Year 5
Cumulative New Load	250	325	425	500	560
Average New Load Load Factor	90%	90%	90%	90%	90%
Marginal Pricing Proposed Rate - Transmission	0.02495	0.02495	0.02495	0.02495	0.02495
Marginal Pricing Proposed Rate - Primary	0.02684	0.02684	0.02684	0.02684	0.02684
Embedded Proposed Rate - Transmission	0.03932	0.03932	0.03932	0.03932	0.03932
Embedded Proposed Rate - Primary	0.04228	0.04228	0.04228	0.04228	0.04228
% of New Load at Transmission service	90%	90%	90%	90%	90%
Projected Schedule 500 Revenue	$49,549	$64,414	$84,233	$99,098	$110,990
Wyoming GRC Proposed Revenue	$427,090	$427,090	$427,090	$427,090	$427,090
New Load Revenue at embedded standard tariff - Proposed Rates	$78,083	$101,508	$132,741	$156,166	$174,906
Total Revenue at proposed embedded rates + New Load	$505,173	$528,598	$559,831	$583,256	$601,996
Cumulative rate increase on other customers in the absence of Schedule 500	**9.81%**	**12.19%**	**15.05%**	**16.99%**	**18.44%**

Q. IS IT DISCRIMINATORY TO CHARGE TWO CUSTOMERS WITH IDENTICAL LOAD CHARACTERISTICS AND USAGE DIFFERENT RATES, BASED ON WHEN THEY JOINED THE SYSTEM?

A. Yes. To economists, price discrimination means a variation in price for similar situations which does not have a cost basis. I think the real question is whether it is unduly or unlawfully discriminatory. There are many examples of discriminatory pricing in duly authorized and lawfully filed tariffs. For example, it is not uncommon to find examples in utility tariffs on file with the Commission

of "grandfathered" rates and different rates for the same service provided to "newcomers." In my opinion, such practices are not necessarily unduly discriminatory; therefore, neither is the new marginal cost pricing proposal by RMP. RMP's proposal is simply an attempt to come up with pricing that accounts for the incremental cost of providing service to new, very large customers. So while the concept may be legal, the OCA believes that the particular design that RMP has proposed is not appropriate.

Q. PLEASE EXPLAIN WHY THE OCA RECOMMENDS THAT THERE SHOULD BE A DISCUSSION ABOUT MARGINAL COST BASED PRICING FOR RAPID NEW LOAD GROWTH.

A. The OCA recommends further action to develop marginal cost based pricing strategies for new large loads. The OCA recommends that if the Commission finds it is in the public interest, interested persons and the parties should be directed to engage in a discussion about marginal cost based pricing for rapid new large load growth. The OCA recommends that the results of that discussion should be reported back to the Commission within 180 days.

Q. PLEASE PROVIDE THE OCA'S SUGGESTIONS FOR DEFINING THE ISSUES AND PUTTING SOME STRUCTURE AROUND THE DISCUSSION.

A. We think that, at a minimum, the discussion should address the following set of issues:

a. How much new load is really expected?
b. If the design includes a threshold like 5 MW new load, what should the threshold actually be?
c. Which customer classes should be subjected to a change in price?
d. Are there alternative proposals?
e. How much revenue will be required?

f. Is the avoided cost method as a proxy for marginal costs a correct approach?

g. How will double-recovery be addressed?

Any other issues that we have not addressed, but which intervenors as well as the Company may deem necessary should be included as well.

Q. PLEASE EXPLAIN THE TASK OF RATE DESIGN.

A. The task in rate design is to take into account multiple objectives. The main priorities are typically:

- recovery of utility revenue requirements;
- fair apportionment of costs among customers; and
- economic efficiency to promote effective load management (Bonbright, 1961; Philips, 1988).

Other important goals include:

- "provision of stable revenues for the utility;
- provision of stable rates for customers;
- promotion of social equity in the form of lifeline rates for people with low incomes; and
- simplicity of understanding for customers and ease of implementation for utilities."[1]

Rate design should avoid shifting costs between customer classes and provide good price signals. In a perfectly competitive market, marginal cost based pricing leads to the most efficient outcome, maximizing social benefits.

