The Future of Integrated Resource Planning in Competitive Energy Markets

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The electricity industry in the United States is undergoing rapid and fundamental changes in its economic and regulatory context. The future of Integrated Resource Planning (IRP) is inextricably linked to these changes. Judging from experience in the deregulation of other industries, including natural gas, it is probably not overstating the case to assert that neither the electricity industry nor IRP will bear much resemblance to their present forms before the 1990s are over. Indeed, we are no longer working at leveling the playing field. Rather, we are in the process of inventing a whole new game. However, we cannot at the moment be certain exactly how and by whom the new game will finally be played. Starting with the supposition that it would also be inefficient to proceed full-speed ahead with IRP in its present form, the paper suggests continuing during the transition to foster only those aspects of IRP that are likely to be applicable and useful after the transition. This paper discusses how these economic and regulatory changes are affecting the electricity industry, and hence the practice of IRP, in the United States. It speculates on the likely effects on the IRP process and concludes with some suggestions for extracting from present IRP practices those which are robust enough to survive and contribute to societal objectives in the new context.

Introduction

The electricity industry in the United States was originally set up as a set of privately-owned monopolies with government regulation to protect social welfare. Demand-side management (DSM) and Least Cost Planning (LCP), the predecessor of Integrated Resource Planning (or IRP), are artifacts of and unique features of this regulatory system. [1] Furthermore, these planning and programmatic approaches have been continuously evolving since late 1970s when they began to be introduced. The major changes in the regulation and in the macro-economic policies that have already swept through the formerly highly regulated natural gas industry, leaving it far more competitive and efficient are fast overtaking the electricity industry. Experience in the natural gas industry suggests that the transition costs and benefits that can result from such changes will be very sensitive to the approach taken during the transition as well as the speed of the transition. Reaping maximum transition benefits may be possible if a vision of the desired endpoint can be maintained throughout the noise and confusion of change. That is, how the transition is carried out may well be key for ensuring that the beneficial aspects of IRP are maintained in a more competitive energy industry.

Turmoil in United States' Electricity Markets

History and Status of Market Restructuring

Today, the majority of United States electricity industry comprises highly-regulated, vertically-integrated monopolies. A minority is government owned and operated, usually at the municipal level and primarily distribution companies dependent for supply and transmission on private utilities or the United States government (i.e., for the most part the large Federal power marketing agencies such as TVA and Western Area Power Administration). IPPs or NUGs comprise only about 7% of total installed generating capacity. The rest is self-generation.

These figures do not reflect the tremendous upheaval occurring right now in the industry, however. IPPs/NUGs installed more than 63% of the new capacity coming on line in 1992. (EEI 1993) Furthermore, the news of late in the United States has been filled with electricity-industry bankruptcies, mergers and acquisitions. These are

symptoms of a tremendous amount of market restructuring activity—consolidations, disintegration, transformation and diversification of the electricity market. Changes in the competitive environment for private power stem from major changes in regulatory practices over past fifteen years.[2] Certain key technological breakthroughs in generation (e.g., small, modular and cost-competitive generation technologies) also allowed market entrants (IPPs, NUGs and self generation) to produce power relatively easily. at lower unit costs than utilities with older generation. Costs are still affected by investment decisions based on forecasts made without accounting for demand reduction from rising prices, economic downturn and oil shocks and the success of DSM programs spurred by a companion piece of legislation to PURPA in 1978, the Energy Conservation Policy Act. Some state regulatory practices put investor-owned utilities in the position of having to buy power (often at uneconomic prices) even when demand and the need for new capacity was not increasing, leading to larger than necessary reserve margins. Bankruptcies are stemming primarily from regulatory disallowances for utilities to collect adequate return on assets once they are constructed but is also resulting from a failure to recognize that viable competition is at hand.

Emerging Industry Structure

Private utilities are both reacting and anticipating, e.g., decentralizing their operations into relatively autonomous business units designed to compete more effectively and to focus on identifying and promoting profitable segments of the business and divesting unprofitable ones. Down-sizing of labor forces is also quite rampant as is "unbundling" of services (e.g., generating; contracting and purchasing; transmitting; coordinating and dispatching; and billing). A recent survey of utility executives found that almost three-quarters of them have already been involved in down-sizing their operations. (WIEG 1994).

