CAN WE GET THERE FROM HERE?

THE CHALLENGE OF RESTRUCTURING THE ELECTRICITY INDUSTRY SO THAT ALL CAN BENEFIT

A report to:

Utility Consumers' Action Network

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1. INTRODUCTION AND SUMMARY

The California Public Utilities Commission (PUC) has announced its intent to restructure the electricity industry in this state. One of the central questions in the debates leading up to the PUC's proposal is whether small consumers are likely to benefit from restructuring. Many parties have voiced concern that small customers may not fare well because they will have little market power, they may face prohibitive transaction costs, or the market to serve them will not be sufficiently competitive.

Two of the specific features of the PUC proposal have been retail wheeling and the need for real-time pricing (RTP) to directly access a competitive wholesale market. It is unclear whether these two features will, in fact, be truly available to small customers, given their unique energy consumption and cost characteristics. Concerns for small customers have been underscored by a recent survey of electricity prices carried out by the Edison Electric Institute which shows that electricity prices for industrial customers in California have been declining (a drop of 10 percent from 1992 to 1994) while residential rates have been increasing.

The primary objective of this report is to investigate whether small customers will have a reasonable opportunity to benefit from industry restructuring. While it is not possible to predict whether small consumers will benefit from restructuring, we investigate whether there are plausible scenarios under which small consumers are likely to benefit. In particular, we investigate the extent to which the requirement of real-time pricing (RTP) to participate directly in wholesale markets is likely to limit individual small consumers from potentially enjoying benefits from a competitive market. We do so by estimating the likely costs and benefits associated with RTP and retail wheeling for small customers. In addition, we investigate the extent to which marketing of electricity services poses unique problems for small consumers, and how the automatic aggregation of small consumers can be used to assure they enjoy the benefits of competition.

In its December, 1995 Order, the PUC has indicated that it will not require small consumers to have RTP pricing meters and capability. However, despite the PUC's reasoned decision not to require small consumers to purchase or lease RTP meters, such RTP capability appears to be a necessary prerequisite for an individual customer of any size to have access to and participate in wholesale power markets as part of retail wheeling.

Our analysis shows that some, but not all or most, residential customers could benefit by participating as individual consumers in the wholesale energy services markets if RTP capability is a prerequisite for access to that market. For individual customers the key factors affecting the ability to benefit are load factor and size. Among residential customers who participate individually in restructuring, those with low or average annual load factors as well
as average usage are likely to face increasing annual costs for electricity. This is true even if those customers obtain benefits from retail wheeling, and is not affected by either the use of energy management systems or reasonable use of capabilities such as home computers to cut costs. Try as

they might, these customers cannot benefit individually from RTP and retail wheeling. These results depend crucially on the fact that customers are assumed to participate individually. A summary of these results is presented in Table 1.1, for scenarios with what we consider to be optimistic assumptions regarding retail wheeling.

Our analysis depends upon certain assumptions, including the notion that there is a 10 percent reduction in the generation portion of electricity rates due to competition. We believe this is optimistic. For other assumed changes in generation costs, the results shown here will vary.

Our conclusion that most residential customers will not benefit if an individual customer must have RTP capability means that it will be necessary to find other cost-effective ways to ensure that all customers have the opportunity to benefit from electric industry restructuring. The most likely means that we identify in this report are: (1) the aggregation of individual customers who wish to make choices in the marketplace by private marketers, brokers and aggregators, and (2) the automatic aggregation of small consumers by entities whose sole objective is to maximize the benefits to those customers. In this respect, our report begins to address the important issue of how to provide the most effective opportunities to attain benefits for small customers who wish to act as individuals and those small consumers who do not, or cannot, act on an individual basis in restructured electricity markets,

We have assessed the extent to which electricity sellers, brokers and aggregators are likely to pursue small customers and provide them with competitive low-cost services. Based on experience in other formerly tightly regulated industries (i.e. natural gas and telecommunications), as well as an assessment of transaction costs and barriers unique to small customers in general, we find that absent the removal of regulatory and economic barriers to the development of effectively competitive markets, that small consumers will not be marketed to as aggressively as large customers and will be at substantial risk of not being offered the lowest-cost electricity or the full-range of electricity- related services. If regulators and governmental authorities simply declare markets open for competition, rather than proactively create and promote effectively competitive market structures, there are likely to be few competitive benefits and small consumers will be the least likely to capture any such benefits.

The active promotion of a market structure that heightens small customer market attractiveness and market power and eliminates both regulatory and economic barriers for independent brokers, aggregators and marketers, should increase the number of small customers interested in participating as individual consumers and increase the interest and capability of independent providers to serve them.

But even if more effective competitive power markets are developed, there are likely to be small consumers who for a variety of reasons, are unlikely to participate in such markets as individual consumers. These small customers who choose not to shop around on their own will be automatically aggregated by some entity to ensure that they have the opportunity to receive electric service. Our report indicates that these automatically aggregated small consumers can still receive competitive benefits if the entity which aggregates them seeks to promote small consumers' interests. For this latter

set of small consumers, it is necessary that the negotiating, bargaining and planning capability be used by the aggregating entity to capture potential benefits, not to isolate these small customers from such benefits. Our analysis shows that, absent aggregation, most small customers will see increased costs if they have to use RTP to exercise the opportunity for retail wheeling--even if retail wheeling is assumed to reduce overall electricity prices by 10 percent.

In recent years, a number of municipal entities have sought to act as aggregators for the customers in their geographic areas by establishing a municipal utility. These efforts have been motivated by the desire to purchase wholesale electricity from lower-cost providers than the local investor-owned utilities, and have been promoted by the 1992 Energy Policy Act, as well as proposals for retail wheeling in California and elsewhere. Unfortunately, experience has shown that these efforts are often stifled by the local utility, due to the difficulties of selling distribution assets, and the concerns about stranded costs.

We recommend a model for automatic aggregation that relies upon the use of benefit developers as the aggregating entity. Benefit developers would be characterized by their primary function, which would be to obtain "least cost" service for small customers while also promoting diversity of choice for such customers. The category of benefit developers, which is only limited by creativity, could include local governmental aggregation entities, non-profit providers and/or entities which win a biddable franchise to serve automatically aggregated customers. This model would both increase the number of independent buyers in the marketplace and promote more competitive markets by reducing the importance of existing incumbent advantages and transaction costs. We believe that the single most effective measure available to ensure that *all* small consumers have the opportunity to benefit in a restructured industry is the use of benefit developers for automatically aggregated small consumers.

While we believe that private and public parties can and should be encouraged to become benefit developers, we particularly focus in our report on the use of local governmental aggregation entities to serve this role. We do so because such entities may offer the most developed model for a benefit developer model in the short term, which is important considering the pace with which restructuring may occur.

The model for automatic aggregation that relies upon local governmental aggregation entities does not necessarily require purchasing the distribution facilities or adopting many of the other responsibilities of municipal utilities (e.g., ratemaking). The local government agency would perform the services similar to a private electricity broker or aggregator, but would be motivated to provide the lowest-cost and widest array of energy services in its geographic region, rather than being motivated to maximize profit.

The use of benefit developers for automatically aggregated small consumers should improve the ability of small consumers to benefit from restructuring by increasing the number of independent buyers in the marketplace and the potential market power of such buyers. But, as noted, competitive benefits will only be produced from effectively competitive markets in which there exist strong

pressure between competing firms to minimize costs, hold prices down to those costs, and promote rapid innovation. Therefore, the crucial factor will be whether the restructured industry allows the opportunity for effective competition by removing economic barriers and market power arising from substantial market share, control of vital information, control of vital technology or systems, incumbent advantages, etc.

Our findings are based on an analysis of the likely costs and benefits to residential customers under a number of scenarios. We begin in Chapter 2 by discussing the technology, costs and applicability of RTP to residential customers. It presents various arrangements for RTP metering, two-way communications and energy management systems (EMS). Chapter 2 also discusses residential customer usage patterns and their potential for load shifting. Chapter 3 focuses on marketing of electricity services to small customers. It discusses the methods by which services might be marketed to small customers, as well as the various factors and circumstances likely to limit marketers' interest in small customers. Chapter 4 focusses on the aggregation of customers and various options for benefit developers such as governmental agencies to act as aggregators. Finally, Chapter 5 relies on the information in the previous chapters to investigate the likely costs and benefits to small customers of RTP, retail wheeling, and aggregation, under a number of different scenarios.

A brief summary of our analysis and key findings is presented in the following sections. Each section below corresponds to a chapter in the body of our report.

RTP Technology, Application and Costs

RTP is a pricing service whereby customers are given a price signal that reflects the variation of generation costs with time. Customers that can shift their consumption patterns away from high-cost periods and towards low-cost periods can reduce their total cost for electricity.

RTP requires two additional pieces of equipment: 1) a new or modified meter, and 2) a two-way communication system. The two way communication system need not use the same media for both directions. In fact, using different media leads to lower costs but may not allow the use of automated controls at the customer's premises.

Real-time pricing and EMS increase the importance of two-way communications. Many electric utilities have entered into partnerships with telecommunications companies to begin integrating electric and communications services. Over time, we would expect that communications companies, such as cable, telephone and wireless companies, would begin to compete with electric and gas service providers to provide energy.

A review of the experience with RTP suggests that only customers with a high usage of electricity will be able to shift significant amounts of load. Such customers are generally those who

use electricity for space heating and/or have several major appliances. The use of automatic controls is likely to significantly increase the load shifting due to RTP.

Some small customers with higher load factors to begin with are likely to see lower bills due to RTP even if they cannot shift their loads. RTP would give lower bills because of their better load factors. However, the cost of metering and additional equipment may not be justified if their loads are low.

For the purposes of our scenario analysis presented in Chapter 5, we provide estimates of the most likely costs of RTP and EMS, under both optimistic and pessimistic cases. We conclude the following:

- For the optimistic case without an EMS, we use a CellNet type system and estimate the additional meter costs to be $4 per year, the cost for the communication system to be about $12 per year. For the pessimistic case, we assume that the CellNet type system is not feasible due to geographic dispersion of the population, and also assume that a more expensive type of meter is required. For this case, the meter costs are about $13 per year, and the communication system costs are about $24 per year.

- For the optimistic case with an EMS, we use a CellNet-type system with modifications for bidirectional communication and a simplified EMS resulting in meter costs of $4 per year, communication costs of $20 per year, and EMS costs of $18 per year. For the pessimistic case, we again assume that the CellNet type system is not applicable and that more expensive meters and EMS are required resulting in meter costs of $13 per year, communication costs of $24 per year, and EMS costs of $100 per year.

Marketing of Electricity Services to Small Customers

Under the consumer choice model the fate of small customers will depend, in part, on the extent to which alternative services are marketed to these customers. The first point that needs to be addressed concerning the marketing of such services to small customers, is that its development is very unlikely to be driven in a satisfactory way by consumer demand alone. Experience from the natural gas and long-distance telecommunications markets suggests that most small consumers (i.e., 60 to 75 percent) will not participate individually in a competitive market primarily based on bill savings, due to perceived limited benefit because of bill size and the cost of shopping and product comparison.

Unless providers are willing to develop and offer products and services which small customers can value and acquire, small customer markets will not develop or, if they do, will be weak and fragile. However, providers will be discouraged from participating in small customer markets if they perceive the potential value to be shared is too limited to allow their cost of providing products

and services and a profit to be recovered with sufficient benefits left over to interest the small customers.

The range of potential savings for many small customers may be too limited to interest them in switching to competing providers for dollar savings. When taking into consideration marketing costs, the total price reduction needed by a provider is likely to be close to 20 percent or more in order to offer a customer 5 percent bill savings. Even then, it is not likely that the promise of 5 percent savings will be sufficient to spur most customers to change providers.

There are a number of actions which will enhance the development of a market for alternative services for individual small customers. In order to increase the attractiveness of markets to small consumers and providers, it will be desirable to: (1) ensure that small consumers have adequate access to understandable and credible information to make informed choices; (2) establish a restructuring framework that promotes entry of new providers into markets including overcoming the incumbent advantage that monopoly regulation has given existing utilities; and (3) ensure adequate consumer protection. However, the analysis presented in Chapter 2 does not indicate that these steps will be enough to ensure adequate market development. Rather, it suggests that, to satisfactorily promote market development, both private aggregation and automatic aggregation of those consumers who do not shop around will also need to play a role.

We note that regulators and other public bodies must be particularly sensitive to the needs of low-income small consumers. These customers, by definition, do not have the income to participate more than marginally (if at all) in competitive markets. They will fare worst when ability to pay is more important than the need for an essential product or service like electricity, as will be the case with consumer choice. Adequate funds must therefore be collected and an infrastructure established to ensure that the level of services, assistance and options, currently available for low-income consumers are continued, and preferably expanded, in a "consumer choice" environment. These low-income concerns must be addressed before restructuring occurs if low-income customers are to be protected and hopefully benefit from restructuring.

Aggregation of Customers Through Benefit Developers such as Government Entities

Given that electricity sellers may be reluctant to market their services to small customers, it will be important to use aggregation to ensure that small customers are offered a full range of low-cost, competitive services. Aggregation can produce substantial economies of scale, because there need only be one RTP meter and one marketing transaction for the entire aggregate. Even if marketing costs are higher for an aggregate, the benefit-cost balance will be much better on a per-customer basis, and net benefits can flow to all.

However, if aggregation is left to markets, then for-profit aggregators are likely to focus their attention on large customers, because they simply offer the greatest return for the investment in time and marketing efforts. Even if regulatory and economic market barriers are mitigated, it is reasonable

to expect that some small customers will not choose, for a variety of reasons, to participate in the marketplace as individual consumers. Therefore, benefit developers such as governmental entities that automatically aggregate customers in a particular geographic region may offer the greatest opportunity to provide benefits to all small customers under restructuring.

There are three primary options for governmental entities to automatically aggregate customers within a given geographic region, including:

(1)formation of a traditional municipal utility under existing statutes;

(2)formation of a "municipal-lite" utility that owns very little of the existing distribution system, but is eligible to pursue wholesale power purchases under the FERC's open-access transmission rules; and

(3)formation of new local governmental entities to automatically aggregate customers within their geographical boundaries, but which may not operate like traditional utilities, and may not own any distribution system or other assets.

The formation of traditional municipal utilities does not appear to be a viable option due to cost, time to establish, and risk of lack of success due to the potential opposition of the incumbent utility and large consumers. The “muni-lite” concept should continue to be pursued by some parties to resolve the legal issues that undergird its creation. But, the potential cost, lack of timeliness, and ultimate success of this latter concept suggest that it may not be viable on a broad basis. State legislation to promote the muni-lite concept would significantly enhance its opportunities.

Community aggregation by new local government aggregation entities may be the most developed means of distributing system savings among customers in a restructured environment. Such agencies should authorized by state legislation and should be empowered to participate in wholesale power markets either alone or by participation in existing or newly-formed joint action agencies.

Automatic aggregation as describe herein is essentially a continuation of the franchise model that has been used in the past to deliver electricity services, albeit with a significantly different type of franchise. However, there are two related concerns that are raised by continuing with a franchise model. First, will the franchise approach inhibit the development of more competitive energy service markets? Second, will customer choice be limited more than is necessary or appropriate?

With regard to the first concern, the benefit developer franchise approach may actually promote the development of more competitive electricity services markets. If small customers are unlikely to actively participate in the market anyway, and a number of geographic franchises can compete against each other, as well as other brokers and sellers, then the electricity market may become more competitive than without automatic aggregation. In addition, the biddable franchise approach in which the right to provide service is subject to a periodic auction can be justified on the

grounds of protecting small customers. If it is likely that small customers will not have the opportunity to actively participate in the electricity market, then the biddable franchise approach may be necessary -- even if it results in a somewhat less competitive market based on individual consumer choice.

The second concern raises an interesting challenge for the automatic aggregation approach. On one hand, it might be best for a franchise to include all customers within a geographic region, in order to avoid "cherry-picking" of the most profitable customers. On the other hand, if all customers are required to participate in the local government aggregation, then the potential benefits available from a "customer choice" environment may be diminished. To the extent that the lack of customer choice limits the competitive incentives on generation companies, brokers and aggregators, then potential economic benefits for all customers could be lost. In addition, some customers (e.g., those with higher load factors, or with unique requirements for power quality, interruptibility, energy management or other specialized services) may not enjoy the full range of services or potential to lower costs if they are aggregated with all other customers in the local region.

One option to address this concern is to allow certain customers to "opt out" of the franchise, and purchase their electricity services from generation companies or from other aggregators and brokers. This option is consistent with the consumer choice approach, but may also maintain enough of a quorum of customers to make the franchise mechanism successful. At this time, it appears as though the opt-out approach provides an appropriate balance between small customers and those who require greater customer choice. However, we recommend that this issue be considered in more detail as the proposals for implementing automatic aggregation entities are more fully developed.

In addition, local governmental aggregation entities should be designed to ensure that their responsibilities are clear and that they maintain appropriate public policy standards. Therefore, proposals for governmental aggregation entities should include the following features:

(1) a commitment to minimum standards for energy efficiency, renewable power, and environmental factors which can be expanded by local decision;

(2)the clear ability for the entity to join with other entities to increase its market power in wholesale markets;

(3)a clear designation of the standards for rate setting and service rules, who is responsible for implementing these functions and how; and

(4)the responsibility to aggregate and serve as a provider of last resort to all consumers who do not opt to be served by other providers.

Small customers are currently automatically aggregated by distribution utilities, which in many cases are vertically integrated in a company that provides supply as well as purchasing functions. There should be real concern if the benefit developers such as local governmental aggregation entities

cannot be established on a broad scale. The same concern should exist if private aggregators are unable to aggregate small consumers to capture substantial market share from incumbent providers. If small consumers are automatically aggregated by the same incumbent provider that they have now, then those providers are likely to have incumbent advantages that undercut attempts at developing effectively competitive markets.

If new entrants into the marketplace cannot provide effective competition, it would appear appropriate to consider the use of biddable franchises to serve as a proxy to create competitive benefits. While incumbent providers could still be expected to have advantages due to access to information and experience with operating the system, at least improved performance and services would be required. The thrust of restructuring is that the current system of monopoly franchise must be undone because it fails to deliver benefits that would be produced from more competitive markets. It would seem that if small customers with limited options on an individual basis are simply defaulted to their current provider, that they are more likely to be isolated from any such benefits rather than to enjoy them. Absent strong competitive pressure on incumbent providers for *all* customers, there is little reason to believe that *all* customers will benefit from restructuring.

Costs and Benefits to Typical Residential Customers

In this portion of our analysis we apply some of the information and insights of the previous three chapters to investigate some of the likely costs and benefits of restructuring to typical residential customers. In the first set of scenarios we model the effects of RTP. Here we assume that service remains available only from utilities which may or may not be vertically integrated. Additional providers do not appear. In the next set of scenarios we explore the way in which retail wheeling might change our results.

In each of our two sets of scenarios we consider the impact of five different sets of meter and/or EMS costs and capabilities, particularly degree of achievable load shifting, on nine different types of residential customers, reflecting independent variation in load factor and usage. The result is a total of 90 combinations. For each combination we have conducted a benefit-cost analysis, to determine the net change in cost which customers might experience.

The results of this scenario analysis show that RTP alone will result in net benefits only to high load factor customers, while increasing electricity costs for other residential customers. Further, our results show that a range of EMS options cannot fully offset these increases. Our results are summarized in Table 1.1.

Our analysis also shows that retail wheeling is more likely to increase total electricity costs to most residential customers. We assume that 10 percent reductions in per-Kwh cost are available to all customers at a marketing cost of $40 spread over two years. While retail wheeling allowed some large, low load factor customers to achieve positive net impacts with expensive EMS, many types of customers still did not benefit with RTP and retail wheeling.

In addition, we considered a number of alternatives to test the ability of different technical and/or institutional arrangements to increase the likelihood that small customers might benefit from restructuring. One often discussed option we considered was Bundling, that is offsetting the costs of communications and EMS by bundling them with other carriers and home computers. Our results show that Bundling, which in any event is most useful to those at higher income levels, is not likely to provide sufficient cost reductions for all customers to benefit. Even with Bundling, small and average-size customers who do not have high load factors fail to achieve positive net benefits from restructuring. Further analysis shows that other remedies, such as Full Wiring, a social funded wiring effort, and a Universal Service Fund may help, but are unlikely to lead to a situation in which all types of small customers can benefit from restructuring.

Finally, we investigated the opportunities for reducing individual customer's costs through aggregation. Our results indicate that aggregating as few as three residential customers results in positive net benefits for the group -- even though the same customers would have had net *costs* if they had acted individually under the same scenario and assumptions. Our results confirm the intuitive notion that aggregation of small customers will be essential to ensure that they can enjoy the potential benefits of RTP and retail wheeling.

Our analysis was limited to residential customers, in order to maintain computational simplicity. We believe that our analysis would likely lead to similar results for small non-residential customers. Just as in the residential case, customers with low load factors are likely to experience adverse impacts if they shift to RTP. The smallest non-residential customers are served on simple, "general service" rates which have energy but not demand charges, and so do not currently reflect customer load factors to any greater extent than do residential rates. Since some types of small business are more likely to "need" air conditioning in conditions where residential customers might not, the impact on low load factor customers could be quite important. For those with low initial load factors, the key issue is the ability to shift load.

Our residential sector computations show that, for the largest residential customers, sophisticated EMS can, in theory, go a long way toward offsetting the impacts of RTP. Presumably non-residential customers who are a bit larger yet might be able to obtain net benefits from EMS. However, based again on the residential results, this would require substantial load shifting.

As with residential customers, aggregation through benefit developers, such as local government agencies, may represent the best across-the-board approach to bring the benefits of restructuring to small, non-residential customers. Such an approach may avoid the heavy per-customer burdens due to RTP, communications and marketing, while still capturing any net benefits that retail wheeling provides.

TABLE 1.1

ANNUAL CHANGE IN THE COST OF ELECTRICITY
WITH REAL TIME PRICING ($/YR)

2. REAL-TIME PRICING TECHNOLOGY, APPLICATION AND COSTS

2.1 Summary

In this chapter, we examine the hardware and software additions that are required to implement real-time pricing (RTP), and estimate the cost for these additions. We also assess the potential benefit from RTP by determining the amount of load that may be shiftable by small customers. In addition, we describe the experience with RTP so far. Finally, we develop the RTP costs for a number of scenarios that are analyzed in Chapter 5 and investigated the costs and benefits of retail wheeling.