Rates are typically designed to recover three types of costs;

[1] U.S. Environmental Protection Agency, Rate Design Working Group, "Using Rate Design to Promote Energy Efficiency" March 2006 ***DRAFT.***
Source: http://www.epa.gov/cleanenergy/pdf/eeap_rates.pdf visited December 4, 2007

1. non-volume sensitive fixed costs that can be assigned to individual customers or groups of customers are recovered through a fixed customer charge;
2. fixed costs that can't be assigned to individual customers or groups of customers but are shared by all customers are recovered in proportion to the demand that each customer or customer class places on the system; and
3. variable operations costs, including fuel and purchased power are recovered through a usage charge often called the kWh or energy charge. The demand component of the overall rate is typically incorporated in the kWh charge for all but the largest customers since smaller customer loads are rarely demand metered.[2]

According to the National Action Plan for Energy Efficiency recommendations for overcoming the barriers to energy efficiency, rate design is a key option.[3] Through rate design, retail electricity utility rate structures and price signals can have the potential to conserve energy and promote energy efficiency. An inverted block rate design is a recommended option for an economically efficient way of promoting energy conservation.

The OCA believes that RMP and other Wyoming electric utilities should also be working with their retail customers, including residential, large commercial, irrigation and industrial customers to explore cost effective conservation measures, load shifting incentives, and rate design alternatives to determine whether there are ways to reduce the Company's combined power and other operating costs.

Q. DO YOU HAVE AN UNDERSTANDING REGARDING POLICY INITIATIVES FOR ENERGY EFFICIENCY?

A. Yes. Energy efficiency is a major issue for the U.S. and for western states. It is estimated that the U.S. could save more than $500 billion in energy costs over 25

[2] Testimony of Bryce Freeman, filed November 23, 2007, DOCKET NO. 10016-48-CP-7.
[3] National Action Plan for Energy Efficiency Report, http://www.epa.gov/cleanenergy/energy-programs/napee/resources/action-plan.html visited January 5, 2008.

years through energy efficiency programs.[4] In 2004 the Western Governors' Association launched the Clean and Diversified Energy Initiative with three important goals for the West:

1. "Develop an additional 30,000 megawatts of clean energy by 2015 from both traditional and renewable sources;
2. Achieve a 20% increase in energy efficiency by 2020; and
3. Ensure a reliable and secure transmission grid for the next 25 years." (emphasis added)[5]

Given the policy link between clean energy, energy conservation, and energy efficiency, it was not surprising to me when, on December 6, 2007, the Western Governor's Association expressed their support for a clean energy policy by stating, "As Governors we have been actively implementing and advocating for clean energy policies in our own states."[6]

Reaching these goals will not be easy. The Western Governors recommend a goal of cost effectively saving 3-5% of projected electricity sales in 2010 and 10-15% by 2020 through Demand Side Management programs.[7]

At its July 2003 meeting the NARUC adopted a resolution to review gas and electric utility programs designed to promote and aggressively implement cost-effective conservation, and energy efficiency. NARUC supports the National Action Plan on Energy Efficiency.

[4] U.S. Environmental Protection Agency (EPA), "Utility Energy Efficiency Vision Can Save Billions of Dollars While Fighting Climate Change" News Release: Washington, D.C. – November 13, 2007. http://www.epa.gov/cleanenergy/pdf/vision_press_release.pdf visited December 6, 2007.
[5] "Clean Energy, A Strong Economy and a Healthy Environment" Report of the Clean and Diversified Energy Advisory Committee to the Western Governors Association, Preface. June 2006. http://www.westgov.org/wga/publicat/CDEAC06.pdf visited December 6, 2007.
[6] Western Governors call for swift, decisive action on Energy Independence and Security Act. December 6, 2007, letter and Press Release http://www.westgov.org/ visited December 6, 2007.
[7] Id. page 17.

