DEFINING THE PRODUCT

MARKET THEORY FOR AN ESSENTIAL SERVICE AND THE PROPER ROLE OF DEMAND RESPONSE

ON BEHALF OF THE CONSUMER DEMAND RESPONSE INITIATIVE

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EXECUTIVE SUMMARY

In 1729, Jonathan Swift provided an economically rational, potential solution to the potato famine then ravaging Ireland. Based on his calculations of the caloric value of the typical Irish toddler (even a malnourished one) and the propensity of the Irish toward very large families, Swift determined that a large measure of relief could be obtained if the Irish simply ate their children (hopefully before they got much skinnier). This would have the multiplicative benefit of simultaneously providing nourishment and also reducing the number of mouths to feed until an optimal balance was achieved.

Needless to say, it was only the purely academic economists who did not recognize Swift's sarcasm. But who can blame them? Economics has nothing to say against Swift's "Modest Proposal". If your desired product is only efficient delivery of "calories" it makes perfect economic sense to eat your children. But while efficient delivery of calories is certainly "part" of the appropriate equation for solving the Irish Famine, it does not stand alone as the sole societal objective or "preference" to be accommodated. In fact, Swift's "solution", however "rational", is transparently ludicrous to any thinking person because it has lost sight of the original objective of trying to solve the problem in the first place: to alleviate human suffering.

Regulation of the electricity too, was, and still is, an attempt to provide a solution to a problem; actually a series of problems that made provision of this service by more common mechanisms problematic. These problems range from capital intensity, lack of storage, the inefficiency of duplicating facilities; a list too long and too familiar to require further elaboration here. But with electricity, as with famine relief, there was also an underlying reason why society felt these problems had to be addressed. The reason for electricity regulation was not regulation for its own sake, but broader social and economic policy goals to support health, safety, public

participation, and the general welfare. The reasons for the legal requirement of "safe and reliable service at just and reasonable rates" are not, in the end, that different from those that underlie the relief or avoidance of famine; certain states of affairs are simply unacceptable to most civilized people because they entail human hardship and injustice that can and should be avoided when possible.

In the past decades, flaws in the traditional regulatory paradigm for electricity have been subject to increasing and often well justified criticism. The proponents of "markets", of whom I am one, have argued that applying competitive market principles to certain aspects of the electric market can do a better job than traditional regulation at getting ratepayers the service they need and want. But somewhere along the way in the discussion and implementation of "markets", economists and market theorists began to lose sight of the reasons for wanting either regulation or markets in the first place. It is now common for ISO personnel to say that their job in designing, running and overseeing markets is not to ensure safe and reliable service at just and reasonable rates, but instead to assure "an efficient market outcome."

The first purpose of this paper is to explain why this shift in emphasis should be as objectionable to any thinking person as Swift's Modest Proposal. Our second objective here is to offer a concrete alternative to what we shall term the "Standard Model" of market efficiency. The alternative we offer; Maximizing Consumer Surplus; redefines efficiency in terms of the real world policy objectives and goals that underlie the just and reasonable standard. Third and finally, we seek to apply these insights and tools to the area of Demand Response and Energy Efficiency. We offer specific suggestions on the principles that should underlay the design and implementation of markets and programs for these services. In doing so, we address the major philosophic and theoretical objections raised by proponents of the Standard Model to the fair

compensation of Demand Response and Energy Efficiency resources. We refute specifically and in detail, every argument or objection raised against paying for Demand Response based on claims that paying for Demand Response results in inappropriate "double payment".

In accordance with these objectives, the paper is divided into three main sections. In Section I, we lay out the policy framework for analysis and discussion of the topics to be addressed. In this section, we identify "the Product" that competition in the electric sector was meant to deliver more efficiently as "safe and reliable service at just and reasonable rates". We note that one of the major components of this product is price based upon cost of service plus a reasonable return. We explain that this concern with cost is a legitimate social preference which competition was meant to further, not displace.

The product "safe and reliable service at just and reasonable rates" is, at base, a societal decision about the proper allocation of resources between markets and goods. For good or ill, this product embodies a decision that society will function "better" if electricity is 1) priced as close to its cost as possible; 2) costs as little relative to other products as possible; 3) requires as small a proportion of total income be devoted to its purchase by consumers as possible; 4) is available on a non-discriminatory basis to as large a segment of the public as possible; and; 5) is not subject to shortage, interruption or unavailability except on rare occasions.

In Section I, we informally define that cost based preference as a requirement to keep the price for electricity as far below the value customers place upon it as possible while still providing adequate compensation to generators and utilities to preserve reliability. We refer to this as "Maximizing Consumer Surplus", a term we will define more rigorously later. We note initially, however, the divergence of this product standard from that espoused by the "Standard Model" of economic analysis. Under the Standard Model, the goal is not to maximize consumer

surplus, but rather to "maximize the value of trade in electrons." Section I goes on to illustrate and discuss some of the undesirable practical, real world policy implications of adopting the "Standard Model" alternative to the just and reasonable rate standard.

One of the major objectives of the first section is to illustrate how the Standard Model has been used to dictate particular social policy outcomes. Despite claims to objectivity, market design theorists routinely misuse the jargon of the Standard Model as normative prescriptions which attempt to dictate the products that consumers "should" want and the policies regulators "ought" to pursue. We refer to all such uses of economic theory as "crony-economics". Crony economics, like crony capitalism, uses otherwise legitimate tools and processes to rig outcomes in favor of certain individual or theoretic preferences. In contrast, we point out that sound economic thinking recognizes the validity and value of all human preferences and understands that the job of economic theory is not to choose between those preferences, but to provide tools that individuals and societies can use to pursue the ones they value most. This section examines the Standard Model's preference for treating KW and KWhrs as "pure commodities" and its attempt to maximize the value of trade in these commodities rather than pursue the broader social and policy goals which motivate regulation in the first instance.

In contrast to the Standard Model's claims of "Economic Efficiency", we note that efficiency must be judged in terms of the preferences society seeks to satisfy. We note that the preferences regulation is designed to satisfy are closely related to electricity's status as an essential service. We note the many aspects and implications of electricity's status as an essential service, and critique many prescriptions of the Standard Model, from value of service pricing, to the uncritical worship of volatility. By re-examining the basic social policy reasons for regulating this service at all, we offer an initial demonstration of the policy gulf that divides

proponents of the just and reasonable rate standard from the social prescriptions many market theorists derive from reliance upon the "Standard Model."

In Section II, having laid the conceptual groundwork for the continued validity of the product "safe and reliable service at just and reasonable rates", we turn to the issue of how market outcomes and design suggestions can be evaluated in terms of the just and reasonable standard without resort to individualized cost of service studies. In this section, we suggest that adaptation of a measurement parameter from the Standard Model; Consumer Surplus; can provide an empirical yardstick for measuring progress towards just and reasonable outcomes. We note in this section that the Standard Model does have the virtue of containing certain measurable quantities, namely Producer Surplus and Consumer Surplus. Changes in these quantities can often be evaluated relative to one another under various market proposals. The goal of providing an empirical metric for progress towards just and reasonable outcomes is to identify real-world objectives which are achievable by market design and program implementation. Without such objectives, the concept of just and reasonable rates is often viewed as too vague or inexact to provide guidance in market design, absent resort to collection and analysis of cost of service information for all providers.

Having introduced the concept of Maximizing Consumer Surplus in the first section, we define the concept more rigorously in Section II, and explain its relationship to the quantities measured in the Standard Model. We then connect the "Maximize Consumer Surplus" standard to the actual protections afforded both consumers and producers under the Hope-Bluefield doctrine of just and reasonable rates. We conclude that the goal of all market designs and programs should be to keep the price of electricity as far below the value that customers place upon it as possible consistent with providing compensation to generators sufficient to cover their

cost of production plus a reasonable return. We contend that this is, in fact, the Hope-Bluefield standard, and that outcomes that approach it can be measured through comparisons of consumer surplus under different program and market designs.

In the rest of Section II, we develop specific recommendations for the design and implementation of Demand Response and Energy Efficiency programs. For the reasons discussed more fully in that section and elsewhere, we conclude that the role of the ISO and the scope of its analysis should be limited to the particular product market that it has authority over; i.e. "grid supplied electricity." In measuring the efficiency of outcomes, we determine that the only relevant cost ISOs or RTOs should concern themselves with, are the cost to ratepayers of particular service options. Cost to ratepayers is defined as out-of-pocket expense to ratepayers for grid electric service and these amounts include only amounts that are settled through ISO or RTO market settlement systems. We conclude that the goal of all DR and Energy Efficiency markets or programs is to Maximize Consumer Surplus as defined more fully above.

We next go on to provide two guiding principles for Demand Response and Energy Efficiency market design and procurement. The first of these we term "the Savings Principle". The Savings Principle says that customers should pay for Demand Response and Energy Efficiency up until the point where the incremental payment for DR or Energy Efficiency exceeds the incremental benefits of the next unit of such services purchased. This means that each increment or offer of Demand Response or Energy Efficiency must be independently evaluated to determine whether that particular service, if purchased, would result in a net savings to consumers. If so, the service should be purchased. If not, consumers should not purchase it.

The second principle is the "Competitive Principle." The Competitive Principle says that DR and Energy Efficiency markets or programs should be designed in a way that maximizes

head to head price competition between Demand Response, Energy Efficiency, generation and transmission options. The goal is to use competition between vendors to lower cost to consumers.

These are basic recommendations that flow directly out of the considerations of the proper role of markets and market design in providing the essential services consumers expect under the just and reasonable standard. However, these recommendations run directly counter to the social policies embedded in the Standard Economic Model and the entrenched practices and perceptions of many ISOs and RTOs across the country.

In Section III, therefore, we turn to a critique of the Standard Model and its various moral prohibitions and euphemisms.

Many of the ideas in this section will have been foreshadowed in the proceeding discussion. However, it seemed logical to first make the case in favor of the original goals of electricity regulation before turning to a detailed critique of the "Market Efficiency" substitute espoused by many ISO personnel and other market theorists. In the first part of Section III, we analyze in detail the specific meanings of the terminology used in the Standard Model. We discover that words such as "Social Welfare" are used in a fashion that would not be recognizable to most responsible regulators, and that "efficiency" is used in a fashion that bears an only accidental relationship to the goal of just and reasonable rates. We note that the Standard Model's equation that maximizing the value of trade in a commodity maximizes social welfare is suspect for a number of reasons. Clearly, there are commodities and services (such as child pornography) where maximizing the value of trade would not further social welfare. But the Standard Model makes no distinction between products, commodities, preferences or goals. It would declare social welfare had been maximized by maximizing trade in any product, including

child pornography. Yet we note that proponents of the "efficient market" substitute for just and reasonable rates, often use these terms in ways that seek to disguise their rather technical and unconventional meanings. Responsible regulators are often chagrinned to find that when they argue for just and reasonable rates, they are accused of being "against social welfare" or sponsoring "inefficient outcomes."

But the list of euphemisms does not end here. Those who oppose needlessly volatile pricing are against letting consumers see "the true cost" of power, a formulation which of course makes every long-term hedging arrangement into an ethical violation of some sort. Those who favor limiting potential sales opportunities for generators in the name of energy efficiency or lower costs for consumers are in favor of making "transfer payments." Finally, and most rhetorically, consumers who can't afford electricity or believe it is too high priced to be worth buying, are being "compensated" when they can't afford or choose not to consume it. These euphemistic, misleading, and self-congratulatory uses of terminology are so embedded in the dialogue that the social prescriptions they are used to advocate go unnoticed. The purpose of taking the time to examine the Standard Model and its terminology is to give responsible regulators the ammunition to take back the debate about real social welfare and how we can achieve it. In this Section, we demonstrate conclusively the huge gap between the efficient market paradigm of maximizing the value of trade in electrons and the policy and other objectives of the just and reasonable rate standard.

From the general critique of the terminology and social prescriptions of the Standard Model, we turn to a very specific set of illustrations of the misapplication of these rhetorical terms to the field of Demand Response. One of the most strident contentions of those who do not wish to pay for Demand Response is that any payment to a customer in excess of the savings

they realize under a properly structured real-time rate, is a "double payment". We note at the beginning of this Section that the concern with "double payment" is simply a concern with paying anything at all for Demand Response. The ruse that customers who don't buy electricity are being "compensated" (i.e. "paid") is a rhetorical sleight of hand that underlies the terminology of "double payment". However, underneath the rhetoric are a series of arguments put forward to explain why paying for Demand Response is "inefficient". We demolish each of these arguments in turn.

The first argument put forward is that paying for Demand Response is inefficient because it will "misallocate resources between markets." Upon closer examination, however, we see that this concern has no rational basis. It is based, instead, on the theoretical construct of "Pareto Optimality" which relies on perfect competition, perfect information, little or no transaction costs, across a range of markets for every conceivable product or preference, and further requires such markets to be in perfect equilibrium, to assure the efficient allocation of societal resources between markets. This wonderful abstract concept has no application to any real world market, and we demonstrate that it cannot even be sustained as a "possible" state of affairs, because the mathematical construct upon which it rests is the intellectual equivalent of having a brilliant mathematical formula for counting fairies. We conclude that there is no basis for any assertion based on the theory of Pareto Optimality, that lowering the cost of electricity to ratepayers to meet the just and reasonable standard will inefficiently allocate societal resources between markets. Further, there is no way for any Standard Model proponent to rationally claim that they know, or have any way of determining, what the "correct" price for electricity is in relation to optimizing all the other goods and services in the market that consumers could spend their money on. In lieu of this grand pursuit of "global efficiency", we suggest that ISOs and market

design gurus exert themselves to accomplish real social policy objectives such as assuring "safe and reliable service at just and reasonable rates."

The next ground offered to support not paying for Demand Response is that paying for Demand Response somehow threatens reliability by distorting investment signals. As we shall see, this argument too is unsupportable. Current RTO/ISO market designs compensate generation needed to serve load under clearing price mechanisms for capacity and energy. These mechanisms do not depend on any particular level of load to be effective. As load goes up, prices go up to attract new supply, and as load goes down, prices go down. None of the proposals in this paper, or elsewhere that we are aware of, have argued that Demand Response would change this basic clearing mechanism beyond adding additional resources of energy efficiency and Demand Response to reduce load. Reductions in load, however, do not threaten the viability of these clearing market mechanisms to provide compensation for whatever generators remain needed after Demand Response and Energy Efficiency are effectively implemented. The alternative is to argue that compensation for generation has to be kept at a level which would be seen if there was no Demand Response or Energy Efficiency even after these measures have been implemented. This, of course, is just silly.

The third argument advanced against paying anything for Demand Response or Energy Efficiency, is that it forces consumers to "pay twice" or pay more than is necessary. As we demonstrate in this section, the argument against paying twice is really just a rhetorical attempt to mislead by implying that paying twice means "paying twice as much." We acknowledge that the number of billing units ratepayers as a whole are responsible for, does not decrease when a Demand Response provider who is compensated at the clearing price interrupts. However, the cost of all billing units goes down, and under the "Savings Principle", would have to go down in

total more than the incremental amount paid to the Demand Resource provider, thereby lowering all customers' bills. Yet still, the Standard Model theorist contends other consumers should be "upset" at saving a million dollars because they have been asked to "pay twice" for ten dollars worth of billing units.

Finally, and most deceptively, proponents of not paying for Demand Response often conflate the unwanted effects of poorly designed programs or markets or of bad actors (which nobody supports or wants) with its "double payment" prohibition, as if paying for Demand Response were a form of dishonesty in and of itself. By using terms such as "double payment" and "gaming" to describe particular outcomes or programs of which they do not approve, the moral waters are often muddied to a degree that makes disentangling the real objections to certain policies problematic. Clearly, programs and markets must be designed so that consumers get the benefit for the money they spend on Demand Response and Energy Efficiency. Paying for Demand Response is one of the best ways to make sure consumers capture the available benefits.

