

Utility Deregulation and Retail Wheeling: The Stakes for IRP and DSM

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Several nations—among them, the United Kingdom, Norway and New Zealand—are well down the path towards deregulation of their power industries. Most notably, these deregulatory initiatives have resulted in the dissolution of the monopoly service franchise, and a consequent diminution of the utility planning function and public review of resource decisions. The “UK model” has begun to receive widespread, and often favorable, attention from some U.S. academics and industrial companies. The alleged successes of such deregulatory initiatives abroad also have been cited as a basis for less comprehensive deregulatory proposals in the U. S., notably retail wheeling. The mere threat of such proposals becoming reality has already affected the rhetoric and actions of many utilities concerning IRP and DSM.

This paper examines the likely impact of electric utility deregulation and retail wheeling on IRP and DSM. Drawing on experience from abroad and analysis of potential deregulation and retail wheeling scenarios in the US, the authors argue that current deregulation models are likely to complicate and in some cases render impossible efforts to reduce long-run costs, risks and environmental impacts of power system operations through DSM, renewable and IRP.

Introduction

A rapidly cresting wave of “common wisdom” asserts that the US electric utility industry is poised on the brink of entering a brave new world of competition. Industry trade journals and publications brim with articles and editorials forecasting the demise of the current regulatory compact. In its place, a competitive structure will emerge, based on competitive wholesale *and* retail markets. Traditional utility regulation will vanish, and individual customers will shop for electric utilities as they now shop for long distance phone companies.

The traditional regulatory compact in the U.S. is certainly under attack. Much of the fire is levelled at integrated resource planning (IRP) and demand-side management (DSM), which opponents see as a massive overstepping of the bounds of regulation (Houston 1992; Black and Pierce 1993). Another faction has targeted the dissolution of the traditional retail market monopoly franchise as a means to achieve rate relief for its constituency through retail wheeling (Anderson 1993).

The stakes are high in the on-going debate over the future of the U.S. electric utility industry. The intent of this

paper is to consider the potential impacts on IRP and DSM should comprehensive restructuring of the industry occur in the U. S., as it has in the United Kingdom and Norway. We believe that there are clear trade-offs between a future industry based on IRP versus competitive retail markets, and it is critical to consider these trade-offs *before* important decisions regarding the future of the industry are made. We draw upon recent experience from Norway and the UK to illustrate some of the potential pitfalls of an electric utility industry that allows retail competition.

We draw a clear distinction between wholesale and retail competition because of the very different nature of these alternatives. In this paper, our attention is focused strictly on the issue of competition at the retail level.

Our analysis focuses on two main questions: (1) If deregulation occurs to allow retail competition, what is likely to happen to traditional IRP and DSM? ¹and (2) What form, if any, would IRP and DSM take in a deregulated, competitive electric utility world?

Retail Wheeling and Deregulation Proposals Examined

Comprehensive deregulation of the electric utility industry is not to be confused with current retail wheeling proposals. Comprehensive deregulation aims to restructure the industry to introduce competitive forces wherever doing so is believed to improve economic efficiency. Although the exact nature of such proposals varies, they generally share the vision of an industry in which only the transmission and distribution network remains a regulated monopoly (Black and Pierce 1993; Hogan 1993; Joskow 1993; Ruff 1992a). Generation and retail sales would be subject to competition.

Current retail wheeling proposals in the U.S. are largely case-specific efforts to receive rate relief by bypassing a high-cost local utility. Retail wheeling as it is being proposed in the U.S. is a transaction in which a customer contracts directly with an outside utility or other generation supplier and where that customer's host utility is required by the regulatory authority to wheel the power to the customer.

While current retail wheeling proposals purport to be part of broader efforts to deregulate the U.S. electric utility industry, we believe that retail wheeling as it is being proposed will expand the amount of regulatory authority and deliberation required. Retail wheeling is likely to involve case by case treatment since there are numerous arrangements possible, depending on the type and location of the seller and wheeler. In each proposal, regulatory authorities will be faced with a plethora of difficult issues, including stranded investment, jurisdictional authority, and unbundled costs of service. Consequently, retail wheeling is likely to *increase*, not decrease the regulatory burden (Cavanagh 1993).