The Energy Policy Act of 2005 required the U.S. Department of Energy to conduct a study and then report to Congress on energy efficient state & regional policies for utilities. DOE and the U.S. Environmental Protection Agency have produced substantial current research on energy efficient utility rate design. In a recent report to Congress, DOE agreed with the National Action Plan on Energy Efficiency that included expert input from, among others, recommendations from NARUC as well as numerous utility sector leaders.[8] The National Action Plan for Energy Efficiency Vision for 2025 provides a framework to consider when seeking policies and programs to achieve cost effective energy efficiency measures.[9]

National Action Plan for Energy Efficiency
Recommendations[10]

1. Recognize energy efficiency as a high priority energy resource.
2. Make a strong, long-term commitment to implement cost-effective energy efficiency as a resource.
3. Broadly communicate the benefits of and opportunities for energy efficiency.
4. Provide sufficient, timely and stable program funding to deliver energy efficiency where cost-effective.
5. Modify policies to align utility incentives with the delivery of cost-effective energy efficiency and modify ratemaking practices to promote energy efficiency investments. (emphasis added)

According to the National Action Plan for Energy Efficiency, in developing tariffs to encourage energy efficiency, the following questions arise:

1. What are the key rate design issues, and how do they affect rate designs for energy efficiency?

[8] "State and Regional Policies that Promote Energy Efficiency Programs Carried Out by Electric and Gas Utilities" A Report to the United States Congress Pursuant to Section 139 of the Energy Policy Act of 2005, U.S. Department of Energy, March 2007.
[9] U.S. Environmental Protection Agency (EPA), "Utility Energy Efficiency Vision Can Save Billions of Dollars While Fighting Climate Change" News Release: Washington, D.C. – November 13, 2007. http://www.epa.gov/cleanenergy/pdf/vision_press_release.pdf visited December 6, 2007.
[10] "Implementing the National Action Plan for Energy Efficiency" presentation by Larry Mansueti, DOE and Stacy Angel, EPA. Southeast Implementation Meeting, September 28, 2007. http://www.epa.gov/cleanenergy/pdf/southeast_28sep07/angel_mansueti_epa_doe_atlanta_action_plan_implementation.pdf visited December 6, 2007.

2. What different rate design options are possible, and what are their pros and cons?
3. What other mechanisms can encourage efficiency that are not driven by tariff savings? And
4. What are the most successful strategies for encouraging energy efficiency in different jurisdictions?[11]

Q. WHAT TYPE OF RATE DESIGN DO RMP'S RATES HAVE?

A. RMP's rates have fixed charges, time of use charges, flat rates and a moderate version of an inverted block rate design. The following chart provides various information about RMP rate designs for various major customer classes: Note that these rate designs take into account load growth for each customer class (shown in the chart under each customer class category name) as well as the total amount of energy for each customer class.

[11] Id. Page 5-1.

RMP Rate Designs

Residential

Forecasted change in mWh 2007-2008: 1.99%	Existing	Proposed
Basic Charge (Fixed)	$9.02	$10.25
Energy all kWh (Flat)	$0.00660	$0.00548
Demand-Related all kWh (Flat)	$0.04467	$0.04530

General Service	Secondary		Primary	
Forecasted change in mWh 2007-2008: 2.5%	Existing	Proposed	Existing	Proposed
Basic Charge				
Single Phase (Fixed)	$14.50	no change	$16.50	no change
Three Phase (Fixed)	$16.50	no change	$19.50	no change
Demand Per kW for all kW > 15 kW (Flat)	$11.13	$11.42	$10.77	$11.04
Energy				
Per kWh 0 - 1,000 kWh (Declining)	$0.05610	$0.04731	$0.05437	$0.04585
Per kWh 1,001 - 8,000 kWh (Declining)	$0.03235	$0.02728	$0.03128	$0.02638
Per kWh > 8,000 kWh (Declining)	$0.01981	$0.01670	$0.01915	$0.01615