The whole electricity market is in flux. New entities are appearing, organized either around these new unbundled services *or* around new regulatory status. Holding companies' are proliferating, facilitating mergers. Mergers are likely to continue, perhaps as many as two to four per year over the next five years.[3] In part this is because the industry is still relatively fractionated (the largest electricity utility produces less than 5% of the total United States electricity), leading to economic inefficiencies.[4] Power brokers and marketers have burst on the scene. Power pools are forming to take advantage of economic efficiencies in addition to those formed around reliability requirements as the Federal Energy Regulatory Commission (or FERC) relaxes its degree of regulation over them. Some companies' service territories are no longer contiguous or even geographically confined. Some rather aggressive utilities are expanding beyond United States borders, notably in Asia, Eastern Europe and Latin America.

Financial markets are also reacting, lowering private utility financial ratings as they consider the likely effects of competition on these utilities and draw on lessons of deregulation from natural gas and telecommunications and from privatization efforts in other countries, such as the United Kingdom. The biggest cause for downgrading of a utility's rating is a very large proportion of its load going to wholesale and energy-price sensitive industrial customers, especially those utilities with relatively high prices vis-a-vis competitors surrounding them. Other causes cited by financial ratings firms include high-cost-capital or "regulatory" assets (i.e., investments, including DSM programs, at risk of being stranded or their cost recovery disallowed). Even long-term power-purchase obligations are grounds for downgrading since the associated contracts are considered debt equivalents. (Zoppieri et al. 1993)

Even given this flux, the emerging consensus of the industry and its "watchers" is that, when things finally settle down, the market structure of the future will be predominantly electricity generating companies, transmission companies, distribution companies and energy service companies, as shown in Figure 1. As these entities become separate and distinct, their evolution is taking different directions as discussed below.

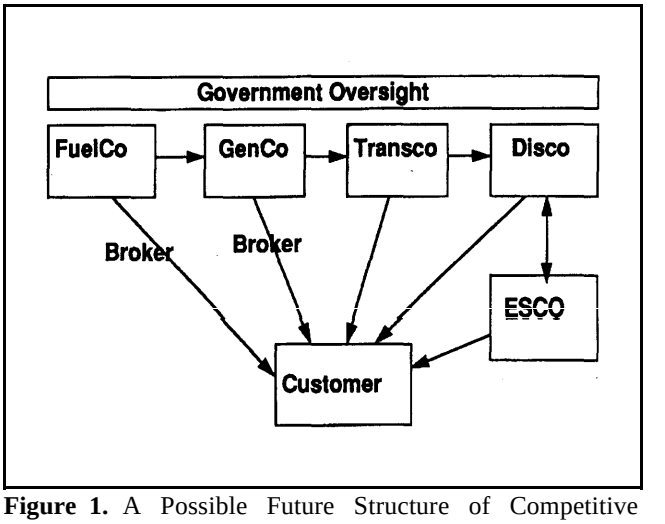

Figure 1. A Possible Future Structure of Competitive Electricity Markets

Generation Companies (GENCOs). Generation is already highly and increasingly competitive with the United States. Indeed, the numbers are quite compelling. Non-utility generators (NUGs, an acronym used to identify any generators not fitting the description of either private or public utilities) are basically today's GENCOs.

NUGs now comprise only 7% of the total United States capacity, but they accounted for more than 63% of the new capacity that came on-line in 1992. (EEI 1993).

PURPA has been the primary driver of NUG growth of which a significant portion (45%) was large projects fueled by natural gas. (EEI 1993) NUGs also tend towards smaller, more modular units that can take advantage of what are sometimes referred to as economies of precision or modularity (i.e., as applied to electricity supply investments to meet demand growth). Reliability councils and economic power pools are now allowing NUGs and QFs to become members.

To compete, many utilities themselves have created their own IPP subsidiaries. Some utilities, e.g., Pacific Gas & Electric in California and Virginia Power Company, have publicly announced their intention to phase out of electricity generation business in their franchised, regulated utility service territories and instead to expand their generation businesses through their unregulated IPP subsidiaries elsewhere in the United States and overseas. EPRI finds that about two-thirds of the top 50 EPRI members (by size) now have business "outside" the core business of generating and distributing electricity and most have moved from their traditional, core-only business with a centralized structure to a multi-focused business with a relatively decentralized structure. Unregulated status carries a premium of sorts, reportedly significantly reducing generating costs (from private conversations with utility managers).