Key findings in this chapter include:

- RTP requires two additional pieces of equipment: 1) a new or modified meter, and 2) a two-way communication system. The two way communication system need not use the same media for both directions. In fact, using different media leads to lower costs but may not allow the use of automated controls at the customer's premises.

- While not absolutely necessary for RTP, automated controls or energy management systems (EMS) can enable the customer to shift significant amounts of load from on-peak to off-peak.

- We provide RTP costs for two scenarios: 1) without an EMS, and 2) with an EMS. We consider both optimistic and pessimistic cases for these scenarios.

- For the optimistic case without an EMS, we use a CellNet type system and estimate the additional meter costs to be $4 per year, the cost for the communication system to be about $12 per year. For the pessimistic case, we assume that the CellNet type system is not feasible due to geographic dispersion of the population, and also assume that a more expensive type of meter is required. For this case, the meter costs are about $13 per year, and the communication system costs are about $24 per year.

- For the optimistic case with an EMS, we use a CellNet-type system with modifications for bidirectional communication and a simplified EMS resulting in meter costs of $4 per year, communication costs of $20 per year, and EMS costs of $18 per year. For the pessimistic case, we again assume that the CellNet type system is not applicable and that more expensive meters and EMS are required resulting in meter costs of $13 per year, communication costs of $24 per year, and EMS costs of $100 per year.

- A review of the experience with RTP suggests that only customers with a high usage of electricity will be able to shift significant amounts of load. Such customers are generally those who use electricity for space heating and/or have several major appliances. The use of automatic controls is likely to significantly increase the load shifting due to RTP.

- Some small customers with higher load factors to begin with are likely to see lower bills due to RTP even if they cannot shift their loads. RTP would give lower bills because of their better load factors. However, the cost of metering and additional equipment may not be justified if their loads are low.

2.2 Real-Time Pricing and Retail Wheeling

Under a real-time pricing (RTP) option, a customer is given a price signal to reflect the variation in the utility's costs with time. This is typically done by forecasting hourly marginal-cost based prices roughly one day in advance based on expected conditions. With a competitive spot market for electricity, the hourly prices could come from an auction process in which supply bids are matched to be meet demand at a particular clearing price. Either way, the hourly price signals permit the customer to benefit by shifting electricity consumption from a period of high cost to a period of low cost. Proponents of RTP say that it leads to economic efficiency because the price under RTP at any particular time reflects more accurately the system's marginal costs at that time than under non-time-differentiated standard rates. In addition, they say RTP allows the customer flexibility in managing its use of electricity.

RTP makes economic sense to a customer only if the reduction in bills exceeds the cost of the meter, associated equipment and non-tangibles such as convenience and predictability. Naturally, the higher the customer's consumption, the more likely it is that RTP will be economically attractive for that customer. Furthermore, RTP may not be attractive initially because the prices of metering may be high, but may become attractive as the prices of metering drop in the future. In this chapter, we review of RTP meter cost and performance information (and projections) and customer acceptance of related ratemaking approaches, and we assess the potential for load shifting by small consumers in response to RTP. Our review suggests that RTP is more likely to be beneficial for the high usage customers with many appliances such as pool pumps, air conditioners, dishwashers, clothes washers and dryers, and less so for customers without these appliances such as low-income households and low usage customers such as single person households. In addition, under there may be some self-selection amongst residential customers. Customers with cost causation less than the class average may benefit by opting for RTP without any load shifting, resulting in higher electricity costs for the remaining customers. However, these customers who would benefit without load shifting may be subsidizing others under the current system with a single rate.

2.3Technology Requirements for RTP

Real-Time Pricing will require hardware additions to the existing electric utility system. The standard meters used for residential customers currently will need to be replaced because they are designed for a single flat rate and will not respond to varying price levels. Two-way communication systems will be required with RTP so that the utility can send price signals, and also so that it can read

the usage by the customer during the different periods. Third, as we point out later in this section, residential customers are most likely to benefit from RTP if an EMS is installed on the customer's premises. In this subsection, we review the requirements for these hardware additions: new meters, two-way communication systems, and energy management systems (EMS). We also discuss current experience with each, and provide estimates of the costs of the additional components that will be required.

Meters

The basic meter used for residential applications is the induction type watthour meter which consists of a motor whose torque is proportional to the power, with a magnetic brake to retard the speed of the motor in such a way that it is proportional to power. This results in the number of revolutions made by the motor being proportional to the energy being metered. The meter also has a register to count the number of revolutions the motor makes, and the amount of energy consumed by the customer (EEI, 1992). Earlier meters had mechanical registers but residential meters today have an electronic output. This plain induction type meter with electronic registers costs about $25 (Anderson, 1995).[1]

Various modules can be added on to the basic meter described above to obtain other functions. A module costing about $60 can be attached to the basic meter to be able to meter both demand in Kw and consumption in kWh (Hack, 1995).

TOU meters differ from the basic meter in that there is more than one register. For example, assume that the TOU tariff has three rates. While the basic meter which has only one register reads the total consumption, the TOU meter must have the capability to read the consumption in three time periods. Therefore, instead of one register the TOU meter in this example would require three registers. When the utility signals that the time period is to change, say from shoulder period to on-peak, the meter stops accumulating consumption in the shoulder period register and starts accumulating consumption in the on-peak register. This process is repeated for the entire meter reading cycle, typically a month. Therefore, at the end of the month, the on-peak register, the off-peak register, and the shoulder period register would have recorded the amount of energy consumed over each period. The basic meter can be converted to a TOU meter using an attachment that costs about $75 (Hack, 1995).

Where a utility wants to do automatic meter reading (AMR), it is usually done via a one-way radio signal. One option is that upon receiving a signal, the meter transmits a radio message that contains data on the consumption of the customer over the metering period, typically a month. Schlumberger makes a module that can be attached to the basic meter and that will transmit the demand and consumption so that automatic reading is done once a month. Schlumberger's module costs about $65 (Hack, 1995). There are alternative ways of arranging the hardware for AMR. Mississippi Power is developing a pilot system that will use electronic meters that transmit digital data

[1] Costs quoted here are estimated market prices for large quantities (about 500,000). It must be remembered that these are rough estimates. Actual prices depend on the quantities purchased and various other factors.

using power line carrier to the first distribution transformer and from there over the mobile communications network to the metering operations center (Reason, 1993). CellNet has developed a system for AMR using a cellular radio network. This system uses a radio transmitter attached to a conventional induction type meter. CellNet says that the radio transmitter adds only about $5 to the meter (Willrich, 1996). The CellNet system is discussed in greater detail along with other radio-based systems in the section in this chapter which describes the various technologies that can be used for two-way communication links.

Finally, there is the option of using two-way communications to do RTP. This option uses the basic meter with added communication capability. Three meter manufacturers--Schlumberger, Landis & Gyr, and GE are carrying out pilot studies using two-way communications. Schlumberger is teaming up with Motorola and carrying out pilot studies for Carolina Power & Light (CP&L) and Hydro-Quebec. It is using the basic induction meter with added communication capability. A rough estimate of the projected cost for such a meter is $125 to $150. Landis & Gyr, a meter manufacturer, is working with PG&E, Microsoft, and TCI to develop an Energy Information Services (EIS) trial project which uses two-way communication. An estimate of the current cost of the meter with communication module is about $200 to $300 (Chen, 1995), however, it is projected to cost about $100 if purchased in volume (Anderson, 1995). This is roughly consistent with the Schlumberger estimate. GE is developing a meter to be used for RTP for PSE&G and AT&T for a pilot study that we describe later in this chapter. It is projected that the cost for the meter will be about $60 (Carroll, 1996).

Table 2.1 provides illustrative metering equipment costs for the various options discussed above. The prices shown are rough estimates and are based on conversation with several people[2]. The prices for TOU meters are the same as those for RTP meters because while TOU meters have lower communication requirements, they require their own clocks and separate registers for each of the time periods into which the day is divided (Yeung, 1996).

[2] Dan Hack, District Sales Manager, Schlumberger, Boston; Bill Carroll, GE; Michael Anderson, Manager, Systems & Promotions, Landis & Gyr Energy Management; David Yeung, PSE&G; John Fielder, VP, Southern California Edison; and Doug Hansen, Principal Pricing Strategist, San Diego Gas & Electric.

TABLE 2.1

ILLUSTRATIVE ELECTRICITY METERING EQUIPMENT COSTS[3]

Note: Installation costs are derived from data for Southern California Edison given in the workpapers for 1995 for the General Rate Case.

Two-Way Communication Links for RTP

RTP requires a two-way communication link between the customer and the utility for three purposes: 1) for the utility to send price information to the customer, 2) for the utility to collect usage information from the customer's premises, and 3) to control appliances in the customer's house. Communication from the utility to the customer is required so that utility can send information about the real-time prices. Communication from the customer to the utility is required first so that the utility's control center can verify that the real-time prices were received by the customer's meter, and also for AMR and outage detection. Utilities already carry out two-way communications for Distribution Automation (DA) and Supervisory Control and Data Acquisition (SCADA) systems. There are various ways in which this two-way communication link can be established depending on the communication medium used (radio, satellite, fiber-optic cable, etc.) and the type of network (dedicated, leased, multipurpose). In this section, we first examine the various technologies and communication media that can be used. Then we look at the various options available to the utilities for the type of network to use.

[3] The costs shown here exclude any overhead costs. Utility overheads may nearly double total costs. The basic residential meter installed, with overhead, would cost $116 according to SDG&E even though unloaded material and labor costs are in the range shown here. This suggests that competition in installation and metering and billing equipment may be important in reducing costs to small customers.

Technologies for Two-Way Communication Links

Telephone Lines. Leased phone lines with modems can be used to transmit data to and from the customer's premises. The advantage of using phone lines is that they are already in place and thus do not have to be manufactured or installed. However, they are slow and a dedicated phone line has a recurring cost of about $30 per month. In addition, if a phone line is not available and has to be installed, the average cost of installation is about $150 (MECo, 1995). Existing phone (non-dedicated) lines may also be used for two way communication, and would require no incremental costs. Such a system is used by AEP for time of use pricing with four price levels. However, non-dedicated phone lines may not work for a system where prices are communicated more often--for example every five minutes. In those cases, a dedicated phone line may be necessary.

Power Line Carrier. In power line carrier (PLC), the communication signal (message) is superimposed on the power line frequency. The major advantage of PLC is that it does not require additional wiring. This advantage is particularly significant inside the house, where adding additional wiring could be difficult and expensive. For this reason, most smart energy management systems use PLC for transmitting signals inside the house. Two protocols--CEBus and LonWorks--for communication within the house are based on PLC.

The disadvantage of PLC is that it is blocked by transformers. Some systems use a low frequency signal to prevent this blocking at transformers, however that results in a reduction in speed.

Radio-Based Systems. Utilities have radio frequency systems for SCADA communications in various forms. Some versions may be useful for two-way communication links for RTP.

In packet radio, the data is broken into small pieces or "packets" which contain header information giving the source and destination of the data. These packets then move around the network as independent entities. Packets are passed from one radio node to another until they reach their destination. All the radios are identical but each of them has a unique logical address. Packet radio systems are wireless and use existing technology. CellNet is using packet radio for AMR in a system it is installing for KCP&L. We discuss it in more detail in the next section.

Because radio-based systems are already being used by utilities for SCADA, the incremental costs for these systems is expected to zero, in cases where a radio-based network is available. Of course, there will be some additional cost for equipment to allow communication between the customer's meter and appliances and the radio.

Satellite-Based Systems. Low orbit satellites can be used to provide two-way communication links between utilities and customers. A 6 inch to 7 inch satellite dish can be installed on each house, or an existing satellite dish can be used. However, in urban areas, even a small satellite dish may be difficult to mount on the side of the house because of space limitations (Yeung, 1996). An alternative would be to send the data from the house to a pole-mounted satellite dish via radio. This would allow several households to use a single dish.

In its reply comments on the CPUC's Proposed Policy Decision Adopting a Preferred Industry Structure, Global Energy Metering Service, Inc. proposed that low earth orbiting (LEO) satellites be used for meter data retrieval and transmission because it says that the costs are less for this option compared to a terrestrial radio network. It says that the cost to replace existing meters with smart meters is only about $70 to $80 per meter (GEMS, 1995). However, the service charges to cover the satellite, the launch costs, and other operation costs are expected to be about $5 to $10 per meter per month (Skillman, 1996).

Broadband Networks. Broadband networks allow the transmission of great amounts of data because of their broad bandwidth. They are usually associated with cable TV, but telephone companies are also considering them for future use. Furthermore, the opportunity to provide other services such as video-on-demand is forcing them to redesign their systems for two-way communications. In this way the cable companies can provide new interactive entertainment services as well as telecommunication services.

Cable TV networks employ a tree-type architecture with a head end which transmits the signal to a node in a neighborhood which then transmits the signal to households. Fiber-optic cable is generally used for the backbone of the network where its high cost can be justified because losses are low and amplifiers can be eliminated. However, from the neighborhood node to the house fiber optic is typically not cost effective and coaxial cable is used. Such systems are known as hybrid fiber coax (HFC).

The cost for establishing a broadband network is high and is expected to be about $800 per household (Yeung and Morgan, 1995). Given the extremely high capacity of such networks, it makes sense to reduce costs by sharing the network with other services such as cable, telephone, etc.

General Comments on Technologies. In its most recent order (December 20, 1995), the California Public Utility Commission (CPUC) said that customers will have the choice to either be charged a single rate based on the average pool price, or be charged according to the real-time price of electricity from the pool. Therefore, not all customers will require real-time pricing and hence not all customers will require a two way communication system with the utility. This affects the choice of technology because for some technologies the economics depends on the geographic concentration of customers' homes or sites. For example, radio networks such as the CellNet system become much more expensive for rural settings where the population is dispersed or for urban settings where only a fraction of the customers are to be connected, as compared to urban settings where the population is concentrated. Similarly, the economics of broadband networks is also affected by the concentration of households. On the other hand, satellite-based systems and phone lines (specially non-dedicated lines) are not affected by the dispersion of the population of households. Therefore, if all customers will not require two way communication networks, it may be more appropriate to use satellite-based systems or existing phone lines. However, the utility may decide that even though two-way communication is not *required* for all customers, it makes economic sense to provide it to all homes and bill the customers according to their choice of rates--a single rate or RTP.

Two-Way Communication Using Different Media for Each Direction. So far the technologies for two way communication that we have discussed assume that the same medium (radio, satellite, phone lines, etc.) is used for communication in both directions. However, this is not absolutely necessary and it may be less expensive to use different media for communication in the two directions. For example, the utility may be able to broadcast its hourly prices one day in advance in the newspaper, or through radio/TV stations. In such cases, for communication from the customer to the utility for transmittal of consumption data, it could use a one-way radio network, satellite metering, or some other medium. This would still be two way communication that allows RTP.

While using two different media for communication is feasible, it limits the use of energy management systems (EMS) which we describe in greater detail in the next section. This is because the EMS generally requires price information in electronic form transmitted automatically so that appliances can be controlled by the EMS without customer intervention.

System Options for Utilities

There is talk of a nationwide electronic communications network, more popularly known as the information superhighway. Utilities are vying for a significant role in the construction and operation of this highway because it would open up the possibility of providing several new services to customers such as automatic billing, outage detection, automatic control of energy, and real-time pricing. However, some utilities would like to take a more aggressive role in the development of the infrastructure because they already own significant communication capabilities and have access to virtually every home and commercial establishment.

EPRI has been looking into the options available for utilities to participate in the creation of the National Information Infrastructure (NII). Because these options also represent options for providing real-time pricing, we provide an outline of them here.

According to EPRI, there are five options available to utilities (Jaret, 1995). The first option is to adopt a wait-and-see attitude and continue to use existing communications equipment. For our purposes, this would mean using telephone lines or existing radio systems for RTP.

The second option consists of leasing network capacity from other suppliers such as cable companies. While this would provide the utility with flexibility, it may help competitors learn about energy information services. In addition, cable TV networks do not provide the reliability that would be needed for utility applications.

The third option involves building a dedicated network for energy information services. However, the capital investment for such a network is considerable. EPRI estimates that a dedicated network using fiber-optic cable for the backbone and coaxial cable or wireless connections to the customer's premises would cost round $500 to $700 per customer in a metropolitan or suburban setting. It would cost twice as much in rural areas.

The fourth option requires the construction of a multi-purpose network on which capacity can be leased to other businesses. Here again, the capital costs are high. However, since utilities would only be using 5-10 percent of the capacity of the system, the remaining capacity could be leased or sold to other businesses providing an additional source of revenue for the utilities. As EPRI points out, the construction and operation of such a network requires skills that are not currently available at utilities.

The last option is to build a full-service network using fiber-optic and coaxial cable and which provides a wide menu of services that include transmission of voice, data, and video. Of course, with such a network the utility could provide entertainment and educational services in addition to energy information services. There is considerable risk and potential reward in pursuing this option. The technology for such systems is either still being developed or has not been commercially tested. Furthermore, there are a variety of ways in which such networks could be constructed, and it is not clear which is the best.

It is unlikely that any utility will develop a full-service network in the near future. Some may provide two-way communication using wireless means such as radio discussed earlier. Others may form partnerships with cable companies or phone companies to develop multipurpose networks. This is already happening at a fast pace. PG&E has formed a partnership with Microsoft, TCI (cable company), and Landis & Gyr (metering and energy management company). Similarly, PSE&G has teamed up with AT&T, Intellon (in-house networking), and GE (electric meters). There are several others which we discuss in the next chapter of this report.

Energy Management Systems (EMS)

By itself, real-time pricing is unlikely to have an effect on the behavior of small customers, particularly residential customers, because they are unlikely to have the time or inclination to monitor electricity prices on an hourly or half-hourly basis and to modify their behavior accordingly. However, an energy management system that controls appliances in the house may make RTP more appealing to customers. An EMS requires only occasional involvement by the customer. Most EMSs work by obtaining inputs, such as temperature settings for different price levels, from the customer and then control appliances like the thermostat in accordance with the choices made by the customer.

Recently there has been a spate of partnerships formed between utilities, phone or cable TV companies, and metering companies to carry out pilot studies on two-way communication systems and smart energy management systems. These case studies provide a window into the kind of services that may be offered in a restructured electric utility industry and therefore it is important to examine them to assess the potential impact of restructuring on small customers.

Almost all the studies use real-time pricing (RTP) and use some kind of smart energy management system or controller to enable the customer to respond to changes in the price of electricity. Given the large number of studies that are being carried out, it is impractical for us to describe each of them. Therefore, we describe a select few here. For simplicity, we will use the name of the utility to identify the study.

Pacific Gas and Electric Company (PG&E)

PG&E has teamed with Microsoft, TCI, and Landis & Gyr to carry out an energy information services trial project directed at residential customers. The purpose of the project is to determine the kind of information customers need to manage their energy use better, to test new services such as automated meter reading (AMR), immediate outage detection, real-time pricing, electronic billing etc., and to determine customer response to these services.

The system consists of a "Smart Box" in the house that is connected to the TV and that allows the customer to control various appliances through a Windows type environment displayed on the TV set. All communications within the house is through Power Line Carrier (PLC) and uses the CEBus[4] communication protocol. The customer's profile and appliance schedules will be maintained by a proprietary energy management unit (EMU). PG&E proposes to integrate the EMU into the meter in later installations. Two-way communication with the utility will be provided by a broadband network owned and developed by TCI.

Regarding services in addition to EIS that will be provided by the system, the companies say:

In Walnut Creek, it is anticipated that TCI will add other interactive television services and applications at some time during or after the Trial. At present EIS will be offered on a stand-alone basis.

TCI recognizes that EIS will not (in the long term) be provided as a single interactive service on a broadband network. The overall success of interactive television will require a suite of services providing entertainment, education, healthcare, electronic commerce, information and utility management. Trials are under way in different parts of the country that address each of these applications (PG&E, 1995).

In their literature on the EIS trial, the companies say that the host utility will provide the control devices as part of the trial. Regarding payment for the devices in the future and target prices, they say that the utility will continue to provide a basic package of control devices when "commercial roll-out occurs." It is not clear if the customers will have to pay for the basic package. The Companies' goal is to expand the market for the devices and bring prices down to less than $300 per home (PG&E, 1995).

Southern California Edison (SCE)

SCE has a pilot program where 50 houses have been wired with an Advanced Energy Management System (AEMS). The customers in this pilot program can view their energy usage on a TV screen. An in-house network connects up to five appliances and a TV interface box. This

[4] CEBus is the communications language prepared for in-home product communications and control by the Electronics Industries Association (EIA).

system also allows communication with SCE through a combination of a fiber-optic network, local phone and cable TV lines (Home Energy, 1995). SCE believes that while this system offers an elegant solution, it is too expensive to be attractive for all customers (Fielder, 1996).

SCE thinks that RTP with a two way communication system is too expensive for residential customers. It estimates that the average bill is $65 per month and a 15 percent reduction in bill will not be sufficient to pay for the amortized cost of the network. It is leaning towards a CellNet type system which is a one-way system that reads meters every 15 minutes or so. With such a system hourly prices would be published in the paper the day before so they would not need to be communicated electronically. Furthermore, such a system will allow customers to opt for either the single rate or the RTP option in accordance with the CPUC's December 20, 1995 order (Fielder, 1996).

San Diego Gas and Electric (SDG&E)

SDG&E has experimented with smart meters and done limited pilot studies using phone lines and radio frequency communication. However, no information is available on the costs of these systems or the results. SDG&E will continue to work on pilot studies until either the CPUC requires specific action or systems are developed which will help the utility in lowering its costs (Hansen, 1996).

Recently, Enova Technologies announced that it has formed a joint venture with Philips Home Services. (Enova Technologies is a subsidiary of Enova Corp., the parent company of SDG&E.) The joint venture will develop a "new type of consumer-based electronic commerce network" based on the Philips Screen Phone, which uses a screen and keyboard in addition to a phone set and transmits voice and data (EUW, 1996). Enova's current plans are to market the Screen Phone for applications such as bill payment, e-mail, paging functions, and other applications with more local content such as fast food ordering and movie reservations at video stores. While the system can provide two way communication required for RTP, Enova does not plan to use the system for energy applications now. In any case, the Screen Phone will not be able to provide energy management functions in the home and a separate EMS will still be required (Nelson, 1996).