Finally we conclude the Section with a few specific examples that apply the lessons and principles developed previously to particular problems in Demand Response valuation including the treatment of Energy Efficiency and distributed generation and self-generation. These final subsections examine the ISOs claim that where an energy efficiency measure is implemented by an individual consumer at a cost higher than what it would cost the consumer to be served from the grid, that that implementation of energy efficiency is "gaming" the system. We find that these claims are crony-economics at its best. Consumers who invest in energy efficiency and Demand Response, including self-generation, do so for a host of reasons and preferences from a desire for the survival of polar bears, to independence from foreign oil, the need for reliable

emergency backup power to preferences for particular power sources (individual solar panels) to a desire to avoid the risk of volatility associated with current grid market designs. It is not for the ISO to choose between people's preferences for environmental improvement, independence from foreign oil or other goods based on its mistaken belief that it knows or can determine what the final societal value of those preferences is in relation to its own preference for grid electricity. The goal of the ISO should be to keep rates for consumers down, not to be the global efficiency police for products and preferences in which it has no expertise, no mandate, no competence, and no empirical knowledge. If a consumer wants to invest $200.00 in an energy efficiency measure, and it turns out that that energy efficiency measure can help reduce all other customer's rates when the clearing price is $90.00, the added investment made is all for the good of other ratepayers. In addition, that investment satisfies other policy goals, objectives and consumer preferences which grid electricity simply cannot supply.

Our hope is that a thorough discussion of the policy basis for designing and implementing Demand Response Programs, will streamline the design process for specific market mechanisms. Too often the debate about program "design" has been conducted without any examination of underlying policy objectives. Thus, elaborate schemes for "netting out" customer bill savings are proposed based on the "double compensation" cliché, or customer baseline methodologies are rejected based on claims of "diminished social welfare" or "inefficiency" without real policy debate or often even understanding of basic principles. There is a tremendous amount of difficult and detailed analytical work that must yet be done to turn the basic policies put forward here into workable market and program designs. But hopefully, by coming to an understanding of the appropriate goals; i.e. the "product" we want to deliver; market design choices can be

made and evaluated more consistently and in conformance with the public interest embodied in the just and reasonable standard.

DEFINING THE PRODUCT

I. POLICY FRAMEWORK FOR ANALYSIS AND DISCUSSION.

1. What is "the Product" Competition Should Deliver?

Chairman Kelliher once observed:

> I want to draw the distinction between competition and deregulation. Deregulation is not and has never been Commission policy or federal policy with respect to wholesale power markets. Deregulation is the absence of regulation, and wholesale markets and wholesale power sales have never been unregulated. The character of our regulation has changed, but we never stopped regulating.
>
> It is also important to recognize that the Commission has never relied solely on competition to assure just and reasonable wholesale power prices. Instead, we rely on a mixture of competition and regulation.
>
> Federal Energy Regulatory Commission *Open Commission Meeting Statement of Chairman Joseph T. Kelliher*, Item E-3 (June 21, 2007).

The distinction made by Chairman Kelliher crystallizes one of the central conceptual issues that needs constantly to be borne in mind. The interdependence of competition and regulation (i.e. rules, laws) in any market is complex and unavoidable. Recognizing the necessary interdependence of these two components can neutralize much unconstructive rhetoric in the debate over market design.

The shift towards competition under electric restructuring was undertaken with specific goals in mind. Those goals may have varied between different parties. From a consumer point of view, the goal of restructuring was to provide a level of electric service that was equivalent to or better than what could be obtained under regulation, but at lower cost. The goal of restructuring was to use competition among vendors as a means to lower the cost of delivering safe and reliable service at just and reasonable rates. Legislatures, State Commissions and Ratepayers who worked for restructured markets did so because they believed a market oriented

approach to electricity could do a better job of delivering this essential service at the lowest possible cost to consumers.

In many respects the problems identified by consumers with current electricity market models stem from a failure to answer the most basic question: what is "the product" consumers want competition to deliver more efficiently?

"The Product" competition was meant to deliver more efficiently is called "safe and reliable service at just and reasonable rates." This product consists, at least, of the following characteristics:

1. Supply at particular voltages and frequencies of electric power sufficient to meet the instantaneous demands of all customers with no more than a one-day-in-ten-year forced outage rate at prices that reflect the efficient cost of production plus a reasonable return on investment to producers.
2. In addition, suppliers should anticipate load growth and economic development in order to supply additional power at non-discriminatory rates to incremental customer demand (i.e. the obligation to serve).

One of the important things about this particular product <u>is that price based on cost is one of its characteristics.</u>[1] There is a reason for this that goes beyond the general concern that market power is a bad thing or that monopoly pricing should be avoided. The FPA "just and reasonable" standard embodies an explicit social and legal decision that pricing any significant segment of society out of the electricity market should be avoided if possible. The availability of safe and reliable electricity at "just and reasonable" rates is neither a societal luxury nor a legislative "option". The product "safe and reliable service at just and reasonable rates" is, at

[1] The *Hope-Bluefield* standard of cost based rates under the "just and reasonable" standard is too well known to require citation. While it is true there are a variety of ways to determine cost, because *Hope-Bluefield* focuses on "<u>returns</u> to investors" it must rely upon some "generally accepted accounting principle" of cost (i.e. shareholder returns are not reported based on "opportunity cost" but revenue vs. expenses). The lower side constitutional limitations on investor returns, the "used and useful" doctrine and a host of other standard legal and regulatory principles interpreting and implementing the FPA, make it clear that "just and reasonable" is a "cost of service" concept. "Perfect competition" drives prices to cost. Hence, the old saw: "perfect regulation and perfect competition will result in the same prices (rates)." We discuss in other sections why a result that drives price to cost was and is a sound social and economic objective for this product.

base, a societal decision about the proper allocation of resources between markets and goods. This product embodies a decision that society will function "better" if electricity is 1) priced as close to its cost as possible, 2) costs a little relative to other products as possible, 3) requires as small a proportion of total income be devoted to its purchase by consumers as possible, 4) is available on a non-discriminatory basis to as large a segment of the public as possible and 5) is not subject to shortage, interruption or unavailability except on rare occasions. Responsible regulators must recognize that this is a legitimate "preference" and, like any other preference, can have market designs and structures developed expressly to deliver it rather than some other product or outcome. A market that fails to deliver this desired allocation and outcome, is a market for the wrong "product."

In what follows we will argue that the just and reasonable rate standard is a cost based standard that requires any competitive market design be structured to keep the cost for electricity as far below the value customers place upon it as possible while still providing adequate compensation to generators and utilities to preserve reliability. In what follows, we refer to this as "maximizing consumer surplus"; i.e. maximizing the delta between the cost of electricity and its value to consumers over the course of a typical utility planning horizon (the reliability component). We use this formulation in an attempt to put a frame around the just and reasonable rate standard in terms of a specific and measurable market outcome. In the absence of direct regulation of cost, some measurable market outcome must be applied to determine whether particular policies or market designs achieve the just and reasonable standard. As we shall see hereafter, the "standard economic model" for evaluating the "efficiency" of various market designs is based on very different principles. Rather, than maximizing consumer surplus (as defined above), it seeks to "maximize the value of trade in electrons." What is not often

recognized is that the standard economic model embeds a normative policy prescription that is often dramatically opposed to the just and reasonable rate standard. By framing the just and reasonable rate standard in terms of measurable market outcomes such as maximizing consumer surplus, we hope to make this basic policy conflict more transparent.

"Electricity", as described above, is not a "simple" product, but in general, consumers did not contemplate a major deterioration of "electricity's" basic attributes under competition. Consumers did not agree to, and did not seek, the opportunity to suffer rolling "voluntary" blackouts based on Value of Lost Load pricing in order to "further competition". They did not desire, or volunteer to pay more for this product than they would have under regulation. They did not agree to forego the opportunity to expand usage at non-discriminatory rates in the name of vindicating competition. What they expected, simply, was that competition would deliver the product described above with greater options and at a lower cost.

Much of what passes for "economic analysis" in current discussions about the value and use of competition in the electricity sector, is based on an error in product definition. Too often economic theory surrounding markets has been misused in an attempt to dictate the type of product consumers or society "ought" to want. When customers have complained the "product" being delivered is not the one they asked for because it lacks certain of the attributes listed above, the reply has too often been that the requested attributes are "not consistent" with the theory of competitive markets or "economic efficiency".

Consumers asked for a better way to get oranges. Engineers and economists wandered off into theory and came back with 1) a system that delivers cucumbers and 2) an explanation that oranges are inconsistent with economic theory and 3) a recommendation that things will be "more efficient" if people have cucumber juice for breakfast anyway. But this is not an answer

to the problem of delivering oranges at the lowest cost. It is simply a sociological preference for cucumbers masquerading as economics.

In what follows, we will refer to all such attempts to fob off particular moral or policy preferences as being mandated by "the laws of economics" as "crony economics". Like crony capitalism that exploits the profit motives, legal restrictions and political favors of rigged markets to favor a select few individuals, crony-economics disguises a preference for particular social outcomes under the façade of euphemistic phrases like "social welfare" and "efficiency."

At its best and most liberating, economics is the study of all human preferences, how they are formed, how we act upon them and how they can best be accommodated. The broad idea that almost any preference can be viewed as a "product" with a cost or a value; e.g. leisure, desire for clean air, etc.; is a valuable perspective that can lead to innovative approaches to solving human problems. Carbon cap and trade markets, for example, convert our "preference" for the survival of polar bears and the maintenance of a livable planet for our children, into trading mechanisms that incent investment in technologies and activities that may satisfy that preference.

In contrast, the crony-economist is not interested in actual human preferences, but in abstract models of how people "ought" to act and what they "ought" to prefer. Rather than provide information and tools for analysis, the crony-economist confuses means with ends and jargon with rationality. Given the entrenched status of the Standard Model and its terminology (like the term "social welfare"), some of this is just honest confusion. But it is confusion with an often terrible cost in terms of people's lives, jobs, health and safety. It is a confusion that needs to be corrected.

Under the Standard Model, consumers have been told that, based on "economic theory", the product they want can be effectively delivered to them under a market design which relies primarily upon treating KWhrs (LMP) and KWs (FCM, RPM, ICAP) as "products" and allowing vendors to bid to supply them independently of one another. The goal under the Standard Model is to "maximize the value of trade" in these commodities because doing so will purportedly "maximize social welfare." For several reasons, all of which will be discussed more thoroughly hereafter, reliance upon this design choice and policy objective has had mixed results. Safe and reliable service at just and reasonable rates is not a commodity nor any combination of commodities; it is a "service" with both political, moral and commodity aspects, all of which must be respected in the design of markets.

2. The Proper Relation of KWs and KWhrs to "the Product"; i.e. Safe and Reliable Service at Just and Reasonable Rates.

Kilowatts and KWhrs under regulation were not "products." Rather, they were billing units used by vertically integrated utilities to recover the regulated costs of a system designed to deliver safe and reliable service. KWs and KWhrs under cost of service regulation were (and are) real, physically measurable quantities. But they function as revenue collection devices, whose price is set to recover specified revenue requirements. As revenue collection devices under regulation, they allocate the cost of the system among users in what rate designers hope is a rough approximation of cost causation. This rate design and cost relation between these billing units assures that the total amount collected for service remains just and reasonable. In a cost of service world, just and reasonable means the lowest price consistent with allowing a supplier to recover its costs plus a return sufficient to stay in the business. The current reliance upon KW and KWhr pricing under LMP and current resource adequacy products is also a "rate design"

choice, but one that often has become unhinged from any rigorous (some would argue, even "coherent") revenue recovery justification. Absent revenue recovery justification, no competitive market design meets the just and reasonable standard.

Proponents of the view that maximizing the value of trade in KW and KWhrs is an appropriate policy substitute for the safe and reliable, just and reasonable product standard, argue that maximizing the value of trade in these products is "economically efficient" and that doing so will increase "social welfare". As we will see hereafter, this use of the term "social welfare" is simply a tautology because social welfare, it turns out, is only measured by the "value of trade." But these claims about "economic efficiency" are no less problematic. If, as I contend, this market is designed around delivering the "wrong product", then in what sense can a claim of economic efficiency be relevant, even if it could be supported?

In the following sections, we will explore fully the often vague, unempirical, confused and sometimes fanciful use made of the term "efficiency" by many market theorists. RTO and ISO personnel are fond of pronouncements such as; "Running an economically efficient market is the best way to assure just and reasonable rates." Such statements are made without examination or discussion of what efficiency is or how it is measured, recognized or correlated to the policy goal of just and reasonable rates. We shall see that when pressed to justify these statements, an appeal is inevitably made to notions of "global efficiency" and "efficient allocation of resources between markets." We will demonstrate these claims are, in themselves, completely untenable. But more importantly, for our initial purpose here, they turn out to have little to do with minimizing the cost, or maximizing the value of this service to customers. In short, to the extent there is any real world substance to this "efficiency" standard (and we shall see there is often little or none) it is at best arbitrarily related to the goal of delivering safe and

reliable service at just and reasonable rates. But before turning to a more theoretical critique of these assertions about efficiency and its wonders, it is useful to recall a few basic facts about the common sense underpinnings of the just and reasonable standard itself.

Physical delivery of electricity to those who can afford it is not the desired product. Rather, continuous (i.e. reliable) delivery of electricity at a price equal to the cost of production plus a fair return is the goal. Except under conditions of perfect competition, (a condition foreclosed in electric markets by a host of obvious factors), no commodity market achieves this goal.

This doesn't mean that one cannot use the insights of commodity trading and markets to help fashion a rate design, such as LMP, which creates trading incentives for KWhrs based on competitive signals and which will help restructured markets deliver safe and reliable service at just and reasonable rates. But any insistence that "economic theory demands" that the billing units of formerly integrated utilities must be traded as pure commodities and that any infringement upon the "free trade" in these hyper defined abstractions creates "economic inefficiency", is simply the crony-economist's way of saying he prefers this product to other possible products, such as safe and reliable service at just and reasonable rates.

3. Why Economic Efficiency Must be Judged in Terms of the Preference we Seek to Satisfy.

The concept of "economic efficiency" only takes on substantive meaning in terms of specific, desired outcomes. If your goal is to deliver ice cream to soldiers on the front line in Iraq, the fact that it would be "cheaper" not to use refrigerated trucks, and deliver congealed 90-degree goo is not an argument based upon economic efficiency, but a simple misunderstanding of the objective. If your goal were different, the economic efficiency calculation would also be

different. This is a tremendously simple point, yet it is routinely overlooked by various market design gurus who speak about "efficient pricing" to deliver the electrical equivalent of 90 degree goo. Though it may be "efficient" in a market for "electrons" to have a certain number of elderly die each summer in their un-air-conditioned apartments, the concept of safe and reliable service at just and reasonable rates has usually been interpreted as an injunction to minimize such fatalities by keeping the price of this essential service as low as reasonably possible in comparison with other, less-essential commodities.

Although the above example seems extreme, it is in fact not. Economic efficiency, as an abstract concept, has nothing to say about whether it is right or proper to have any particular number of deaths attendant upon the delivery of any product. Calculations of economic efficiency, where they can be made, cannot tell society what it ought to strive for or achieve. Once public policy and basic product definition decisions are made, however, economic efficiency calculations can help us determine relative efficiency in delivering desired outcomes. That it may be more expensive per delivered KW and KWhr to have a system that delivers safe and reliable service at just and reasonable rates than to have one that does not, is neither here nor there until Congress decides to change the law, and/or society determines that electricity is no longer an essential service.