Transmission Companies (TRANSCOs). Most transmission companies are part of vertically integrated utilities at present. Transmission systems are still considered to be natural monopolies and thus will remain regulated. However, the way they are regulated is changing drastically as a result of EPACT92 which opened up access to transmission to wholesale wheeling. FERC is in the process of resolving a host of implementation questions, so far on a case-by-case basis. In general, access is being allowed and even at times to require a transmission owner to build additional transmission capacity to accommodate the wheeling. EPACT92 gave a major push to the concept of Regional Transmission Groups (or RTGs). FERC has indicated that RTGs would be given some degree of deference on, inter alia, transmission pricing, and other transmission-related issues. The first RTG proposal on pricing was submitted to FERC as of this writing. The resolution of the many issues still to be addressed in transmission will be unlikely to change how IRP is practiced (though at least one analyst, Wiel, 1994) suggests placing IRP oversight in the transmission regulation.

Distribution Companies (DISCOs). Distribution companies are already quite prevalent. As noted above, many municipal utilities are virtual distribution companies due to their reliance on purchasing power from generating investor-owned utilities or from Federal power marketing agencies. In most cases it is the distribution company which obtains and holds a monopoly franchise on serving the electricity customers in a geographical area. In the vast majority of the power served today the distribution company is part-and-parcel of a vertically-integrated utility. Municipalization is increasing. The same technological and cost advantages that NUGs have along with municipal' ability to "self-regulate" are major causes for the increase.

Being the closest entity in the electricity supply chain to the customer, the distribution portion of the utility company has traditionally been the provider of DSM services and hence could well be in direct competition with ESCOs to provide energy-efficiency services in the restructured industry. In fact, the division between DISCOS and ESCOs could very well blur in the new structure.

Energy Service Companies (ESCOs). ESCOs already exist as the offspring of the many aggressive DSM programs that were designed to create opportunities for private enterprises to enter the energy-efficiency market with the aid of utility-provided rebates, other DSM program incentives, and the advent of competitive bidding for DSM (or all) resource additions.. Some of these ESCOs are relatively weak companies, however, because they have relied on the incentives (i.e., subsidies) to sell their products. Some utilities have formed subsidiaries to provide ESCO-type services in their own or other service territories (even extending to other countries), although they may be limited in some places by what utility regulators would allow. ESCOs have the potential in the future to become multi-faceted service providers or brokers.

A recurring question under the scheme of unbundling of the vertically-integrated utilities into their alphabet-soup companies is the disposition of the so-called obligation to serve customers. (Electricity-providing investor-owned entities have been considered to be institutions affected by a public interest and with a statutory or common-law "obligation to serve" all customers on a non-discriminatory basis, charging just and reasonable rates for their services.) This obligation becomes a problem when large customers begin to leave (bypass) the franchised electricity supply/distribution system to take advantage of good, but distant opportunities but then expect to be able to return if and when the advantage is no longer there. This is often cited by both regulators and utilities as the reason why complete unbundling will not occur. There is much to be resolved on this issue, too, but solutions have been found in the case of natural gas and

other deregulations. Indeed, it seems quite possible to unbundle and price the service of being the server of last resort; although the techniques are just starting to be worked out for electricity.

Brokers and Marketers. Power brokers and marketers are an inevitable addition to a market re-organizing itself in this way. They are presently flourishing because of the growing need for their services and relative lack of regulation in the wholesale markets. This again indicates a lot of pent-up demand for taking advantage of market opportunities as soon as regulation became loose enough.

Customers. Competition has brought about a mass revelation that customers are the reason for being in business. The successful utility (or energy-service provider) will concentrate on what the customer wants first and then on whether the utility can provide it at a profit. Pricing (and marketing) to meet customer needs is re-emerging as a legitimate and important function of electricity pro viders. Prices are beginning to be set by the market instead of by computations of average or embedded costs plus rate of return, thus leap-frogging in some cases marginal-cost-based rates. It also appears inevitable that market forecasting will replace demand forecasting. Probably every entity in the chain of electricity supply and transmission will do its own market forecast. This is not a subtle distinction; the object of market forecasting would be to understand the share of the total market that a particular market player will be able to win and under what conditions. Demand forecasting always had as its basis the assumption that the market would be captive and hence only the growth of it was important.