The Screen Phone is likely to cost about $400 per phone. With increased volume, prices are expected to drop to about $200 per phone (Nelson, 1996). This is more expensive than a cellular radio network.

Public Service Electric and Gas (PSE&G)

The system that PSE&G has developed with AT&T is very similar to that developed by PG&E. It uses a PLC or radio network inside the home, using the CEBus protocol. An energy management system developed by Honeywell is used to control the appliances in the house. A Utility Interface Unit (UIU) provides the interface between the in-home network and a broadband network. The broadband network is developed by AT&T. Other partners in the venture are GE (electric meters), American Meter Company (gas and water meters), Intellon (in-home network), and Andersen Consulting (software interface between network and PSE&G's information systems).

American Electric Power Company (AEP)

While the previous two examples used a broadband network for communication, AEP has installed a system that uses the existing telephone lines. Messages from the phone are translated by a modem, and the resulting signal is sent to the Transtext Advanced Energy Management System (AEM) developed by Integrated Communication Systems (ICS). The AEM system uses power line carrier within the home to control appliances. The utility sets up to four price levels per day--low, medium, high, and critical--which covers every hour of the year, and the customer can change the thermostat setting accordingly. The system also uses the utility's existing radio system to broadcast prices during critical period. Radio is used at these times to enable the utility a large number of customers very quickly.

According to Joe McDonald, AEP's assistant controller and the program manager for the pilot test, the system cost about $800 per home for the 25,000 homes in which it has been installed. In large quantities, he expects the cost to be $500 per home. It is not clear if these costs include the costs for the phone line (McDonald, 1995).

Kansas City Power & Light (KCP&L) and Union Electric (UE)

Both KCP&L and Union Electric have agreements with CellNet to install a two-way communication system for automatic meter reading. While these systems will not be used for real-time pricing and control of appliances immediately, these services could be provided at a later date. Since this system uses cellular radio, and it would be useful to compare the costs of such systems with those discussed earlier, we briefly describe them here.

The system uses a three tier system with microcellular local area networks (LANs) integrated with a wide area network (WAN). Each LAN covers a radius of a quarter of a mile and consists of MicroCell Controllers collecting data from small radios incorporated in hundreds of meters or other devices. The MicroCell Controllers transmit the data over a cellular radio WAN to the CellMaster. Each CellMaster communicates with a System Controller at the utility's operations center through dedicated media such as fiber-optic cable, microwave, point-to-point radio, or leased phone lines (CellNet, 1995).

Under the agreement with KCP&L, CellNet will install and maintain the system over the life of the agreement, charging a monthly fee of less than $1 per meter per month. This is roughly the cost of reading meters manually, which based on an analysis of California utilities is about $5 to $8 per meter per year.

At this time, Union Electric is also planning to use the CellNet system for automatic metering only. They may use the system for automated controls in the home later. Union Electric did not discuss costs of the system with us, saying that they were confidential.

CellNet did put in comments on the California PUC's Proposed Policy Decision and restated the estimate of less than $1 per meter per month. CellNet says that roughly similar prices will apply for most of California also (Willrich, 1996).

Central and Southwest Corp. (CSW)

CSW has initiated a pilot program in Laredo, Texas for providing interactive energy services using a two-way communication link. The system which is uses a hybrid fiber coax broadband network also includes automated energy controls in the home provided by Raytheon. CSW will use the system to provide time-of-use pricing with three price levels. In response to price changes the automated controls will change appliance settings such as thermostat settings as programmed by the customer.

The cost of the in-home equipment is about $1,800 but CSW hopes to bring it down to $1,000 or below. Network costs are expected to be about half the total costs, and will therefore be around $1,000 also (McCants, 1995). CSW believes that the total cost per home needs to be less than $1,000 to be successful in the market. When the program is available for all customers, CSW would prefer not to charge customers, hoping that demand savings are sufficient to recover costs. However, if that is not the case, the utility may install and maintain the equipment for a fee of around $4-$5 per month (McCants, 1995).

The system has sufficient capacity to provide cable and telephone. The Company says that it, "...does not immediately plan to compete with the phone company" (Quad Report, 1995). However, it does plan to offer a "combination of information superhighway services" in the future (McCants, 1995).

Entergy

Entergy initiated a pilot study in Chenal, Arkansas using a hybrid fiber coax network and its PowerView in home energy management system developed in collaboration with Honeywell. The in-home network cost was $1,500 to $3,000 per home, but was expected to drop to about $800 per home in large volume. The hybrid coax network was built at about $942 per home (*Electrical World*, 1994). First Pacific Networks (FPN) was a partner in the venture and supplied some of the initial control electronics. However, Entergy later switched to Honeywell to supply the in-house controls (Bolton, 1996).

Entergy shut down the pilot study saying that it had learnt what it had wanted to learn. It concluded that the technology for two way communications and EMS was functional but too costly. In addition, there were some issues regarding the boundaries between its regulated subsidiary and the unregulated entity (Bolton, 1996).

Others

As we mentioned earlier, there are many utilities that are forming partnerships with communications companies (cable TV, phone, etc.) to develop two-way communication links. Some of the other utilities that are involved in such ventures include Utilicorp, Wisconsin Public Service, and Detroit Edison.

Table 2.2 provides a summary of the various pilot studies discussed here.

TABLE 2.2

SUMMARY OF PILOT STUDIES OF SMART ENERGY MANAGEMENT SYSTEMS AND TWO-WAY COMMUNICATION SYSTEMS

2.4Potential for Load Shifting

Benefits from RTP result from the ability to shift load in response to price signals. Clearly, not all loads are shiftable. For example, it may not be possible to turn off a refrigerator for a few hours during the on-peak period because food may go bad if the temperature rises in the refrigerator. On the other hand, it may be possible to defer use of other appliances such as clothes washer, dryer, and dishwasher to a lower price period. Therefore, for any household the potential to shift load and consequently to benefit from RTP depends on the mix of appliances in the house. Further, the overall level of electricity usage measured in kWh also affects the potential to shift load. All else being equal, a house that consumes a lot of electricity is likely to be able to shift load to a greater extent than a household that consumes less electricity.

In order to determine the potential to shift load amongst residential customers in California, we examined a preliminary load forecast prepared for *Energy Report 96* (ER96) by the California Energy Commission to determine saturation levels for various appliances. Table 2.3 shows the saturation levels for a variety of appliances in households in California, and Table 2.4 provides a summary of electricity usage by end-use.

Table 2.3 shows that for many items such as those for pools and tubs whose use can be easily shifted to low price periods the saturation level is quite low (10 percent or less). Other appliances for which use can be shifted to other periods, albeit with some discomfort to household members, such as air conditioners, the saturation level is a little higher (around 33 percent). Based on this data, we think that a very small percentage of California residential customers, those owning swimming pools etc., will be able to shift a significant part of their on-peak load to other periods, while a third or so of all residential customers in the state will be able to shift some of their load. However, the majority of residential customers will not be able to shift any significant part of their load to other periods.

In order to estimate the amount of load that would be likely to shifted in response to RTP, we constructed a profile of the usage of the "average" customer. Based on the consumption of residential customers for the three California utilities for 1992, we estimated the average annual consumption to be 6,000 kWh. Since we had load research data for Southern California Edison (SCE) only, we assumed that the usage pattern for the average customer in California would be the same as that of the average customer of SCE. For SCE, the average Kw used in the on-peak, shoulder, and off-peak periods are 0.877, 0.736, and 0.639 respectively. This shows that the kilowatt usage does not vary significantly between the periods. For the average customer in California, we scaled the SCE usage in the various periods to get an annual total of 6,000 kWh.

TABLE 2.3

LOAD SHIFTING POTENTIAL FOR CALIFORNIA RESIDENTIAL CUSTOMERS BASED ON 1993 DATA

TABLE 2.4

SUMMARY OF ELECTRICITY USAGE BY RESIDENTIAL CUSTOMERS IN CALIFORNIA

Since shifting potential is related to the differences in electricity prices during the different periods, we also examined the difference in system lambda (system marginal energy cost) for California utilities during the peak, shoulder, and off-peak periods. We found that the price differential between periods is not very large. PG&E had the largest variation in prices, and a plot of the system lambda for all hours of the years is shown in Figure 2.1. From this plot, we estimated that the energy prices during the peak, shoulder, and off-peak periods were 30 $/MWh, 24 $/Mwh, and 18 $/Mwh respectively.

FIGURE 2.1

PG&E SYSTEM LAMBDA DISTRIBUTION

The potential for load shifting naturally depends on the usage level of the customers. If RTP is offered to a select group of high consumption users then the load shifting potential will be higher than if RTP is offered to all customers. We looked at both these options. American Electric Power Company (AEP) carried out a pilot study for customers whose annual usage was around 20,000 kWh per year (Parker, 1994). In that pilot study, in response to RTP customers reduced their load by about 50 percent during the critical period, reduced load by about 38 percent during the high-price period, increased load by about 7 percent during the medium-price period, and increased their load by about 5 percent during the low-price period.

The AEP study shows that high usage customers may shift load by significant amounts in response to RTP. However, the average customer cannot be expected to shift load in the same proportions. One reason for this is that the average customer's usage in California is not significantly different for the various periods. If RTP is offered to all customers, shifting can only occur until the load curve for the average customer is flat across all periods. As we have seen, the average kilowatt usage per customer in California is already almost the same across all periods. Therefore, if RTP is offered to all customers, then the load shifting potential is severely limited.

2.5Customer Response to RTP

The success of RTP depends on the reaction to it. So far, most RTP programs have been directed at industrial, and to a lesser extent commercial, customers. While our interest in this report is to understand the impact of RTP on small customers, it will be worthwhile to examine the results from the C&I sectors in order to see if we can draw conclusions that may be relevant for the residential and small business customers. Therefore, we first examine the experience with RTP in the industrial and commercial sectors, and then review the limited experience in the residential sector.

RTP Experience in the Industrial Sector

Industries where there is ability to shift, reduce or generate load, and where the customers' peak demand occurs as the same time as the utility's peak are suitable candidates for RTP (Takos et al. 1994). Examples of such industries are: extraction of stone, clay, sand and gravel; chemicals industry; rubber and plastic processing; and manufacturing in the auto and aerospace industries (King and Shatrawka, 1994). In some industries that use large amounts of electricity to produce intermediate products, production of these intermediate products can be scheduled to low cost periods and the intermediate products can be inventoried. In this way, "storage" of electricity in the form of intermediate products can provide flexibility in the use of electricity (E-Source, 1995).

While many utilities in the U.S. are considering RTP programs, the analyses done so far have focussed on experimental programs involving a small number of customers. Two such programs show that customers are able to shift load in response to prices. In an experimental study, Niagara Mohawk found that customers reduced their peak load by 0.1 to 0.2 percent of the pre-experiment load for every percentage increase in price, resulting in a reduction of 5 to 10 percent of load for the 25 days of highest prices. At the highest priced hour, the reduction in load was 36 percent. In another

experiment by PG&E, the utility found that customers reduced load by 5 to 10 percent for the 8 days of highest prices (King and Shatrawka, 1994).

Experience in the United Kingdom indicates that as expected the response to prices varies by SIC codes. One analysis of customer response to RTP showed that between one third and one half of the participating customers respond to prices, although the response varies by time of year. Further, the analysts found that customers shifted from 0.07 to 0.35 percent of their load between days for every percent change in price. Within days shifting was in the range from 0 to 0.08 percent (King and Shatrawka, 1994).

In their review of industrial RTP programs, E-Source found that automated control technology did not play a significant role in the response of customers to RTP. However, they found that analytical tools played a major role in the load shifting decision-making process. Examples of such tools are Enerlink licensed by Georgia Power and LoadExpert offered by Electrotek Concepts, Inc. Enerlink provides metering, communications, data management and analysis functions, and costs from $5,000 to $10,000 per customer plus annual service and maintenance charges (E-Source, 1995).

RTP Experience in the Commercial Sector

Utilities have focussed their RTP programs on the industrial sector and not the commercial sector because it was thought that the potential for load shifting in the commercial sector was low. Electricity costs in commercial buildings are typically only about one percent of the combined salaries of the people working in the buildings. Since responses to RTP are expected to result in curtailment of services and thus have a negative impact on worker productivity, building managers are not expected to show enthusiasm for RTP in the commercial sector. However, through the use of smart energy management systems, some installations are able to reduce energy costs and enhance the working environment (E-Source, 1995).

Smart energy management systems in commercial buildings can reduce or shift load through the following strategies: 1) shedding load by shutting off banks of elevators, circulating fans, and other such loads at times of high prices; 2) shifting loads such as pool pumps and defrost cycles on walk-in freezers to off-peak periods; 3) using sensors to detect occupancy, lighting, air quality, etc. and using ventilation, heating, cooling, lighting only when required; 4) using look-ahead capabilities to dynamically optimize the use of HVAC systems (E-Source, 1995). We next look at two examples of load reduction through RTP with smart energy management systems.

EPRI and Honeywell decided to implement a building automated control system at two Marriott hotels: the Marriott Marquis in New York City and the Marriott Moscone in San Francisco. At the Marriott Marquis, which has a peak load of 6 MW, prior to the automated controls, manual load shedding was used and resulted in a load reduction of about 200 kW, or about 3 percent. After the installation of the automated controls, the hotel was able to reduce load by about 1 MW or 17 percent. The automated control system has not been installed at the Marriott Moscone. At the Marriott Moscone, currently manual load shedding and variable speed drives (VSDs) result in a load reduction in response to RTP of 300-500 kW from a peak of about 3.2 MW. It is expected that the

automated controls will result in a load reduction of 800 to 1000 kW during high price periods (Flood, et al., 1994).

The automated control system consists of a two-way communications system using a modem link that is used to transmit data between the Honeywell Facility Management System (FMS) and the utility's computer. RTP prices and load are transmitted over the communication system. The FMS initiates pre-programmed load-control strategies which are implemented by direct digital control (DDC) panels (E-Source, 1995).

Vendors of control equipment such as Honeywell and Johnson Controls are developing "portable" products that can be used with a variety of existing control systems to provide the ability to automatically respond to real-time pricing. Similarly, "... some energy service companies that are developing communications links to their customers to support preventive maintenance and other operations and maintenance services may be able to use these communication capabilities to manage electricity loads in real-time" (E-Source, 1995).

RTP Experience in the Residential Sector

There have not been any major studies involving RTP in the residential sector. However, there have been some experiments with time-of-use (TOU) pricing that shed light on the potential for load shifting in the residential sector and on customer reactions to pricing schemes that differ from the conventional flat rate for residential customers.

During the summers of 1991 and 1992, Midwest Power Systems (MWP) implemented a TOU rate experiment in order to determine how volunteers differed from non-volunteers in their load patterns and demographic characteristics, and also to see how volunteers changed their load in response to TOU rates. They found that volunteers did not differ significantly from non-volunteers in their usage patterns before the experiment and ownership of appliances. In addition, they found that the volunteers reduced their on-peak usage by 24 percent over the summer. On the days that the system peaked, they found that the load reduction was even higher at 28 percent. The analysts reported,

In addition, we found that the ability/willingness of individual households to respond to the TOU tariff is significantly influenced by their appliance holdings and socio-demographic characteristics. In particular, the ownership of major electrical appliances, such as dishwashers, central air conditioners, and dehumidifiers, significantly increases the percentage reduction in on-peak kWh induced by TOU pricing. (Baladi, et al., 1994)

Electicite de France (EDF) performed an experiment using a real-time tariff for residential customers known as the TEMPO option. Under this option, the year was divided into three types of days--300 blue days (least expensive), 43 white days (average prices), and 22 red days (the most expensive). Each day was divided into a peak and off-peak resulting in 6 different energy prices with a ratio of about 15 between the lowest and the highest prices. Eight hundred customers were included

in this experiment. EDF found consumption was reduced on average by 15 percent on white day and 45 percent on a red day compared to blue days. A major component of the reduction came from reduced usage for space heating (Giraud and Aubin, 1994).

EDF launched TEMPO in September 1993 and will gradually propose it throughout the country by the end of 1995. This tariff is directed at customers who have a high usage and fall into one of the following three categories: 1) customers equipped with an alternative heating source in addition to electric space heating, 2) customers who have electric space heating and are willing to lower their thermostats by several degrees during the expensive period, and 3) customers with major consumption falling outside the peak period. As part of the technical assistance provided with this tariff, the customer is informed about an energy management system that can be used to control energy usage in response to price changes (Giraud and Aubin, 1994).

Based on the MWP and EDF studies discussed above, there seems to be evidence that at least some customers, particularly those with many appliances, can reduce or shift their loads in response to RTP. However, it should be remembered that the MWP study used volunteers. In order to determine the probability of success for RTP amongst the general population of residential customers, we need to examine the reactions of such customers to RTP. In an EPRI report, Mihlmester et al. reported on a survey analysis of three innovative rate structures: TOU rates, RTP, and Demand Subscription Service (DSS). They found that, "...price variation alone only accounts for a small difference in probability of acceptance of an innovative rate program when compared to other intrusive factors such as frequency, length, and warning associated with control or peak periods. In general, this reflects the greater concern placed by the average residential customer on behavior and life-style factors rather than on price (at the levels analyzed) where electricity is concerned." Commenting on the use of rate structures to influence behavior, they noted that, "Based on this analysis, it appears that the potential monetary savings available to residential customers are a secondary factor when compared to other intrusive aspects of the program."

Mihlmester, et al. also found that customers were not very enthusiastic about RTP. They reported that, "Of the three innovative rate programs analyzed (TOU, RTP, and modified DSS), residential TOU rates had the highest probability of acceptance overall, whereas RTP had the lowest."

Conclusions on RTP for Residential Customers

Based on the work on RTP for industrial, commercial, and residential customers described above, we can make two conclusions. First, as shown by the MWP and EDF studies, RTP is likely to be beneficial only for those customers with a high usage of electricity. Customers who use electricity for space heating and/or have several major appliances such as dishwashers and central air conditioners are likely to benefit most from RTP. Customers with low usage, particularly low income people with few or no appliances, are not likely to benefit much from RTP. Indeed, if the cost of metering equipment is borne by the customer, and/or the customer's pattern of usage tends towards system peak periods, then the customer could be significantly worse off with RTP.

The second conclusion, which is based on the case studies in the commercial sector and the EDF study, is that the use of automatic controls are likely to significantly increase the savings due to RTP and thus its attractiveness to customers.

2.6Conclusions

Additional equipment that will be required for RTP can be broken down into two parts: 1) a new or modified meter, and 2) a two-way communication system between the utility and the customer. However, RTP or TOU rates without automated controls may not result in significant reductions in loads except for a small number of customers, such as those that have swimming pools on their premises. For others that have shiftable loads, it will be necessary to install automated controls in order to get significant shifting of loads from on-peak to off-peak periods. Therefore, we need to consider automated controls even though they are not absolutely necessary for RTP.

There are a variety of ways in which a utility can implement RTP, given the variety of meters available and the numerous technologies to provide two way communication between the utility and the customer. This is further complicated by the fact that the technology used for two way communication will affect the cost of the meter.

In Chapter 5 we use a scenario analysis to investigate the costs and benefits of RTP and retail wheeling. In order to avoid evaluation of the many options to carry out RTP, we consider two scenarios for RTP: one without an EMS and the other with an EMS. For each of these scenarios, we consider both optimistic and pessimistic cases. The optimistic case represents the installation of RTP metering and communication equipment in an urban environment with a high population density so that significant economies of scale can be realized. For the pessimistic case, we consider a rural setting where large distances result in increased cost per customer for installing the equipment.

Our research indicates that the cost of two-way communication systems is likely to be low because either existing narrowband technology can be used, or if broadband systems are used the cost will be shared with other services that will be provided. An example of low cost existing technology is cellular radio (like the CellNet system that is discussed in the body of the report) and is likely to cost in the neighborhood of $1 per meter per month. Companies like PG&E that are considering the use of a broadband network are teaming up with cable companies and/or phone companies which are likely to provide additional services such as cable TV, telephone, and video on demand. In such cases, the provision of energy information services will be bundled with the provision of these other services.

For our optimistic case without EMS, we assume that a system like the CellNet system is installed. For such a system, the communication system costs are about $12 per year ($1 per meter per month). As discussed earlier in this chapter, for the CellNet system to function the meter has to be retrofitted with a radio transmitter, adding about $24 to the meter costs. The CellNet system allows automatic meter reading and thus avoids manual metering costs which are in the range of about $5-$8 per meter per year.

For the pessimistic case without EMS, we assume that the CellNet system is not cost-effective because of the distance between households and therefore another system which costs twice as much is required. Furthermore, this alternative system requires an intelligent RTP meter which costs about $89 resulting in an annual cost of about $13. We assume that the manual meter reading costs that are avoided remain the same as the optimistic case.

For the optimistic case with an EMS, we assume that the CellNet system (or a similar alternative) would be used. In addition, we assume that instead of sophisticated automatic controls, the house would be equipped with a less expensive option such as a thermostat that would permit cycling of the air conditioning system. However, even a simpler control would require an electronic signal from the utility. Since the standard CellNet system does not have two way communication all the way down to the household, we included a communication link between the micro-controller (the device with which the house communicates) and the thermostat. This additional communication link is expected to cost about $50 (Willrich, 1996), adding about $8 to the annual cost for the communication system.

For the pessimistic case with an EMS, we assumed the use of an automated control in the house. At present the costs of such automated controls are quite high. While exact cost estimates are difficult to obtain, it is clear that current prices are greater than $800 per home (AEP $800, PG&E $800-$1000, CSW $1,800). This is too expensive for widespread use by customers. However, most utilities have set targets that are lower. We averaged the targeted or projected costs for these controls made by PG&E, AEP, CSW, and Entergy resulting in a cost of $650.

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3. MARKETING OF ELECTRICITY SERVICES TO SMALL CUSTOMERS

3.1 Summary

This chapter analyzes the potential nature and scope of benefits that small consumers might enjoy in a "consumer choice" environment. It also proposes means by which these benefits could be expanded by: (1) increasing the attractiveness of small electric consumer markets to consumers and providers and (2) increasing, directly and indirectly, the market power of small consumers.

- The benefits potentially available for small consumers could include both lower costs and a greater variety of diverse products and services that could increase the value of using electricity to small consumers.[5] Thus, to the extent that the latter benefits can be captured, it may not be the case that competition in wholesale power markets alone should be expected to provide the primary or exclusive benefits to small consumers.