Retail wheeling is not synonymous with competition. Retail wheeling is but one of many mechanisms to introduce competitive forces into the electric utility industry. Wholesale competition is an on-going, and accelerating, trend in the U.S. that began with the passage of the Public Utilities Regulatory Policies Act in 1978. With the passage of the Energy Policy Act in 1992, the federal government affirmed this direction by including provisions to promote greater levels of wholesale competition within the electric utility industry, while at the same time expressly prohibiting the Federal Energy Regulatory Commission from ordering retail wheeling.

We are not alone in drawing this distinction between retail wheeling and comprehensive market restructuring based on competition. Some of the most ardent supporters of a competitive electric utility industry, neoclassical power

sector economists, do not see retail wheeling as an effective form of competition. For example, Larry Ruff (1992a), one of the principal architects of the UK electric system restructuring, writes:

In the United States, competition in electricity is being defined in terms of "wheeling" rather than in terms of the open pooling and transmission model outlined here. As a logically consistent statement of how an electricity system can combine effective competition with economic efficiency, the wheeling model is seriously deficient or even non-existent.

Other neoclassic economists who support competitive electricity markets share this ambivalence towards retail wheeling (Hogan 1993; Joskow 1993).

IRP and Retail Competition

IRP and Retail Competition Frameworks Compared

Both IRP and deregulation proponents see inefficiency within the various markets that comprise the electric utility industry as a major problem. The fundamental difference between IRP and deregulation lies in how to address this problem. Deregulation proponents believe that efficient markets will maximize social welfare. Therefore, their objective is to remove unnecessary regulations to create markets that allow individual consumers to make economically rational decisions regarding energy use. IRP proponents believe that certain market and regulatory failures encourage investments in new utility supply resources over investments in DSM and non-utility supply resources. IRP was developed in response to these failures. The objective of IRP is to provide a framework and sufficient incentives to overcome barriers to investments in DSM and non-utility supply resources.

An electric utility industry based on an IRP framework is fundamentally different than one based on the model of retail competition (to be achieved through deregulation), as illustrated in Table 1, which contrasts these two models of industry structure.

Table 1 clearly illustrates the alternative visions of the role of electric utilities within society held by the opposing camps in this debate. It is this difference that fuels the passion in the debate over retail wheeling and other deregulation proposals. Proponents of competitive markets view electric utilities as simply another type of industry that should operate unfettered by excessive market regulation. Society is served through the voice and outcomes of the market, according to this perspective. Environmental and other social objectives would not fall

Table 1. Characteristics of IRP and Retail Competition

	IRP	Retail Competition
Industry focus	least cost energy service	least cost kilowatt-hours
Planning horizon	long-term	short-term
Planning objective	minimize societal cost	maximize private wealth
Strategy	diversity, stability	competitive advantage
Constituency	public and private interests	private interests
Rates	cost-based	market-based
Obligation to serve	yes	no
Risk	shared	individual firm
Externalities	included	excluded
Direct public input	yes	no
DSM driver	direct intervention	price driven

directly within the realm of utility planning and operation, as they do within the IRP framework. IRP proponents view electric utilities as providing a broad public service. Consequently, regulatory oversight is required to assure that this service is provided to society in a means that directly accounts for long-term public interests, such as environmental protection.

The standard response by opponents of IRP to the concerns over incompatibility of sustainable energy decisions with a short-term, retail-price driven environment is that such considerations can be dealt with through external taxation schemes—either emissions taxes or taxes to support DSM and renewables—or through direct emissions controls. But such an approach is unlikely to avoid the problem of costly generation mistakes made obsolete by successive waves of environmental regulation or taxes, or the problem that newly vested interests will resist such regulation and taxes. In addition, taxation schemes are much less likely to produce truly cost-effective DSM and renewable than is an environment that requires a rigorous cost- and risk-weighted comparison of these resources to conventional generating options. It is indeed ironic that, just at the moment when “pollution prevention” approaches have gained currency in national and state policy, we would abandon perhaps the most powerful opportunity available to implement that approach in the electric power sector.

Competitive Retail Electricity Markets in Practice: Lessons from Norway and the UK

Comprehensive utility deregulation to allow retail competition is more than speculation. A number of countries have recently implemented, or are in the process of implementing, competitive industry structures, including the United Kingdom, Australia, Chile, Argentina and Norway. Similar moves are being debated across the globe.