The most recent economic downturn and the resultant focus on the competitiveness of American-based industry also heightened customer importance. This coincided with the first impacts from EPACT92 and accelerated some of the regulatory changes stemming from the law. In a move to find non-economic factors limiting their ability to compete globally, large energy-intensive industries (customers) started to push for retail wheeling (that is, access to transmission enabling them, as retail purchasers, to buy from generators outside the franchised service territory and to wheel it through the franchised utility's system.) This gives them access to low-cost electricity outside the franchised (monopoly) service territory in which they were located or prices comparable to those they could get elsewhere.

After a long battle in Congress, EPACT92 left the decision on allowing retail wheeling up to the states. Although (Zeppieri et al. 1993) showed a wide variety of *de facto* wheeling and a number of states (e.g., Michigan and New Mexico) were considering formal retail wheeling during the last two years, the California PUC "broke the log jam" when it issued on April 20, 1994 its historic rule making proposal for retail competition and regulatory reform in California to begin in 1996. (California PUC 1994) A major concern about the possibility of retail-wheeling is what happens to the unamortized investments in the utility system being so bypassed. Paying for such "stranded investments" could become burdensome to remaining customers.

It would be too discursive to go into all of the arguments for or against retail wheeling (but see speeches by Ralph Cavanagh, Natural Resources Defense Council for arguments against the inevitability of retail wheeling and speeches by John Anderson of ELCON for arguments in favor.) Suffice it to say that these arguments are fiercely raging at present; yet the consensus is that, if retail wheeling becomes a reality, the United States will have moved from an argument about leveling the playing field to one over what the new field and the new game to be played on it are. going to look like. The likelihood of retail competition, and the customer choice that it will bring with it, is the biggest reason IRP will have to change as discussed in the next section.

These business lines are not as distinct as I have portrayed them. Nor is the structure that I have postulated the only one that might be extrapolated from the present trends, especially given the possibility that each state could design and adopt a slightly or radically different version of the new "regulatory compact."[5] Indeed the lines are already blurring in other directions, e.g., between fuels and with other markets. ESCOs and IPPs are beginning to provide a range of energy-related services. Grid- and network-related services are also beginning to merge. Utilities are looking for ways to take advantage of their experience with and investment in two-way fiber optics lines that could form the backbone of the so-called information superhighway. The industry already has a multi-billion dollar investment in communications systems for such purposes as electric fault isolation and remote operation of generation and transmission facilities. DISCOS might naturally become the common carriers of the various services to be offered over the information superhighway. It is clear that the creation of the marketplace could bring many new products and services to the retail scene.

The Need for IRP in a Transformed Electricity Industry

Many analysts (e.g., Bauer and Eto 1992 and Chamberlain 1994) have looked at the future of IRP, in the context of either expanding it to new applications or examining the effects of deregulation. Most start from the supposition that IRP as practiced contributes to a more balanced, equitable and environmentally-sound electricity system as

we have known it. However, few analysts have foreseen the far-reaching and synergistic effects of the economic downturn, the Clean Air Act Amendments of 1990 (CAAA90) and EPACT92 on IRP, DSM and industry structure. The larger question needing to be answered is whether IRP will be needed after the effects of this recent legislation and trends described earlier are fully infused into the system and, if so, what form IRP should take and how the transition should be made from the present regulatory process to one better suited to the transformed industry.

Against the background presented above, examining the precepts of IRP and contrasting them with what will be needed after the industry's structural changes have been absorbed can help to determine what aspects of IRP might be robust in the new industry planning paradigm. Below are some of the key precepts of IRP followed by my opinion on their robustness.

Better Balance Between Supply and Demand Side Resource Utilization and Lower Electricity Costs

Operating within the confines of regulated monopoly industry structure, IRP has caused very significant amounts of DSM resources to be utilized that otherwise would not have been. Indeed, IRP catalyzed the maturation of utilities into energy service companies. The unbundling of services will pave the way for even more of this, but there will be (and should be) no limit on the way in which and by whom those energy services will be provided. It is not, however, entirely obvious that IRP has succeeded in lowering the costs of providing electricity. Furthermore, one of the weaknesses of IRP in a competitive world could be its focus on cost minimization as the main goal of the planning process. As John Chamberlain points out (Chamberlain 1994), "[IRP] assumes that customer loads are predictable and that customers in a given area will be served only by the host utility. Competition undermines both the assumption that lowest cost is equivalent to greatest value and the expectation that customers are made dependent, and therefore relatively predictable, by the fact of geography." Cost minimization will be replaced by a package of cost and quality considerations reflecting customer value. The market will be inventive in finding and developing these packages.