- While transaction costs such as marketing costs will limit the potential benefits available when price competition based on switching suppliers is the key source of competition, such costs will not necessarily be a limiting factor when competition concerns better or differentiated products and services.

- The extent to which small consumers benefit in a "consumer choice" environment will primarily depend on two factors: (1) the attractiveness of a market to consumers and providers and (2) the relative market power of participants in a market. Unless small consumers are willing to participate in a market and providers are willing to offer products and services which they perceive small consumers will be willing to acquire, small consumer markets will not develop or, if they do, will be weak and fragile. The two primary deterrents to the development of a vibrant market for small consumers are likely to be due to inadequate benefits available to small consumers and/or customer market barriers that must be overcome to have small consumer pursue even a valuable offer. Providers will be discouraged from participating in small consumer markets if they perceive the potential value to be shared is too limited to allow their cost of providing products and services and a profit to be recovered with sufficient benefits left over to interest the small consumer.

- Marketers will adjust the cost and means of marketing to fit the potential benefits available in diverse small consumer markets. They will also seek to increase value by offering

[5] While this report tends to focus on individual consumer benefits, competitive markets, even for only some consumers, could provide general benefits to be shared to some degree by all consumers, such as: (1) not bearing the risk of paying for "excess" new generation construction; (2) avoiding paying for costly mistakes or costs actually caused by others; and (3) general cost reductions in the form of lower total costs due to competition.

differentiated products such as offering consumers a portfolio mix of various types of supply and energy efficiency or management services to fit various small consumers' needs and wants.

- Even if small consumer markets develop, small consumers will only enjoy the value created if they have sufficient market power to capture a fair share of the benefits for themselves. The extent to which this will occur depends on five primary competitive forces: the rivalry among firms; the threat of substitute products; the threat of new entrants, the bargaining power of suppliers and the bargaining power of buyers. The greater the strength and balance of these forces within a market, the greater the price and other benefits that will accrue to small consumers. The failure of competitive markets to develop in which there are competing providers with offsetting market power against other competitors is likely to mean that any value created in small consumer markets is captured by someone other than small consumers.

- To ensure that most small consumers have an effective opportunity to significantly benefit from "consumer choice", it will be necessary to: (1) increase the value of benefits to both consumers and providers, and (2) to increase small consumer market power vis-a-vis providers and other consumers. Experience from the natural gas and long-distance telecommunications markets suggest that most small consumers (i.e., 60 to 75 percent) will not individually participate in a competitive market primarily based on bill savings.

- In order to increase the attractiveness of markets to small consumers and providers, it will be desirable to: (1) ensure that small consumers have adequate access to understandable and credible information to make informed choices; (2) promote and encourage the voluntary aggregation of small consumers in order to reduce transactions costs for providers and to increase the desirability of individual small consumers; (3) recognize that regulators must establish a restructuring framework that promotes entry of new providers into markets including repricing services, where appropriate, and overcoming the incumbent advantage that monopoly regulation has given existing utilities; (4) ensure adequate consumer protection to help overcome consumer market barriers; and (5) to aggregate small consumers who do not choose, for whatever reason, to participate in the competitive market into similar groupings of small consumers who could as an aggregate still enjoy competitive benefits.

- To ensure that small consumers have adequate market power to capture a fair share of the value created in competitive markets, it will be necessary to: (1) ensure that marketers, brokers and aggregators have fair access to supply and unbundled transmission and distribution services to allow them to increase their relative market power vis-a-vis suppliers; (2) promote vigorous competition among suppliers; (3) promote vigorous competition among brokers, aggregators and marketers; and (4) offer small consumers who do not wish to participate in the market as an individual consumer to participate

in an aggregate of small consumers with similar characteristics to be served by competing providers.

- It may be necessary early in the development of potential markets to establish "benefit developers" whose role is to maximize benefits by small consumer groups by acting as an arranger/broker for such consumers in the market. These "benefit developers" could be created as non-profit entities funded by a non-bypassable charge to ensure that all small consumers have the opportunity and power to participate in the market. The extent to which there is vigorous competition among providers, small consumers should be able to capture a fair share of benefits for themselves.

- Regulators and other public bodies must however be particularly sensitive to the needs of low-income small consumers in a "consumer choice" environment who by definition do not have the income to participate more than marginally (if at all) in competitive markets in which ability to pay is more important than the need for an essential product or service like electricity. Adequate funds (probably through a non-bypassable charge) must be collected and an adequate infrastructure must be established to ensure that the level of services, assistance and options, currently available for low-income consumers are continued, and preferably expanded, in a "consumer choice" environment.

- If small consumers (including low-income consumers) are to be better off, then the timing of any electric industry restructuring should recognize that the necessary rules and structures (including consumer education particularly for low-income, senior citizens, and limited English-speaking consumers) to support competitive markets for all consumers must be in place before restructuring commences. Small consumer markets may develop over time. But without previous efforts to promote the attractiveness and market power of small consumers, there will only be an illusion of fair competition for or an equal opportunity to potentially available competitive benefits in the near term.

3.2 Introduction

The "consumer choice" or direct access model would allow individual customers to decide from whom to purchase and what package of services will best meet their energy needs. The vision underlying this model was recently described by the California Public Utilities Commission.

> Clearly, the vision we propose and the strategy to achieve it mark the end of one era and the beginning of another. In this new era, consumers will not automatically be subject to a monopoly franchise and thus dependent upon the utility as the sole provider of retail electric services. Furthermore, we believe that a managed and responsible shift to consumer choice through direct access promises to steer utilities and other non-utility

> service providers away from the hearing room, and to more productive, consumer oriented strategies focussed on delivering a diverse array of competitively priced, high-value products and services. As in other product and service markets, choices will appropriately decentralize decision-making and give consumers direct influence over the development, delivery, consumption and price of energy services. We believe this shift will benefit both large and small electric consumers, providers of electric services, including the utilities we oversee, California businesses and the state's economy. (*Order* at pp. 13-14)

The CPUC recognized that where competition was absent or insufficient in a customer sector that continued regulation of some form would be necessary. However, where competition could play an increasing role in the delivery of electric services, the Commission's responsibility would be to maintain the integrity of the marketplace in those competitive sectors (*Order*, Appendix A, Paragraphs 1-5). Based on its view of the effective competitiveness of customer sectors, the CPUC initially indicates that large industrial customers would be able to exercise consumer choice first, to be followed in a few years by all remaining consumers, including residential and small commercial customers. (*Order* at p. 30)

The CPUC has been evolving its framework to introduce and capture the benefits of more competitive markets. In its recent *Order* of December, 1995, the CPUC repeated its belief that:

> In the absence of well understood and easily exercised consumer options the genus of competition is thwarted. (*Order* at page 4)

This effort to ensure effective and practical options for consumers led the CPUC to revise some of its earlier decisions, including the timing for different consumer classes to enjoy competitive options. Under the December Order, the initial phase of direct access will be open to a representative number of customers from all customer groups (i.e., individual or aggregated consumers which exceed a 8 MW threshold limit).

The CPUC's continued deliberations over the form and timing for restructuring based on consumer choice through direct access have raised the following issues:

- Will small consumers enjoy the benefits of a competitive marketplace?

- Will disaggregating small consumers from large consumers with greater market power substantially limit any benefits that might be available from a more competitive electric services industry or worse result in a shift of costs to small consumers from more competitive markets?

- Will the timing to allow consumer choice through direct access disadvantage small consumers?

This chapter will analyze these issues to determine if the break-up of the traditional franchise concept is likely to benefit or hurt small consumers. We will also analyze potential means to improve the likelihood that all small consumers could benefit in a "consumer choice" environment.

The Need For A Relative Context To Consider These Issues

The question of whether small consumers will benefit under a "consumer choice" environment is not the same as whether small consumers will benefit or be worse off due to the disaggregation of the traditional franchise concept. The reason is that there are multiple sources of benefits and costs for small consumers that have no necessary correlation to the franchise concept.

A good example of a source of potential benefit for many small consumers would be the repricing and restructuring of current rates that would more appropriately relate usage (particularly time of usage) to price. Traditionally, regulation has tended to average prices across customers in the same class. As a result, it can be argued that many small consumers who do not use much electricity on-peak (e.g., non-air conditioning load customers) are paying far more than the cost to serve them because on-peak users continue to be undercharged. Changes such as a movement to real-time pricing, or a more rational, lower cost time-of-use pricing scheme for small consumers, could create significant benefits for some small consumers.[6] But, while real-time pricing has been discussed as an element of restructuring, the benefits to small customers of rate reform are by no means dependent on the ending of the franchise concept based on the aggregation of all customers. It is only if one assumes that markets are more likely to appropriately price services than regulation, that repricing benefits could be treated as the direct consequence of more competitive markets.

The context within which this chapter will analyze the issues raised by consumer choice through direct access focuses on those benefits and costs that are the direct consequence of relying on competitive market forces and individual consumer choice rather than the traditional aggregated utility franchise. While we do not mean to downplay potential benefits and costs unrelated to industry restructuring, the issue before us is whether consumer choice, franchises or some mix of choice and automatic aggregation is likely to provide the most benefit to small consumers.

[6] Indeed, this report demonstrates in subsequent sections that mandating the use of real time pricing meters for small consumers would exceed the potential benefits for most small consumers

The Prerequisites and Conditions for Potential Benefits to Small Consumers In a Consumer Choice Environment

The prerequisites for small consumers to have an opportunity to benefit in a "consumer choice" environment are the existence of benefits and the strength of competitive forces that circulate these benefits back to consumers, instead of allowing them to be captured by producers or distributors. Whether small consumers will benefit and the extent to which they will benefit is dependent on small consumers' market power vis a vis other consumers and potential providers. This will depend upon the following factors:

(1)The nature and extent of the benefits produced. While lower costs and savings are indeed valuable potential benefits for consumers, they do no represent the full range of value or benefits that competitive markets may provide or that consumers may value.

(2)The strength of the competitive forces in a market that both creates benefits and permits consumers to capture a substantial share of those benefits. There are five primary competitive forces within a market that determine the extent and distribution of benefits in a market: (1) the rivalry among existing firms; (2) the threat of substitute products and/or service; (3) the threat of new entrants into the industry or market; (4) the bargaining power of suppliers; and (5) the bargaining power of buyers. This "five-forces" model reveals that the greater the strength and balance of these five forces in a market, the greater the benefits that will retained by consumers in the market including lower prices and a greater variety of products and services to fit an individual consumer's needs and wants (Porter, 1980, pp. 3-33).

(3)The extent to which competitive benefits for consumers will accrue to all consumers, including small consumers, regardless of whether a consumer actively participates in the competitive market. Because some consumers can benefit in a competitive market does not automatically mean that all consumers will share in the benefits. For example, natural gas wellhead deregulation and open access transportation has resulted in lower gas supply costs. But, as noted previously, the distribution of these benefits has not resulted in all consumers seeing equal benefits. The shifting of embedded cost responsibility to price inelastic consumers has, at least for some period of time, offset or limited the potential benefits that small consumers have experienced from lower gas supply prices.

(4)The ability of small consumers to directly participate in a competitive market and exercise sufficient market power to ensure that they capture a significant share of the benefits created. Indirectly sharing in the benefits created by other consumers may or may not provide significant benefits to small consumers. One may be more confident that small consumers will significantly or equitably benefit in a "consumer choice" environment if (1) small consumers have a market which they could directly participate in and (2) the strength of competitive forces within that market was

> sufficient to ensure that small consumers would capture a significant share of the benefits created in that market. (Porter, 1985, p. 9.)

The strength of competitive forces in a market is important for two primary reasons: (1) it is the means by which downward pressure on price for equivalent benefits is created and (2) it determines the distribution of benefits produced in a market. The distribution of value between sellers and buyers is determined by relative market power (Porter, 1985, p.9; Porter 1980, 24-26).

3.3Experience Of the Impact on Small Consumers Of The Introduction of Competition Into Natural Gas and Telecommunications Industries

This section reviews the experience gained to date from efforts to open up the small consumer markets (i.e., residential and small commercial consumers) in the natural gas and long-distance telecommunications markets to competition. Three case studies will be considered on the natural gas side: (1) the California Core Aggregation program; (2) the open access opportunities available to all natural gas consumers in Ontario, Canada, and (3) a demonstration being conducted in Rock Valley, Iowa, to test the competitiveness of small consumer markets as well as to assess customer responses to repricing of natural gas service, particularly for peak use. A review of how small consumers have fared in competitive long-distance telecommunications will follow. Finally, we will draw lessons learned from these experiences which can help provide a framework and background against which to analyze the potential impacts and issues that the introduction of competitive forces into the electric industry may have on small electric consumers.

(1) Lessons Learned From Natural Gas

This section presents the experience gained to date from efforts to open up competitive options for small consumers in the natural gas industry. While competition for supply in the natural gas market has been a fact for almost ten years, it has only been recently that efforts to introduce competition into small consumer gas markets have been undertaken. The most advanced efforts to gain real world experience in these markets have occurred in the province of Ontario, Canada; in California; and in Rock Valley, Iowa. The lessons learned from these efforts follow.

- *California Core Aggregation Program*

California allows core customers (which include small residential and commercial customers) to purchase natural gas from suppliers competing against the incumbent supplier utility. However, the experience from this core market aggregation program to date has been: (1) that most small customers have not participated; (2) that only a few marketers continue to try to serve the market and (3) that marketing efforts have focused on small consumers with higher usage (e.g., multi tenant buildings and small commercial franchises).

The core market aggregation program peaked for Southern California Gas Company (SoCal) about April, 1993 when approximately 5.3 percent of the core aggregate load by volume was served by alternative providers other than the incumbent utility. That high point has declined by almost 30 percent to 3.6 percent in 1995. This decline in alternative provider volumes is also reflected in the decline in the number of alternative providers. In 1991, there were 10 third-party providers in the SoCal core aggregation program. By late 1995, there are only three remaining alternative providers. At least one of these providers is considering withdrawing from the program.

A similar track record has been achieved with Pacific Gas and Electric Company's (PG&E) core aggregation program which currently involves only 3.7 percent of sales by volume with three alternative providers. The San Diego Gas and Electric Company (SDG&E) program has also declined by 25 percent since 1993 so that current alternative provider volumes are only 5.5 percent of core volumes. The SDG&E program currently has three alternative providers.

The history of the core aggregation program in California has been driven by two crucial factors: the component of gas service that is subject to competition and the regulatory rules governing that competition. Under the core aggregation program, competition is limited to the commodity cost of gas which represents approximately 30 percent of an average customer's bill. Other services such as billing, transportation etc. are not subject to competition. In addition, competing suppliers due to regulatory order are limited to competing with the incumbent utility by buying supply in a limited number of geographic supply areas; areas in which the incumbent supplier is also a purchaser. The design of the core aggregation has had the effect of severely limiting potential benefits and therefore the extent of price competition among potential providers.

These facts explain what has happened to date in offering competitive gas procurement options to small customers. When the core aggregation program was first offered in 1991, even small customers were able to obtain cost savings by moving from core sales service to transportation only service. The price of natural gas from alternative providers was lower than the weighted average cost of gas offered by the various utilities. These factors induced some small consumers, as noted above, to switch suppliers.

This cost difference that provided the initial impetus and benefit to switch to third-party supply has however progressively diminished as the price differential between the utilities' weighted average cost of gas (WACOG) and third-party suppliers has steadily narrowed. A primary reason for the decrease in the size of this differential has been a restructuring of utility core supply portfolios to reduce the average WACOG. The result has been that alternative providers can only offer limited commodity savings to small customers. For an average SoCal residential consumer whose average monthly bill is $31, only $9, the commodity cost of gas, is even subject to competition. The following table shows the potential benefits if an alternative provider was able to capture a range of price advantages over the incumbent supplier.

TABLE 3.1

POTENTIAL BENEFITS OF PRICE ADVANTAGES FOR AVERAGE SOCAL RESIDENTIAL CONSUMER

	Monthly Savings	Annual Savings

Cost of Gas Advantage

0.4%*	$0.04	$0.48

0.6%*	$0.05	$0.60

5%	$0.45	$5.40

10%	$0.90	$10.80

16.5%*	$1.49	$17.88

20%	$1.80	$21.60

30%	$2.70	$32.40

40%	$3.60	$43.20

50%	$4.50	$54.00

* The current cost advantage of one provider over SCG, SDG&E, and PGE respectively.

As can be seen, the overall level of potential benefits is quite small even if a competing provider could save 20 percent of the commodity cost. The attractiveness of the prospect to compete for the average (or less than average use) consumer must be further put into perspective by acknowledging that the total potential benefits must cover the provider's cost, provide a profit and leave enough so that adequate savings attractive to the customer can also be provided. The low participation rates and the provider marketing focus on high use small consumers in the core aggregation program suggest that such limited benefits are inadequate to provide an attractive competitive option to many, if not most, small consumers.

The limited price advantage for third-party providers, together with the continued prohibition on other potentially competitive services, has forced alternative providers to segment the core aggregation market by targeting small consumers with high usage. As a result, the bulk of the current activity in the marketplace is in the small commercial sector, although higher use residential customers are also sought. Typical facilities served by third-party providers are institutions such as schools and hospitals, hotels, restaurants, laundromats, master metered apartments and a variety of other commercial businesses.

While alternative providers argue that the limited competition over commodity price restricts the scope of the market that is subject to competition, these providers indicate that marketing to small consumers is still a cost-effective process for higher use, small consumers who already have aggregated loads. The aggregators/third-party providers in California have used a broad range of marketing techniques ranging from direct mail to telemarketing. The most effective type of marketing has depended on the target customer sector. For example, sales agents have proven most cost-effective for commercial customers (e.g., chains or franchises). Telemarketing for some marketers appears to be the most cost-effective option for individual customers. Direct mail and door to door solicitation are the least favored approach because of the limited resulting participation compared to the cost of such marketing efforts.

The main marketing theme used by third-party providers in the core aggregation program has been cost savings. As expected, as the price advantage relative to the utility WACOG has declined so has customer interest in switching. There are however a few value-added benefits offered to small consumers by third-party providers such as allowing customers to pay by credit card and thereby capture incidental benefits such as frequent flier miles from using the card.

The limited potential benefits to small consumers who do not have high usage do not provide an attractive market to alternate suppliers, particularly when transaction costs such as marketing and the limited likelihood of participation are considered. The current third-party providers do not find marketing costs to be a problem at this time for the higher use, small consumer submarket that they are currently targeting. They are somewhat more concerned about the potential level of marketing costs if increased competition is allowed or occurs in the market. The need to differentiate one's offering

from other competitors is perceived as being an expensive, albeit necessary, cost to retain and capture market share. Marketers contacted pointed to the long-distance telecommunications market as an example. In addition as with any fixed cost, the more sales over which such costs can be spread the better.

The lessons learned from the California Core Aggregation Program should be caveated because the competition is limited to only a portion of the services offered in the market and regulation has limited the potential benefits even for supply by restricting potential sources of supply. Participation of third-party providers in the non-core market in which more services are competitive and thus potential benefits to customers greater is far more robust and successful. (Obviously this is likely to be due in part to the larger volumes to be saved by non-core customers.) However, knowledgeable utility personnel estimate that if the restrictions imposed in the core aggregation program were eliminated, as they are in the non-core program, between 20 percent to 40 percent of core customers would likely participate in the program. But, the limited extent of activity in the core market certainly suggests that unless the value of switching to a third-party provider is great enough (regardless of the reason why), most small consumers will not do so.

Thus, the experience to date in California in the natural gas industry has been that: (1) with limited potential cost savings, most small customers did nothing but remained with the current utility supplier when given that option and (2) the value of what can be offered to customers has driven to whom and how marketing efforts will be targeted. In addition, by maintaining the current utility as the default provider from a consumer doing nothing, rather than, for example, requiring customers to select a new provider, inertia favors the current provider who bears lower or no marketing costs to retain customers than competitors must expend to attract customers.

- *Rock Valley, Iowa*

The Rock Valley Iowa demonstration is an attempt to design a pilot to determine how small residential and commercial customers will react to being able to select third-party gas suppliers. The primary differences between Rock Valley and the California program are that: (1) in Rock Valley all customers have real-time pricing meters due to Rock Valley having been a test site for an earlier energy efficiency program and (2) in Rock Valley, the existing provider was going to participate in the pilot as an unregulated competitor. Simply, MidAmerican Energy (formerly MidWest Gas) was going to withdraw from the regulated gas supply business to become a distribution company. It would compete to offer gas supply to the residents of Rock Valley through an unregulated gas supply affiliate.

Because of MidAmerican's interest in separating the distribution and supply functions, small customers in Rock Valley had to choose a new supplier. This process was initiated by MidWest issuing a Request for Proposals to other suppliers and published in trade journals to select three bidders who could compete to offer services to the residential and small business market in Rock Valley. The three bidders selected to participate in the demonstration with MidAmerican were:

Equitable Gas of Pittsburgh, Pennsylvania; Interlink Energy Services, a division of NorAm Corporation and Minnegasco; and Energy One, a UtiliCorp United affiliate.

The three selected suppliers had a three week time frame to market their services to Rock Valley residents. Staff from each supplier was responsible for marketing. Each of the suppliers were given an opportunity to provide information and presentations during 15 public meetings that were held during one week in Rock Valley. Individual suppliers chose to pursue other marketing efforts as well such as door-to-door solicitations, newspaper ads and community events such as sponsored picnics. Equitable Gas, one of the competitors, also donated money to local community events and projects when it signed up or got a participation pledge from a customer. In addition, it started a Rock Valley office staffed by three employees from Pittsburgh and local persons. The marketing was somewhat stylized in that Rock Valley is small enough to allow certain kinds of marketing to reach large percentages of eligible customers (e.g., community forums and picnics and door to door solicitation in a small geographic area). At least one competitor established its marketing budget by analyzing acquisition costs per customer in other industries.

Customers selected their desired supplier by ballot. The final balloting gave Equitable Gas by far the largest number of customers with the unregulated Mid-American supply affiliate a distant second. 712 small consumers chose Equitable Gas, 167 selected MidAmerican, and 81 chose Interlink Energy Services. Energy One gained only 14 customers, below the minimum 50 required to stay in the demonstration.