Large Power	Secondary		Primary	
Forecasted change in mWh 2007-2008: 5.61%	Existing	Proposed	Existing	Proposed
Basic Charge				
Load Size ≤ 3,000 kW (Fixed)	$1,050	$625	$1,360	$810
Load Size > 3,000 kW (Fixed)	$1,725	$1,090	$2,185	$1,380
Load Size Charge				
≤ 3,000 kW per kW (Flat)	$2.26	$2.26	$2.54	$2.54
> 3,000 kW per kW (Flat)	$2.02	$2.02	$2.43	$2.43
Demand Charge				
On Peak (M-F)				
Per kW all kW of On Peak Demand (Flat)	$11.91	$12.32	$11.56	$11.95
Energy Charge				
Per kWh (Flat)	$0.00719	$0.00571	$0.00676	$0.00536

Large Power Transmission

Forecasted change in mWh 2007-2008: 5.61%	Existing	Proposed
Basic Charge (Fixed)	$3,780	$3,670
Demand Charge On Peak (M-F) per kW (Flat)	$9.93	$10.93
Energy Charge per kWh (Flat)	$0.00648	$0.00541

Irrigation	non-West		West	
Forecasted change in mWh 2007-2008: 0.01%	Existing	Proposed	Existing	Proposed
Basic Charge				
Single Phase (Fixed)	$21.75	$18.05	$25.00	$15.00
Three Phase (Fixed)	$27.25	$22.60	$30.00	$18.00
Demand Charge (Fixed)	$6.79	$5.63	$14.65	$14.13
Energy Charge				
May 1 - Sept 15 (Flat)	$0.02955	$0.02454	$0.00611	$0.00571
Off Season (Flat)	$0.05042	$0.04181	$0.00611	$0.00571

Q. PLEASE DISCUSS FIXED CHARGES.

A. From an analytical standpoint, a larger fixed charge means a smaller volumetric charge (per kWh), which lowers the customer incentive for energy efficiency. However, a larger fixed charge and lower volumetric charge reduces profit from

increased sales, and so reduces the utility's disincentive to promote energy efficiency.

Q. DOES RMP's RATE STRUCTURE HAVE ANY FIXED CHARGES?

A. Yes. Basic monthly charges for residential, general service, large power, large power transmission and irrigation customers are all fixed charges.

Q. PLEASE DISCUSS TIME OF USE CHARGES.

A. Time-of-use rates can promote energy efficiency, but the cost of replacing existing induction meters with electronic interval meters can be discouraging. Inverted block rates do not require the replacement of the meter.[12] RMP's rates do not vary by time of use but there are rate differentials for peak (business days) and off-peak (weekends) consumption in the large power, and large power transmission classes. The irrigation (agricultural pumping) class also has a peak pricing period defined as the irrigation season.

Q. PLEASE DISCUSS FLAT RATES.

A. Although it is simple, the flat rate is not cost reflective. Flat rates often result in cross-subsidization because some customers use more than the average amount of electricity, and others are below-average consumers. A flat rate does not create price signals.

Q. DOES RMP HAVE ANY FLAT RATES?

A. Yes. RMP's rates are typified by flat rate designs.

Q. PLEASE EXPLAIN THE TERM "DECLINING BLOCK RATE."

[12] Before the NOVA SCOTIA UTILITY AND REVIEW BOARD IN THE MATTER OF: The Public Utilities Act, R.S.N.S. 1989, c.380 as amended - and - IN THE MATTER OF: An Application by Nova Scotia Power Incorporated for Approval of Certain Revisions to its Rates, Charges and Regulations. Testimony of Dr. Larry Hughes, Energy Research Group - Department of Electrical and Computer Engineering, Dalhousie University, Halifax, Nova Scotia, 24 November, 2004. http://dclh.electricalandcomputerengineering.dal.ca/environment/nspi_ibr/Report.pdf visited December 4, 2007.