Better Communication of Resource Need

The practice of IRP definitely addresses the breakdown in communications and resultant mistrust that developed between consumers (and regulators) and their utilities. Under retail competition where the "customer is king" and such breakdown occurs, however, the market solution is quick: poor financial performance or even going out of business. This is risk and can be quantified, evaluated, priced and managed by the market.

Increased Public Participation

IRP has created a process of alternative dispute resolution, called "collaborative," where public participation allows all stakeholders to have a say in resource planning. In this way, IRP shifted the resource planning decision from the utility to the public. However, the existence of collaboratives presupposes the litigious forum for resource planning that existed in the 1980s. Collaborative and public participation are both likely to become irrelevant in the new industry structure, except in local siting decisions. Indeed, Chamberlain (Chamberlain 1994) argues that public intervention is increasingly having the effect of stymieing the planning process because of the increasingly complicated and prolonged process that it has become, particularly the attempts to expand it to the environment, transmission and distribution issues and other fuels such as natural gas. In the future resource planning decisions will occur in the market unless specific steps are taken to imbed IRP considerations somewhere in the new system. The location of such a function is not at all obvious given the flexible nature of the new system.

Creation of Infrastructure to Overcome Market Barriers to Energy Efficiency

Just as deregulation of generation created the conditions for independent power producers to flourish, IRP and regulations requiring DSM programs definitely helped to create the infrastructure for overcoming the market barriers to energy efficiency. However, the question that now has to be addressed is whether independent power and energy-efficiency services are strong enough to survive without continuing regulatory oversight and the subsidies provided to them (either from less stringent regulatory requirements in the first case or from the rebates and other financial incentives provided for energy-efficient products in the latter case.)

Protection of the Environment

Utility regulators joined environmental regulators and legislators in environmental protection efforts by taking on environmental "regulation" in the IRP process several years ago, acting with legislative authority from a number of laws at various levels. Utility regulators began to require the evaluation of environmental externalities (i.e., residual environmental costs occurring after the imposition of regulations designed to protect the environment) as part of the decision-making process in IRP. One of the biggest unresolved aspects of the trends affecting electricity today

is whether examining environmental externalities, should continue apace or not. New research that takes account of the effectiveness of the implementation of the CAAA90, indicates that remaining externalities for conventional air pollutants will be very small if not inconsiderable. Furthermore, given that most electric utilities have recently voluntarily joined together to stabilize carbon dioxide emissions and the continuing progress made through traditional environmental protection channels, the additional environmental review imposed by IRP processes may well no longer be necessary. The risk of a carbon tax that might be imposed in the future is something that the market can evaluate and incorporate in risk assessment and management.

In summary, some of the precepts of IRP are still important and ways to maintain them in the emerging industry structure need to be developed. Others may be discarded, at least until it becomes evident that the new structure will not perform as envisioned. Others have probably outlived their usefulness. But the fundamental lesson is that IRP kinds of processes probably can't succeed if authority, responsibility and accountability are diffusely shared by many institutions and this is precisely the market structure that is forming. Hence, IRP as we know it is not likely to work.

Towards Robust Post-Transition IRP Strategies

The following advice on the transitioning of IRP is offered as a first cut at the issue and is not intended to be comprehensive. Two criteria have to be applied: whether the action will contribute to smoothing the transition and whether it will survive the transition to be robust in the restructured electricity industry.

Deal Swiftly with Residual Regulatory Issues/Capitalize on the Transition

Transition costs arise as temporary inefficiencies result from changes being made. It is important to keep the goal of economic efficiency in view. Regulatory lag is one cause of loss of economic efficiency; retaining anachronistic or contradictory regulations is another. Where lines are blurred between the authorities of regulators and those of legislators on the protection of society and the provision of social goods (e.g., economic development and environment), there can also be inefficiencies. This is occurring at present where some state legislatures are making *de facto* rate decisions in order to retain or attract big industrial companies to their states.