I anticipate objections that talking about the social policy and the moral aspects of "products" violates competitive and economic principles in some way. In fact, almost every product traded in world markets exists, and can be efficiently traded, only because it embeds features mandated by social policy and moral objectives. Whether it's the absence of antifreeze in your toothpaste, implied warranties of merchantability and fitness for a particular purpose under the U.C.C., the sulfur content of particular oil grades, the expectation of cockroach free

soup at your favorite restaurant (backed up by the ability to sue for damages if such expectation is disappointed), or even that the paint you buy will not contain lead; safety, health, environmental and broader social policy goals restrict, define, and make possible efficient trade.

I personally am unpersuaded by the "free market" argument that producers should be allowed to put antifreeze in toothpaste, melamine in baby formula or lead in paint because the market will "self correct": i.e. those who buy such products will sicken and die and the manufacturer will lose his customer base. Although this is certainly what will occur in a free market for defective products, allowing trade in defective products destroys the basic expectations that promote efficient trade. In short, those who argue that social and moral policy are not a legitimate basis to define what an "efficient design" for an electricity market should be, simply misunderstand how civilized societies operate and the legal and regulatory underpinning of all efficient trade.

In contrast, sound economic thinking recognizes the economic validity and impact of all human preference and seeks efficient ways to embed legitimate preferences (like the preference not to have infants die of melamine poisoning) into the design for markets and products. The crony-economist tolerance for defective goods, which are really only a reflection of a market dysfunction that limits information (who, after all, would feed their infant melamine based formula if they knew the product was contaminated?) reflects a mind set that views profits that arise from market dysfunction (i.e. the ability to sell tainted formula to unsuspecting mothers) as supplier entitlements.[2] Needless to say, one does not need to adopt these basically sociopathic and anti-intellectual views of markets and market design simply because one favors using competitive structures and incentive mechanisms to satisfy preferences where possible.

[2] We will see that this attitude has an analogue in later discussions of "efficiency" as it relates to demand response.

Reasonable requirements for product design, information, etc., are pro-competitive in a world that needs confidence in the content and value of what is traded.

The extent of regulation and explicit social policy design embedded in products is usually correlated to the importance of any product in maintaining health, public order, social participation, and general well being. Thus, necessities may be more "socially defined" than luxuries. This has implications for electricity.

4. The Social Considerations That Mandate a Market Design for Electricity that Maximizes Consumer Surplus.

Safe and reliable service at just and reasonable rates is an essential service. The implications of this for the design of markets are not trivial.

The product "electricity", as described herein, has characteristics similar to a public good; similar to national defense, a stable banking system, the administration of justice and adequate transportation infrastructure. To a greater or lesser extent all of these systems are characterized by economies of scale, the need for coordination in order to avoid social chaos, and the prospect of truly unacceptable results in the event of system failure. The Great Depression taught us that general banking failure; whatever may have been the result in earlier, less-financially integrated times; is an unacceptable outcome for a modern society. This doesn't mean that competition in the banking sector won't lead to efficiencies, it only means that what folks are competing to provide is a defined set of banking services within parameters designed to avoid fraud, illiquidity, exploitation, and financial instability. In short, competition in the banking sector works within a market framework consciously designed to deliver a desired product which is measured in "dollars" but is more than "money."

Similarly, the unified coordination of national defense is not based simply upon the tragedy of the commons, wherein individuals will fail to take steps to adequately defend themselves in reliance upon others contributing, but to the much more profound "chaos of the commons" which ultimately ensues in nations where every individual becomes their own militia. Yes, there are economies of scale in having a single, unified defense force for the country. But there are also basic, social order priorities which require the subordination of our "free market" right to conduct belligerent activities. Does this mean that there should not be competitive principles and forces applied to the areas of arms procurement, personnel recruitment, advancement by merit within the ranks, and any other aspect of the armed services where competitive principles could be effectively applied? Of course not. It does mean, however, that competition and economic efficiency must be judged within the confines of the overall objective to be served. Allowing commodity dealers to dictate what type of electric market we should pursue, is like allowing arms dealers to dictate national defense policy. Arms dealers may be an important part of a well-functioning market to procure items needed for national defense, but the policy of war and peace is of deeper social significance than the need to buy cheap arms.

The status of electricity as an essential service with aspects of a public good is the elephant in the living room in most discussions of market design for electricity. The reason no one wants to talk about the elephant is because it is either unclear exactly what implications it has, or less charitably, it is all too clear that the implications may 1) frustrate short term profit motives of suppliers or 2) challenge the cherished theoretical "idealizations" of "pure markets" entertained or imagined by certain theorists.

a.) Failure Not an Option.

The first implication of electricity as an essential service is that failure of the system is not an acceptable outcome. Reliability requirements are an obvious manifestation of this. The cost of blackouts in social disruption, business loss, risks to health and public order are too well documented to require elaboration here. What is less well appreciated is that theoretical estimates of the Value of Loss Load (VOLL) reflect the same realization. VOLL estimates several orders of magnitude greater than the production costs of a small denomination, paper currency fueled combustion turbine, are routinely trotted out as the appropriate measure for pricing during scarcity on the grounds that this represents the "value" of keeping the lights on. We will have more to say, hereafter, about the implications of routine resort to "cost of disaster" pricing in the name of "efficiency". But for present purposes it is enough to observe that most credible VOLL calculations recognize that the cost of system failure, and even individual interruption, can be unacceptably high.

b.) "Alternatives" and Economies of Scale.

The root cause of this extremely high "cost of failure", is not only (perhaps not even primarily) the result of societal indifference to readily available alternatives to central station technology. Rather, it is at least in part an empirical commentary on the vast economies of scale and overwhelming social and economic value a well organized, central market for these services makes available. Those economies of scale are driven by several factors that are unlikely to change appreciably in the near future.

1. Baseload efficiencies of large plants running 24/7 with low per unit cost of labor, incremental compliance, safety, expertise, maintenance, fuel transport and procurement, etc. Best example; nuclear, hydro and coal;

2. High voltage delivery;
3. Fuel diversity and portfolio benefits;
4. Lack of storage;
5. Power quality (voltage, hz, VARRs); and
6. Reliability.

In this respect, a word should be said regarding "alternatives" to electric consumption for the myriad of tasks we use it for. With the exception of marginal uses (like space heating), for most applications there are no alternatives except foregoing productive activity. We will not go back to gas lights (for example). You can use less light or more efficient light bulbs, but your lights, your computer systems, communications, industrial motors, clocks, air conditioning, etc., cannot and will not be cost effectively powered by other sources. Given recent climate change concerns, and the possibility of producing electricity from non-carbon based energy sources, this list will expand rather than shrink in the future. For instance, you can run your car on wind power; you just need to convert wind to electricity first…*more* electricity. The proposition that unnecessarily increasing the cost of electricity is "OK" because folks will find alternatives has all the intellectual credibility of that most famous of all suggestions for alternatives; Marie Antoinette's "Let them eat cake!" It is true that if we are careless in our design of markets for "central station/grid" based electricity, we can drive up the cost (or at least the price) so that consumers are forced to get electricity from other sources (e.g. individual solar panels). But this will not be economically efficient unless the alternative ("the grid") is priced based on cost and consumers can accurately balance their preference for an independent power supply against a cost based grid option.

The realistic expectation with every new technology for producing electricity (including and perhaps especially, solar) is that costs will be driven down by economies of scale. Large solar collectors spread over hundreds of acres, rather than millions of small roof top collectors each with its attendant maintenance, installation and ancillary equipment costs, will reduce overall investment needed to produce and deliver the same volume of KWhrs. Just as in prior decades, economies of scale will be available and desperately needed given the proliferation of new uses (like cars) electricity will be needed for in the future. Although, as we shall see, self generation options satisfy a wide variety of preferences that often cannot be met by grid based generation, large scale applications, like converting to electric cars, are likely best served by central station technology.

The notion that the lack of demand elasticity (very high VOLL) is primarily the result of consumer neglect of readily available "efficient" alternatives to consumption from the grid is one of the least plausible arguments advanced by proponents of "cost of disaster" pricing policies. Surely, you can drive people off the grid with such pricing; that this is an economically efficient outcome for most uses is extremely dubious. Intentional, periodic physical or economic blackouts of essential services is not a desirable design feature.

There are certainly identifiable failures in rate design that, if corrected, could lead to greater overall societal benefits. But such rate design corrections are entirely dependent upon properly identifying the product you are trying to price. Failure to take that necessary first step leads to economically plausible, but societally and morally absurd or pernicious results. This is not to belittle the efforts that will be needed to combat waste and promote wiser usage, but only to point out what should be obvious; tomorrow, just as today, the exclusion of any substantial

portion of the population from "affordable" electricity will be socially disruptive, unhealthy, and counter-productive.

c.) Reliability: What's the Point?

The point of reliability is to avoid blackouts. The reason for avoiding blackouts is because the societal cost of system failure is too high to be acceptable. It is not just system wide failure that is unacceptable. Very high Value of Lost Load estimates are a reflection of a basic inelasticity in the electric market which arises from 1.) its status as an essential service with aspects of a public good and 2.) the absence of alternatives. As an essential service that underlies public participation, health and welfare, shortages are socially and economically disruptive. Value of Lost Load pricing is therefore a sign of system and market failure, and leads to the same type of economic inefficiencies and disruptions as Value of Lost Life pricing of foodstuffs during famines. Society works better without periodic famines, even if it could be argued that Value of Lost Life pricing leads to "efficient" economic allocation of foodstuffs.

"Organized" scarcity in an essential service, like an organized famine, in the name of efficient price formation, misconceives the product to be delivered. Reliability is about preventing scarcity and its economic costs, not provoking or mimicking it.

The appropriate level of reliability <u>is</u> a political decision about a public good. But that level of reliability is part of the definition of the good to be delivered. In the end it may (but likely will not) cost more to design a market that avoids Value of Lost Load pricing and blackouts based on income to the greatest extent consistent with other objectives (e.g. conservation, avoidance of subsidies, etc.), but using Value of Lost Load as a general pricing tool for electricity is simply "efficiently pricing" the wrong product.

d.) The Worship of Volatility and Other Distractions From Just and Reasonable Rates: If Risk Were Free, Volatility Would be Efficient.

Volatility creates risk. Not all risk is bad, but all risk has cost. When prices rise because of risk, no one is better off. Risk raises real supplier production cost and capital cost so, even though suppliers may collect more, their profits do not increase. Allocating risk to the party best able to hedge is important because this allocation actually reduces economic risk and so, cost. The theoretical love affair with VOLL pricing, and scarcity pricing generally, ignores the inefficiencies introduced (increased costs) by relying upon short-term volatility and (often) administratively inflated (or market power generated) "system failure mimicking" pricing strategies.

One of the least logical, yet most often repeated, justifications of this approach is that if consumers find such volatility unacceptable they can sign long-term contracts. Long-term contracts, however, will not decrease cost, they will instead simply internalize the risk of periodic exercise of administratively provoked or market power driven VOLL pricing. Clearly, by making the risks associated with being unhedged dire enough, one can provoke consumers into signing something (anything) to avoid volatility. But this "make them an offer they can't refuse" approach to market design, simply projects supplier market power into the forward markets. Suppliers granted periodic opportunities to invoke VOLL pricing will not give up such a right without being compensated for it. With the invocation of VOLL pricing, the electricity "protection money" racket is off and running.

Power traders love volatility; the more the better. It is an opportunity to arbitrage and to charge risk premiums for hedging price risk. These are very useful functions in a volatile market, but they are not performed for free and customers ultimately foot the bill for higher total costs than they would in a less volatile market. The fact that you can pay suppliers to hedge risk

is not an argument for creating unnecessary volatility in the first instance. Volatility increases risk. Risk increases cost. Unnecessary volatility increases costs unnecessarily to no societally useful purpose. To determine when and to what extent short-term volatility should be used in the design of electricity markets, the objective of maximizing consumer surplus must be in the forefront of the analysis.

There is an almost schizophrenic quality to some of the discussions surrounding the importance of price transparency at the retail level. Commenters lament the lack of real time price signals at the retail level, and in particular, the lack of seasonal and hourly differentiation similar to the short-term real-time LMP market. These commenters suggest that because retail households do not see the "real" cost of electricity, they lack appropriate incentives either to do demand response, or to enter into long-term hedging contracts. What these commenters seem to forget, is that under Cost of Service rates from their state level utility, these customers already have a long-term contract in place which hedges volatility. Unless the utility is not passing through its wholesale costs, it is recovering the long-term cost of power from its customers. The purpose of a long-term contract is to provide some price stability and to hedge against volatility. If the objections to retail rate structures is that they provide rate stability (average rates), and hedge against volatility, then this same objection must be made against every long-term contract a customer signs to achieve these objectives.

While it is clear that certain retail rate designs do not reflect accurate <u>average</u> costs of consumption to customers because of inappropriate interclass rate allocations, temporary rate caps, and other factors, the objection to averaged rates in general, (i.e. a lack of short-term volatility), is basically an indictment of the very things that consumers want long-tem contracts for.

Getting the average cost of consumption correct through appropriate rate design at the retail level is extremely important. However, replacing current averaged, low volatility retail arrangements with blissfully volatile real time LMP pricing, for the purpose of "encouraging" customers to enter into long-term average contracts with lower volatility, is an entirely circular exercise which not only exposes retail consumers to abuse from market power along the way, but needlessly complicates, and in fact will probably impede, the development of demand response at the retail level. Providing opportunities for customers with demand response or efficiency alternatives to depart from averaged pricing regimes, or to take power under lower priced average pricing regimes, in return for certain modifications in usage (e.g. interruptability), is by far the better approach. The most important thing states can do is to ensure that the averaged rates under which various customer classes take service accurately reflect the cost of service for that class so that those who choose to avail themselves of more volatile pricing structures are making economically efficient decisions that will lower the cost for themselves and, in the long run, for all other customers when they do so.

e.) Value of Service vs. Cost of Service.

The usual justification for allowing the price of electricity to rise, often to several orders of magnitude in excess of its cost, is that economists want prices to reflect the "value" of service. The differences in terms of social policy and outcome between pricing electricity to reflect its value and the concept of just and reasonable rates could not be more stark.

Electricity is an essential service. Value of service pricing of an essential service allows producers to abuse consumers up to the point that their "value" for something essential is exceeded. How valuable are essential services? Measured by "willingness to pay" if you are a retiree on a fixed income, your willingness to pay is closely correlated to your willingness to eat

cat food, forgo your prescription drugs, go without computers and other electronic devices that are increasingly necessary to fully participate in democratic and social processes, or suffer any other number of depravations in order to avoid living in an unheated, uncooled and unlit house or apartment. These are not extreme examples, they happen everyday.

The line between what is essential and what is not is notoriously fuzzy for this product. Is it "essential", for instance, that children have access to computers and the internet at school? If so, should they give up their athletic teams, teacher raises, drama, music and a full time librarian to pay the school system electric bill? Isn't that the "value" of the service after all? Shall we experiment and drive up the price to see what the "true value" is? Presumably we should let suppliers run the price up until the school system balks at getting rid of the librarian, and gives up their computers instead. Then we would know the "true value" based on the school system's "willingness to pay". If we then drop the price a nickel so that they keep their computers, this will maximize the value of our sales, (i.e. the value of trade) but they will still have to forego their sports teams, drama and music classes. Is it even really "essential" that the elderly be able to afford air-conditioning on their own? Are there not "alternatives?" Shouldn't they just be living with their kids who can still afford it? Is it actually essential that we produce anything at all in America? Don't we want the price of electricity to increase right up to the point where the factory is forced to close its doors? After all, isn't that the "value" of the product?