A. The term "declining block rate" describes a price structure in which per unit prices decline with increasing blocks of use. Declining block rates can reduce customer savings from energy efficiency measures. This can even lead to increased demand due to a poor price signal from a declining block rate since customer's efforts to conserve energy will likely occur in the higher tier and they will see smaller reductions than under flat rates. If demand increases due to the rate design, then that can lead to long-term higher rates and additional upward pressure if new supply is more costly than energy efficiency.

Q. DOES RMP HAVE ANY DECLINING BLOCK RATES?

A. Yes. RMP's charges for general service energy are set forth in a declining block rate design.

Q. PLEASE DISCUSS INVERTED BLOCK RATES.

A. Under an inverted block structure rates go up with increasing usage. Inverted block rates may produce higher average bills for consumers with greater than average consumption. Thus, it can be argued that inverted block rates load an inordinate amount of revenue recovery on consumption levels that may not occur, for example, during a mild winter. It can also be argued that the lower average price to the lower than average customer is fairer than the declining block rate, since the cost to serve their load is below average.

A caution concerning rate stability, social equity, and rate design applications is that inverted block rates for electricity may harm low-income customers if the initial block is not set correctly. In recent testimony by Roger Colton on behalf of Community Action of New Mexico concerning a Public Service Company of New Mexico electric rate case, Mr. Colton testified that the first consumption tier should be set at 500 kWh rather than 200 kWh. [13] However, in California, an

[13] "Factors to Consider in Designing Initial Block of Inverted Block Rates for Electricity" September/October 2007 bimonthly electronic newsletter of Fisher, Sheehan & Colton

inverted block rate plan was initially called a "lifeline rate" because it provided a small base level of electricity to all residential customers at a low rate.[14]

There are additional tradeoffs in designing inverted block rates as summarized in the table below. As with many rate designs, various stakeholder perspectives can be different and at odds with one another and there are transition and implementation issues to be considered. However, policy makers should be free to combine design elements and so the table is presented as a starting point for conceptual analysis of the issue.[15]

Pros and Cons of Inverted Block Rates

	Avoided Cost Benefits and Utility Incentives	Energy and Peak Reductions	Customer Incentive and Bill Impact	Impact on Non-Participants	Implementation and Transition Issues
Pro	Good match when long-run marginal costs are above average costs	Can achieve annual energy reductions	Provides strong incentive to reduce usage.	If mandatory, little impact on other customer classes.	Simple to bill with existing meters.
Con	Might not be the right price signal if long-run marginal costs are below average costs	Does not encourage reductions in any particular period	Could result in large bill increases for users that cannot change their usage level, and could encourage more usage by the smaller customers.	Could not be implemented on a voluntary basis because of free rider losses.	Could require phased transition to mitigate bill impacts.

Q. UNDER WHAT TYPE OF CONDITIONS WOULD AN INVERTED BLOCK RATE DESIGN BE APPROPRIATE?

http://www.fsconline.com/downloads/FSC%20Newsletter/news2007/n2007_0910.pdf visited December 5, 2007.

[14] National Action Plan for Energy Efficiency, Chapter 5, Rate Design. Page 5-5. http://www.epa.gov/cleanenergy/pdf/napee/napee_chap5.pdf visited December 6, 2007.

[15] Adapted from National Action Plan for Energy Efficiency, Chapter 5, Rate Design. Table 5-2. http://www.epa.gov/cleanenergy/pdf/napee/napee_chap5.pdf visited December 6, 2007.

A. Inverted block rates might be used when a utility is experiencing high load growth and increasing costs to serve that load growth. Inverted block rates are desirable if they provide a more accurate price signal in order to influence customer usage.[16].

Q. DOES RMP HAVE ANY INVERTED BLOCK RATES?

A. No.

Q. PLEASE EXPLAIN HOW AN INVERTD BLOCK RATE DESIGN IS ACCOMPLISHED.

A. The creation of an inverted block rate structure is an iterative process:

1. Select the number of blocks.
2. Assign consumption limits to each block.
3. Assign prices to each block.
4. Calculate the revenue from a database of customer energy consumption.
5. If the calculated revenue is not equal to the required revenue, repeat from step 1 (to change the number of blocks), or step 2 (to change the consumption limits), or step 3 (to change the prices).[17]
6. Please see the testimony of my colleague, Ms. Amy Zamora for additional comments on the issue of designing inverted block rates for RMP.