A recent survey (Marron, Stephen et al. 1993) bears out that regulators recognize that competition is wreaking significant changes on the financial health of regulated utilities but admit readily that they have not yet acted to make the regulatory changes needed to allow utilities to compete fully. Some regulatory strings are being loosened faster than others. This creates the possibility of uneconomic bypass by some customers and increased rates to remaining customers. Rate cases, prudency reviews and disallowances of return on previously-agreed expenditures continue. Utilities are avoiding new regulatory assets in the interim until they find out how the regulatory situation will play out. Bankruptcies and stranded assets, both physical and regulatory, have some parallel problems to privatization and disposition of "state" assets. The issues and their solutions are not fully worked out.

Contradictions are also prevalent. For example, in the United States EPACT92 requires states that do not already have IRP requirements to institute them. Thus the same law that is cementing competition and changing the very foundation of the electricity industry's structure mandates the spread of IRP in a form which may be outmoded because of those changes.

Incentive regulation is a means to ease the transition to competition by allowing some flexibility for utilities to compete on price. Incentive regulation could play a major role in the evolution of the United States' electric utility industry during the remaining years of the 1990s. A number of progressive utilities have proposed or have had accepted indexed price-cap incentive regulation programs. Others have initiated corporate performance incentive programs whereby utilities win extra return on investment through meeting certain agreed performance objectives. Finally, DSM incentive programs, i.e., where utilities share some of the profits from such programs with the ratepayers and the shareholders, are probably the most widely adopted form of incentive 'regulation. Indexed price-cap incentive regulation also is widely used in other regulated utilities, notably telecommunications and natural gas transportation, and in other countries (e.g., the widely-publicized case of the UK but other European countries, etc.).

Some utilities in the United States are prepared to trade the traditional cap on return (or cost-plus return) for a price cap and are even promising their regulators (and customers) rate reductions or freezes in return for pricing flexibility. This in turn allows them to provide better pricing options to their customers. Some have developed bypass-deferral prices that reduce prices to customers likely to leave the system or become self generators. This can cause short-term rate increases to other customers but in the longer term could allow full utilization of assets that otherwise would be liable to become stranded assets. Utilities are also reducing or eliminating cross-subsidies within and between customer classes in order to retain their

customers with the result that industrial rates are stable or falling. Others are developing customized prices to increase customer "value" while improving their own profitability. One example is the recent activity in real-time pricing which proves to save millions of dollars for utilities and customers alike. (The Washington International Energy Group reports the existence of at least sixteen such programs.) (WIEG 1994) Again EPRI is very involved with developing innovative pricing options that are responsive to customer needs.

Another interim strategy (Chamberlain 1994) for adapting IRP to new competitive situations is to add the customer value test to the tests of cost-effectiveness already used to examine DSM programs. This will help utilities to focus on customer needs and the value of energy services provided instead of utility load requirements. Yet most regulators do not yet recognize the value test as admissible in evaluating the services proposed by utilities in the resource planning process.

Do Customer-Responsive Regulation

The natural gas industry is a vertically disintegrated industry with the delivered price of gas being outside the control of the local distribution companies. There is already a substantial amount of bypass occurring in this arena and significant infrastructure challenges. There is no consensus on the appropriate long-run avoided-cost standard by which to assess resource alternatives. The parallels with the electricity industry of the future are obvious and could almost be taken as a forecast for the future of electricity pricing.

The regulatory system which evolves out of the restructuring of the industry to serve the societal needs in the new electricity market must above all start by allowing for equal treatment for the full range of players (competitors). These will include: the utilities, substitution of gas for electric power, substitution of other products for current end uses (e.g., insulation for heating), energy service companies that provide DSM measures and charge a share of the savings, independent power producers, cogeneration (on site self-generation), direct utility competition via transmission access, and new entities (or differently structured utilities) that package financing, equipment, maintenance, operations and energy. If not, regulators risk that two other competitors may win the game. These would be utilities that draw customers to other territories by offering lower prices and other countries that offer not only lower prices but lower labor costs. In short utilities and their competitors must be allowed determine and to provide the services that they can provide with a competitive advantage and that customers demand. These services will likely be a menu of options from which "customers can customize their services, valuing individually the importance of cost, time-of-use, reliability, power quality, design assistance, and environmental concerns." (Chamberlain 1994)