In the United Kingdom, deregulation has occurred in tandem with privatization of the electric utility industry. First proposed in 1988, the system was completely reorganized within three years. The previously state-owned generating companies were split into two private generating companies with fossil fuel generation. Nuclear generation remains a state-owned enterprise due to the liability and risk factors that were beyond acceptable limits of private industry. Non-utility generating companies are guaranteed access to the transmission grid to be able to compete in the generation market. Twelve regional electricity companies (RECs) were established that serve customers directly as distribution companies. The transmission network is operated as the National Grid Company (NGC) with regulated access fees and rates. NGC is responsible for managing bulk power transmission and also coordinates dispatch of individual power plants.

By 1998 all retail customers in the UK will have the option to bypass their local REC to buy electricity from alternative suppliers, but currently only those customers with a demand of 100 kW or greater are eligible. Initially this threshold was 1 MW, but the lowering of the threshold is part of a planned phase-in of the retail structure.

RECs are subject to price regulation by the Office of Electricity Regulation (OFFER). OFFER has developed two pricing formulae for generation and distribution; both are based on a price cap tied to inflation. Profits for RECs are tied to their ability to operate at costs below the price caps.

The UK “experiment” has had a rather devastating impact on DSM according to many observers. For example, Holmes (1992) writes:

... [T]he new system [in the UK] has introduced a race for the cheap kilowatt, introducing wasteful power station construction and sectioning the market into pieces whose only rationale is to sustain and protect fuel producers and “independent” generators. Introducing DSM into this jungle will be an impossibility.

DSM has fared similarly in Norway. Like the UK, Norway has radically restructured its electric utility industry based on competition at both the generation and retail levels (York 1994). The Norwegian parliament passed the enabling legislation (the Energy Act) for this industry reform in 1990, and the new structure became fully operational in 1992. The market restructuring that has occurred in Norway is in many respects more comprehensive than the UK because the retail market is much more open (any retail customer can theoretically participate in the competitive market) and there are a much larger number of generating companies competing at the wholesale level (approximately 60). Norway’s revised utility industry structure may be the closest example in practice to the theoretical ideal of a competitive utility industry.

In the “restructured Norwegian system only the transmission and distribution network remains under regulatory control because of its status as a natural monopoly. The network operates as a common carrier with regulated access fees and rates. Statnett, a state-owned company created by the Energy Act, is responsible for operating the network and owns the main grid (high voltage transmission system). Statnett also functions as the power pool to coordinate bulk transfers and system dispatch. Unlike the restructuring of the utility industry that has occurred in the UK, Norway’s Energy Act did not occur in concert with privatization of state-owned or other publicly owned industries.

Norway provides a clear example of the inherent conflict between competitive retail markets and IRP. Efforts to implement IRP and DSM within the Norwegian system have been complicated and frustrated by the competitive market structure.

The Norwegian Energy Act attempted simultaneously to create competitive retail and production markets and to implement the basic elements of IRP, although the IRP requirements were for planning and information only (York 1993). Actions, based on an integrated resource plan, were not required. While competitive markets have been developed, the requirements for IRP established by the Energy Act have been abandoned. In the first two years after implementation of the Energy Act, the IRP requirements were not actively enforced by NVE. In 1994 the government officially removed the IRP requirements established by the Energy Act and weakened the requirements pertaining to DSM. The government’s position is that the market will dictate utilities’ energy resource choices and, in turn, long-term planning.

The problem with relying on market-driven DSM in Norway is that the market prices that have developed do not provide consumers with the proper signals regarding costs. The existence of a power surplus in Norway has led to significant (20-40 percent) rate decreases in the spot market and has exerted downward pressure on firm power rates. A series of warm winters, abundant precipitation and low activity within power-intensive industry and other manufacturers have created the power surplus. There also is evidence to suggest Norway has an oversized production system due to large additions to existing hydropower capacity made during 1980s in anticipation of higher-than-actual demand growth.

The market prices for electricity in Norway reflect short-term conditions, not long-term costs for new energy resources. The low spot market prices do reflect the low short-term marginal costs (essentially zero for a hydropower-dominated system), but it appears that the downward pressure on firm power rates due to the competitive market structure has forced some utilities to set rates that do not adequately reflect their long-term marginal costs. This is exactly the kind of pricing that opponents of retail wheeling suggest would occur.