Value of service pricing in this market is not an invitation to abuse, it is abuse. We certainly cannot sustain a system which does not recover the cost of production, and if there is price sensitive discretionary usage, we certainly do not want to charge such usage less than the long-term cost of production. We should bear in mind that, increasingly, the "discretion" to, for

instance, use your electric car (along with electric trains, busses and other public transportation) rather than the old fossil fuel burner sitting in the back yard, may be a key to saving the planet. In this context, the quest to drive up the cost of electricity to its "value" rather than restrain it as closely as possible to its cost, is an idea for which a plain statement of its potential implications makes ridicule redundant.

II. APPLYING THE JUST AND REASONABLE RATE STANDARD TO: 1) EVALUATE SPECIFIC MARKET DESIGNS AND OUTCOMES AND; 2) ESTABLISH A PROPER FRAMEWORK FOR THE DESIGN OF DEMAND RESPONSE AND ENERGY EFFICIENCY COMPENSATION AND PROGRAMS.

Having laid the conceptual groundwork for the continued need for and validity of the product "safe and reliable service at just and reasonable rates" we turn to the issue of how market outcomes and design suggestions can be evaluated in terms of the "just and reasonable standard" without resort to individualized cost of service studies for all producers. In this section, we suggest that adaptation of a measurement parameter from the "Standard Model"; Consumer Surplus; can provide an empirical yardstick for measuring progress towards just and reasonable rates. I shall propose that "maximizing consumer surplus" as defined more fully below, is the appropriate goal of all market design for competitive markets for electricity.

We then apply this concept directly to the design of Demand Response and Energy Efficiency markets and make specific recommendations; 1) regarding the appropriate scope of ISO/RTO analysis; 2) the principles that should guide designs and compensation and 3) the quantities that should be measured to determine success or failure in the quest for just and reasonable rates.

1. Defining the Just and Reasonable Rate Standard in Terms of Market Results That Maximize Consumer Surplus.

As noted previously, RTO and ISO personnel often claim that the just and reasonable rate standard is either equivalent to, or "should be" replaced by, the "efficient market" standard. Many ISO personnel are quite candid in asserting that, in spite of claiming in every filing made to FERC that their proposals are "just and reasonable", ISOs are not in fact charged with seeking just and reasonable rate outcomes for consumers. Upon closer examination, we will see that this

"efficient market" standard is really no standard at all, but simply a preference for different economic and policy outcomes disguised as "economics".

But proponents of the just and reasonable rate standard (present author included) have not helped their cause by failing to articulate more precisely how market design and program choices are to be evaluated in terms of measurable market outcomes to determine when the just and reasonable standard has been met. Although there is much to criticize in the social policy outcomes championed by the Standard Model, the model nevertheless provides certain analytic and measurement concepts that, freed of their policy bias, can be used to evaluate market outcomes.

One of these measurable quantities is consumer surplus. Changes in this quantity can be measured relative to other quantities in the model, like generator profits or "producer surplus" to determine whether all, some or no parties are "better off" as a result of a particular action or program. Although we will reject the larger, empirically preposterous calculations of "global efficiency" the ISOs pull out of their model, the concept of "consumer surplus" and the ability to measure the same and determine whether particular acts or market designs increase or decrease it, can provide a metric for distinguishing "better" or "worse" market outcomes in terms of meeting the just and reasonable standard.

Under the Standard Model of cost benefit analysis (discussed in Section III below), there are two components of "social welfare:" 1.) Consumer Surplus and; 2.) Producer Surplus. These quantities are defined as follows:

1. Consumer Surplus: the amount that consumer's benefit by buying electricity at a price less than they would be willing to pay.

2. Producer Surplus: the amount producers benefit by selling at a price that is higher than they would be willing to sell at.

Under the Standard Model social prescription, it is only the sum of these two quantities that has relevance. The greater the sum, the greater the "social welfare." Anything that makes the sum greater is "efficient" and "increases social welfare", while anything that makes the sum less is "inefficient" and "decreases social welfare." We shall have more to say about this use of "efficiency" and "social welfare" in what follows, but for our purposes here, it is important to note that this "efficiency" calculus is completely indifferent to whether costs to ratepayers are higher or lower than necessary to preserve reliable operations. Even if underlying cost of production doesn't change, if rates go up, this is not a problem so long as consumers continue to buy. Their surplus may go down, but producer surplus (generator profits) goes up correspondingly so the total doesn't change. In a world where the elderly were eating cat food and forgoing prescription drugs to avoid sweltering in unairconditioned apartments, this model would deem that state of affairs "efficient" so long as total sales did not decline. If the responsible regulator is wondering at this point "What is wrong with this picture?", the answer is, unfortunately, "Nothing." If your goal is simply to maximize the value of trade in electrons, this is what efficiency can look like. If you have different goals, efficiency needs to be defined in relation to them. Which brings us back to the element of the model that does represent a measurable proxy for progress towards just and reasonable rates: consumer surplus.

Now let us imagine the outcome on the other side. The model would also consider the outcome as "efficient" (despite the fact we have seen the arbitrary relation of this "efficiency" endorsement to the goals we wish to obtain) if the situation were reversed and producers were being squeezed for every last dime, but were still just barely making money. In fact, they could

even lose money so long as they kept producing because this just increases consumer surplus, but the total stays the same. Clearly on this side, with rates driven below cost (at least for the short time producers endure it instead of exiting the market) the goals of the just and reasonable standard are again violated. But our efficiency calculus looks just fine. It is questionable that this situation (unlike the "cat food for lunch" situation) could long endure. Producers not recovering their cost will exit the market and any "consumer surplus" created by prices below cost would go with them. But this leads to an interesting observation.

The just and reasonable standard protects both consumers and producers, but the interests it is meant to protect are quite different. Producers are entitled to their cost of production including a reasonable rate of return on investment. Consumers are entitled to pay no more than producers need to meet this standard. In terms of the Standard Model, this can be expressed as increasing consumer surplus to the point just before producers are not recovering their cost plus a return and would retire (reducing consumer surplus). Market designs and programs that increase consumer surplus without driving prices below cost, are designs that bring us closer to safe and reliable service at just and reasonable rates. Therefore, taking a long enough view to factor in the need to pay producers enough to keep them around, the way to achieve the just and reasonable standard under the measurement protocols of the Standard Model is to maximize consumer surplus.

For all the reasons outlined above and in the sections that follow, we reject the social prescriptions of the Standard Model. Total surplus is not a measure of either efficiency or social welfare in terms of accomplishing just and reasonable outcomes. We conclude that total surplus for this particular market (i.e. the "value of trade" in electrons) could even decrease as long as consumer surplus increased and that this would be a desirable outcome; particularly if the goal

eventually is to reduce total energy consumption. But the goal of increasing and maximizing consumer surplus is measurable and concrete. Through this metric various proposals can be judged in terms of their effectiveness at achieving just and reasonable rates.

Traditional cost based pricing, and the Courts' rejection of "speculative returns" for suppliers, are signs of a very clear social decision that electricity is to be delivered at the lowest reasonable cost to consumers. Unfairly low returns to suppliers won't accomplish this, but the lowest possible returns necessary to get them to continue producing and expand to meet growth are what the "just and reasonable standard" seeks. Unsurprisingly, that is exactly the result that would obtain in a perfectly competitive market. This means simply that the object of regulation, whether by means of direct cost based review, or competitive market mechanisms, is to maximize consumer surplus; to squeeze every dime out of the supplier surplus except the minimum needed to avoid a supply disruption.

2. Specific Recommendations for the Design of DR Programs, the Proper Scope and Role of ISO Analysis, and the Appropriate Principles of Compensation for Demand Response and Energy Efficiency.

At the outset, we observe that there are two generally recognized forms of demand response; 1) long term energy efficiency and 2) shorter term curtailment or load shifting. Accurate and even predictable long-term average prices are a better inducement to long term energy efficiency than periodic bouts of scarcity pricing and black outs. Because all demand response requires some investment, volatility in the "payback" stream of revenues increases risk and the cost associated with investment in long term energy efficiency. On the other hand, short term price volatility is an essential ingredient to making some short term load curtailment or shifting options attractive. Ideally, the market would provide pricing structures which

encouraged both; an accurate long term average price signal, but also the availability of occasional, extraordinary savings through short-term response. Customers would then self-select the rate design that was optimal for their DSM opportunity profile. The availability of both pricing options would spare customers without short term flexibility the unproductive bludgeoning by volatile prices to which they have no way to respond. Further, removing unnecessary volatility from the short-term markets will reduce risk premiums on investment in energy efficiency and lower overall costs for consumers and suppliers.

We believe that the adoption of a Financial Performance Obligation (as described more fully in FERC Docket No. RM07-19-000) in any market that has a capacity product/obligation is necessary to assure rates are just and reasonable and is an integral component of a market design that enables economically efficient self-selection by customers between available Demand Side Management options and investments. But even if such mechanism is not adopted, the concept of maximizing consumer surplus leads to the following observations and recommendations regarding the appropriate compensation structure for Demand Response resources and the principles that should guide design and evaluation of markets and programs.

a.) Role of the ISO and Proper Scope of Its Analysis:

The ISO's focus should be on constructing markets and market designs that maximize consumer surplus within the confines of the product market it has authority over. That product market can be defined as "grid electricity services", including grid supplied generation, transmission and demand response services.

As will be discussed fully hereafter, the ISO should not make speculative forays into markets for other goods and services attempting to determine what a particular pricing or market structure in the electric market will do to prices or services in other markets. The ISO should

recognize that the scope of its responsibilities and the extent of its competence is limited to the market it has been assigned to oversee. It is not the ISO's job to seek "global efficiency" across all markets at ratepayer expense, or to maximize the value of trade in electrons based on claims of broader "social welfare".

b.) Measuring Outcomes.

In measuring outcomes, the only relevant cost the ISO should concern itself with are costs to ratepayers of particular service options. Costs to ratepayers are defined as out of pocket expense to ratepayers for grid electric service. This includes only amounts that are settled through the ISO's settlement system or charged directly under the ISO's various tariffs. As will be discussed thoroughly hereafter, the cost to the DR provider of an energy efficiency or demand response option is of no relevance.

c.) Appropriate Goals.

The goal of the ISO's evaluation of demand response programs is to assure that consumers "pay" as little as possible for the services they need to buy from the grid without paying less than necessary to ensure reliability of supply; i.e. to maximize consumer surplus as described above.

The ISO's job is not to raise costs to consumers to protect supplier entitlements to make sales on the grounds that it is "efficient" for ratepayers to pay more to maximize the value of trade.

d.) General Limitation on ISO Roles.

The ISO has a limited job and function. It is not the global efficiency police. It is not the protector of generator entitlements to sell beyond the requirements of safe and reliable service

at just and reasonable rates, and it does not have competence to be the arbiter of choices made in other markets for other goods that satisfy other preferences which cannot be satisfied by grid generation.

e.) Principles for Program Design.

When determining what kind and how much of demand response or energy efficiency service to procure, the following two principles should be embedded in any program or market design:

1. <u>The Savings Principle:</u> Customers should pay for demand response and energy efficiency up until the point where the incremental payment for DR or energy efficiency exceed the incremental benefits of the next unit of such services purchased.

i. Illustration/Explanation of the Savings Principle:

If consumers can buy a block of a hundred MW of demand response service for $10.00 and that service will lower costs paid by all other consumers by a million dollars, they would make that investment. Total savings will be $1,000,000-10=$999,990.00. If the next unit of demand response is offering 50MW at $50.00, and that unit will save all other consumers and additional $500,000, consumers would purchase that amount as well and the incremental savings would then be $499,950.00, for a total savings of $999,990 + $499,950= $1,499,940.00. If the next unit offered is 10MW at $10.00 and consumers will save an additional $11.00, then consumers would buy that as well and total consumer surplus would be at $1,499,941.00. If the next unit were offered at 10MW for $15.00, but consumers would only save $10.00, that unit would <u>not</u> be purchased because those 10MW cost $15.00 and that is more than the $10.00 that would be saved. Therefore, the optimal amount of demand response is to stop buying demand

response when consumer surplus reaches $1,499,941.00. This maximizes the amount consumers have saved. Under the savings principle, each increment of demand response will only be purchased if that increment increases the amount of consumer surplus. As soon as the next increment would begin to eat away the consumer surplus already accumulated, that increment is rejected and should not be purchased.

2. The Competitive Principle:

DR and energy efficiency markets and programs should be constructed in a way that maximizes head to head price competition between demand response, energy efficiency and generation options.

i. Illustration/Explanation of the Competitive Principle:

Demand response and energy efficiency providers should be placed, whenever practical, into a clearing type bidding structure so that quantities are procured from lowest to highest cost resources per MW. Efficient providers will likely bid very low in order to be price takers. This will drive down the cost just as efficient generators do on the generation side. As long as ratepayers are saving money with each increment purchased, and DR and energy efficiency providers are facing competitive pressures to keep their bids down, the ISO (for the reasons to be discussed thoroughly hereafter) does not need to concern itself with or calculate the cost to providers of providing Energy Efficiency or DR services.

These are very basic recommendations and principles concerning the goals and appropriate structure of DR programs and compensation. They flow directly out of considerations of the proper role of markets and market design in providing this essential service to consumers under the just and reasonable standard. As we will see, however, they run counter

to the social policies embedded in the Standard Economic Model, and the entrenched practices and perceptions of ISOs and RTOs across the country.

We turn, therefore, to a critique of the Standard Model and its various moral prohibitions and euphemisms. We shall demonstrate conclusively that it is an inappropriate replacement for designing markets to deliver just and reasonable rates.

III. CRITIQUE OF THE STANDARD MODEL AND ITS PRESCRIPTIONS:

In the preceding sections, we have described the general policy framework regarding "the product" the markets should be trying to deliver and the appropriate role of volatility and other market design features in light of the essential nature of electric service. We have then provided a basic, empirically measurable parameter; consumer surplus; that may be helpful in determining when a particular market outcome or market design approaches or diverges from the just and reasonable rate standard. We have then deduced (though not yet fully justified) specific policy, market design and compensation principles that should govern design and implementation of DR programs.

We turn now to address the Standard Model "efficiency" and "social welfare" prescriptions more directly. The recommendations we have made regarding proper design, structure and compensation for Demand Response run directly contrary to the policy recommendations that flow out of the Standard Model. In this section, we examine first the precise theoretical meanings and implications of the terminology used in the Standard Model and how that terminology is often employed, intentionally or otherwise, as a set of "buzz words" that stifle meaningful empirical or policy discussion about desired outcomes. For example, the phrase "Maximizing Social Welfare", is a euphemism with a very particular, specialized economic meaning which often has little or nothing to do with "social welfare" as almost any rational policy maker would conceive it. Likewise, phrases such as "transfer benefits", "transfer payments" or "compensation" (discussed briefly above) are routinely trotted out to suggest that those who disagree with the "efficiency" prescriptions of the Standard Model are violating social

or ethical norms. Who, for instance, is about to stand up and be against "social welfare", or in favor of "double compensation" or in support of making "transfer payments" from one group to another or, worse yet, "subsidizing inefficient outcomes?" In most discussions of social policy, these phrases are nothing more than propaganda used to silence opposing views.

We will then turn to one of the most persistent and tenacious misapplications of the Standard Model "efficiency calculus"; the prescription against "double payment". As we shall see, this prescription is really a prohibition of any "payment" at all for DR or Energy Efficiency services. We analyze in depth the theoretic and philosophic underpinning for all the known arguments advanced to support this prescription. We shall demonstrate that each is untenable. In addition, however, we shall uncover a common thread that unites almost all of these concerns; the belief that "global efficiency" or, more concretely, "the efficient allocation of societal resources across all markets", can provide a useful touchstone for judging the correctness of outcomes. As we shall demonstrate, this is a false guide and an empirically unfounded standard that can provide no coherent or rational alternative to the just and reasonable standard of maximizing consumer surplus.