Institute IRP (Only) as an Indicative Planning Tool for Government

IRP is a planning process that is most needed in situations where significant resource additions will be required and where it can be demonstrated that the market is not properly accounting for social welfare. It is unclear when significant resource additions will be needed in the United States, especially as sales of power from Canada and wheeling of power from areas with overly-large reserve margins appear to be able to sustain any additional power needs in the United States for at least a decade. It is also not obvious that the restructured industry will contain any significant bias for or against any particular resource. It would seem prudent to redesign the regulatory system, beginning with a simple system, see how it works, and add other protections as the need arises. The simplest system would be to institute indicative resource planning (i.e., government oversight and analysis of market trends and implications for social goals, including, inter alia, service reliability, environmental protection, economic impacts and fuel diversity). For this, the IRP tools already developed in the United States to examine the full-fuel-cycle effects and costs of alternative resource options could still be appropriate, if properly adapted. Rather than doing such planning on a utility-by-utility basis, however, the planning would probably be best accomplished at the national or even regional level in order to account for cumulative effects or cancellations.

One such concern might be that environmental costs are not being internalized. It should be remembered that deregulation does not mean no regulation. Having an effective environmental-protection system is essential. But, where environmental protection is already sufficient, it will be most efficient to get one environmental protection system right than to double regulate, especially as it is economically inefficient to make one fuel much "cleaner" than another fuel just because the regulatory apparatus makes it easy to do so.

Let Utilities Use the Best from IRP for Strategic Business Planning

The biggest challenge to the future of IRP is the disintegration of the vertically integrated utility into separate business units. Even for nominally vertically integrated utilities, most planning will no longer be centralized in an organizational entity such as corporate planning but rather will be devolved into separate planning functions within the different business units. A former utility's GENCO

business might compete with other IPPs for the business of DISCOS. Competitive positioning and business planning for these new entities may little resemble the IRP function the utility formerly performed for regulators. That being said, many of the tools and techniques that have evolved in response to needs created by the IRP requirements will have some application in new industry structure. The Washington International Energy Group reports that over half of the respondents felt that IRP helped in long-term strategic business planning. (WIEG 1994) This is especially true for tools and aids for planning for and managing risk and uncertainty. They will become more important than ever. Other tools, such as those used for computing revenue requirements, production costing and expansion planning, could become less relevant, at least in their present forms.

New tools are also needed. Contracting is replacing resource planning in restructured utilities. Bidding systems were introduced in the early 1980s as a means to rationalize the supply additions of utilities in the face of the emergence of a significant over capacity being developed by QFs. Fuel diversity is now being valued and portfolio diversification leading to more reliance on DSM programs as well as renewable energy.

Do "Smarter" Energy Efficiency

The billions of dollars spent annually by the United States utility industry is well publicized. Less well known, however, is how effective these programs are, particularly one approach compared to another. It has been difficult to evaluate DSM effectiveness and it is getting harder, primarily because the evaluations depend on postulating what would have happened without the program in a highly varying recent past and uncertain future. Nevertheless, as utilities have been allowed to profit from DSM programs and required to compete for sales in more efficient technologies and services, they have begun to move towards being smarter about the programs and minimizing the money spent for the effect achieved.

Smarter energy efficiency starts with removing resistance in the system, i.e., removing subsidies, as already discussed. The next step is to add a minimum amount of "grease''- smart energy efficiency-to overcome some residual market barriers to using energy more efficiently.

The system can be set up so that there are incentives for utilities (distribution companies) to promote energy efficiency. Utilities' acceptance of DSM programs began when regulators realized that the failure of utilities to do DSM was not a perverse and pervasive discriminatory bias on their part but rather that it was a direct result of the regulatory "box" into which they (all too willingly perhaps) had been put by the regulators. In fact, significant implementation of DSM started to occur when incentives to utilities (in the form of return on investment) were made part of the package. As just one example, approximately 16% of NEES' earnings are now coming from DSM programs. A major question is whether the new competitive electricity industry can and will retain these incentives.

Some utilities are unbundling DSM and other services and weaning customers from an "entitlement mentality." BPA is introducing tiered rates and making DSM programs compete with other alternatives at the customer level.