Aside from price, there was no significant difference in the type of services offered. The price differences offered by the various suppliers track the results of the balloting. MidAmerican Energy (the unregulated of the former regulated supply) proposed to offer the current rates. Against this baseline, the other competing providers offered consumers the following choices:

- Equitable Gas guaranteed that each consumer would receive $6.25 per month in savings below the 1995 rates proposed by MidAmerican Energy.

- Interlink offered customers a $25 signing bonus and guaranteed $2.50 per month in savings off the MidAmerican 1995 rate.

- Energy One guaranteed a 10 percent savings off the MidAmerican 1995 rate.

Thus, approximately 84 percent of the consumers in the demonstration selected a new provider who had no affiliation with the previous supplier.

There are several important implications of the Rock Valley demonstration to date. First, the demonstration required all existing consumers to choose a new supplier. In contrast to the California Core Aggregation Program, existing small consumers did not have the option of simply making no decision and defaulting to the incumbent supplier. Second, the absence of a default option tended to levelize the cost of, need to, and potential success from marketing. It is a tenet of marketing that it is

less costly to retain customers than to attract them (Kotler, 1988, pp. 330-339). The ultimate success of Equitable Gas, which is acknowledged by observers to have been more effective in its marketing efforts, in gaining customers is telling.

Other important lessons learned from the Rock Valley demonstration are likely to be learned in the future because the test is also designed to determine how customers will respond to the ability to change suppliers or adjust their usage to time differentiated costs. Customers will be free to switch suppliers as often as they like while participating providers can change their marketing methods and service offerings at will. Rock Valley has also allowed customers to choose a new supplier as a result of the existing regulated supplier exiting the supply market. In that regard, the initial Rock Valley phase has resulted in a new mix of customer suppliers who will now compete over time in terms of price and service differentiation to augment the market share captured in the initial balloting. How these suppliers compete and what motivates customers to switch suppliers will be important future lessons learned from Rock Valley.

● *Ontario, Canada*

The development of the natural gas industry in Canada has preceded in some respects the evolution of the natural gas industry in the United States. Beginning in 1985, large customers were able to shop around for suppliers or third-party providers to meet their supply needs. By 1990, most industrial customers had been reached and third-party providers began to turn their attention to residential and small commercial customers. The strategy of the third-party providers appears to have been to focus on utilities that had the highest weighted average cost of gas (WACOG) which was often based primarily on long term supply contracts. By buying a different mix or portfolio of gas supply (perhaps only from one field or based on spot prices), third-party providers were able to offer small customers substantial cost savings compared to the prices offered by utilities based on their WACOG.

This price differential reached its zenith in the early 1990s when third-party providers found significant success in signing up residential and small commercial customers. This surge in core market direct purchases was driven by a sudden drop in short term gas prices compared to utility WACOG costs based on longer term contracts to ensure the security of supply. In 1990, the average Ontario gas utility WACOG was around $2.20 (Canadian) per gigajoule (gj). Spot market prices available to large aggregators were around $1.00 to $1.20 (Canadian) per gj. Small marketers and brokers paid more than large aggregators for spot market supply (e.g., $1.50 to $1.70 per gj) but still far less than the utility WACOG. Competitive suppliers at this time had no requirements or restrictions on where they acquired supply or for security of supply. As a result, competitive supply providers often bought short-term supply and did not worry about reliability. About one-third of core market customers (i.e., residential and small commercial customers) switched to an alternate supplier.

The Ontario natural gas utilities responded by adjusting their supply portfolios by moving to shorter term supply contracts (5 years versus 10 to 15 years) and by indexing and hedging to spot and

futures markets over the next two years. Spot prices also began to rise during this period reducing the price differential between the utility's WACOGs and prices in the spot market. At one point in 1994, the spot market price actually exceeded the prevailing utility WACOG. Currently, the utility WACOG is around $1.70 per gj, while a large aggregator could acquire spot gas supply for about $1.30 per gj. Small aggregators and marketers have seen an even more dramatic reduction in the price differential versus the utility WACOG.

But, even today, after price differentials have narrowed between the utilities and the providers, an estimated 25 percent of the roughly two million residential customers in Ontario receive gas service from a broker. There are approximately 24 to 25 brokers of all kinds in Ontario presently including those that serve small customers.

Initially, the driving force to get customers to sign up was the significant cost savings offered in the commodity cost of gas. (Like California, competition was over the cost of supply not over a broad range of potential services.) Under the typical "buy/sell" arrangement a third-party supplier would sell its available gas to the utility at the WACOG price and receive the difference between the WACOG and what it paid for the gas. This difference represented the monies available to share part of the savings with the customer and to pay for the costs of operating the brokering service as well as provide a profit.

In the early 1990s the predominant marketing technique was the use of door to door solicitation tactics using students and senior citizens who received a commission for each new participant who signed up. The sign-up cost to a customer during this period was around $35 to $50 (Canadian) which was estimated to cover the costs of the door to door representatives and the crew leader. An option was given the customer to have this fee taken out of the first "rebate" check to be given. About 30 percent of the customers of one broker choose this latter option.

The early marketing efforts in the 1990s focused on apartment buildings where individual meetings were held with the owner to get him or her switch the entire building. As this submarket became saturated, the movement to door to door canvassing to individual residential customers began.

These marketing efforts had two primary themes: (1) cost savings and (2) help to control the utility monopoly. The largest transaction costs to brokers were staff, rent and materials. One large broker estimated that it cost about $50,000 (Canadian) to maintain 100,000 customers per month. Canvassing or marketing was done by neighborhood with no particular targeting to reach low-income or non-English speaking groups. Some efforts were made to use community groups or churches as a means to solicit customers, but these efforts seem to have diminished over time due to limited success.

At the high point in the early 1990s, one broker had approximately 235,000 customers. It currently has 116,000. This decline appears due to two primary factors: (1) as in California, the price difference between the WACOG and the alternative supplier's cost of gas has significantly narrowed and (2) the impact from some early "fly by night" brokers who promised savings that were either not attainable (e.g., saving 20 percent of the bill when the savings were 20 percent of the commodity cost)

or did not emerge due to reductions in the price differential between WACOG and alternative supply prices and at one point, a sharp run-up in spot prices. Some customers who had paid $50 to switch found that the maximum annual savings were likely to be $15 per year or less. In addition, supply problems began to emerge as some third-party providers did not have adequate supply to meet contingencies due to a colder than normal winter or failed to honor supply contracts because of the narrowed price differential with utility prices, particularly in 1994 when spot prices temporarily exceeded utility WACOG costs. As a result, Ontario utilities acted to backstop providers to ensure that customers were served.

The problems with the "fly-by-night" firms and the difficulty that small customers had in understanding the often convoluted legal contracts that they signed with brokers led Ontario to develop a Code of Conduct regulating broker marketing practices and sales pitches as well as requiring certain supply reliability (e.g., at least three years of supply and transportation capability). In addition, marketers must give customers a written disclosure statement of potential risk and estimated savings. A copy of the Code of Conduct is contained in Appendix A of this report.

The direction of the degree of competition in the small consumer market appears to be toward consolidation in the number of providers and declining interest by small consumers for participating in the market. The current market has seen a shift in the nature of the competition due to the narrowed price differential that can be offered customers as cost savings. Door to door marketing still is favored by many third-party providers in Ontario with representatives making about $15 per customer signed up. Some brokers offer a somewhat higher sharing percentage of cost savings for senior citizens as an inducement to get them to sign up. Increased competition among brokers has however led to the elimination of seeking up-front fees from potential customers. The least favored means of marketing are direct mail and newspapers. Television and radio advertising have been used sparingly and with limited success.

The reduction in the price differential between the WACOG and alternative supply also appears to have led certain third-party providers to attempt to improve the results of their marketing efforts while reducing the costs. Municipal Gas of Winnipeg, Canada, a large aggregator, has recently concluded agreements with municipalities such as Winnipeg and Toronto to market alternative gas supply services using the municipality's name and marketing by adding a message to municipal mailings such as water bills. To attract the municipalities, the agreements provide that a certain portion of the savings will be received by the municipality. For example, Toronto received an endorsement fee of approximately $100,000 from MuniGas and will receive a portion of future savings as donations to its environment and energy efficiency project funds. The obvious benefit for the marketer, aside from using municipal resources to reduce the incremental cost of marketing, is the use of the municipal name which helps overcome potential customer concerns about the credibility and stability of the marketer.

There are several important implications from the Ontario experience. First, initially the significant price differential seems to be the motivating force for customers switching suppliers. Second, with an adequate price differential, the ability or cost to market alternative services to small

customers does not appear to be a problem. The marketing techniques used initially were essentially undifferentiated marketing techniques which presented natural gas supply as a commodity, not as a differentiated product involving security of supply. Third, a shake out period among brokers can be expected as well as normal "fly by night" firm problems in a developing market. A need for consumer protection such as the Code of Conduct is likely to be necessary. However, even with these early market problems and a reduction in potential benefits, reputable and well financed third-party providers have continued to market to small customers. Fourth, there have been changes in marketing efforts over time, in part as more neighborhoods have been canvassed and the need for a perception of credibility has increased. Decreasing ability to market substantial savings has led to a focus on reducing transaction costs by (1) piggybacking on other communications to potential customers and (2) improving the effectiveness of marketing by increasing credibility or using social marketing themes to increase perceived value by the consumer.

Ontario's efforts to create a competitive supply market for small customers was most frenetic in the early 1990s when costs savings potential was greater. But, even then most small customers (about 70 percent chose not to participate). The next few years will tell if the current third provider efforts to co-market with municipalities and to police their own industry will further increase participation by small customers. But, with typical customer savings now in the $15 to $20 per year range, it could be a hard sell for brokers and alternative providers, particularly if small customers who do not participate in the market simply default to the incumbent provider.

- *Experience From The Long-Distance Telecommunications Market*

Long-distance telephone service has been competitive since at least the late 1980s. Since that time, small customers (really those with long-distance bills over $10) have been subject to extensive marketing efforts by competing firms such as AT&T, MCI, Sprint and a variety of resellers. Despite this sophisticated and intensive marketing effort, a full 60 percent of small customers have not participated in a discount plan offered by any provider.

Aside from claims of better clarity in voice and data transmission and better customer service, the primary means of differentiation among competitors for small consumers has been over whose discount plans are the best. Indeed, the essence of competition has been to offer discounts to the minority of customers willing to change providers while charging other customers the costs of those discounts.

Recent surveys have also indicated that many customers rank the extensive marketing, particularly telemarketing by telecommunications competitors, as a major source of irritation. In addition, the "churn" of customers switching firms represents a substantial administrative cost to firms.

The more sophisticated marketing efforts of telecommunications compared to current natural gas efforts for small customers appear to be a product of the size of the potential market over which participants can be solicited. Also, because price or service comparisons to interest customers tend to

cover broad markets (e.g., international or national calling) rather than comparisons against the local utility's retail rates, which argue for more localized and specific marketing efforts, marketing has been conducted through national and regional media (e.g., television and print media) and telemarketing. Once it is decided to use national or regional media, there is little reason to not solicit even small customers to switch providers. In addition, increased competition to gain market share has resulted in increased marketing costs to differentiate one provider from another. It has become more expensive to add incremental customers as might be expected in a more mature market.

The experience in the long-distance market reveals that many different kinds of providers (e.g., full service companies like AT&T, Sprint, and MCI, and resellers like Schneider Communications and Working Assets) have developed to offer customers choices. Some firms offer an undifferentiated product (e.g., pay less) while, as noted, other firms attempt to differentiate their product even to small consumers (e.g., whom and when you call at a discount).

Firms have also sought to differentiate themselves to respond to customer needs and wants. Working Assets has employed a social marketing theme (i.e., part of your payment goes to causes that you want to support) while MCI markets that it has real people who answer when you need assistance.

For the 40 percent of customers who participate in the long-distance discount market, there are many firms and options to choose from if one wishes to do so. While any single small consumer may have no effective direct market power, resellers who aggregate customers have developed sufficient market power vis a vis suppliers to generate adequate value to attract customers, pay for costs, and provide a profit.

But, an equally important implication from the long-distance market is that despite heavy marketing, most small consumers have not participated in the market.

- *Lessons Learned From The Experience in Other Less Regulated Industries For Potential Electric Industry Restructuring*

The experience to date in markets in which small consumers have been offered competitive options suggest the following lessons learned:

(1)The predominant marketing efforts to date in competitive markets involving small consumers have focused on persuading consumers to switch suppliers to save money. Simply, natural gas and, to a lesser extent, telecommunications have been treated and marketed like a commodity-type or undifferentiated products. Commodity-type or undifferentiated products are perceived by buyers as highly standardized or identical offerings except for price.

> If a product class is perceived by buyers to be homogenous, then buyers will buy it from whoever charges the lowest price (Kotler, 1988, p. 448).

(Also see Kotler at pp. 494-495.)

The focus on price has two important consequences for the nature of the competition and marketing that will occur. First, the attractiveness of a commodity-like product to small consumers will be reflected in the magnitude of the price savings offered. If savings are adequate, consumers may act. Second, the attractiveness of the consumer market to potential providers will be determined by their ability to use whatever price differential is available to cover their cost, earn a profit and provide a product (i.e.,. savings from switching suppliers) that is sufficiently attractive to small consumers to acquire. In this situation, the transaction costs to attract consumers, including marketing costs, will be directly limited by the amount of the potential savings. Marketers and brokers/aggregators will concentrate on those small consumer segments that provide an opportunity for their benefits to exceed their costs.

The focus on an undifferentiated product does not however mean that firms offering commodity-like products will not seek to differentiate themselves or their product offering in some way from competitors (Kotler, 1988, p. 448). The recent activity of MuniGas in Ontario to partner with municipalities and to offer contributions to Toronto's environmental fund is similar to Working Assets's efforts in the long-distance telecommunications market to distinguish itself by earmarking some of a consumer's payment as contributions to causes of the consumer's choice. In addition, the discount plans offering savings for AT&T, Sprint, and MCI have also focused on who you can call for less in an attempt to create more value for consumers.

But, as we will discuss in the next section, this "value chain" for supplier switching based on price is quite distinct from offering consumers a product that is differentiated, not only by price, but by other aspects such as quality, reliability and other attributes that consumers may value.. Therefore, it is important to recognize that most of the experience to date with small consumers has not involved another potential source of competitive benefits for small consumers; differentiated products and services.

(2)When small consumers have been offered a commodity-type competitive product, most small consumers have done nothing (i.e., have not switched suppliers) unless they have been required to do so (e.g., the Rock Valley demonstration). Regardless of the industry (natural gas or telecommunications), 60 to 75 percent of small consumers have not opted to change suppliers, even though the competing provider may offer a price advantage over the incumbent utility.

There would appear to be three likely explanations for this result. It may be that consumer perception about the value of potential savings is based on: (a) the relative magnitude or importance of his or her energy or telecommunications bills in relation to other expenses; (b) the extent of potential savings in relation to the total bill and (c) the perception of whether all else is equal. Simply, a small consumer may not care about expending time, resources and effort to switch suppliers if energy or telecommunications bills are small in relation to other expenses or the consumer's available income; the savings off the total bill are not meaningful and the

consumer perceives that something may have changed (e.g., less reliability than the consumer wants or the risk of making a bad choice).

These factors also recommend caution in drawing conclusion from the experience of small consumers in other markets in other areas to assess how small consumers may act in competitive electric markets. Due to climate, average small consumer natural gas bills in Ontario are far larger than electric bills, while electric bills for consumers who live in central or southern California or heat with electricity are likely to be larger than natural gas bills. For example, the average monthly electric bill for residential customers in the San Francisco/East Bay area are approximately $54 to $64. Natural gas costs for these customers average about $42 per month. Unless the famous "all else equal" is in fact true for the comparison being made, the correct lessons learned will only be serendipitously identified. It would seem likely that consumers react more to relative total bills, than to energy or fuel type.

(3)In the Ontario and California cases, the presence of a competitive option for small consumers appears to have produced a benefit for all consumers, whether they exercised a competitive option or not. Prior to small consumer direct efforts, the Ontario and California gas utilities had not substantially revised their core market WACOG portfolios to reduce the average WACOG price.

The presence of significant activity in the small consumer market led these utilities to change their portfolios in order to reduce prices to compete with other providers. This reduction in the average WACOG benefits all of those small consumers who do not directly participate in the market in the form of lower prices. One could argue that the price reduction was acquired at the cost of less supply reliability (i.e., shorter long-term supply contracts). But, there appears little argument that the change does not represent a meaningful increase in risk in availability, particularly with the development of options and futures markets.

(4)The reduction in the price differential, and therefore the magnitude of potential savings, due to the utilities' readjustment of their supply portfolios has resulted in a sharp reduction in the number of competing providers in the small consumer market. But, the remaining marketers have increased their efforts to differentiate their firm's offering to increase its value to small consumers.

(5)The California Core Aggregation program has never had many competing providers because of the small price differential and limited savings that can be offered to small consumers. At least part of this result is attributable to regulator's decisions to permit the incumbent utility to maintain comparative advantages. This limitation highlights that limited benefits may be a consequence of institutional and regulatory policies, rather than an inherent aspect of small consumer markets.

(6)There is a need to protect small consumers from sharp business practices and "fly by night" operators. This protection could include establishing a governmental or industry code of

standards and educating and informing small consumers so that (a) they can make better decisions in the market and (2) to allow them to protect themselves. As in many developing markets, there will be providers who will be willing to join in such efforts to shore up the long-run sustainability of their industry (as well as in some cases to try and hamper potential competitors) (Porter, 1980, pp. 220-232).

There is a caveat that is also necessary when considering the experience to date of small consumers in competitive markets. That caveat is that competitive markets, strategies and providers do not typically grow up overnight. There is a transition from an emerging market to a mature one that takes place over time and which is marked by changes in a market's competitive environment (Porter, 1980, pp. 237-253). For example, marketers upon their initial entry into a new market are likely to target the "best" opportunities and form marketing strategies and organizations designed to capture those opportunities. This is what has happened in the Ontario direct access and California Core Aggregation program. It should not be assumed that these initial strategies or structures are what will be most effective in marketing to other small consumers in the market. A cadre of service agents who work with small commercial chains is unlikely to be the best means of success in capturing small residential homeowners. This caveat has particular vitality when applied to demonstrations such as Rock Valley. Unless a demonstration is simply a smaller microcosm of the world, it can contain artificial constraints or opportunities that are not reproducible in the real world.

3.4Potential for Small Consumers to Benefit from a "Consumer Choice" Model

The experience from other "deregulated" industries reinforces that the likelihood and extent of small consumers benefiting in a "consumer choice" environment will primarily depend on:

(1)The perceived value by small consumers of the potential benefits offered;

(2)The attractiveness of small consumer markets to potential providers; and,

(3)The extent of market power that small consumers can assert to ensure that a significant or equitable share of any competitive benefits accrue to small consumers, rather than suppliers, marketers/aggregators or other consumers.

In this section, we will analyze:

- the factors including value that will affect the attractiveness of competitive markets to small electric consumers; and,

- the factors including transaction costs that will affect the attractiveness of competitive markets to potential providers.

Based on that analysis, we will propose frameworks for:

- increasing the attractiveness of competitive markets to both small electric consumers and providers; and,

- increasing the market power of small electric consumers.

A. Factors That Will Affect The Attractiveness of Competitive Markets to Small Electric Consumers

The beginning of our analysis is to return to the fundamental definition of a market as sellers who have something of value to willing buyers that they are willing to exchange. Inherent in this definition are two necessary characteristics from a buyer's perspective: (1) a seller has something of value that is of interest and (2) the buyer is interested in making an exchange for that value. The strength of the value offered by the seller and the buyer's interest in the offer will determine the probability that a small consumer will participate in a competitive market.

Definition of Value To A Small Electric Consumer

We have noted earlier that competitive benefits include: (1) lower costs and (2) other benefits that are perceived to be valuable by small consumers. This value is expressed by a consumer's willingness to pay either lower prices for equivalent benefits or even higher prices for unique or superior benefits (Porter, *Competitive Advantage* at p. 3). Thus, to investigate the potential benefits that may be of sufficient value for small consumers to be willing to participate in a competitive market, it is necessary to distinguish between:

- Commodity-type products, and

- Differentiated products.

A commodity-type product is characterized by a perception that one unit of the product is identical to or highly similar to any other unit of the product, even if it is offered by a different provider. Price is the distinguishing factor. A differentiated product in one that is offered to consumers on the basis that it is different than similar products in some way that is or should be important to the buyer (Weinstein, 1994, pp. 5; 215-216).

Small consumers may value either or both types of products. But, their willingness to exchange with a seller may be different depending on which type of product that small consumers perceive is involved.

Electricity, like many products, has the potential to be marketed or perceived by consumers as either an undifferentiated or differentiated product. If a small consumer only views electricity as a means of lighting potential and does not care about the various ways in which it may be generated or

know about potential differences in reliability or quality, electricity is a commodity-like product. If all potential providers provide the same level of quality and reliability and that is all the small consumer is concerned about other than price, then electricity will be a commodity-type product.

However, electricity has the potential to be offered as a highly differentiated set of products to targeted consumer segments, perhaps to a greater extent than natural gas or long-distance telecommunications. The California Energy Commission's Committee Report on Electricity graphically distinguishes some of the various components of providing electric service that could be offered by competitive providers. These service components provide the basis to offer unbundled or bundled, differentiated services in a manner that meets the needs of individual or aggregated consumers. As one CEO of a major corporation has noted:

The lesson to be learned is that no matter how commonplace a product may appear, it does not have to become a commodity. Every product, every service can be differentiated.

Table 3.2 lists the various components of electricity services, as well as the feasibility of providing customer choice for them. In sum, electricity can be offered as a differentiated product on the basis of:

- Whether it is generated from fossil fuel or renewable resources;
- Quality;
- Reliability;
- The time period in which it is used;
- An alternative to a competing energy or fuel source because of some inherent quality (e.g., it tends not to explode);
- Bundling with end-use efficiency services or energy using products;
- Social marketing themes (e.g., contributors to charitable causes).