1. Critique and Analysis of the Standard Model Terminology.

The following bullet point presentation drawn from a recent ISO-NE discussion of Demand Response illustrates the basic structure of the Standard Model.

Defining the Economic Benefits of Price Responsive Demand

- **Social welfare gains**
  - Consumers' surplus: the amount that consumers benefit by buying electricity at price that is less than they would be willing to pay
  - Producers' surplus: the amount that producers benefit by selling at a market price that is higher than they would be willing to sell
  - Retailer's net revenue: the difference between the retail revenue and the procurement cost
  - This is the standard economic criteria for cost/benefit evaluation

- **Transfer benefits**
  - Bill savings: the reduced payments for the retailers who purchase energy from the real-time market to meet their customers' load
  - Hedge premium savings: the reduced risk premium for the bilateral contracts
  - These are transfer payments that affect the financial incentives for demand participation, contracting, and investments[3]

We begin first by noting that "social welfare" under this proposal is measured strictly by dollar amounts calculated by comparing the difference between prices and the willingness of consumers to pay or the willingness of suppliers to sell. For instance, if a producer can sell the same amount of power at a higher price simply because consumers place a higher "value" on it, this supposedly increases social welfare. The most accurate neutral description of what this model actually measures is the "value of trade". The goal, under the Standard Model, is to have all of these different pieces add up to the largest possible value. Thus, "maximizing social welfare" is simply "maximizing the value of trade."

The implicit social policy embedded in this formulation is that "maximizing the value of trade" means maximizing social welfare. As noted by the bullet points, this is the "standard

[3] Hung-Po Chao Presentation, ISO New England Markets Committee Meeting 10/22/08.

economic criteria for cost benefit evaluation." This is not a special formulation that applies only to the energy sector of our economy, but supposedly applies to every product and service in any market. Therefore, if the argument is valid, one would clearly have to be prepared to argue that maximizing the value of trade in child pornography maximizes social welfare. The problem with this is obvious. The notion that simply trading more of everything for a higher price is socially beneficial is justifiably suspect when we recognize that certain products are freighted with other social and ethical considerations that go beyond their dollar value. To use a less controversial example, which nonetheless proves the same point, one would also have to presume that; "Maximizing the value of trade in credit default swaps maximizes social welfare." Although it is undoubtedly true that credit default swaps have some potential hedging function in the market, simply maximizing the value of trade in these instruments has other social and financial implications which make the proposition questionable. For instance, it is very likely that if there had been greater transparency and information available to the market, (both things which competitive theorists rightly approve of) that the "value of trade" in these commodities would have been considerably less, but society would certainly have been better off. Is providing accurate information on financial instruments therefore an "inefficient" restriction on social welfare? Hardly. What we have discerned instead is that when you develop a market to sell the wrong product (in this case, credit default swaps without sufficient information to evaluate their risk) you stand as much chance of doing harm as good by maximizing the value of trade.

Likewise, for all the reasons stated in the previous section, electricity is a product that has other social implications if it is traded improperly, quite similar to the disruption in a financial market which can be caused by inadvisably trading credit default swaps with no goal other than to maximize the value of total transactions. As we have noted, establishing a market to

maximize the value of sales in electrons, is establishing a market for the wrong product, and by that I mean a product which does not reflect the end result that society is trying to achieve[4] just as credit default swaps which are not transparently evaluable do not represent the goal society wants to achieve by appropriately hedging risk.

The next thing to notice about the Standard Model formulation is that it is completely divorced from cost of service considerations. This is a value of service pricing model which has made the social policy determination for us that electricity is appropriately priced up to the level that consumers are willing to pay before being deprived of it, and further, that this may be consistent with "maximizing social welfare." We need not pause here to reiterate the problems that arise from that social policy prescription. It is because the value of electricity to consumers is generally so far out of proportion to the cost of production, that the just and reasonable standard (which is designed to mimic a "perfect" competitive outcome) is necessary.

Another potentially loaded term that falls out of the Standard Model is the notion that an electric producer's lost opportunity to make a sale at a higher price, is a "transfer payment" to consumers. Further, if price were held constant, a lost opportunity to sell by a producer represents a diminution in social welfare. Energy efficiency, therefore, will inevitably harm social welfare any time it reduces the sales of suppliers who will be shown on the various charts of analysis as having lost the opportunity to maximize their sales.

But to the uninitiated, what are the connotations of terms such as "transfer payments" or "transfer benefits" when used to describe a generator's lost opportunity to make a sale? Embedded in this formulation is a not so subtle appeal to a notion that suppliers are "entitled" to a certain level of sales and that depriving them of this is akin to "stealing their money" and giving it to someone else. The terminology plays off a well-known psychological effect evident

[4] i.e. safe and reliable service at just and reasonable rates.

in the market behavior of even sophisticated purchasers; the "endowment effect."[5] Under the endowment effect, which is a version of loss aversion, a market participant places an unreasonably high value on something they already possess. By framing the loss of a sales opportunity in terms of a "transfer" of wealth, the implication of illegitimacy is unmistakable.

A similar effect, intended or otherwise, is obtained by the economists insistence upon calling the amount of money a customer saves by not buying some amount of electricity "compensation." As we shall see, the rhetorical appeal of arguments over "double compensation" or "double payment" hinges upon this terminological sleight of hand. The implication that someone is being "paid twice" provokes the moral sensibilities of anyone not in on the secret handshake. But in the real world where those moral sensibilities reside, everyone knows that while you can save money by buying less at the grocery store, you are not being "compensated" by the grocery store when you leave with an empty cart. Nor, despite this euphemistic use, could anyone be fooled into believing that the homeless are the most highly "compensated" individuals in America, on the grounds that they avoid buying almost everything. Yet this would be a consistent application of the term to everyday life.

All of these implied social prescriptions are well illustrated by a very common example, the details of which I will concoct, but the structure of which has become almost the sine qua non of Demand Response discussions:

Let us suppose there is a Demand Response program that pays a customer $10.00 to interrupt their load on peak or to install some energy efficiency measure. In addition to the

[5] The endowment effect (or *divestiture aversion*) is a hypothesis that people value a good or service more once their property right to it has been established. In other words, people place a higher value on objects they own relative to objects they do not.

> Thaler, R. Towards a Positive Theory of Consumer Choice. *Journal of Economic Behavior and Organization*, 1, 39-60 (1980).

$10.00, the customer also gets "to keep" whatever bill savings he achieves by not buying high priced electricity. Because the customer interrupts, or installs an efficiency measure, all other customers on the grid see $10 million dollars of savings through lowered clearing prices. If your goal is to maximize consumer surplus, lower the cost of production, and drive prices to cost, the introduction of such a program makes perfect sense. But through the lens of the social prescriptions in the Standard Model, this is an "inefficient" outcome.

To begin with, under the Standard Model, the $10 million dollar savings to all other customers are not "real" savings. They are merely "transfer payments", money which suppliers have apparently been unjustly deprived of, or, at the very least, a matter of indifference to the efficiency calculus.[6] Further, that $10.00 is not considered the payment for a service, but rather an inappropriate "subsidy" which results in "double compensation" for the consumer who should not be encouraged to reduce their load, even if all other ratepayers will otherwise suffer, unless their avoided costs alone justify it.

The Standard Model as applied to electricity has at best an accidental relation to real social welfare. The elements of the Standard Model could be used as non-judgmental measurement tools to help evaluate progress towards designing an appropriate market by measuring increase in consumer surplus under the constraint of never driving prices below cost for any given quantity produced. The Standard Model, however, is not always acknowledged or used merely as a tool, but is rather used in an attempt to dictate social outcomes, both as to the type of product consumers should be allowed to ask the market to deliver, and the social outcomes policymakers should be permitted to pursue. Neither of these functions are an appropriate role for economic theory.

[6] Remember our discussion about efficiency being related to your object. Because the object of the Standard Model is not to deliver safe and reliable service at just and reasonable rates, but rather to maximize the value of trade, it is not "efficient" to lower prices even if all other ratepayers would save $10 million dollars for a $10.00 outlay.

We turn now to a very specific social prescription laid down by the Standard Model in the name of "efficiency." In all Demand Response program design discussions, the great White Whale of "double payment" exerts its awful fascination on the Ahabs of the Standard Model, driving them to elaborate and byzantine lengths to "net out" this evil leviathan from the seas of their efficiency calculations. Upon closer examination, the white whale turns out to be just another red herring distracting us from the achievement of just and reasonable rates.

2. Double Payment Issues.

a.) Introduction: Defining the Issue; Identifying the Arguments.

As will be discussed in detail hereafter, the pejorative term "double payment" is used in many different ways by those who are opposed to paying for demand response.

In its purest sense, the economist will argue that if we had perfectly and universally implemented real time pricing and metering for all customers under a real time LMP clearing market, then all customers would see the "true cost"[7] of electricity and then could decide whether or not to purchase based on the "value" they place on the product. Under such "perfect" rate design, the argument goes, it is "economically inefficient" to pay anything to incent demand response. The customer's savings alone "should" motivate "efficient" DR and paying money in addition to this is a "double payment" and "should not" be done.

The first thing that must be noted is that this "should not" is a normative policy statement. It is a value judgment of what "ought" to happen or not happen in the real world, and

[7] I have often wished ratepayers could collect a nickel for every euphemism tossed about in these debates, but this one is perhaps less jingoist than others. The belief that certain snippets of economic data or information are "truer" than others is as silly as the idea that "true" measurements can only be made in inches and that centimeters are "false". A flat average rate based on accurate costs is no less "true" than a ticker tape of the individual prices that make up the average. But, once again, use of this term puts those who oppose this particular prescription into the camp of "untruth".

in that sense, needs to be justified by an appeal to real-world consequences which are undesirable if the prescription is violated. As will be demonstrated thoroughly below, there is no real world economic analysis or rationale that supports this normative prescription. Nor is there any "moral hazard" that arises from the violation of this prescription. Therefore, the double payment issue is a rhetorical red herring.

A brief word on terminology. We have discussed above the rhetorical use of the term "compensation" to refer to customer bill savings. In this section and hereafter, we will use the term "pay" and "payment" in the ordinary sense; an outlay of money by a purchaser for a product. Bill savings do not represent such an outlay of money by other ratepayers or anyone else. "Paying" for demand response will mean that other customers pay some amount. Therefore, limiting "compensation" of demand resources to no more than bill savings, is a refusal to pay for demand response.

A similar motivation not to pay for demand response underlies every scheme for "netting out" customer "bill savings" from DR or energy efficiency payments. Under these scenarios, the argument is that "market imperfections" such as averaged retail rates, prevent customers from seeing the "true cost" of power. Thus, retail rates on peak are not high enough to reflect scarcity prices under LMP. If a customer is paid the LMP for an interruption, but also gets to keep his or her "retail bill savings" then a "double payment" has allegedly occurred. Often elaborate designs to "net out" bill savings are justified by this concern, but they all boil down to the same thing. The Standard Model views any payment to a customer for demand response to be illegitimate because customers "should" only receive their "true" savings. Again, we intend to demonstrate that this normative social policy prescription is based on nothing more than the economist's own

preference for certain products and outcomes over other, equally legitimate and far more rational outcomes (like just and reasonable rates).

It is unfortunate that even those who support paying demand response providers for demand response rather than simply relying upon bill savings to incent desired activity, pay implicit lip service to the "double payment issue." Many supporters of demand response point to "market imperfections" as factors which "excuse" or make necessary the payment of "incentives". Though there are certainly market imperfections which it is wise to pay demand response to overcome, these apologists are too ready to concede the underlying validity of the social prescription against alleged double payment. As a result, value of service pricing proponents feel encouraged to insist that incentives are unnecessary so long as value of service pricing can be invoked. As we shall demonstrate, however, unless every market for every good and service were "perfectly competitive", it would be impossible for the proponents of the "no payment" prescription to rationally demonstrate that a world without "double compensation" was in fact better or more conducive to "social welfare" of any kind than a world with incentive payments. In contrast to the position that paying for demand response can only be justified by appeals to market imperfection, we shall demonstrate that paying for demand response is a legitimate and helpful public policy in every instance where doing so will promote the twin goals of driving the cost of grid supplied electricity down and driving prices for this product closer to cost.

The arguments made in support of the prohibition against paying for demand response fall into four main categories. Proponents of this prohibition often make discussion difficult by muddling these different grounds and failing to clarify when they are relying on one or the other to justify their conclusions. Public policy makers who have a responsibility to consumers, must

cease being embarrassed about their core mission of achieving just and reasonable rates and begin to insist on a statement of the specific basis' which underlie ISO or other market theorists' assertion that the just and reasonable rate standard interferes with the quest for a "better world". We intend to be very specific. If there are other rationales proponents of not paying for demand response wish to advance to support their position, they are, of course, free to articulate them.

There are four major grounds put forward by proponents of the "do not pay for demand response" school of thought to justify their normative prescription, as follows:

1. **Efficiency Between Markets**. Competitive markets allocate societal resources efficiently. Consumers should weigh the cost of electric consumption against other goods and services. If they value electricity more than other goods and services, they will purchase electricity and be better off. If they do not value electricity more than other things they could use their money for, they will purchase other products and all society will be "better off". Offering incentives not to purchase electricity "misallocates societal resources" because it not only suppresses consumption of a more valuable product (electricity), but "misdirects" societal purchases and investment to other less valuable products. This decreases social welfare and should be avoided.

2. **Efficiency Within the Electric Market**. Paying for demand response is inappropriate because it will distort price signals for new investment and threaten reliability.

3. **Consumers Will Pay Too Much**. Paying for demand response means that consumers will pay twice for the "same service".

4. **Moral Hazard**. Taking money from other ratepayers for demand response is a form of stealing and dishonesty.

We shall deal with each of these arguments in turn. As we will demonstrate, the first argument provides no rational support or empirical foundation for the proposition that paying for demand response will misallocate societal resources. The second is simply a desperately

maintained non sequitur that presumes a design for programs that no one is proposing. The third depends on misunderstanding of the appropriate product to be delivered and an easily demonstrable factual fallacy. Finally, the fourth, is simply an attempt to conflate the consequences of poorly designed programs or bad actors with the untenable philosophic positions of 1, 2 and 3 above by using the same term "double compensation" to describe "gaming" and being intentionally vague in other contexts as to which sense of the term is being used. We address this last use here only because this tactic has been employed in these discussions, and has colored enough of the debate to make addressing it necessary.

b.) The Argument Against Paying for Demand Response Because Doing So Interferes with Efficient Allocation of Societal Resources Between Markets is Logically Unsupportable, Empirically Unfounded and Therefore Untenable.

As noted above, the clearest statement of this argument goes as follows:

> Competitive markets allocate societal resources efficiently. Consumers should weigh the cost of electric consumption against other goods and services. If they value electricity more than other goods and services, they will purchase electricity and be better off. If they do not value electricity more than other things they could use their money for, they will purchase other products and all society will be "better off". Offering incentives not to purchase electricity "misallocates societal resources" because it not only suppresses consumption of a more valuable product (electricity), but "misdirects" societal purchases and investment to other less valuable products. This decreases social welfare.