Other ideas that have begun to replace the more traditional form of DSM program (which often consisted of payments or rebates to customers to take some energy conserving action) are provided below:

1. Loan programs with repayment on the utility bill.
2. Commissions to sales people (instead of incentives to customers).
3. Customer-designed DSM and tailored/customized programs.[6]
4. Creating or transforming markets for energy-efficient products.[7]
5. Relying more on better customer information.[8]
6. DSM as an Environmental Offset.[9]

Conclusion

In conclusion, recognition is mounting of the seriousness of the inroads that competitive forces are making into the very structure of the electricity industry. Direct actions are needed to prepare for a transition to a new regulatory structure more in tune with the new industry structure, though still preserving the legitimate reasons for regulation in the first place. This has major implications for the practice of IRP. There is much of IRP as it is presently practiced that can be brought over into the new structure; although adaptation and rethinking will be necessary to make the fit efficient and productive and working with the market forces that are being unleashed. Starting now to study and make the necessary change would be prudent and productive.

Endnotes

1. Integrated Resource Planning (IRP) as it is practiced in the United States, is a process, open to public involvement, for selecting a broad range of new

resources, both on the supply-side (i.e., conventional central station generation) and on the demand-side (i.e., more energy-efficient technologies), for meeting customer energy service needs over the long term. IRP was developed as a means for giving equal footing to energy efficiency in an industry traditionally dominated by a supply-side approach to providing electricity. Recently IRP concepts have begun to be applied to other forms of energy or across energy forms. Another recent development is the incorporation of environmental externalities in the IRP process. Many other countries, e.g., in Europe, Japan, Australia and New Zealand, have government-sponsored energy efficiency programs and government-driven resource assessment processes, sometimes resulting in utility programs which resemble DSM. Few, if any, have gone to the point of the elaborate cost-effectiveness tests from a variety of perspectives that characterizes the practice of IRP and DSM in the United States.

2. In 1978, the Public Utilities Regulatory Practices Act (or PURPA) began the deregulation of the electricity industry by requiring utilities to buy the power output from "qualifying facilities" or QFs at the utilities' full avoided costs (i.e., those costs avoided by delaying or avoiding construction of new generation capacity). The National Energy Policy Act of 1992 (EPACT92) made major advances on the deregulation of generation by requiring open access to transmission by wholesale generators and devolving to the States the authority to decide upon retail wheeling. It also reversed prohibitions in the Public Utility Holding Company Act (PUHCA) which had forced divestiture of foreign holdings.

3. Jerry Pfeffer, Skadden, Arps, Slate, Meagher and Flom, quoted in *Electric Utility Week,* December 27, 1993. See also, WIEG 1994 whose recent survey of utility executives found that one third of them said that their utility was involved in merger and acquisition activity and three-quarters of them thought that merger activity would increase.

4. It is interesting to note that the Massachusetts Division of Energy Resources recently began to investigate the benefits of encouraging utilities to merge, finding an annual savings of up to $170 million. Reported in *Electric Utility Week,* February 21, 1994.

5. Other outcomes suggested include: splitting the business into regulated and unregulated components (Chamberlin 1994). FERC commissioner Vicky Bailey recently postulated a range of possibilities in a speech reported in *Energy Daily, 2/25/94.* These included: status quo with vertically integrated regulated utilities owning generation, competitive generation procurement; unbundling of generation from transmission services; and "de-integration" with different companies controlling generation, transmission and distribution functions (as described in this paper).

6. Virginia Power Company is building cogeneration units on-site for industrial customers and pricing to beat self-generation. Detroit Edison is turning its industrial DSM efforts more toward plant- and process-specific DSM applications.

7. One example is working with governments to set efficiency standards and then allow the natural turnover of appliances and equipment to do the work formerly done with rebates and other DSM programs. Another example is the much-publicized efficient refrigerator development contest. Another example is negotiating with manufacturers of products such as manufactured homes to produce more efficient ones. Such efforts reduce the number of transactions necessary and thus are generally much more efficient.

8. An example is the Entergy-type DSM approach, where the utility installs an interactive box called PowerView in 10,000 homes to achieve customer-controlled load management of eight appliances, may be ala mode. Another example is Southern Company which introduced "Enerlink Information Services" to give customers reports and graphics on the real-time energy use and bill estimates and expects greater energy efficiency productivity, and cost savings.

9. The Clean Air Act Amendments of 1990 provide explicit incentives for utility IRP and DSM activities for utilities having units affected by the legislation, e.g., providing credits or conservation and renewable energy allowances depending on the time period in which action is taken by the utility.

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