TABLE 3.2

FEASIBILITY OF CHOICE FOR COMPONENTS OF ELECTRICITY SERVICES

Service Component	Nature of Choice Options
Grid Connection	
1. System Connection	None possible - Distribution monopoly.
2. Connection Reliability	Differentiated quality feasible / alternative supplier feasible.
System Power Flows	
3. System Integration (includes voltage support and frequency control)	None possible - System operator monopoly.
4. System Reliability	None possible - System operator monopoly.
5. Power Quality	Differentiated quality feasible.
6. Minimum Load/Schedule Power	Alternative suppliers are feasible.
7. Real-Time Load Following Support	None possible - System operator monopoly.
8. Load Growth	Differentiated service levels feasible / alternative suppliers feasible.
Information	
9. Consumption Analyses/Advice	Alternative suppliers are feasible.
10. Usage Metering	Alternative suppliers are feasible.
11. Billing and Collection	Alternative suppliers are feasible.
End-Use Services	
12. End-Use Services	Alternative suppliers are feasible
13. Public Programs	Alternative suppliers are feasible.

This list can and will be expanded by creative thinkers and marketers. (Kotler, 1988, p. 448)

These attributes can be used to differentiate electric service as a variety of competitive products to be offered consumers reflect the differentiations made under regulation that track the costs to serve different types of customers. While regulators have used such differences to establish rates to reflect cost, marketers would use such differences to determine the extent of value that may be able to be created that consumers are willing to pay for in excess of costs.

The important point for assessing the potential attractiveness of competitive markets to small consumers is that competition does not take place on price alone because small consumers do not necessarily value products such as electricity on price alone. Small consumers may receive competitive benefits from buying differentiated products even though they may pay the same or even more than they are paying for their electric service now. The reason is that they perceive a higher value in the differentiated product.

The implications of the importance of value to small consumers in assessing the attractiveness of a competitive electric market are:

(1)The more that competing providers can increase value to small electric consumers, the more likely small consumers will be attracted to and participate in a competitive market; and

(2)Small consumers will need information to assess the value of an offer and consumer protection from offerings of providers who seek to create a perception of value, where none exists.

Both of these implications will be discussed in greater depth in a subsequent section concerning increasing the attractiveness of a competitive market to both consumers and providers.

Market Barriers That Limit Small Consumers' Interest In Competitive Offerings

The creation of adequate value for a small consumer is a necessary, but not a sufficient, condition to create the possibility that a small consumer would be interested in participating in a competitive market. The second condition needed is that the small consumer be willing to participate in such a market. Experience in other markets as well as within the energy services markets suggests that some portion of potential buyers in the small consumer market may not participate in a market exchange despite the potential for apparent substantial benefit. There seem to be three distinct reasons for this situation.

(1)They are simply not interested in making a market decision;

(2)After considering to some degree the potential exchange, they conclude that the status quo is good enough albeit not necessarily the best possible deal that they could get; and

(3)There are costs and risks, some hidden, that act as customer market barriers to committing to a potentially beneficial market transaction.

The line between the first two reasons may appear thin. But the natures of the two factors are qualitatively distinct. The second reason for foregoing a benefit has been termed "satisficing." Simply, consumers of all kinds, particularly when small benefits are involved, may not care about making the best economic deal. Small consumers often exhibit the characteristics of price insensitive

or inelastic customers. They are: (1) unlikely to care about small savings for a relatively small cost; (2) unlikely to be willing to consciously risk bearing more costs for a limited benefit; (3) unwilling to spend a lot of time or effort on a potentially small benefit; and (4) as a result, have great difficultly understanding the value or existence of potential substitutes or difficultly in really comparing options. (Porter, 1985, pp. 499-500.)

These characteristics have often been noted in small consumers' decision-making concerning cost-effective energy efficiency options and appear to exist for many small consumers in the natural gas and long-distance telecommunications markets. This "satisficing" decision is however a shorthand means of making a market decision: what I have is good enough.

The first reason, noted above, however is not an economic decision. Rather, it is a decision by a customer not to make a market decision.

> People do more than "satisfice"; they simplify, routinize their decisions, purchase by habit, adapt to familiar situations, all to economize on their scarce cognitive resources. (Lane, 1991, p. 27.)

Small consumers may simply decide that they do not care that an exchange is offered or that the exchange might even be beneficial.

The third reason that a customer may be unwilling to make a potentially favorable market exchange is that the "hidden" costs in terms of knowledge and the risk and potential for regret are not worth the potential gain. Unlike satisficing, the customer has weighed all benefits, costs and risks and found the exchange undesirable.

The potential customer market barriers in this category are similar to those commonly recognized as barriers to small consumers' interest in cost-effective energy efficiency investments. The prominent factors are:

- High information and transaction costs to research, to assess and verify the provider's claims, and to judge the uncertainties involved; and

- Irreducible but hidden indirect costs such as the risk of and regret for having made the wrong choice (i.e., having spent time and effort to receive no value or to lose value due to the decision made).

- Small consumers may face significant costs and/or efforts (relative to the potential benefits) to switch providers. (Krause et al., 1988, p. II-13.)

Conclusion

Overcoming these potential barriers to small consumers' perception of the attractiveness of a market exchange will require that:

(1)potential value offered to small consumers be sufficiently increased to change consumer behavior;

(2)customer market barriers are reduced by providing the consumer credible information to increase perceived value or reduce perceived risk;

(3)consumers are required to make a choice, because remaining with the status quo is not an option;

(4)switching costs be minimized relative to potential benefits.

B.The Factors Affecting The Attractiveness Of Markets To Potential Providers

There are two primary factors that will affect the attractiveness of small electric consumer markets to potential providers: (1) the extent of the potential benefits to capture; and (2) the ability to capture those potential benefits for oneself. The greater the potential benefits and the greater the market power that may be attained to capture those benefits, the more attractive a market will be to a provider (Kotler, 1988, pp. 298-308; Porter, 1985, pp. 231-272). Following is an analysis of the elements that will influence each of these primary factors.

(1) Extent of Potential Benefits To Capture

The determining influence in the size of the potential benefits to be captured is the extent of the value that can be created for small electric consumers. This value, as noted, encompasses both (a) price or cost savings compared to current price being paid by a consumer and (b) net revenues from selling products for whose value a small consumer's willingness to pay exceeds the cost to provide the product. If a provider's product does not create much value for small electric buyers, there will be little value available to be captured (Porter, 1985, at p. 9).

Because the experience to date in other "deregulated" markets has been on marketing to influence small consumers to switch suppliers (i.e., treating the product primarily like a commodity), it is not possible to estimate the potential magnitude of the benefits that will exist to be captured in small consumer electric markets. However, it is possible to suggest, based on some consumer surveys and average small consumer bills in California, the extent of the potential benefits that may be available from competition which treats electricity as a commodity-type product.

Survey and focus group information indicate that small consumers may be willing to switch suppliers for small cost savings. (It appears that consumers in this market research assume all else equal such as no diminution in reliability or quality.) For example, a survey in California by the

Charlton Research Company indicated that 63 percent of the respondents would consider switching for a 5 percent bill savings on their gas or electric bills. A similar type of survey by UtiliCorp indicated that 43 percent of the respondents would consider switching for a 5 percent bill savings, while 80 percent would seriously consider switching for a 15 percent bill savings. Our contacts with marketers and brokers in the natural gas small consumer market produced similar estimates of the bill savings needed to interest small consumers to switch suppliers.

We cite the survey information because it indicates that if marketers or brokers can offer net savings to small consumers in the stated ranges, after covering marketing, operations and administrative costs, that a potential market for small consumers may be viable. However, we caution planning based primarily on this survey information, as the experience to date suggests that even when some savings to small consumer may have been within this range, that most small consumers did not switch suppliers (i.e., 25 to 40 percent of small consumers did switch suppliers).

A more useful piece of information to estimate potential benefits, part of which may be subject to capture, is a range of potential savings for small electric consumers in California set forth in Table 3.3.

Based on information supplied to us,[7] it appears that approximately 50 percent of a small consumer's average total electric bill covers the costs of generation plant and fuel. This means that any percentage price advantage for these costs that a provider has over the incumbent utility will translate into bill savings of only one-half of the supply savings percentage (e.g., a 10 percent price advantage on supply represents a 5 percent bill reduction for the consumer).

[7] This information is attached as Appendix C.

TABLE 3.3

RANGE OF POTENTIAL SAVINGS

% Supply Cost Advantage	Annual $ Advantage	% Single Family Bill $672 annual
5%	$16.80	2.5%
10%	$33.60	5.0%
20%	$67.20	10.0%
30%	$100.80	15.0%
40%	$134.40	20.0%
50%	$168.00	25.0%

The 50 percent number above included costs which would be considered stranded investment in a restructured industry. If the market price of electricity was assumed to be 3 to 4¢ per kWh, then only somewhere between 1/4th to 1/3rd of an average residential bill would be subject to competition.

It must also be recognized that the price advantage for the provider must not only provide an attractive bill savings to the small consumer, but also cover the provider's costs and profit needs. One of the key costs that a provider may incur are marketing costs to attract small consumers to switch. Table 3.4 sets forth a range of potential price advantages and the impact of a range of potential marketing costs on those gross savings.

TABLE 3.4

RANGE OF POTENTIAL PRICE ADVANTAGES[8]

% Electric Cost Advantage	Annual $ Advantage	Direct Mail				Telemarketing				In Person Marketing			
		0.5%	1.5%	2.5%	3.5%	2.5%	3.5%	4.5%	5.5%	4.5%	5.5%	6.5%	7.5%
Marketing Costs =>		$200	$67	$40	$29	$83	$60	$46	$38	$69	$57	$48	$42
		Years Payback				Years Payback				Years Payback			
5%	$16.80	11.9	4.0	2.4	1.7	5.0	3.5	2.8	2.3	4.1	3.4	2.9	2.5
10%	$33.60	6.0	2.0	1.2	0.9	2.5	1.8	1.4	1.1	2.1	1.7	1.4	1.2
20%	$67.20	3.0	1.0	0.6	0.4	1.2	0.9	0.7	0.6	1.0	0.8	0.7	0.6
30%	$100.80	2.0	0.7	0.4	0.3	0.8	0.6	0.5	0.4	0.7	0.6	0.5	0.4
40%	$134.40	1.5	0.5	0.3	0.2	0.6	0.4	0.3	0.3	0.5	0.4	0.4	0.3
50%	$168.00	1.2	0.4	0.2	0.2	0.5	0.4	0.3	0.2	0.4	0.3	0.3	0.2

The marketing costs are based on a range of potential effectiveness in attracting customers and California specific marketing costs by particular method. It is important to recognize that the lowest cost-per-customer marketing method may not be the method most used. Rather, cost-effectiveness to select a specific marketing means and campaign (a mix of various means) will focus on the method that is most successful in attracting customers on a per-acquired-customer basis (Kotler, 1988, pp. 604-606).

Table 3.4 suggests several lessons. First, the range of potential savings for many small electric consumers may be too limited to interest them in switching to competing providers for dollar savings, particularly if the costs (including marketing costs) substantially diminish potential benefits that can be provided the customer or retained by the provider. Small benefits to small consumers when electricity costs are not a significant expense in relation to disposable income, as noted above, may simply not interest consumers. In addition to potentially uninterested consumers, providers may find insufficient attractive returns to be worth the cost, risk and effort to capture such returns.

[9] The derivation of the marketing costs is contained in Appendix B.

Second, marketing costs per se may not be the key factor in determining the attractiveness of small consumer markets. The reason is that the importance of marketing costs as a portion of individual customer benefits decreases as their effectiveness in attracting customers increases. Figure 3.1 demonstrates the exponential decrease in per unit costs as participation rates increase. But, to the extent that marketing costs are incurred, the total price advantage must be greater than the required bill savings to the consumer. For example, if many consumers require a 5 percent bill savings to act, the total price advantage needed by a provider is likely to be closer to 20 percent or more.[9] Obviously, if a competitor must spend more in marketing costs per customer attracted than benefits per customer, there is unlikely to be any market. As previously mentioned however, benefits beyond bill savings from the cost advantage of one provider over another are also possible and may be sufficient to promote a market exchange.

In addition, marketers are unlikely to use the same marketing techniques for small consumers that they use for consumers with higher usages and therefore higher potential benefits. Indeed, marketers tailor the means to fit the needs of the market including how much can be spent (Kotler, 1988, pp. 604-606). While it makes sense to use service agents for small commercial chains or direct solicitation to master metered apartment houses, these techniques are unlikely to be sustainable in small consumer markets with limited potential benefits. More undifferentiated marketing focused on savings with broad differentiation techniques (e.g., social marketing themes) are likely to be used for small consumers with small usage both to maximize marketing cost-effectiveness and to reflect that for many of these small consumers that electricity may be perceived as more of a commodity-type product.

The experience in Ontario is that current marketers seek to reach certain small customers by piggybacking on municipal mailings to reduce transaction costs. The effectiveness of these mailings have been sought to be increased by coupling the credibility of the municipality with the savings and social marketing messages (e.g., help the environment) used. In addition, marketing to customers with greater potential for benefit may provide a lower-cost opportunity to also reach small consumers. The experience in the long-distance telecommunications market suggests that this opportunity will be available, particularly the broader the potential market.

FIGURE 3.1

ILLUSTRATIVE MARKETING COSTS

[9] Table 3.3 shows a 5% bill reduction translates into a requirement for 10% cost advantage. Another 10% or more is needed to recover marketing costs shown in Table 3.4 plus profit. If there are special costs for equipment (e.g., meters), a much larger cost advantage is required.

But, regardless of the mix of undifferentiated or differentiated marketing techniques used, the limited potential benefits to many small consumers and the costs to attract new customers are likely to restrict effective marketing to some portion of small consumers for providers (1) who market solely to small customers to switch suppliers on the basis of savings, and (2) where the incumbent utility gets to keep small consumers if they decide not to act for whatever reason. This last factor of incumbent advantage is important to consider because of its potential impact on stymieing competition in small consumer markets.

Absent Requiring Small Consumers To Choose A New Supplier, Incumbent Advantage Will Decrease The Attractiveness of Small Consumer Markets to Competitive Providers

There can be a unique situation however in the competition over persuading small consumers to switch away from their incumbent utility supplier that marketing costs can be both a limiting factor in the ability to make an attractive offer to small consumers and a source of competitive disadvantage. This situation occurs when a small consumer simply defaults to the incumbent supplier if they do not select or are not allocated or assigned to another provider.

Existing utility suppliers to small consumers typically will have what are called "first mover" or incumbent advantages. These advantages can be particularly important for small consumers whose electric bills are not a significant expense in relation to available disposable income. The reason this is often so is that consumers have experience with existing suppliers which can provide useful knowledge to make a decision and/or create customer loyalty. In addition to these incumbent advantages, the utility may enjoy the use of cross-subsidies from the regulated enterprise including the use of utility name recognition, customer data, and shared overhead expenses. Potential providers must absorb additional transaction costs to overcome the incumbent advantages, provided as a result of the previous monopoly utility environment. Indeed, it is an axiom of marketing that it is less costly to retain customers because of incumbent advantages, then it is to attract new customers (Kotler, 1988, pp. 330-339).

But, there is another potentially more significant incumbent advantage if small customers who do not participate in the competitive market are simply defaulted to be the customer of the incumbent utility. The incumbent benefits because they are likely to retain a significant portion of their small consumer market base without any significant cost. Conversely, a competing provider must incur substantially greater marketing costs to overcome the incumbent advantage. The differential in cost and in success in maintaining or building market share all decrease the attractiveness of a significant portion (based on other experience between 60 to 75 percent of small consumers) of the small consumer market.

There are multiple ways to diminish some of the incumbent advantage to promote an increased attractiveness to potential competitors. The Rock Valley demonstration involves the need of all customers to choose a new supplier. The result was that the initial winner was a new supplier as opposed to the unregulated affiliate of the incumbent supplier. Another option is to allocate small core consumers among eligible competing providers or to allow small consumer the option to choose and assigning those who do not.

Allocating these customers among competing providers or allowing choice however does not necessarily increase the market power of these small consumers. History suggests that when price inelastic customers are aggregated with more elastic or price sensitive customers, that costs or margin requirements are shifted from the more elastic to the less elastic consumer. Equal or greater market power for small consumers would deter such a shift.

(2) Ability To Capture A Significant Portion Of Value Created

The second desirable aspect of a market for providers is the ability for a provider to capture for itself most of the value created. In order to do this a provider must have market power vis-a-vis consumers and other providers. The danger for small consumers is that they may be attractive because they have little market power due to being price inelastic or insensitive, but are not attractive enough to encourage the development of a strongly competitive market which flows competitive benefits back to small consumers. The result could be that small consumers are used as a source of high margins by providers and to augment provider market share and power.

The 60 to 75 percent of small consumers who typically to date have not actively participated in competitive markets represent a potentially valuable aggregated load for these very reasons. As noted, in this situation, the potential transaction costs to attract these small core consumers and incumbent advantage may limit the ability of providers to effectively compete for these consumers. The incumbent utility becomes the recipient by default of the margins that can be earned from these consumers.

Even the small consumers who exercise choice may be attractive to providers because they lack significant market power. As noted, history suggests that when price inelastic consumers are aggregated with price elastic consumers, either under regulation or in private markets, costs are shifted to, or margins increased for, the less elastic consumer. To the extent that a provider perceives that it can create value for small consumers, it may find them attractive for the very reason that it will able to capture most of that value.

C.Need to Increase the Attractiveness of Small Consumer Markets and Market Power For Small Consumers

If all small consumers are to benefit in a "consumer choice" environment then (1) the attractiveness of small consumer markets must be increased and (2) ways must be found to ensure that small consumers receive a significant share of the benefits created by competitive markets. In this section, we will discuss means to increase the attractiveness of markets to both small consumers and providers, and means to increase the market power of small consumers.

Increasing the attractiveness of markets to small consumers and providers.

We expect that marketers and brokers/aggregators initially will find a small consumer market that is characterized by great diversity in customer segments that they could market to and a wide differential in the attractiveness of various segments of the small consumer market.[10] Based on the experience from the natural gas and telecommunication industries, providers will initially segment the small consumer market based on the ability to offer price savings or value that allow the best opportunity to attract consumers and earn an adequate return. This means that the small consumer segment with the greater potential for benefit will be the first target of providers.

[10] Marketing techniques and messages will need to be different for certain kinds of customers. Low-income,

Those providers who wish to be more than niche players will focus on marketing that emphasizes price but contain differentiated firm and product messages that seek to distinguish their firm from other competitors. Marketing methods will be tailored to accommodate the size of the potential benefits available in different small consumers submarkets with more interpersonal techniques such as sales agents and telemarketing used for higher use small consumers. Lower cost and broad media (especially direct mail and news media) will be directed at the sizable core of small consumers who perceive only limited bill savings.

Niche providers will appear who emphasize price benefits to some customer segments such as promoting direct load control or savings opportunities for consumers with air conditioning or who reside in winter peaking microclimates. Other niche providers will emphasize some aspect of electricity as a differentiated product such as selling "green power" or offering a bundled package of electricity and natural gas brokering, energy efficiency and advanced telecommunications services. As the market matures, one would expect market, customer and firm differentiation efforts to increase if more providers compete for customers and emphasize shifts from price to some differentiable aspect of electricity such as reliability.

Marketing messages will be informational (e.g., you can save 10 percent) but like any marketing, will be geared to create a perception of value in the consumer's mind. Because of the potentially limited benefits to many consumers, marketing is unlikely to provide adequate information for small consumers to often verify the perception of value being created. For example, is a large price savings due to a drop in reliability of supply or does it represent a real increase in value without a decrease in reliability?

Absent efforts to increase the attractiveness of all small consumer submarkets to providers, experience suggests that a majority of small consumers will not directly participate in the market. Development of competition in other submarkets will be retarded by potential transaction costs to solicit and aggregate consumers, a lack of adequate value and/or artificial obstacles potentially caused by regulatory impediments to competition.

While initial experience suggests that many small consumers will not directly benefit by participating in competitive markets, this suggestion may be inappropriate because there are means that could increase the attractiveness of potential markets to both small consumers and competing providers. Following is a discussion of what we believe to be the primary means to increase small consumer opportunities in competitive markets.

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non-English speaking, and senior citizens all present unique barriers for effective marketing. These customers may make decisions for different reasons and marketing messages may need to be different in content and concept to be understandable and useful. However, the characteristics that distinguish certain customer groups will not, in our opinion, deter marketers from tailoring offerings for many of these types of customers. There are sufficient customers in each of these customer niches to make it worth while for marketers to pay special attention to the niche markets created by the customer usage or service need characteristics.

There is a need for small consumers to have access to credible information to assess the real value of competitive offerings.

Experience from areas such as energy-efficiency marketing indicate that lack of information and the cost and effort to secure necessary information can be significant customer market barriers despite the apparent value of the offer being made. This can be expected to be a particularly critical need for low-income, senior citizen, and limited English-speaking consumers. There are a number of potential ways in which to establish or enhance institutional credibility for the provision of information to small consumers. They include:

(1)Using institutions that already have credibility with small consumers. These institutions include independent testing labs such as Consumers Reports; small consumer advocacy organizations; unaffiliated environmental groups, regulatory commissions and state and local governmental bodies which represent sources of information that small consumers may believe in and feel comfortable seeking information from. Of particular value may be low-income weatherization and energy assistance providers who constitute an existing network experienced in dealing with low-income and limited English-speaking populations.

(2)To ensure that credible information is provided, an independent organization could be created whose sole function is to both proactively and reactively provide information to consumers, including small consumers. To capture economies of scale, this body could be a source of information for a variety of small consumer concerns in all deregulated industries: electricity, natural gas and telecommunications. This body could also act as a designated watch dog to assure that the marketing information being presented to small consumers is truthful, understandable and focused on the most important small consumer concerns. It could even do co-marketing with industry providers to disseminate desirable information by a variety of forms of media. Funding could come from a "tax" or transition fee imposed on all providers.

(3)Another option is to require certain disclosures and statements in either marketing efforts or contracts with consumers. The Ontario Code of Conduct attached as Appendix A provides an example of what disclosures might be required.

Promote and encourage the voluntary aggregation of small consumers to increase their market attractiveness and market power vis a vis marketers and brokers/aggregators.

The voluntary aggregation of small consumers can increase their attractiveness to potential providers in several ways. One way is by reducing transaction costs for potential providers who can deal with the aggregated entity as opposed to facing marketing and contracting with many individual small consumers. Voluntary aggregation also increases the load or market share that the provider may acquire (i.e., voluntary aggregation creates a larger customer for a provider). Voluntary aggregation also provides more market power for the aggregated entity to be offered or acquire a desired product offering and may permit greater savings which can be shared, as desired, among individual members of the aggregated entity.