The net result of the market restructuring in Norway is that there are currently no strong incentives, either from the market or from regulatory authority, to implement DSM that is cost-effective. It is not clear whether future market conditions will provide the proper incentive or whether regulatory intervention will be needed to achieve these objectives.

No Room for IRP in a World of Retail Competition

We believe that implementation of retail wheeling will likely negate the progress that has been made in the implementation and practice of IRP, as shown by the experiences with market restructuring in Norway and the UK. As shown in Table 1, IRP requires utilities to focus on providing *energy services*, to take a long-term planning perspective to minimize the long-term cost of providing these energy services, and to consider a broad range of environmental impacts explicitly in their planning and operation. IRP broadens a utility's resource portfolio through consideration and inclusion of energy efficiency, renewable resources and non-utility generation. Risks of utility planning and operation are shared among utility stockholders, the utilities themselves, customers and regulatory authorities.

'Competitive retail markets, in contrast, will require' utilities to focus on providing *kilowatt-hours* only at lowest direct cost, to react to short-term market conditions, and to consider environmental impacts only to the extent required to comply with existing regulations. The advent of IRP has changed electric utilities from sellers of a commodity to providers of a service. Retail wheeling and other forms of retail competition threaten to turn back this advance, forcing utilities to act once again purely as sellers of a commodity.

Retail competition will likely narrow a utility's portfolio of resource options, favoring investments that minimize capital requirements and risk. Consequently, utility investment in energy efficiency, renewable and even conventional base-load fossil fuel generation will likely diminish greatly. Long-term costs will likely be greater, and a wealth of opportunities for investments in energy efficiency, renewable and other alternative, and even conventional, technologies will be lost. While new participants, such as energy service companies (ESCOs), may emerge and bring innovation into retail markets, we doubt the ability of such participants to fill the void that would be left as utilities diminish their investment in energy resources that are "least cost" from a societal perspective.² We discuss why we believe this would occur in the next section.

IRP is likely to vanish if the industry is restructured so that only the transmission network is regulated. While deregulation can be an integral part of an IRP framework, IRP stripped to its critical elements still requires regulatory authority to administer and enforce the basic rules that constitute an IRP process. IRP requires a certain degree of central regulatory authority to succeed because of the existence of market failures. Regulatory authority is also needed to balance the numerous, sometimes conflict-

ing, objectives of public utility policy, including economic efficiency, equity and environmental protection.³

DSM and Competition

DSM Under Fire

The electric utility industry in the U.S. is already feeling the pressure from deregulation proposals and is responding to this pressure by trying to become more competitive. The layoffs that have occurred in some utilities recently are obvious manifestations of this pressure.

As utilities try to rein in expenses, DSM programs have come under close scrutiny. DSM opponents claim that DSM is far costlier than projected, so much so that only limited amounts and types of utility DSM are justified based on cost-effectiveness (Joskow and Marron 1993; Ruff 1992b). Another sign of the pressure on utility DSM is the introduction of "value tests" in addition to the four traditional DSM tests of cost-effectiveness. The value tests attempt to emulate market operation more closely and measure economic efficiency, accounting for customer value and preferences (Chamberlin et al. 1993).

DSM is clearly being affected by the threat, however real or imminent, of increased competition. In anticipation of a competitive market structure, some utilities have begun reducing DSM program budgets as a cost-cutting measure. We believe that these cut-backs in DSM budgets are a harbinger of times to come should the industry be restructured according to competition at the retail level.

Utility investment in DSM is likely to diminish greatly under widespread retail wheeling or other retail competition mechanisms. IRP requires utilities to take a long-term perspective on the costs of supply and demand resources. The nature of certain types of investments, including DSM, is that to minimize societal costs in the long-term, some short-term rate increases may be necessary. However, with widespread retail competition, utilities will be reluctant to make any investments that increase rates to any degree because of the possibility of losing customers, particularly large customers readily able to buy electricity from an alternate supplier.

Utilities also are likely to be reluctant to make DSM investments in the buildings and facilities of customers if these same customers may have the possibility to leave the utility's system in the future. Utilities could offer such DSM investments to firms in exchange for long-term service commitments. However, in a competitive market, customers are likely to perceive any long-term commitment as potentially risky, especially if rates appear to be stable or declining in the short-term.