The assertion that competitive markets allocate resources efficiently is not offered by economists as a bit of general folk wisdom which can be challenged by appeal to facts. For example, though many of our markets are considered generally competitive, unemployment, stock crashes, near financial collapse, boom-bust investment cycles, randomly volatile commodity prices, and a few other factors, might, to the unenlightened observer, seem to require

some qualification of the term “efficient” as that term is normally understood. The economist will hasten to point out that these unfortunate effects only result because the particular markets in question are not “perfectly competitive” in the classic sense. However, some economists, at least, will also rush to assure us that however imperfect markets are at whatever it is they are doing, and however badly they may be doing it at the moment, they are entitled to deference because every other outcome would be less efficient. They argue repeatedly that “interfering” with markets (even imperfect ones) in any way, moves outcomes further away from the ideal of efficiency that would be achieved by perfectly competitive markets. When it is pointed out that “interfering” with markets can often make them more competitive by establishing rules (such as anti-trust laws, standardization of measurements, clearing house and market platform procedures like ISO settlement systems, etc.) they argue that such observations “miss the point”. If you are by now confused as to specifically what the “efficiency” point is, you are in good company.

In these situations, the efficiency being referred to by the economist is the concept of “Pareto Efficiency” or “Pareto Optimality.” The assertion that competitive markets allocate resources efficiently is a restatement of what is known as “The First Welfare Theorem of Economics.” A few definitions may help here.

A Pareto improvement is a change in any allocation of goods, services, money, etc., that can make at least one individual better off without making any other individual or firm worse off. A system is Pareto Efficient, or Optimal, when no further Pareto improvements can be made. This state is known as Pareto Efficiency and it is the state that the economist is claiming competitive markets can get you to.

In the above formulation of the argument, preferences between goods and services, like electricity and some other product such as bagels (just to take an example), are evaluated by

consumers in conjunction with all other goods and services their money might buy. By acting on their "preferences", consumers efficiently allocate their resources. Note here that the idea of efficiency is closely tied to the notion that people are getting what they want (satisfying their preferences) to the greatest extent possible given an initial allocation and the competing preferences of all others in all other markets.

The idea of Pareto Optimality or Pareto Efficiency, posits a "state of reality". It implies there is an actual objective outcome that can be measured under which all rational observers would agree they were as well off as they could be without making other rational observers worse off. In economic models, this objective state of reality is modeled as a "location" in a multi-dimensional vector space composed of value and profit "functions" that reflect the preferences of households, firms, individuals, and all other participants in the market for all goods and services. Because it is a "state of reality" or a "location" in value space where everyone's preferences are optimally satisfied,[8] empirical measurements ought to be available to verify that we have arrived.

Pareto Optimality and Efficiency do not depend upon the method by which you arrive at this happy point in value space. Like the City of New York, Pareto Optimality is not the result of how you get to New York. New York, like a Pareto Optimal state of affairs is "out there" somewhere and there may be any number of conveyances to get you there. In this respect, markets are like a train: they might get you to New York or Pareto, if you jump on the right one on the correct schedule. But a train can also take you to Philly, and a poor market can take you in a direction you don't want to go, i.e. away from Pareto Optimality.

[8] Remember, this does not mean you get everything you want; you only get as much as you possibly can get of what you want without harming anyone else who is also getting as much of everything they possibly want without harming you.

So, you may be asking, exactly how competitive does a market need to be to get us to Pareto Efficiency?

Well, the first thing to note is that no single market for any single product, no matter how perfectly competitive, can ever get you to a Pareto Efficient outcome, in the sense of the global argument presented above. Pareto Efficiency requires consumers to optimize their utility by choosing between various goods in various markets. Even if the electric market, for example, were perfectly competitive, if other markets for goods and services were not competitive, prices in those markets would not be optimum.[9] Therefore, in comparing the price of electricity to the price of other services, consumers would not necessarily be choosing the optimum outcome that would make them most happy if things were truly "efficient". Assume, for example, the bagel market has extreme price distortions. In accordance with their "true preferences,"[10] in order to be "truly happy", consumers would like to buy bagels, but because they are so expensive, consumers instead buy more electricity which will not make them as happy as a good bagel would if it could be had at its perfectly competitive price. Thus, the allocation of resources between markets is a tricky business. A distortion in the bagel market could make us buy "too much" electricity or bread or coffee or oil or vice versa.

So then, you might reasonably ask, how competitive should markets for all services be in order to assure this wonderful Pareto outcome? You will be happy to know that economics has provided a definitive answer to this question. It is known as the "First Welfare Theorem of Economics."

[9] In an obvious example, if the markets for all of the production inputs for electricity like oil, gas, labor, steel, aluminum, insurance, etc. where imperfect, then all these societally suboptimal inputs would influence the price of electricity and we might buy more or less of it than we would if the price of, say, oil where optimally determined.
[10] We will see that in order for any of this "efficiency" talk to be more than a "just so" story, someone must actually be able to define some set of stable preferences or values so we can determine to what extent these are satisfied by one state of affairs as opposed to another. Without this it is hard to know who is better off or why.

The First Welfare Theorem of Economics states that a system of free markets will lead to a Pareto Efficient outcome.[11] In order to make this happen, you only need seven little pre-conditions to be satisfied:[12]

- 1. Markets exist for all possible goods.
- 2. All Markets for all possible goods are in full equilibrium.
- 3. All Markets for all possible goods are perfectly competitive.
- 4. Transaction costs in all markets are negligible.
- 5. There are no externalities.
- 6. All Market participants have perfect information.
- 7. There are no technological improvements.

Thus, presuming, as we must, that Pareto Efficiency is a real-world outcome,[13] and that it is possible to arrive there by taking a train of competitive markets, there appear to be a few minor obstacles in the way. First, markets must exist for all possible goods. That means that for every preference whether it be for blue sunglasses, yellow fin tuna, the survival of polar bears, insurance against the risk of mosquitoes, clean air, etc., there must be a market. Since Pareto Optimality is supposed to balance all preferences for all individuals and put us in the best possible state, this only makes sense. After all, how can a market balance all our preferences if markets don't exist for our preferences? But in terms of real-world ability to trade, this is a bit of a tall order.

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[11] Hayek, Friedrich A. (September 1945), "The Use of Knowledge in Society", *American Economic Review* (American Economic Association) **XXXV** (No. 4): 519-530.

[12] Arrow, Kenneth J. and Gerard Debreu (1954). "Existence of a Competitive Equilibrium for a Competitive Economy". *Econometrica* **22** (3): 265–90.

[13] I ask the reader to constantly bear this requirement in mind. Economists are telling policy makers that they should take actions that will have real world consequences in the name of achieving or approximating Pareto Efficiency. If Pareto Efficiency is not a real world state of affairs that can be "approximated", then it is no guide at all. If economists cannot measure how "close" a particular outcome is to Pareto Efficiency, they cannot assert one outcome is better than another or closer to being efficient than another based upon this concept.

Second, not only must all these markets exist, they all must be in full equilibrium. We will not trouble the reader just now with the specialized role of "equilibrium" in market theory, but it is somewhat just what it sounds; a market that has reached a certain stage of stability of trading. Then, all of these markets for all of these good must also be perfectly competitive. Again, this only makes sense. As we noted in our earlier example with bagels, having one of these possible markets out of competitive whack will have knock-on effects to allocations in all other markets, because people who should (or should not) be investing in bagels will be investing in other things because the price of bagels is wrong. Then, each of those markets themselves will be out of whack, and people who should be investing in those markets will now be investing in the wrong things in other markets, and so on and so on.

As for the lack of transaction costs and externalities, these are the least of our problems. The requirement that all market participants have perfect information is difficult in itself, but when coupled with a requirement that it be essentially "costless" so transaction costs are negligible, certain problems do arise. Finally, the inability of the model to handle technological innovation might make one dubious of its application in these markets, but we will pass that by for now as it seems a minor blip compared to the other requirements.

Needless to say, the economist who asserts that competitive markets allocate societal resources "efficiently" is making a very special case. Certainly no existing market or series of markets meets this definition. But surely you say, the economist making such prescriptions must mean something by his assertion that paying for demand response will lead to "inefficiency." Perhaps he knows something we don't, and there is some corollary to the First Theorem of Welfare Economics that allows us to presume the efficiency of outcomes under less constrained

circumstances. Unfortunately, for our economist, there is not. What there is, in fact, is a very well-known theorem which asserts the opposite.

In 1986, Bruce Greenwald and Joseph Stiglitz established what has become known as the "Greenwald Stiglitz Theorem".[14] The Greenwald Stiglitz theorem states that in the absence of perfect competition, complete markets and perfect information, market outcomes will always be Pareto Inefficient. This mathematical proof, using the assumptions embedded in the original formulation of the "First Theorem", has been around for quite some time, and is largely uncontested. The outcome of the Greenwald Stiglitz theorem is not surprising, but having mathematical proof of the obvious[15] is sometimes liberating. But just as interesting as this main result are some of the subsidiary results. Interestingly, Greenwald Stiglitz demonstrated that because of the interaction of each market with all other markets, and the corresponding multiplicative effects of market imperfections, you cannot calculate your way back to a Pareto Efficient outcome by, for instance, figuring how much it costs to obtain information in the market for a good, then factoring that cost in when doing the calculation to determine what the "true" efficient outcome is. As stated by Greenwald Stiglitz in their 1986 paper:

> "Our results do, however, run counter to much of (at least the older) folk wisdom. This suggested that although an economy with, say, imperfect information would not do so well as one with perfect information, this was an irrelevant comparison. The relevant comparison had to take these costs of information into account; when this was done, it was suggested (though never proved) that the efficiency of the competitive economy would be re-established. We hope this paper will have laid to rest this heuristic argument."

[14] Greenwald, Bruce; Stiglitz, Joseph E. (1986), "Externalities in economics with imperfect information and incomplete markets", *Quarterly Journal of Economics* 101.

[15] Although much more "clever" mathematically, the Greenwald Stiglitz Theorem is logically equivalent to a demonstration that you can't get to New York if you take the train to Philly.

Returning now to our economist who is attempting to prescribe particular social outcomes (such as value of service pricing for electricity and not paying for demand response) in the name of Pareto Efficiency, we see he is making some rather remarkable claims. Despite mathematical proof that, even accepting the proposition that Pareto Efficiency might be a real world outcome, there is no market or set of markets that achieve it; despite equally compelling proof that imperfections in any market skew the results in every market and that every market is inefficient; despite proof that he cannot determine by "netting out" even identified inefficiencies in a single market what a Pareto efficient outcome would be; he claims to know which direction prices in the electric market "should" move in order to "efficiently allocate societal resources across all markets".[16] Thus, he can confidently tell you that paying for demand response is "inefficient" because, apparently, he "knows" that the current savings a customer achieves when interrupting is the "right amount" when making that consumer choose between electricity and all other goods in order to assure the world arrives at Pareto Efficiency. Even within the admittedly narrow confines of classical economics (the actual discipline as opposed to the "just so" ideology of the Chicago Madrassa), these claims are unsupportable. In the larger world of empirical fact, they are demonstrably preposterous.

We have been charitably assuming all along that the paradigm of determining "efficiency" by means of the mathematical construct underlying the First Welfare Theorem could have some basis in reality. Yes, you may say, it may be difficult to measure people's preferences, but surely they have them and those preferences are consistent enough to rank order so we can have a scale to measure when people are "better off". Surely, you may also say, markets must be capable of achieving equilibrium, etc. Unfortunately for our economist/social

[16] Or even more irrationally, he is claiming the current prices in the electric market are already globally Pareto Efficient so are the "standard" against which all other outcomes must be judged.

engineer, all of this can be empirically demonstrated to be bunk. People's preferences are not stable or consistent. They may prefer A to B, B to C, C to D, and yet prefer D to A. Framing effects, loss aversion, over-evaluation of "sure things"; i.e. people's "actual preferences", all defy the rank order stable continuum necessary to make the measurements of "efficiency" the economist invokes to support his preferred social outcome.[17] The same sort of demonstration can be made regarding market equilibrium based on the observed chaotic, fractal and interdependent nature of price changes in commodity markets. We leave the discussion of these empirical findings to an appendix. But policy makers should be aware that there is ample and irrefutable empirical evidence that the entire edifice upon which the first theorem is based is the intellectual equivalent of having a brilliant mathematical formula for counting fairies. Surely, if fairies existed, we could count them and put them into continuous functions and derive all sorts of interesting results. Unfortunately, fairies do not exist and Pareto Efficiency as a "location" or destination is as plausible as "Never Never Land."

For these reasons, we conclude that Pareto Optimality is not a useful or relevant concept in discussions concerning the wisdom (or lack thereof) of pursuing particular pricing policies in real world markets. We do not know, and will never know, the optimal amount of electric consumption at any particular price point that will guarantee the greatest level of human happiness, so we can never know whether a particular price impact is good or bad based on this "global efficiency" standard. On the other hand, there are some very solid and measurable real

[17] In one of the most notable findings of economic research, economists have finally learned what savvy retailers have known since creation of the first surplus that permitted trade; "prices" can themselves be "products" for which people have "preferences." Sales of many luxury items actually increase when prices are raised. In another example, the price a consumer is willing to pay for a bottle of wine can be highly influenced by the prices of other wines on the rack. Retailers know that consumers will have a "preference" for wines priced in the middle of the range. Thus, including a few high priced bottles in the rack raises the price point consumers purchase at. Price is not just a function of preference, it is a component of preference. People prefer mid range prices when buying wines. This, of course, makes a muddle of claims that prices simply reflect preferences, let alone that preferences can be rank ordered coherently across all markets, even if they were perfect.

world outcomes that result from particular pricing regimes, like value of service pricing, and these outcomes violate standards and goals that we, as a society, have determined are worth pursuing.

The reader should not presume from this discussion that reliance on competitive processes to provide market based solutions to identified problems (like keeping the rates of electricity just and reasonable) must be abandoned simply because we cannot find Never Never Land. Using competitive processes within markets to achieve local, identifiable policy objectives does not require subservience to the imaginary strictures of Pareto Optimality. There are ample reasons to prefer harnessing the incentive effects of competition in structured markets for products without appeal to quasi mystical, mathematical constructs. To take a simple example, it does not require balancing the Pareto Optimizing outcome for all markets to determine you are "better off" putting out an RFP and inviting competitive bids for services, than dealing with a lone monopolist. All of the competitive structures of the current RTO markets, from LMP to capacity auctions, can be rationalized (or challenged) in terms of their effects on procuring needed services for ratepayers at lower cost without invoking false claims of global Pareto Efficiency.

It has been well understood for over a hundred years that keeping the price of electricity as low as reasonably possible for consumers will impact how much they buy and the relative proportion of their available income they must spend on this essential service. The decision has been made that other markets that are more elastic, less essential and less affected with the public interest are not the standard by which prices in these markets are judged. We do not raise the price of electricity to secure cheaper bagels or cars, or widgets; we keep the price down to assure affordability, economic viability, health, societal participation, universal service and a host of

other important policy objectives. The purpose of using competitive markets in this sector is to keep prices down, not to optimize the bagel market or to maximize the value of trade in electrons. Regulators who are asked to compromise basic and long standing policy objectives in the name of "globally efficient allocation of resources between all markets", are being asked to repeal the just and reasonable standard in return for a ticket to Never Never Land. That request for repeal must be rejected.

c.) The Argument Against Paying for Demand Response Because it will Distort Price Signals For New Investment and Threaten Reliability is Factually Unsound and A Logical Non Sequitur. Paying for Demand Response Improves Rather than Threatens Reliability.

As we have seen above, the notion that any economist can tell a regulator what the optimal level of investment in generation technology and infrastructure is based upon an efficient allocation of resources between all markets is insupportable. Therefore, when discussing the appropriate amount of generation investment needed to support load in the electricity market, we take the amount of load that actually appears in that market as a given and purchase generation as needed to meet that load. Demand Response and Energy Efficiency will surely affect the amount of load that appears in the market that requires grid supplied generation service. That is the whole point of much of the endeavor. The object of maximizing consumer surplus under the Savings Principle[18] means that we only continue to pay for demand response and Energy Efficiency until the cost paid by other ratepayers for DR and Energy Efficiency exceeds the incremental benefit in terms of lower clearing prices, greater reliability or other identified benefits. Clearly, this means that if there is a generation resource that customers would have to pay less for than what consumers would have to pay to incent an Energy Efficiency resource,

[18] Discussed in Section II (2)(e) above.

then the Energy Efficiency resource would not be purchased and the generator would be. Whatever load remains to be served after the optimal amount of demand response is procured, that load should be served by whatever generation is still needed and that generation should be compensated under the current LMP and capacity payment construct.