Voluntary aggregation to achieve the purposes listed above are reflected in the formation of buyers clubs and customer cooperatives. For example, small consumers interested in purchasing power from renewable resources may aggregate in order to seek a marketer for such power or to further aggregate with other voluntary consumer organizations interested in a similar objective. Joint action agencies are another example. These voluntary aggregated entities could form as non-profits, such as the Citizens Conservation Corporation, to further reduce transaction costs for consumers.

Regulators should assist in the development of markets for differentiated products.

Regulatory reforms could aid in the development of differentiated products. As noted, regulators differentiate customers based on their cost to serve, while providers differentiate consumers to determine if they can create value for them in excess of the costs to provide that value.

Regulation however tends to average customers with different costs to serve and energy service needs within a single class. For example, the residential class contains those who heat, air condition or do neither with electricity. In addition, utilities serve all consumers based on one type of portfolio mix which all consumers pay a share of despite their possible desire to acquire a different mix. A prime example may be residential air conditioning consumers who may be paying less than their cost of service. The difference is made up by all other residential consumers. If residential air conditioning consumers faced a more appropriate rate, they could be more willing to acquire differentiated products and services to mitigate their costs.

Regulation should be concerned with potential mispricing that diminishes the attractiveness of potentially competitive services. In addition, regulation should serve as a credible source of information to consumers that better allows them to understand the cost to serve them as well as provide protection through establishing minimum standards for customer service or standards to provide understandable information to customers about their portfolio of electricity.

Assure adequate consumer protection for small consumers.

While this action is related to providing credible information to consumers, it also addresses the customer market barriers of risk and regret. The presence of "fly by night" operators or sharp marketing practices increases the risk of regret for small consumers, who are particularly prone to scams due to generally limited sophistication.

The Ontario Code of Conduct contained in Appendix A suggests the desirability of both proactive and enforcement actions that ensure consumer protection. While licensing is often proposed as a cure, it will not be meaningful one unless the requirements for licensing directly relate to ensuring a square deal for the consumer and are easily enforceable.

Experience from other deregulated industries indicates that there will be a need to prevent consumer marketing abuses. Some of the minimum actions necessary would include:

- An entity that can provide small consumers information on available prices and services that allow a consumer to understand what they are getting and to be able to compare offers.

- Ensuring adequate resources in the Attorney General's or Consumer Protection department to allow oversight of consumer transactions and to promptly prosecute abuses when they are detected.

- A requirement that information, contracts or other documents used by providers be both in English and all of the other primary languages in the areas sought to be served by the providers.

- Consideration of a requirement that a provider must meet minimum supply reliability requirements in order to be licensed.

- A license should require that a provider agree to a consumer protection system in which customers have (1) specified rights in case the provider fails to fulfill its contract, and (2) access to assistance in a dispute resolution process.

Funding for additional consumer protection needs created by a "consumer choice" environment should be collected through a non-bypassable charge.

Remove regulatory impediments to effective competition in small consumer markets.

There are two specific areas in which regulators can inadvertently constrain the development of a potentially competitive market. They are: (1) creating incumbent advantage and (2) artificially restricting the scope of products and services that can be subject to competition. We have discussed incumbent advantage previously so we will not dwell on it here.

As more products and services are opened to competition, it may be a worse case to leave small consumers halfway between regulation and competition. The California Core Aggregation program may be a case in point. That program is far more restricted in terms of competitive offerings than the analogous non-core open access program. Aside from the differences in volumes between the core and non-core markets, the restrictions imposed on the core program can only reduce the potential value and benefits available to consumers and therefore only decrease the attractiveness of that market to providers. If competition is to be the choice, then artificial constraints on its scope would appear to be counterproductive.

Treat small core consumers who do not actively participate in the competitive market as consumers who still have the potential to benefit from competition.

Experience suggests that at least initially many small consumers (perhaps 60 to 75 percent) either will decide not to or may not have an effective opportunity to participate in the competitive market as individual consumers. The conclusion is sometimes made that these core consumers will not benefit from competition, unless some competitive benefits trickle down in the form of lower total costs. Therefore, these consumers should be aggregated into a rump franchise and protected by some form of performance-based regulation.

There may be two reasons not to accept this potentially self-fulfilling conclusion. First, as noted previously, aggregated core customers may have real value due to their lack of elasticity and ability to add to market share. Second, there are likely to be some small consumers in this initial core who could in fact benefit in a competitive market, but for whatever set of reasons have not yet opted to participate. Creating a wall around these core consumers could further discourage some of these consumers from opting for better competitive offerings. If "consumer choice" is to be the policy chosen, it should be allowed a fair opportunity to provide value and benefits to all consumers.

D.Increasing the Market Power of Small Electric Consumers

The distribution of value or benefits in a market is determined by the collective strength of the competitive forces in a market. The greater the strength of collective competitive forces, the greater the benefits that will accrue will be to consumers. The greater the number of independent buyers and providers in a market (i.e., not affiliated with a power supplier or distribution utility), the more intense competition is likely to be (Porter, *Competitive Strategy* at p. 9).

The extent of the competitive forces within a market or industry can be further assessed by a consideration of four factors:

(1)The extent of competition for the same customers or whether competition is focused on distinctly different market segments.

(2)The degree to which product or service offerings are perceived by consumers as interchangeable or as distinct and different offerings.

(3)The number of strategic groups and their relative size in various markets. Strategic groups are firms offering similar products in the same market segment.

(4)The extent of the differences in strategy for brand identification, cost position, and technological leadership.

The extent to which small consumers will secure substantial competitive benefits will thus depend on the presence of multiple, equally balanced and sized firms, each following a different set of strategies while competing for the same small consumers (Porter, 1980, pp. 138-145).

The issue presented by a voluntary aggregation, "consumer choice" model is whether and/or how such a competitive market will develop for small consumers in which the "institutional" market structure and forces flow substantial benefits back to small consumers. The existence of attractive small consumer markets therefore does not ensure that small consumers will capture most or even many of the competitive benefits created in those markets. Rather, small consumers will secure significant benefits only if their market power is adequate to result in lower prices or improved available valuable products and services.

It is appropriate to separate small consumers into at least two distinct groups for analyzing whether and how small consumers might be able to increase their market power sufficiently to ensure that they capture a "fair" share of any competitive benefits. The two distinct groups are:

(1)Those small consumers whose potential level of value and /or willingness to seek competitive benefits make them sufficiently attractive and valuable to competing providers, especially aggregators, marketers and/or power brokers; and

(2)Those small consumers whose level of potential value make them less attractive to competing providers because of potentially high transaction costs in relation to limited potential value.

In the next section, we will discuss a framework for how each small consumer group might increase its relative market power. We will analyze how efforts to increase the competitive forces present in the market could potentially establish this framework for increased market power.

Framework For Increasing the Market Power of Small Consumers With Higher Potential Levels of Benefits

The small consumer group being considered in this section are the 25 to 40 percent of small consumers who have in other industries found competitive options that were sufficiently valuable to pursue. Conversely these consumers were found to be sufficiently attractive by potential providers to be worth the cost and effort of pursuing. For purposes of further discussion, it is desirable to distinguish among the potential competitors to serve these consumers.

(1)Generation owners who offer bilateral contracts. It can be expected that the cost, sophistication, risk and resources needed to negotiate such agreements will preclude individual small consumers from pursuing this theoretical option.

(2)Brokers or aggregators who might consolidate the demands of a number of customers and proceed to negotiate directly with suppliers

(3)Marketers who have put together packages of alternative services and market them to various groups of customers. This group would include specialized providers who offer bundled or unbundled products and services that increase the value or efficiency of using electricity, not necessarily including the supply of electricity itself.

Existing utility distribution companies could act as either brokers or marketers by better matching the cost, time-of-use and quantity of electricity available from its suppliers and the demand of its customer base. Indeed, if incumbent utilities maintained the bulk of market share, perhaps they should be required to provide portfolio choice to consumers (Hamrin, 1994).

The key to increasing the market power for this segment of small consumers will be dependent on: (1) a provider of electricity supply and/or other products and services who possesses the resources, sophistication and time to negotiate favorable contracts; (2) the ability of these providers to aggregate sufficiently large loads that are attractive to suppliers; (3) these attractive aggregated loads are dependent on marketers' and/or brokers'/aggregators' ability to influence small consumer purchasing decisions; and (4) there is strong competition among marketers and brokers/aggregators that flows significant benefits gained by these providers' use of market power vis-a-vis suppliers down to consumers. Therefore, it is imperative that any restructuring of the electric industry ensure that brokers and aggregators have competitive access to unbundled transmission and distribution services. The threat of entry of alternative providers must in fact be more than a threat, but a reality if small consumers are to have a real opportunity to benefit.

The ability and success of *independent* marketers and brokers/aggregators to affect small consumer purchasing decisions could indirectly increase small consumers' market power vis-a vis-suppliers. But, in order for any substantial potential benefits to flow down to small consumers, the strength of the competitive forces among competing marketers and brokers/aggregators must be sufficient to force these benefits down to consumers. A strong, competitive and independent network of marketers and brokers/aggregators would appear essential if all small consumers are expected to benefit from "consumer choice." The market attractiveness of small consumers must be adequate to allow these type of providers to develop and to take the risk of developing innovative products and services.

Sufficient numbers of marketers and brokers/aggregators who do not have conflicts of interest with small consumer interests (e.g., affiliated with powerful suppliers or attracted by large customers) may meet the four criteria discussed above. However, limitations on the number of marketers, barriers to market entry of marketers or conflicts of interest may create a need for someone to represent the interest of small consumers with the ability to influence their decisions. Therefore, there may be a need to develop "created or designated" brokers, developers or aggregators (i.e., benefit developers) to voluntarily aggregate this segment of small electric consumers to participate in supply and products and services markets. Non-profit organizations designed to perform this function could be created and promoted until the markets were sufficiently developed to sustain adequate private sector businesses to ensure a strongly competitive market. These entities could be created as part of any deregulation legislation needed with a sunset clause or requirement that after so many years (e.g., five years) that the regulatory commission determine the need for their continued existence. If they were no longer needed, their customers could be bid to independent marketers and brokers/aggregators with any net benefits given to consumers or their customers simply could be allowed to choose a new provider.

Framework For Increasing the Market Power of Small Consumers With Limited Potential Benefits

The keys to developing a framework to increase market power for small consumers with limited potential individual competitive benefits would involve: (1) minimizing transaction costs to secure competitive benefits by aggregating small consumers in this segment; (2) distinguishing consumers based on similarity of their usage and cost to serve characteristics; and (3) facilitating competition for the provision of services to customers based on these characteristics.

Facilitating competition for the provision of services to customers could take the form of either a) some form of authorized entity offering these segments for bidding among potential providers (similar to a biddable franchise discussed earlier) or b) assigning these customer segments to "benefit developers" whose sole responsibility is to facilitate the development of benefits for those customers. Using benefit developers for both customers with more market value and those with less value could be important for small customers because there may be no clear way to distinguish before hand which customers are valued and which are not. Hence, benefit developers might assist customers who are willing to participate in the market to obtain reduced costs or increased value. For customers who are not willing or are not able to participate in a competitive market, the developer would be responsible for making decisions to obtain competitive benefits.

The essential elements of this framework would be to aggregate these customers to increase their attractiveness to competitive providers, but to disaggregate consumers with different characteristics to discourage cost averaging in which, for example, the costs to serve higher volume users such as air conditioning users could be shifted in part to customers with predominantly small off-peak or flat loads. While this latter requirement would appear to disadvantage some consumers who currently enjoy being "subsidized" by other customers, the disadvantage is relative. Segmenting such customers to acquire competitive benefits would be intended to seek providers who would offer these customers cost-effective means to mitigate what they might pay if the costs to actually serve them were directly and fully assigned to them.

Another potential option could be to select potential bidders on the basis of creating a synergy with independent marketers or brokers/aggregators who serve larger use customers with cost to serve characteristics similar to the aggregated small consumers. This would seek to decrease contradictory interests between aggregated consumers. This would be done with the hope of increasing the market power of these providers vis a vis suppliers, as well as capturing some of the benefits that they may have already created with larger customers. However, this still creates the risk that larger customers would receive the benefits rather than small customers.

Finally, we recognize that some proposals have suggested that small core customers simply continue under a price cap form of regulation and stay out of competitive markets. While we do not believe that this alternative would produce comparable benefits to bidding to serve these customers, the situation would be improved if the concept of "tandem pricing" rather than simply the normal productivity factor was used to determine core customer prices and revenue requirements. "Tandem pricing" would link the prices charged to core customers with a basket of similar services in a competitive market. As prices declined due to competition in the competitive market, the corresponding prices in the core market would by proportionately reduced by some set ratio (probably less than a 1:1 ratio to encourage core consumers to opt to participate in competitive markets when that is a viable option) (See O'Connor, "Progressive Choice" in Enholm et al.).

We believe that there are two primary obstacles to the potential development of a viable competitive market for energy services for small electric consumers: (1) limited or inadequate benefits perceived by consumers (real or not) and/or potential providers, and (2) an inadequately competitive supply market which extends supplier market power through affiliated entities to the marketer and broker/aggregator level.

This second obstacle should be of concern, particularly until the outlines of the likely supply market become more discernable a few years after a move to a more competitive market. However, we are unable to devise any practical (and perhaps legal) way to ensure that such a situation does not occur. The best solution would appear to be efforts to ensure the development of a strongly competitive market among suppliers by requiring utilities to totally separate generation, transmission, and distribution functions.

If we knew the answer to the first issue: will small consumers and providers both see attractive market opportunities and adequate shared benefits, there would be little need for this report nor much controversy about how small consumers could be expected to fare in a "consumer choice" environment. We cannot rely on experience to answer the question because the predominant experience has been one of franchise regulation. As we have noted in this report, the experience from other deregulated utility industries can be used to gain insight, but is far too limited to provide conclusive answers to important and difficult issues.

Therefore, the "conclusion" that we draw is that it is not unambiguously obvious how much most small consumers will benefit in a "consumer choice" environment. This section has attempted to provide at least a framework for people to make their own decision.

The Special Circumstances of Low-Income Customers

In competitive markets, willingness to pay and ability to pay are more important than the consumer's need for a product or service. The direct consequence of this fact is that consumers with limited or inadequate ability to pay will be excluded from the market or limited in their participation by means of exclusionary credit policies or limitations on the nature and the extent of the service available to them. The inability to pay can also be compounded by elderly or limited English-speaking status.

Low-income consumers, almost by definition, are marginal or excluded market players due to limited or inadequate income. Individual low-income consumers do not have market power. Unfortunately, aggregated low-income consumers are no more attractive than individual consumers because aggregation does nothing to increase their value to potential providers, and indeed may even diminish any willingness to serve. This unattractiveness can be compounded by the "redlining" of low-income customers or neighborhoods because of other too common prejudices such as racism, sexism and welfare bashing.

Regulation has had to grapple with low-income consumer issues for a long time. In some states, extensive policies, mechanisms and programs have been developed to respond to low-income consumer needs. These efforts include: (1) establishing credit practices and policies far more forgiving than found in the private marketplace in order to maintain service to low-income consumers; (2) regulated collection practices that seek to make disconnection a final and seldom used means; (3) prohibitions or extreme limitations on potentially dangerous disconnections such as cold-weather moratoriums or procedures to avoid health-threatening terminations of service; (4) energy-efficiency programs designed to reduce consumers' bills; (5) emergency financial crisis intervention funds to prevent disconnection;[11] and (6) targeted lifeline rates and Percentage of Income (PIP) programs that seek to better match low-income consumers' ability to pay with the charges that they are assessed to receive service. These procedures and practices have been developed because electricity service is an essential service to what we now consider as a minimum level for the quality of life.

By itself, moving to a "consumer choice" environment would not appear to provide any significant benefit to low-income consumers, except to the extent that total costs to serve all consumers decreased. However, the opposite risk is also present that cost-shifting and lack of market power will result in small captive customer rates increasing. If this was the case, the current programs and efforts which are often woefully inadequate now would need to be expanded and strengthened. There is also a danger that in a "consumer choice" environment there will be less willingness or less ability to continue programs to aid low-income consumers or seek to substitute "market oriented" practices such as stricter credit requirements, higher deposits or authorize the use of prepayment or service limiters to make low-income consumers ration their use of electric service. Experience with such practices in France revealed that low-income consumers wound up self-terminating and doing without needed service because they could not afford the prepayment."

Utilities with particularly large segments of low-income consumers argue that it is unreasonable in a competitive world to force them to bear the cost of maintaining service and operating programs for low-income consumers. Some utilities propose that either the cost be borne by taxpayers (an unlikely option in these times), allocated among all utilities in a state (an idea resisted by other utilities who see no advantage to paying for someone else's customers) or allocating low-income customers across all providers to spread the burden more equitably. This latter proposal concerns some low-income advocates who perceive that keeping track of low-income burdens and problems will be much more difficult in a fragmented world of deregulated or partially regulated providers (Public Service Commission of Wisconsin, 1995).

The relevant question is what should be done to ensure that low-income consumers are at least not worse off in a "consumer choice" environment and hopefully are better off. Potential options to attain this objective could include.

[11] Federal and state budget cuts have severely undercut the ability to provide emergency payment and weatherization assistance to low-income consumers.

(1)Either existing regulatory entities or a separate state authorized entity should continue to mandate reasonable credit policies, collection practices and termination protections for all low-income consumers regardless of whom their provider is;

(2)Adequate funds to provide low-income energy assistance, early intervention programs, and low-income energy efficiency services should be collected by means of an access charge, taxes or a charge assessed to power suppliers. These aggregated funds would be administered by existing agencies or through a separate entity such as a Low-Income Energy Services Agency governed by a Board of Directors. A state commitment to Universal Service should be made in any deregulation regulation.

(3)The use of prepayment devices or service limiters for low-income consumers should only be permitted as a voluntary service which is priced lower to recognize the degradation in the quality of service that they represent.

(4)Low-income, non-English speaking and senior citizen consumers in particular, will need special consumer protection to prevent abuse by unethical marketers. This protection should include the provision of understandable information, through existing networks such as energy assistance and weatherization providers or new institutions designed to allow consumers to make informed decisions. Preventing "redlining" by competing marketers similar to the means used in the banking and insurance industries should also be pursued.

We attach as Appendix D, a review of potential low-income support mechanisms catalogued by Nancy Brockway at the National Consumer Law Center.

Providing funds to supplement low-income consumers' ability to pay will increase providers' willingness to serve low-income consumers to some degree. But, we believe that a continuing commitment by regulators or by a state authorized entity (preferably a non-profit entity governed by a board) with the authority to impose an obligation to serve as well as administer programs to make electric service more affordable and accessible is imperative in a "consumer choice" environment, just as it is under the current public utility franchise.

The Timing for the Introduction Of Competition to Small Consumers Is Crucial to Their Likelihood Of Achieving Significant Benefits

The timing of the introduction of a "consumer choice" environment is crucial for small consumers for two reasons: the current situation of available "abundant" power markets; and the importance of having certain institutional and structural requirements in place before small consumers enter the marketplace.

A driving force for "consumer choice" in California has been the high level of retail rates compared to other jurisdictions and the concomitant impacts on small consumer disposable income

and large customers' competitiveness. The presence of lower price power due to abundant supply within the region provides an opportunity for consumers to lower costs by switching from the incumbent supplier to take advantage of lower-cost supplies resulting from, in essence, a "buyer's market."

It would seem that whomever has more opportunity to capture the available lower- cost supply will have maximized the opportunity for benefits. For example, if a consumer or aggregated group of consumers can strike a deal in a "buyer's market" they may secure the best discount off the current price that they are paying the incumbent provider. The later a consumer comes to the market, the more opportunity there is for market conditions to have changed so that the "buyer's market" is less vibrant or, worse, the market has become a seller's market.

This disparate opportunity to access better supply options could occur even though ostensibly all consumers are allowed to compete at the same time (as indicated in the recent CPUC restructuring Order). Unless the market capability existed for small consumers to aggregate or be aggregated by marketers or brokers and small consumers could be induced to and understand how and why to participate in the market immediately, the same result as a differential release date will be likely to occur.

The potential response to the problem noted above is to act before the date for the introduction of "consumer choice" to remove or put in the place those institutions or processes that would aid and accelerate the development of more competitive markets for small consumers. These steps should include all the recommendations made in the preceding section to improve the attractiveness of small consumer markets to both small consumers and potential providers. The desirability of beginning consumer education early on to allow consumers to understand: (1) the potential benefits of aggregation; (2) how to choose a provider; and (3) whom to seek more information from should be highlighted. In addition, a Commission must be clear about what the "rules of the game" will be before the action started. This is necessary in order to allow potential participants in the markets to develop a strategy and capability to participate at the inception of the market.

3.5Conclusion

The "consumer choice" model is driven by the voluntary actions of individual consumers to maximize their well-being. This could include voluntary aggregation to enhance the market attractiveness and market power of individual consumers vis a vis suppliers, marketers and other providers. The competitive benefits that a small consumer may capture in a "consumer choice" environment based on voluntary selection include lower prices and the ability to choose among a greater diversity of products and services resulting from an increased incentive for innovation.

The development of small consumer attractiveness and market power in a "consumer choice" environment based on voluntary aggregation is dependent on: (1) substantial competition among independent suppliers and providers for small consumers' business; (2) informed consumers who

understand the value and nature of the offers being made and (3) the expenditure of time, effort and risk to aggregate many or most small consumers into more attractive entities to providers and/or to increase small consumers' relative market power. While there are means that may and should be used to cultivate more competitive small consumer markets, there is no obvious reason, based on limited experience in “deregulated” markets, why robust small consumer markets will develop absent governmental and/or regulatory involvement to remove institutional obstacles and to allow the development of new institutions such as “benefit developers.”

It could reasonably be anticipated that, at least initially, competition for small consumers will be price driven as to the cost of a kW or kWh. We expect that providers who offer or bid to supply small consumers will also offer additional energy services (e.g., energy efficiency and management services) and different portfolio mixes (e.g., more from renewable sources and less from fossil fuel plants) to differentiate themselves to gain business. But, it would appear that, at least at the inception of a small consumer market, that aggregated small consumers will be most attractive to marketers and other providers because of reduced transaction costs and increased market share for the provider who can capture the aggregate's business.