As discussed earlier, DSM initiatives in both Norway and the UK have been adversely affected after deregulation. In both countries, utilities and customers lack incentives to invest in levels of DSM that are cost justified from a societal perspective. A lesson from these experiences is that deregulation alone does not necessarily correct market failures relative to DSM investment. The creation of competitive retail markets will not assure that the resulting market prices for electricity will adequately reflect long-term societal costs. Competitive DSM markets will not necessarily develop because of deregulation nor assure that optimal levels of DSM investments from a societal perspective are achieved.

Barriers to DSM investment are well documented and understood (Cavanagh 1986; Hirst and Brown 1990). The existence of these barriers led to the development of IRP as a means to overcome these barriers and invest in DSM resources that are cost-effective from a societal perspective. Implementation of retail wheeling will re-introduce some of the barriers to DSM that have been reduced with the advent and practice of IRP. We believe that DSM, as currently practiced, is incompatible with widespread retail competition.

DSM in a Competitive Electric Utility World

In the preceding section we raised concerns over the ability of DSM as “currently practiced” to survive in a competitive utility industry. But what would DSM look like in the brave new world of competition? Energy efficiency will still be an investment option for customers and utilities.

DSM in a competitive electric utility world would be vastly different than it is today. In a competitive retail market, utilities would not likely offer the broad blanket of programs that many utilities now do, but would rather focus on a much narrower menu of options. Specifically, DSM under retail competition would likely focus on the following market niches:

1. **Load Management.** Load management, including peak demand control and off-peak load promotion (“valley filling”), is likely to remain an attractive option for utilities as a means to avoid capital investment in peaking generation and to optimize plant and system operation.
2. **“Participant-pays” energy efficiency programs.** Utilities may offer leasing and other alternative financing schemes for efficiency improvements in which the participating customer pays the full cost of such improvements over time (for example, Blank
3. **DSM to retain customers.** Utilities may use DSM as a marketing mechanism to retain customers as part of the terms of service negotiated in bilateral contracts. Such DSM services could include direct utility investment in DSM technologies for the customer.
4. **DSM to offset geographic-specific T&D investment.** Utilities may develop and target DSM programs to specific geographic regions to avoid expansions and/or upgrades of transmission and distribution systems (Haeri and Thomas 1993).
5. **Information campaigns.** Utilities may continue to offer general customer information programs on energy conservation opportunities, and may also continue to offer audit programs to customers willing to pay full cost for such service.

DSM is not likely to disappear under competitive retail markets, but will undergo fundamental changes. The major issue is whether or not market-driven DSM will achieve the levels of DSM that are beneficial from a societal perspective. We believe that the level of DSM activity will diminish greatly under retail wheeling and other scenarios of retail competition. We discuss our reasons for this conclusion in the next section.

Market-driven DSM: Gains and Losses Compared to IRP-Driven DSM

The primary potential gain from market-driven DSM is reduced regulatory costs. DSM would exist at the discretion of the market; regulators and other parties would have limited input into the DSM and utility planning processes. Much of the DSM infrastructure that has developed would likely vanish or at least be vastly streamlined.

While a streamlined industry may sound appealing to some, we believe that this potential gain would come at a high cost. We see many potential losses under a market-driven approach to DSM and discuss what we see as the major losses below.

Utility Investment in DSM Would Greatly Diminish. IRP has fostered a regulatory environment that assures utilities cost recovery of prudently incurred DSM expenses, and, in some cases, offers them direct financial incentives for making such investments. Absent such regulatory treatment as envisioned under retail competition scenarios, utilities would reduce their long-term investments in DSM as a means to offer the lowest short-term rates possible.

Cream-skimming and Lost-opportunities Would increase. IRP has promoted investment in DSM resources that are cost-effective from a long-term societal perspective. Market-based DSM is likely to focus on options with a short “pay-back” and bypass cost-effective options with long pay-backs. Individual customers clearly exhibit this predilection. Similarly, third-party energy service companies and other providers of DSM services have clear incentives for “cream-skimming” to maximize their returns and minimize long-term risk. The net result will be lost-opportunities for cost-effective improvements in the efficiency of energy end-use.