RTO markets have competitive clearing processes for both energy and capacity which supposedly compensate generation needed to provide service sufficiently to assure their continued operation. These mechanisms do not rely for their effectiveness upon there being any particular level of load to be served. As load goes up, capacity auctions clear at higher quantities and prices. As load diminishes, those prices go down until unneeded generation units retire and etc. DR presents no special challenges or problems to these mechanisms that are not already encountered in the course of normal fluctuations due to economic downturns, weather, technological innovation and other impacts on load. Unless, therefore, there is an argument that current market structures which pay generators for energy and capacity are insufficient to properly incent needed generation, changes in load caused by demand response present no special problems. Even if it is to be argued that current mechanisms are inadequate, this has nothing to do with any affect of having other customers pay demand response to reduce load. Rather, it is simply a generic problem that will afflict generation any time there are changes in load <u>for any reason</u>.

Therefore, we conclude that so long as clearing price market mechanisms remain, and they are applied as currently to pay generation that remains needed after an optimal amount of demand response has been purchased, there is no reason to be concerned that this amount of generation will not be adequately supported by current market pricing mechanisms. The alternative is to adopt the untenable position that the amount of generation service actually

needed, is the amount that would be necessary absent demand response. This formulation would obviously defeat the entire purpose of trying to use demand response to lower customer bills and needed generation.

It is important for responsible regulators to note that proponents of the view that paying for demand response threatens resource investment slip rather easily back and forth between local pricing concerns about reliability and the previously exploded concerns about proper allocation of societal resources. They will claim, for instance, that paying self generation for demand response services "distorts" prices in the electric market and is "inefficient". But this appeal to "efficiency" has nothing to do with keeping enough generation around to reliably serve remaining load. It is instead a statement of the ISO's preference that investment be made in grid generation rather than some other product market, like efficient lighting or self-generation. These concerns are crony-economic in nature, and we shall deal with them directly below. But needless to say, such "concerns" involve the ISO once again in claims that it knows the "true value" of preferences in a host of markets in which it has no competence, policy mandate, experience, expertise or empirical knowledge.

Clearly, however, the amount of generation needed for remaining service on the grid after DR can be adequately compensated by relying on existing clearing markets to no less an extent than current levels of generation are. This will provide the same incentive as currently to maintain and invest in all generation needed to serve load that requires service from the common grid.

d.) The Argument that Paying for Demand Response Causes Consumer's to "Pay Twice" for the Same Service or will Result in Consumer's Paying "Too Much" is Purely Rhetorical.

As we have noted above, Demand Response is a service that consumer's may avail themselves of to lower clearing prices, improve reliability, lessen volatility and risk, defer needed infrastructure expansion, and better manage scheduling of infrastructure outages (among other things.) Demand Response is not the sale or arbitrage of electrons. Demand Response and Energy Efficiency are, specifically, system response services. Their contribution to the system can be measured as a change in KWhr demand and can be paid for in billing units of KW/hrs and KWs. However, with the sole and easily recognizable exception of self-generation technology which may occasionally "turn the meter backwards" and supply grid electricity ("electrons"), Demand Response does not provide a supply of a physical quantity of electricity in return for payments.[19] Customers who pay Demand Response providers to provide service, are not paying for electrons, but paying for the services that have the effects listed above of lowering the clearing price, improving reliability, etc. Those services have value to other customers, because they make purchasing needed electrons cheaper and more reliable.

It is true that when other ratepayers pay the clearing price for KWhrs of interruption, the total number of billing units that customers pay for do not go down.[20] In essence, all remaining customers are paying proportionally for more billing units (KWhrs) because they are paying the customer to interrupt. However, as discussed above and widely recognized, every single KWhr that every single customer on the system in that hour purchases costs less. Further, the savings enjoyed by all customers generally far exceed the minimal amount expended to pay for their diminimus share of the additional billing units the purchase of Demand Response requires. All

[19] To be clear, there is nothing whatsoever wrong with paying the clearing price for KWs and KWhrs placed upon the grid when a behind the meter resource interrupts its load and "turns the meter backward" as a result. It would, in fact, be inappropriate not to pay the clearing price for these services, but in this instance, metering protocol must be in place to assure payment is only made for the net change to the system. These metering regimes are already used successfully in ISO-NE. The electrons provided in these instances provide the same services to consumers of lowering clearing prices and improving reliability.

[20] By paying the Demand Response provider, all other customers "pick up" responsibility for the billing units of KWhrs that the Demand Response customer would have consumed.

this, however, does not stop the crony economist from arguing that all other customers should be upset because they are "paying twice" for those added billing units. The attempt here is to dissimulate and to pretend that paying twice means "paying twice as much". In the case of effective Demand Response, this is clearly not the case.

The final fallback position of these "do not pay" apologists is that even if all other ratepayers are saving money, they are still paying "more than necessary" to induce the desired response. The obvious question is; "more than necessary for what?"

We have thoroughly dealt with the quest for Pareto Optimality, and economist claims that they are in a position to know the optimal price of either electricity or of an interruption of electric usage. We need not reemphasize the vacuity of those claims here. However, the belief that paying some amount, for instance the clearing price, is more than needed to induce an interruption is easily tested by invoking the Competitive Principle discussed in previous sections.

Under properly structured markets for Demand Response and Energy Efficiency, DR providers should be in a position to bid against one another and against generation to clear. If, in fact, there are a significant number of Demand Response providers who can provide service at nothing but their avoided cost or bill savings, then competitive pressures will cause them to bid down the price of providing the service to ensure they are cleared. To assure dispatch, efficient DR providers, like efficient generators, will likely bid zero and be price takers. Under these conditions, given that all DR or Energy Efficiency requires some capital or other investment, the objection to paying a DR provider the clearing price because their costs are lower, makes no more competitive market sense than refusals to pay generators the clearing price because some of them have lower costs than others. Demand Response providers and Energy Efficiency providers incur real costs, both capital, labor and others, just as generators do, in order to provide

service to customers. In the absence of market power, a clearing price market should put pressure on all providers to bid at or near cost.

e.) Moral Hazard.

The final bulwark of the "do not pay for Demand Response" school of thought are a variety of arguments that attempt to paint the receipt of compensation by consumers for providing Demand Response services as "dishonest" or morally suspect in some other fashion.

Let us acknowledge, upfront, the importance of properly designing customer baselines and other measurements of Demand Response activity in order to provide assurance that ratepayers are receiving identifiable services in return for DR payments. That said, measurements of customer baselines and the metering or other protocols for long-term energy efficiency measures like efficient lighting or motors, will always be subject to estimation based on the always imperfect ability to know "what would have happened" under an alternate state of facts. But problems of imperfect information and measurement are not unique to DR and energy efficiency even within the services provided to the grid. The debate, for instance, about how much to pay for reliability or surplus capacity, the appropriate level of reserve margins, etc., are all instances where both judgment and measurement are intermingled. Specific program design issues surely need to be addressed, but they provide no justification for the assertion that paying for demand response encourages or is "gaming" under properly designed programs or markets.[21]

[21] A word for the reader on the use of the term "program" here. Those who distinguish the mechanisms necessary for the procurement of demand response from those needed for generation by pejorative use of the word "program" fail to acknowledge the obviously "constructed" nature of all trading platforms for electricity. To listen to these "Tut-Tutters" one would presume they had stumbled upon the RTO market mechanisms while wandering about in a state of nature. The current contrived market is in fact, nothing but a "program"; an algorithm if you will, to permit generation owners to sell their goods. To test this, abolish the ISO settlement system as of midnight tonight and see how much trade takes place "naturally" the next day. There are better or worse algorithms for purchasing what we want, but they are all equally and necessarily contrived.

The notion that all payments in addition to bill savings are "unnecessary" and therefore accepting them is dishonest, goes back, once again, to the global efficiency arguments thoroughly exploded previously. Customers clearly can be incented to take steps that benefit all other customers in terms of higher reliability and lower clearing prices by payments for Demand Response. Under the Standard Model, of course, savings to other customers are "unnecessary" because the Model does not view keeping rates for consumers as low as reasonably possible a legitimate economic objective. Rather, it views the markets job to be maximizing the value of trade in electrons and protecting global efficiency. Neither of these grand alternative missions is wise or even rationally supportable in terms of real social welfare.

Yet, those who interfere with the economists', self appointed role as the economic global efficiency police, come in for special umbrage for "gaming" the system. For instance, if the cost of an energy efficiency measure a customer implements plus the payment made to them by ratepayers plus the customers' "bill savings" is, in total, more than the clearing price for generation from the grid, the ISO claims "everyone would be better off" not implementing the EE measure and the customer is "gaming" the system. Although, as we shall see in detail in the next section, the economist's claim that this is "inefficient" is based on the unfounded claim that he or she knows what a "globally efficient" price is for any product, the use of the word "gaming" in this context lacks candor. A competitive supplier of any service, in any market, is not "gaming" when it does not recover all of its investment in any single market, or achieve all of its value preferences that motivate a particular expense through operation of a single market.

The ISO's insistence that when ratepayers get the benefit of a lower than full marginal cost bid for Demand Response services, that they are being "scammed" is easily refuted. There are only a few legitimate instances for questioning bids for service that are below some measure

of "cost." These situations invoke predatory pricing or other anti-competitive activities designed to destroy competitors by foregoing revenue recovery in order to later recover monopolist rents. This is not a concern with Demand Response providers or energy efficiency services. These investments are made for reasons in addition to the service they can provide to consumers of grid electric service including the opportunity to more reliably serve ones own load with less volatility. The independent values and preferences these customers capture which allows them to sell their system response to other customers cheaply is all to ratepayers benefit. Once again, we see the ISO stepping in as protector of grid generation's supposed "entitlement" to make sales, even if all customers who must rely upon grid generation (and who may not have the opportunities to engage in DR) must pay higher rates for the privilege. In the sections that immediately follow. We discuss these and other specific examples of the ISO's claim it must regulate markets other than grid supplied generation service in order to assure "economic efficiency." They too shall be seen to be baseless.

f.) Every Argument Advanced for Refusing to Pay for Demand Response or for Netting Customer Bill Savings is Insupportable and can be Traced Back to One or More of the Proceeding Four Discredited Arguments.

As we have noted above, the grounds advanced by proponents of the moral prescription against paying for demand response are often intentionally vague and shifting. Claims of "inefficiency" and "gaming" are used interchangeably to muddy the moral waters, and fears of improperly designed programs are paraded as inevitable outcomes of violating the moral stricture against "double payments." These arguments can be very difficult to disentangle and responsible regulators are often thrown on the defensive, particularly by tactics that intentionally conflate poor program designs (which nobody wants) with "double counting." In this section, we will

disentangle these often conflicting claims in the context of the ISO's "poster child" example of "inefficiency" or "gaming."

i. Context of the Discussion: A World With More Than One Preference to be Satisfied.

It does not matter what method a customer uses to mediate demand response or Energy Efficiency. Whatever method is employed, it results in a "cost" in terms of another good, service or preference to avoid electric consumption. These may include capitol investment, lighting, labor, loss of leisure time (a "preference" that has a "cost"), inconvenience, staff training, information acquisition, assumption of risk, metering technology, or any number of other things that constitute "valuable consideration." Neither the ISO nor any other person or institution knows what the Pareto Optimal level of investment in leisure, metering or self-generation is because they have no idea, none, how investment in these preferences effects other preferences such as the preference 1) for polar bears, 2) for independence from foreign oil, 3) for a stable industrial base, 4) for encouraging R&D in energy efficiency, 5) for bagels, and etc. Nor do they know what the optimal level of investment is to achieve any single one of these preferences (say, for independence from foreign oil). Thus, attempts to use the price that happens to fall out of the electricity markets at any particular time (bill savings) to "regulate" how much investment gets made or expense is incurred in Energy Efficiency or DR are misguided. I repeat, we do not know, nor will we ever know, whether current prices in the electric market represent a Pareto Optimal allocation of investment in electricity by society. Greenwald/Stiglitz in fact teaches that these prices are most certainly not efficient in any global sense. The ISO does not know, and cannot rationally claim to know, what direction electric prices would need to move to achieve global efficiency. Therefore, "netting" these prices or refusing to pay more than "bill savings" is

simply arbitrary from the point of view of "efficiently allocating societal resources" or "increasing social welfare" even in the classic sense.[22]

We note, however, that ISOs and RTOs like their vertically integrated predecessors, often exhibit a particular fixation with wanting to regulate self generation. But should all other ratepayers pay higher rates if necessary to assure that customers who rely on self generation aren't doing something "inefficient" in terms of allocating societal resources? Ratepayers' own inclinations, and the requirements of the just and reasonable rate standard, both militate against having ratepayers pay, through higher rates, for the privilege of having the ISO or utility play economic policeman in the self generation market.[23] As we shall see, the ISO's claim that it must control the price and level of investment in all generation in order for an "efficient outcome" to be achieved, and that ratepayers should pay a premium on their electric bills for the privilege of protecting against "inefficient" investment in self generation, is as untenable as the contention they should pay more for electricity to avoid inefficient investment in bagels. It is the same fallacy, based on the same bogus claim of Pareto omniscience about the proper balance of all preferences, and must be rejected for the same reasons.

We will deal with the general case first to make the logic of the argument clear. We will deal specifically with the case of self generation thereafter, not because it is any different than the general case, but because it is the example utilities always trot out to justify making all ratepayers pay more in the name of "efficiency". The reader should be clear, however, that self generation is not a special case. The ISO's argument that it must regulate investment in any

[22] Let alone our observations regarding the essential weakness of this paradigm because of its lack of any real world value system that could be relied upon to base actual calculations even if they were possible.

[23] As a historical aside, we note that vertically integrated utilities with captive customer bases still argue that self generation is inefficient because they can force all other customers to pay the stranded costs associated with utility generation "left unused" when a customer self generates. With respect to this argument (often dubious even in its historic context), we note that the purpose of competitive markets was precisely to relieve customers of the risk for specific investments in generation. Thus invocation of this old "stranded cost" argument would be wonderfully ironic in the "competitive" RTO context.

Energy Efficiency or DR measure based on whatever globally inefficient price happens to fall out of the current obviously inefficient electric market is equally untenable. These restrictions on energy efficiency investment are unwise and the inevitable result for all ratepayers is higher rates than necessary for an essential service.

ii. The General Example.

The general case runs as follows:

First, we assume that before ratepayers pay any amount for an Energy Efficiency or DR measure, that the net result is some level of savings to all other customers. If there were no verifiable savings to other ratepayers, ratepayers should not "purchase" the DR or EE service. Thus, we begin with the proposition that whatever measure is implemented, it results in lower clearing prices for consumers.

Per a typical ISO example, we assume a DR or Energy Efficiency measure that has an effective cost of $200/MWhr to implement. Assume a clearing price of $101/MWhr in the hour the measure is used. If you add the bill savings ($101) and the payment at the clearing price ($101), the customer is supposedly getting a net "incentive" of $2.00 and may invest in $200 worth of Energy Efficiency rather than in $101.00 of grid generation. The ISO reasons that paying the clearing price for this EE measure is "inefficient" because total investment in Energy Efficiency and payments is higher than if the customer just purchased generation from the grid.