Q. DOES THE INVERTED BLOCK RATE STRUCTURE PROVIDE CONSUMERS WITH THE PRICE SIGNAL TO CONSERVE ENERGY EVEN WHEN THE UTILITY'S UNDERLYING WHOLESALE PRICE STRUCTURE IS NOT AN INVERTED BLOCK RATE ALSO?

A. Yes. For example, even though the utility may purchase power at a flat rate per unit, the use of inverted block rates for retail services will still result in a price signal to retail consumers to conserve energy. It has been suggested that even though the utility's wholesale price is a flat rate, load factors can be improved, perhaps resulting in a declining block price structure. Even if the utility is able to improve its load factor, in effect causing the per unit price to decline to some

[16] "Energy Utility Rate Setting" by Lowell E. Alt, Jr., 2006, page 93.
[17] Hughes, page 10.

extent with more usage, the inverted block rate structure for retail services will still cause a price signal that promotes conservation.

In theory the latter example does appear to amount to a departure from the regulatory principle of setting prices that reflect the underlying cost structure. However, I believe that the general intent of that principle is to make sure that prices cover cost of service and are not discriminatory. I believe that so long as the prices in the inverted block rate structure are set so as to cover the cost of service, and they are not unduly discriminatory, then the principle of promoting energy conservation and the underlying set of ethics for setting price to reflect the underlying cost structure can both be met.

Q. PLEASE PROVIDE SOME EXAMPLES OF INVERTED BLOCK RATES.

A. Inverted block rates are utilized in other states. In Utah, Rocky Mountain Power offers residential electric service during the summer months under an inverted block rate structure as shown below.[18]

Example of Inverted Block Rates for Rocky Mountain Power
Residential Customers in Utah, May Through September

Monthly Bill:	
Customer Charge	$2.00
Energy Charge	
first 400 kWh	$0.075389
next 600 kWh	$0.085562
all additional kWh	$0.100779

Another example of an inverted block rate structure is in the rates for Puget Sound Energy in Washington, where residential rates are set with a basic charge of

[18] Rocky Mountain Power Utah, Residential Service Tariff: P.S.C.U. No. 47, Electric Service Schedule No. 1, Original Sheet Nos. 1.1, 1.2, and 1.3, Effective December 11, 2006.

$6.02, the first 600 kWh are priced at $0.078122, and the price per kWh for all kWh over 600 increases to $0.095930 per kWh.[19]

Inverted block rates are in use in other parts of the country. In April 2007, the board of trustees of an electric utility in Iowa, Waverly Light and Power, approved an inverted block rate structure for residential customers to "encourage energy conservation by charging customers higher rates as more electricity is used."[20] The new rate is only in effect during summer months.

Q. WHAT ARE SOME OF THE BARRIERS TO CUSTOMER ACCEPTANCE OF INVERTED BLOCK RATES?

A. Education, marketing and experience with new price structures may help consumers gain greater acceptance of a change to an inverted block rate design. Customer acceptance may depend on how the rates are designed and presented to customers, such as emphasizing the opportunities for saving money rather than the possible downside of occasional high prices.

Q. PLEASE SUMMARIZE THE OCA'S RECOMMENDATIONS SUPPORTING INVERTED BLOCK RATES.

A. The OCA recommends that if the Commission finds the current declining block rate design is not in the public interest, RMP should be directed to provide alternative proposals for an inverted block rate design and an average cost rate design in its next rate case. As an alternative, the OCA suggests that the Commission might find it to be in the public interest to require that an inverted block rate design be proposed in the Company's next DSM filing.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

[19] PSE Tariff WN U-60, 27th Revision of Sheet No. 7, Effective January 13, 2007.
[20] http://www.newrules.org/de/archives/000160.html