The Link Between Electricity Sales and Utility Profits Would Be Reforged. The innovation that has occurred with the advent of IRP to remove incentives for utilities to build and operate generating plants will be lost in an industry “based on retail competition. Utilities will have incentives to increase, or at least maintain, sales volumes. They are not likely to promote efficiency” programs that result in “lost revenues.”

DSM Momentum Would Be Stopped. Society as a whole has expressed a strong interest in promoting energy efficiency and developing renewable energy technologies as alternatives to conventional fossil-fuel generation. IRP developed as a policy instrument to achieve these objectives. DSM has developed a lot of momentum, both in terms of developing DSM expertise and infrastructure, and in fostering a conservation ethic among customers. Massive cut-backs by utilities in DSM will stop this momentum. DSM experts will go on to other fields and customers will be given the signal that energy efficiency is no longer important. We do not believe that the private sector (such as ESCOs) will fill in the void left in the wake of utility DSM cut-backs due to the differences between the planning objectives of a firm operating within an IRP framework and a firm operating in a competitive retail market.

Conclusions

Deregulation of the electric utility industry in the U.S. to introduce retail competition will likely lead to the demise of IRP and will greatly diminish utility-based DSM. Despite the advances and successes of IRP, opponents to the IRP model say “enough is enough.” They point to problems that have arisen with the practice of IRP and call for an end to this regulatory innovation. But what they are really proposing in place of IRP, and even traditional electric utility regulation, is an entirely new experiment, whose outcome is just as uncertain as was IRP when first proposed. Experience with market restructuring in

Norway and the UK shows the incompatibility of retail competition with IRP.

We believe it is premature to abandon the IRP model that has been developed and implemented across the U.S. We now have more than a decade’s worth of experience with DSM and IRP. There clearly have been utilities that have been successful in implementing IRP, such as New England Electric Service Company and Wisconsin Electric Power Company. As with any innovation, there have been problems, which have forced IRP to adapt and evolve. The IRP model is not anti-competitive; rather, IRP is increasingly embracing competition where possible, such as in the wholesale market.

Deregulation to introduce retail competition does not directly address barriers to DSM. Reliance on market-based prices is not sufficient to achieve optimal levels of DSM implementation from a societal perspective. The success of the competitive model is premised on: (1) all products and services are correctly priced; (2) all product and service markets are perfectly competitive; (3) consumers have complete and accurate information; and (4) consumers are economically rational. We have serious reservations about the validity of these premises.

Public concern about and reaction to power system environmental impacts and generation and transmission siting decisions have transformed the electric power scene in the last decade, and that concern is likely to intensify rather than to abate. By wide margins, the American public continues to articulate a preference for exhausting lower-impact renewable energy sources and energy efficiency before conventional generating technologies are deployed, even at a somewhat higher cost (Vincent Bregelio Research 1991). The institutional and political response to these environmental and consumer concerns has been the creation of IRP and related processes that provide forums for public input into major utility decisions, such as siting energy facilities.

Retail wheeling and broader industry restructuring proposals with a retail wheeling component locate generation and siting decision-making in the realm of short- to medium-term retail markets, and nullify public participation in the resource selection process. Under retail wheeling, there is no forum or criteria in or by which to justify a particular generating plant or transmission line as “least cost,” or as the best of the long-run alternatives. In a retail wheeling world, there is no “big picture” into which any incremental decision can be explained or justified. In a world confronting a barrage of environmental problems that know no borders, we believe that looking at the big picture is not an option. It is a necessity.

Acknowledgements

We wish to thank Steven Kihm of MSB for his contributions to this paper. We also wish to thank the two anonymous reviewers for their helpful comments and criticisms.

Endnotes

1. By “traditional IRP and DSM” we mean IRP and DSM as currently practiced across the U.S. See Mitchell (1992) for a definition, discussion and survey of IRP practice in the U.S. See Hirst and Sabo (1991) for a discussion of electric utility DSM programs in practice.
2. “Least cost” or “cost effective” from a societal perspective means resources that minimize the present value of the total costs (including direct and external costs, such as negative environmental impacts), using a societal discount rate, associated with providing a particular energy service. See Pearce (1992) for a discussion of “cost-benefit analysis” and “cost-effectiveness analysis” as applied to investment decisions.
3. The basis of public utility policy in the U.S. is protection of the “public interest,” which has been interpreted to include fair and reasonable rates, equitable treatment of all rate classes, and environmental protection.

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