Two things are clear from the ISO's reasoning. First, it believes it possesses some special knowledge that allows it to determine what total level of investment in <u>both</u> Energy Efficiency and ratepayer payments is "efficient". Second, it believes it can use the current price of electricity as a proxy for determining what an efficient level of investment in Energy Efficiency is. The problem is the ISO doesn't know, can't know, can't rationally claim to know

and has no way to measure what an "efficient level" of investment in EE is. Remember, all other ratepayers' rates went down, so they are certainly not harmed by this added investment. So who is the ISO playing economic policeman for? Obviously, the global economy which, based on its limited information "should" be investing in generation from the grid rather than EE because, to the ISO, it looks "cheaper".

The question that the ISO's limited analysis always misses is; cheaper for whom and for what? Cheaper than a world with polar bears? Cheaper than a world with less greenhouse gas? Cheaper than a world with more or fewer bagels? The ISO does not know what the added investment in Energy Efficiency means in terms of satisfying the global set of preferences for all goods. It has no way of knowing whether it is wise or foolish for the world to invest two times, three times, one hundred times, or only half as much in a MW of Energy Efficiency as a MW of grid based generation. Yet every time the ISO claims paying for demand response is "inefficient" and every time it provides calculations netting out "bill savings", it is making just such a claim to economic omniscience. The ISO doesn't know, for instance, what a single polar bear is "worth", let alone what the survival of the species might be worth. Perhaps we should be paying ten thousand times the clearing price for every MW of Energy Efficiency. But from the ratepayers perspective, they have only been asked to pay for a direct benefit to themselves in terms of lower prices. This is an "efficient" way to achieve their legitimate preference for just and reasonable rates. Exactly who is the ISO looking out for here?

iii. The Self-Generation Example.

We turn now to the issue of whether the ISO has any greater claims to such omniscience in the case of self-generation than other resources used or approaches taken to Demand Response. First, we remind the reader that ratepayers only pay for service from this DR resource

on the same terms as any other i.e. when their out of pocket cost is less than the savings realized through lower clearing prices. Despite the best efforts of utilities to quash it, self-generation has always been an alternative to service from the common grid and investment in it has been made or encouraged for a large number of policy and other reasons such as 1) environmental benefits of cogeneration; 2) Reduction in reliance on foreign oil; 3) customer preference for reliable back up power at known prices; 4) customer preferences not to deal with the bureaucracy of utilities and ISOs and their constantly shifting demands and rules; 5) customer preferences for power from particular sources (individual solar panels); and 6) preferences for industrial development and employment. This is not an exhaustive list.

The ISO has no rational basis to claim it knows what the true value to society (or even individual customers) is of investing in these preferences as opposed to those furthered by central station grid generation. And yet it claims it knows what an "efficient" level of investment in (or payment for) self generation is simply by comparing current electric prices to self generation operating or investment costs. Again, all other ratepayers would rather <u>not</u> have this customer take from the grid because it will cost them all more money. So who or what is the ISO protecting by attempting to regulate investment in the self generation market? There are only two candidates; 1) grid generation owners or; 2) global economic efficiency. We take these in order.

As we have seen in Section III(2)(c) above, there is no reliability reason for ratepayers to be asked to pay for more grid generation than is needed after optimal DR (as defined by the savings principle) is implemented. But ISOs, like the utilities before them, seem to view their job as one of protecting a generator "entitlement" to a certain level of sales. Like the utilities before them, ISOs view self generation mediated demand reductions as "taking" potential sales

from grid based generation, and they seem to believe that all ratepayers should pay higher costs for electricity to vindicate the generator's right to make such sales rather than have DR supplied by these supposedly less efficient self generators.

This desire to protect grid generation from supposedly "unfair" competition from the self generation sector is based on the false premise that regulation was meant to secure "fair treatment" for grid supplied electricity vis-à-vis other market substitutes. It was not. In fact, regulation in the form of either cost based or RTO market based approaches, already provides grid generation with a remarkable array of competitive protections that are not available to any other investment opportunity. There is no one out there mandating a minimal price to be paid by consumers, or a minimum quantity that must be purchased of chemicals, paper, or other products. Yet, reliability requirements and market structures such as FCM, RPM and others routinely guarantee the existence of a certain level of "compulsory demand" for investment in generation capacity, and further, anytime it does not look to FERC or an ISO like generators will be paid enough to keep a certain number of them viable, these entities quickly step in to raise prices or require more to be purchased. These are not intended as criticisms of the current system, but these are protections afforded investors in these markets that are unavailable in any other market <u>because</u> we have agreed as a society that reliability is an essential component of this service. However, those protections come in return for restricted expectations concerning sales and profits. Consumers will not buy more than they need and will not pay more than cost plus a fair return. Generators are entitled to absolutely no protection from the strict application of these standards, and ISO attempts to restrict consumer access to or use of any alternatives to purchase of grid based generation in order to prop up sales levels or further increase profits for grid generation investors are inappropriate.

There is no generator entitlement to make any sale. Ratepayers don't and shouldn't care about the relative operating or capital costs of solar panels, cogeneration or any other form of self generation, because they are not being asked to pay those costs. They are only paying for a service in so far as it lowers their own costs. Nor should ratepayers be asked to fund, through higher rates, ISO adventures into regulation of the efficiency of the self generation market. As we will see below, the Energy Efficiency market and the self generation market do not require the ISO's uninformed meddling to achieve efficiencies. Further, as noted above, the ISO wouldn't know efficiency in these markets even if it stumbled across it, because the value in terms of societal welfare of satisfying the preferences these markets satisfy that grid generation cannot satisfy are not reflected in the current, globally inefficient electricity price which is ISO's only proxy for "efficiency." The ISO simply doesn't know what self generation or any other DR measure is "worth" in terms of all the reasons people prefer these options to grid supplied electricity.

So we are faced once more with an ISO claim that it must act to protect some global sense of efficient allocation between markets. If the customer using self generation to mediate DR is producing, say, chemicals, then as far as she's concerned the cost of producing her product just went down. Is the ISO's concern then that this is unfair competition in the chemical market? Other ratepayers, "qua ratepayers", don't much care about the chemical market and would probably prefer cheaper chemicals anyway. Should they pay more to prevent this nefarious subversion of global efficiency to vindicate grid generation's entitlement to sell more at higher cost? We think not.

The ISOs job is to organize markets to assure ratepayers pay the least amount for service from the grid (however obtained) consistent with compensating producers at a level that is just

and reasonable and maintains reliability. None of this requires ISOs to roam at large among the markets for chemicals, paper, energy efficiency, self generation or bagels ferreting out imagined inefficiencies based on comparisons with short term electricity prices.

iv. Does the Self-Generation Market Need ISO Regulation to be Efficient?

Now, we come to an equally salient question. Is it plausible that the self generation market requires ISO regulation in order to be efficient? Recall that ratepayers are being asked to pay a premium on their bills based on the ISO's claim the self generation market needs its intervention in order to be efficient. What can the ISO bring to this market that would warrant higher rates for all ratepayers to achieve?

Nothing. The self generation and Energy Efficiency market has more than ample incentives to achieve lower cost and greater efficiency without the ISO's uniformed intervention into price setting.

Aside from the horrible hypotheticals, what are the actual market incentives created by demand response opportunities in the self-generation market (aside from those used to lower all other customer's costs)? The ISO would have you believe that inefficient units will be "rewarded" for inefficiency and so ISO must step in.

And do what? Aside, that is, from raise rates for all other ratepayers.

As for providing any added incentives for efficiency, the ISO's actions accomplish nothing. If a DR provider can lower its cost of providing DR and still get the clearing price, it obviously will do so because it stands to make more money. The more efficient their generation source, the more money they stand to make providing DR at the clearing price. DR opportunities may, in fact, provide the impetus needed to justify investment in more efficient on site generation. Further, investment in more efficient self generation technology does not face the

barriers to entry posed by all current ISO capacity deliverability requirements that grant preferential access to the transmission system for capacity to incumbents regardless of how inefficient they are compared to new entrants.[24] In contrast, a behind the meter resource can deliver to its "load" without paying a premium to preserve the market share of incumbents. Unlike on the ISO grid, if an investment in a new, more efficient unit can be justified on the basis of operating savings alone, it can be made without adding a premium for preserving incumbent transmission rights to buy access in order to replace that same inefficient incumbent. Study times for BTM applications are also dramatically shorter. Further, aside from continued attempts by some ISOs to set discriminatory standby, back up and transmission rates, savings on transmission costs are directly available and losses are minimized. Finally, BTM installations are never discouraged by corporate reflections on the (to utilities) potentially unfortunate effects in terms of lower congestion rents and lower clearing prices that new investment in efficient technologies may present for the "grand old fleet." In short, the market for self generation is notably free of a multitude of anti-competitive incentives and barriers to entry that afflict the "grid" generation market.

All the market forces that drive efficiency in the self-generation market, including market pressures from competing chemical suppliers, (for instance), are far more pristine and effective than the "grandfathering for incumbent" practices and incentives of ISO grid markets. Based on this, where is the new "efficient" investment likely to come from at least cost? Not the grid. The ISO's faith in markets appears to have a remarkably limited range.

We repeat, what does ISO attempted regulation of these markets bring in terms of added efficiency incentives in return for higher rates for all ratepayers? Nothing.

[24] For a discussion of current, anti-competitive grandfathering of incumbent capacity rights, see Appendix _____.

Actually, worse than nothing. ISO's refusal to pay for demand response from these resources simply means it leaves on the table value available both to all other customers and our hypothetical chemical plant in return for vague, and impossible to substantiate, claims that it "knows the way to Pareto." Netting bill savings from a DR provider's compensation only means other ratepayers must pay yet more in incentives to get the potential provider to respond or must forego services that would lower their cost.

The ISO should avoid playing economic police for markets other than electricity supplied from the grid and focus on lowering cost to ratepayers and assuring reliability. This means dispatching all resources including DR and EE however mediated, in merit order based on their cost to ratepayers, not on the ISO's opinion of the proper weighting and valuation of all societal preferences for all other goods and services.

v. A Very Specific Example.

We take now a very specific example to illustrate this point. There are many commercial and industrial enterprises that invest in generation for reasons quite specific to their own needs in their particular product areas. Large grocery stores like Hannaford's and almost all hospitals make significant investment in back up generation and emergency generation because the grid lacks (for good reason) sufficient redundance to assure uninterrupted power at all times. This investment will be made whether ISOs approve of it or not, because dying patients and endless aisles of spoiled produce or dairy products are too large a risk to run and it is "uneconomic" to build sufficient redundancy into the grid to avoid this risk completely. Though these units may not be as efficient as some central station technology on a BTU per KWhr basis, investment in them and their operation is not justified, and does not need to be justified, by reference to the

ISO's clearing market. We will not have people die in hospitals during blackouts to mollify the ISO's concerns about "gaming".

Once such investment is made, however, it may also be available to run during high cost hours. If it does so under a properly designed DR program or market, it will lower cost for all ratepayers. It will also provide additional revenues to hospitals and grocery stores which should lower the cost of both health care and groceries. ISO's desire to, instead, invest in redundant generation capacity on the grid because it believes the short-term operation costs of grid generation is lower, even when doing so raises the cost of electricity, health care and groceries, is a typical example of crony economic thinking. ISO assumes the only legitimate purpose of generation is to satisfy the particular preference it has authority over; grid generation. It does not "want" grid generation to be subject to competition from generation whose primary purpose is to satisfy preferences for, say, safe hospitals and unspoiled groceries and whose investment and operation can be justified by the economic logic of satisfying those preferences in addition to the ISO's product. The ISO sees grid generators as its "clients" who are "entitled" to sell electricity to anyone if they can produce it "cheaper", even if that results, ironically, in higher prices to all consumers for electricity, higher costs for groceries and higher cost for health care.

But the ISO does not know whether it is actually better for society to invest its money in the capital and operation costs of hospital emergency generation or grid generation. It doesn't know whether it is better to have lower health care costs or more money spent for "efficient" grid generation. It is looking out for its crony preference, grid generation, but it has no way to justify that preference over non-grid investment in technology with less operating efficiency but many other benefits that grid generation cannot supply.

CONCLUSION

The legal and regulatory paradigm underlying the product "safe and reliable service at just and reasonable rates" is based on a societal decision about the proper allocation of resources between the market for electricity and markets for other goods and services. For all of the reasons discussed in this paper, the social and economic wisdom of that decision on allocation is no less evident today than it was almost a hundred years ago. If anything, increasing reliance upon electricity as a potential source of carbon free energy adds increased urgency and impetus to the original social and economic logic of that original societal decision to keep the price of this product as low as possible in relation to other products and services.

There is nothing at all about the just and reasonable rate standard that makes it incompatible with the use of competitive markets and incentives. It is clear that competition in the generation sector has led to efficiencies of operation and dispatch, that have benefited consumers and can continue to benefit consumers. It is arguable (though not empirically verified) that the imposition of long-term capacity markets, by lowering investment volatility and risk, can lower the overall cost of supplying capacity to consumers. There is nothing in the just and reasonable rate standard that contradicts these goals, or makes them unachievable.

But all of these market structures, as they are applied to electricity, must be judged empirically and must be accepted, rejected, modified, or conditioned as necessary to achieve the goals of the just and reasonable rate standard. Those goals do not include the misguided and impossible quest for Pareto Optimality across all markets, or adopting structures which increase rates to consumers based on the unfounded belief that "interference" with trade in the billing units of formerly vertically integrated utilities as if they were independent commodities is a

violation of "global efficiency". We have demonstrated that these later beliefs and prescriptions are untenable, and in the case of electricity, can be socially and economically pernicious. They are instances of crony-economic thinking which pretend certain social and economic outcomes are mandated by "the laws of economics". No responsible regulator needs to adopt such ideas in order to support vigorously pursuing the task of finding, wherever possible, competitive incentives and solutions to the procurement of this essential service.

We hope that the thorough discussion of these issues provided here, can move the debate about markets and particularly about the role of Demand Response and Energy Efficiency in markets, to more constructive ground. As noted by Chairman Kelliher at the beginning of this discussion, regulation and competition in this market are inextricably intertwined in any responsible public policy approach. We have suggested that by focusing on a particular measurable result, the maximization of consumer surplus, an empirical yardstick may be established to allow constructive debate about whether particular market mechanisms are more conducive to meeting the just and reasonable rate standard than others. We have suggested specific roles for, and restrictions upon, ISO regulatory activity and analysis based on a coherent view of what the ends sought by ISO markets and regulation are and, yes, "ought" to be. Those who continue to believe that the role of competition and regulation in these markets is not to achieve the just and reasonable rate standard as described herein, should make their case clearly, and explain why increased cost to consumers for this product is a good thing and how it vindicates whatever broader societal, commodity trading outcomes they prefer. We hope at least to clear the air of euphemisms, and get down to a discussion of what it is we hope to accomplish with Demand Response, Energy Efficiency, and electricity regulation and competition generally.

Only when this is settled, can a rational discussion and evaluation of programs and program designs be made. If we continue with the rubric of viewing lost sales opportunities for generators as diminutions of "social welfare", we will cripple our ability to implement effective DR and Energy Efficiency. But we should at least be in a position to recognize what version of "social welfare" we are vindicating by refusal to pay for Demand Response. If we cannot agree on the proper role and scope of ISO analysis and regulation, then bickering over the details of programs, which will be fashioned to reflect those inconsistent preferences, will not be constructive or enlightening. We hope by clearly stating the public policy underpinnings of the design principles and preferences we espouse, that the process of program design and market implementation can be rationally structured to achieve those objectives.

There is much work that needs to be done. There is a long road ahead, but the first requirement is that we choose a direction. For our part, safe and reliable service at just and reasonable rates is the only responsible direction to go.