In this latter context, the distinction between a "consumer choice" environment based on voluntary, individual consumer aggregation and the franchise model based on automatic aggregation to change the status quo would be needlessly artificial. There would appear to be potentially significant real-world obstacles such as limited individual consumer and provider benefits, the potential for inadequate product service differentiation, and incumbent advantage to the widespread voluntary reaggregation of small consumers outside of the existing incumbent utility. These impediments may be transitional, but they raise a serious issue as to whether and when most small consumers will be able to benefit to the broadest extent possible from more competitive markets.

As a result of these obstacles, it may be that a combination of the local governmental aggregation model and the voluntary aggregation "consumer choice" model would be appropriate, at least in the early development of competitive small consumer markets. The local governmental aggregation model initially overcomes the inertia, limited information and experience, and the limited price benefits for an individual small consumer, while ensuring a level of protection against small consumer market failures. Local governmental aggregation to the extent that it does not preclude consumer choice (by allowing opt-out or disaggregating the aggregated entity for energy services acquisition) can increase the attractiveness of small consumer markets. The creation of viable, independent marketers and other providers in a robust small consumer market may provide the best opportunity for small consumers to share in competitive benefits. In this latter context, local government units could be playing the role of a “benefit developer.”

The effective development of small consumer markets should also contribute to the development of consumer information sources, provide valuable experience that allows consumers to gauge the value and risk of various competing offers, demonstrate which segments of small consumers are or are not enjoying competitive benefits, and reveal the extent of vigorous competition in the wholesale power and retail energy services markets. As robust small markets are developed,

one could expect more individual consumers to opt out when other providers offer more attractive options. If small consumer markets did not develop, then local governmental aggregation could serve to protect and benefit small consumers.

However, there is an inherent problem with automatic aggregation, whether it is due to local governmental aggregation or the automatic default to the existing provider absent a voluntary consumer decision to switch. The problem is that it may limit real options that are more favorable to individual small consumers by averaging and bundling rates and services across consumers with different costs and needs. There is however, no rule that prevents an aggregated entity from offering a range of bundled and unbundled services to its customers. But, "opt-out" provisions may be less effective in ensuring individual consumer choice than anticipated because of the incumbent advantage created for entities that can automatically aggregate consumers and the resultant transaction costs incurred by marketers and other providers to persuade small consumers to opt out. Simply, while aggregation by entities other than the existing incumbent utility may increase the potential number of independent buyers in wholesale markets, that, by itself, does not assure that individual consumers have access to varied prices, products, and services that best meet their needs.

However, in our opinion, the perfect should not be an enemy to an attainment of the good. The goal of a restructured "consumer choice" environment should be to ensure that all consumers benefit on a sustained basis. There are real and significant potential obstacles to the creation of robust small consumer markets, either in the short or long-term, through an exclusive reliance on voluntary, individual consumer aggregation alone. If small consumers must be aggregated to protect against market failures or to capture market benefits, it would make sense that the options should be designed to enhance the development of competitive small consumer markets, rather than to isolate small consumers from competitive markets or to enhance incumbent advantage which can only diminish robust competition. This may require that aggregated consumers be differentiated by cost to serve and need, rather than simply blended into a pot of undifferentiated consumers.

The use of "benefit developers" whose sole objective is to maximize competitive benefits for small consumers and the local governmental aggregation model (that includes a feature of disaggregating consumers within the aggregate and allowing consumers to opt out) together with the voluntary aggregation "consumer choice" model may hold the most potential to move from a tightly regulated environment to one in which the increased use of market forces is employed to stimulate innovation, the diversity of products and services available to individual consumers and the pressure to lower the total costs to provide energy services. If competitive markets for small consumers did not develop, this same blend of models would appear to protect small consumers.

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4. AGGREGATION OF CUSTOMERS THROUGH GOVERNMENT ENTITIES

4.1 Summary

In this chapter, we review the proposals made to continue a franchise model for electric utility services. The franchise model is characterized by the ability of an authorized private corporation (e.g., a utility) or local governmental unit to aggregate, at least initially, all electric consumers within a designated area into one entity.

Key findings in this chapter include:

- The primary objectives of the proposals to continue the franchise model are to protect small consumers from market discrimination by providers and vendors, and to provide more benefits to small consumers as an aggregate group.

- The continuation of the franchise model through the creation of local governmental aggregation entities could co-exist with a new environment characterized by consumer choice and direct access if individual consumers are allowed to opt out or select other providers. The local governmental aggregation model however, eliminates the exclusive right of public and private utilities to aggregate electric consumers within a specific geographic area.

- In a world of consumer choice, there appears to be no public policy reasons why local governmental units should not have the ability to aggregate consumers in the same manner that existing utilities still enjoy. This is particularly true as long as all consumers in an area must be aggregated to prevent "cherry picking," and the local governmental aggregation entity must be the provider of last resort for those consumers who do not opt to be served by another provider.

- The creation of the authority for local governmental units to aggregate consumers would "expedite" the formation of municipal aggregation entities without creating a monopoly, as long as consumers could opt out of the established entity.

- In addition to protecting small customers, the proposals to continue the franchise model would also promote the development of more competitive energy services markets.

    - The ability of local governmental units to aggregate consumers and to potentially join with other aggregated entities (e.g., by forming a joint action agency) can be expected to increase the number of larger, more powerful buyers in the wholesale power market, which could increase the strength of competition in that market.

- The ability of local governmental units to aggregate consumers reduces the transaction costs to create aggregated purchasing entities. In particular, local governmental aggregation would reduce marketing and other costs for potential providers, thus increasing the attractiveness of the small consumer market to these providers and increasing the level of competition in retail energy services markets.

- An aggregated entity could also provide the point for real-time pricing, thereby mitigating the cost and need for each individual consumer to have their own meter and communications system.

- The concerns raised by a continuation of the franchise model are that core aggregation entities (whether existing utilities or new local governmental aggregation entities) may make it more difficult for more competitive energy services markets to develop by deterring potential providers from offering services, especially to small consumers.

- The most viable option to continue the franchise model in an era of "consumer choice" is specific state legislation that authorizes local governmental units to aggregate consumers within a certain area. The formation of traditional municipal utilities does not appear to be a viable option due to cost, time to establish, and risk of lack of success due to the potential opposition of the incumbent utility and large consumers, who have direct access to the wholesale market. The "muni-lite" concept should continue to be pursued by some parties to resolve the legal issues that undergird its creation. But, the potential cost, lack of timeliness, and ultimate success of this latter concept suggest that specific state legislation is likely to be the more complete and timely option.

- In our opinion, the preferred form of a local governmental aggregation entity would include: (1) a provision that ensures the flexibility to capture "consumer choice" benefits including allowing consumers to "opt out"; (2) a commitment to minimum standards for energy efficiency, renewable power, and environmental factors which can be expanded by local decision; (3) the clear ability for the entity to join with other entities to increase its market power in wholesale markets; (4) a clear designation of the standards for rate setting and service rules, who is responsible for implementing these functions and how; and (5) the responsibility to aggregate and serve as a provider of last resort to all consumers who do not opt to be served by other providers. These attributes are contained in the TURN model, discussed below.

- In our opinion, if small consumers are both to be protected from potential market discrimination and to enjoy the maximum benefit of customer choice, proactive efforts to increase the market attractiveness and power of individual small consumers

are necessary to complement the authorization of the establishment of local governmental aggregation entities.

4.2 Introduction

Proposals to restructure the electric utility industry by introducing greater reliance on market forces, when feasible, raise fundamental issues concerning the ability of small consumers to benefit in such a restructured world. Traditionally, small customers have been aggregated along with other customers into a public utility franchise. This aggregation of all customers was often justified on the assumption that public utilities were "natural monopolies" that needed to be fully regulated to ensure the public interest.

Current restructuring proposals contend that the "natural monopoly" characteristic of providing electric utility service is overstated and that continued regulation may only be applicable to some core of small consumers and to certain services (e.g., transmission and distribution services). These proposals, such as the Direct Access plans set forth by the California Public Utilities Commission, seek to replace the existing monopoly franchise based on the aggregation of all customers within a specified geographic area with a mixed system of competitive markets for consumers, when possible, and revised regulation to protect customers who do not have effective access to competitive markets.

However, there remain vital unanswered questions that affect the resolution of whether a change to a "consumer choice" environment based on a Direct Access model will provide benefits or hurt small consumers (i.e., residential and small commercial customers). These questions can be divided into two general areas:

(1)The first general area of inquiry concerns whether it is in the public interest and the interest of small consumers to allow "consumer choice" to disaggregate the existing franchise model? Will small consumers be better off in a "consumer choice" model if the aggregated franchise is currently the primary source of benefits, including protection from a lack of relative market power. An additional concern is that by disaggregating the franchise, small consumers' ability to benefit from potential competition in wholesale power and energy services markets may be compromised.

(2)The second general area of inquiry concerns how small consumers could be expected to fare in a "consumer choice" model based on Direct Access. How many small consumers might be able to benefit in a "consumer choice" environment in which relative market attractiveness and market power, rather than regulation, determine the distribution of competitive benefits? Will providers find small consumer markets attractive enough to even care about? Will the level of transaction costs incurred to compete for small consumers exceed or limit the potential benefits from competition to such an extent that most small consumers either have no competitive options or lack any real market

power to ensure that they gain a significant share of any potential competitive benefits?

We begin our analysis with a review of the current proposals that seek to retain the franchise concept by automatically aggregating all customers within a prescribed geographic area. After identifying the primary justifications to support these proposals, we determine how small consumers might fare in a primarily disaggregated "consumer choice" environment. Finally, we assess the implications from these chapters about what type of environment could be expected to provide the maximum benefits for small consumers.

4.3 Continuation of the Franchise Model

"Automatic aggregation" for purposes of this chapter refers to a situation where some body (traditionally a utility, but in new proposals a governmental entity) is authorized by state legislation to aggregate all customers within a specific geographic area into a single entity, whether such individual customers initially wish to be aggregated or not.[12] We make this distinction in order to assess how the maintenance of this franchise model through "automatic aggregation" would co-exist or conflict with a movement to a "consumer choice" model.

The local governmental aggregation options reviewed in this chapter are based on the view that small consumers may be disadvantaged by a greater reliance on market forces (at least in the near term). Therefore, these options seek to either continue traditional regulation or to substitute local control to protect consumers against potential market discrimination in less regulated energy services markets. In addition, they serve as a means to capture benefits for aggregated consumers, rather than depending on market forces to equitably distribute benefits to individual consumers.

There are two potential concerns that are raised by the options to continue a franchise model:

(1)Will the form chosen inhibit the development of more competitive energy services markets? and,

(2)Will individual consumer choices be limited more than is necessary or appropriate?

There are four primary justifications that are generally used to justify the continued aggregation of customers within a prescribed geographic area into some form of a franchise.

(1)Competitive forces will be inadequate to protect some, most, or all small consumers from cost-shifting or to ensure that these consumers get a fair share of the overall benefits in

[12] Consistent with a "consumer choice" environment, an individual consumer could opt out of the entity initially formed by "automatic aggregation."

less regulated markets. The franchise concept of aggregating small consumers would seek to prevent market discrimination between consumers.

(2)The distribution of any benefits resulting from economies of scale or potential increased competition in energy services markets should be determined by "political" decision, not market forces, to avoid inequity due to differences in market power among customers, particularly for small consumers.

(3)There are some collective benefits (e.g., environmental, energy efficiency) that will be lost because voluntary decisions by individual consumers, even if aggregated, will not provide these collective goods.

(4)A franchise formed by automatic aggregation will reduce the transaction costs (e.g., metering and marketing costs) incurred to promote potential competition resulting in more benefits that can be distributed among all consumers.

Based on one or more of these arguments, proposals in various jurisdictions have been made to allow the automatic aggregation of customers within a specified geographic area (i.e., a continuation of the franchise concept to provide energy services) as part of the move to a consumer choice, direct access environment (TURN, 1995).

Forms of Automatic Aggregation

The primary forms for the automatic aggregation of customers within a given area in a consumer choice environment that are currently available or proposed to be created include the following:

- formation of a traditional municipal utility under existing statutes;

- formation of a "municipal lite" utility that owns very little of the existing distribution system, but is eligible to pursue wholesale power purchases under the Federal Energy Regulatory Commission (FERC) open-access transmission rules and policies; and

- formation of new entities authorized by new state legislation that designates local governmental units to automatically aggregate customers within their existing jurisdictions, but which may or may not exercise the same authority as traditional utilities and may own no distribution system or any substantial assets at all.

In addition to these entities formed through automatic aggregation, a second tier of aggregation to further increase potential benefits is also possible. The extension of the current joint action agency concept to any of the entities above could provide additional benefits to consumers.

Following is a discussion of the nature of and issues surrounding the formation of entities based on "automatic aggregation" to maintain the franchise concept in a “consumer choice” environment.

A. Forming Municipal Utilities Under Existing Statutes and Regulation

The formation of a utility by a municipality is currently authorized by state statute. Aside from the ability of a municipal government to involuntary aggregate all customers within a municipality into a municipal utility, there are several important fundamental features that characterize a traditional municipal utility: (1) ownership of at least the distribution system used to provide service to retail customers; (2) the authority and responsibility to establish rates, customer classes and service rules on a non-discriminatory basis in operating the utility; and (3) regulation on the wholesale level by the Federal Energy Regulatory Commission and perhaps state regulation over the provision of service to retail customers.

The creation of a new municipal utility by a community would create an entity that could participate directly in acquiring supply in the wholesale power market and determine how any savings would be distributed among aggregated customers. The Energy Policy Act of 1992 (EPAct) provides encouragement for the formation of traditional municipal utilities by promoting more equitable transmission access for wholesale buyers such as municipal utilities. EPAct reinforces what has been a growing interest to form municipal utilities to allow communities to purchase lower-cost power in the wholesale market.

The formation of traditional municipal utilities has been particularly driven in the last few years by the wide disparity between the retail prices established by investor-owned utilities and the price of wholesale power available in the market. Municipalization has been used to either form a municipal utility that allows access to the lower-cost wholesale market or to create a sufficient threat so that lower-rates can be negotiated with the existing supplier.

The driving force for the creation of new municipal utilities in the past few years has often been a large industrial customer in a community. As increased national and international competition has accentuated the importance of all input costs to large industries, such industries have become acutely concerned with being able to gain access to lower-cost power available from entities other than their existing supplier. Absent a direct access regime that would allow a customer to participate directly in the wholesale market, large customers have been instrumental in persuading some municipalities to form a new municipal utility that would allow access to the wholesale power market.

The feasibility and effectiveness of forming new municipal utilities as a way to increase access to a more competitive wholesale power market is however likely to be circumscribed in the future for several reasons.

The first obstacle to forming municipal utilities is the opposition of large customers to involuntary aggregation with small consumers which results from the formation of a municipal utility,

Large industrial customers, as noted, have often been a driving force in municipalization efforts. However, the advent of direct access proposals that would allow such customers to go directly to the wholesale power market undercuts their interest in being involuntarily aggregated with other customers. Indeed, two of the driving forces that has caused many large customers to favor "consumer choice" has been a desire to avoid the possibility of having to pay for "mistakes" made to meet aggregated demand during the last utility construction cycle, and to have the capability to avoid paying costs that are at least perceived to be costs that should be borne by other customers or taxpayers (e.g., the costs of Demand-Side Management (DSM), Integrated Resource Planning (IRP) and social programs such as low-income assistance. As a result of Direct Access for retail customers to power suppliers, large customers are no longer dependent on the formation of a municipal utility as a means to acquire lower-cost power. Thus, in a restructured environment, large customers are more likely to oppose, rather than support, the formation of municipal utilities in which they are involuntary aggregated.

The second primary obstacle to the formation of new municipal utilities may be the opposition of the incumbent supplier, particularly through onerous demands for the acquisition of the existing distribution system used to provide service to retail customers. a recent study by the Oak Ridge National Laboratory found that:

> These efforts can--and often do--take the form of refusing to sell the existing distribution network and seeking top dollar for these facilities if they are condemned, seeking recovery of stranded investment costs, attempting to negotiate lower rates with the utility's largest customer(s) and contesting all aspects of the proposed action in regulatory and judicial proceedings. These utility responses and the associated costs for the would-be municipal utility, in conjunction with local inertia, help explain why there has not been a flood, or even a significant trickle, of new municipalizations since the passage of EPAct in late 1992. (ORNL/CON-416, June 1995)

The formation of a municipal utility also means a loss of revenues and potential stranded investment for the existing supplier. Thus, it is hardly surprising that opposition from the incumbent supplier can result in extensive costs and time frames for municipalization efforts, which may ultimately prove unsuccessful. This possible outcome can and does have a chilling effect on the use of forming a new municipal utility. Proposed rules by the FERC create an additional barrier to forming municipal utilities. FERC has proposed to require that wholesale purchasers such as municipal utilities that change suppliers bear the cost of any stranded investment caused by their switch. While this stranded investment requirement will not necessarily discourage all wholesale supplier switching due to the wide price disparities from available wholesale power sources at this time, it does have the effect of reducing the magnitude of potential benefits relative to the likely costs and effort.

The circumstances noted above strongly suggest that the use of traditional municipalization in which a community aggregates all customers and acquires the local distribution system is unlikely to be the most practical and effective means to protect small consumers in a more competitive

environment. The cost of the acquisition of the distribution system and the cost and length of municipalization efforts due to the opposition from the incumbent utility and large customers will tend to make the creation of new municipal utilities a practical alternative only in specific circumstances (e.g., if large customers are willing to be aggregated and existing suppliers are cooperative). As a result, if communities that do not already have an existing municipal utility wish to capture the potential benefits of lower price power in the wholesale market, other more viable and effective alternatives will need to be developed.

B. "Municipalization Lite" Under Existing Statutes

Communities interested in taking advantage of lower-cost wholesale power opportunities by forming a municipal utility are well aware of the downside costs and risks of trying to form a municipal utility by traditional means. Instead, various communities across the country have been exploring a lower-cost municipalization option dubbed "municipalization lite."

The primary attributes of the "muni lite" concept are directed at (1) reducing the transaction costs to create a municipal utility, particularly the need and cost to acquire the existing distribution system and (2) using the open-access transmission powers and decisions of the FERC to gain access to the wholesale power market. A utility subject to FERC jurisdiction can use FERC powers and policies to gain access to the open-access transmission opportunities in EPAct and implemented by FERC in the wholesale power market. Section 213(a) of the Federal Power Act, as amended by EPAct, requires a utility to respond to a good faith request for transmission service by an electric utility. A refusal to provide the transmission services requested allows the denied electric utility to ask, pursuant to Section 211 of the Act, that the FERC require a transmitting utility to provide the requested transmission services (including any enlargement of transmission capacity necessary to provide such services).

The "muni lite" concept raises a threshold legal issue: how much equipment must an entity own to qualify as a municipal utility under existing statutory definitions to be able to operate under FERC open access rules? This legal issue is currently being raised before the FERC in a number of cases involving the efforts of various communities to gain access to the wholesale power market. One illustrative case involves Falls Church, Virginia. Falls Church wants to aggregate all electric customers within its jurisdiction to create a municipal utility in order to seek lower power costs. But, Falls Church has no interest in acquiring the existing distribution system. Rather, it has proposed to acquire and own minimal distribution plant (e.g., meters for customers) and has asked FERC to certify it as a public utility so that it can participate in wholesale transactions. Falls Church's current supplier is vigorously contesting this request. Falls Church has indicated that, if necessary, it will keep adding a little bit more distribution plant each time that FERC fails to certify it until FERC finally determined that public utility status for wholesale power market purposes has been satisfied.

The "muni lite" concept and attendant legal controversy have also become active issues involving California communities and investor-owned utilities. The City of Palm Springs recently

requested Southern California Edison (SCE) to provide network transmission services for the delivery of wholesale power to Palms Springs. SCE denied the request stating that:

> ...an entity requesting wheeling that intends to resell that wheeled power to ultimate consumers must deliver all of the wheeled power to all of its ultimate customers over an integrated transmission or distribution system that it owns or controls. This interpretation is based on Congress's intent that sections 211 and 212 [of the Federal Power Act] does not become a vehicle for disguised retail wheeling or other sham transactions. Congress did not intend, and the words of the statute do not provide, for FERC to compel utilities to wheel power to their former retail customers if a third party "wholesaler" simply installs duplicative meters--which do not and cannot, deliver--next to the customers' existing meters.[13]

The City of Palm Springs has indicated that it will file for a Section 211 Order from FERC as well as issue a request for proposals to potential power suppliers.

The "muni lite" issues raised above are present in other California community efforts to gain access to the wholesale power market without having to bear the cost of acquiring the entire existing distribution system. Culver City, the City of San Carlos, and more than a dozen cities in San Mateo County are actively pursuing the "muni lite" option. Similar efforts are underway or being seriously considered in various communities across the United States: Albuquerque and Las Cruces, New Mexico; Brook Park and Toledo, Ohio; Broken Bow, Oklahoma; Bennington, Vermont; Westbrook and Jay, Maine; and Romeo, Michigan.

The success of the "muni lite" option to gain access to the wholesale power market is obviously dependent on the resolution of the legal issues involving an interpretation of existing statutes. In particular, how much distribution system must a municipal utility own to qualify as an electric utility under the Federal Power Act, and do Sections 211 and 212 permit such "muni lites" to receive wheeling orders from FERC under the open access authority granted FERC by EPAct (if a state does not compel wheeling itself)?

Experience to date would indicate that incumbent utility suppliers may vigorously oppose "muni lite" efforts through extended litigation and non-cooperation. (This may not be universally true however as a number of California communities interested in the "muni lite" concept have indicated that their incumbent supplier, Pacific Gas and Electric, has not rejected their interest for access out of hand and has been cooperative so far in considering their interest for access to the wholesale market). Therefore, there are several reasons to wonder whether pursuing the "muni lite" concept under existing statutes will be anymore effective than traditional municipalization efforts:

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[13] It should be noted that SCE's comments here are directed at FERC's authority to compel retail wheeling. But, since the CPUC is compelling access to the transmission system and wheeling, this type of argument may be germane only if a state is unwilling to order retail wheeling.

(1)The cost and resources to establish the "muni lite" concept under existing statutes may be costly with no certainty of success in the long run.

(2)A key issue in access to the wholesale power market is timing. Because of "surplus" capacity and the creation of a new or expanded power market, it is reasonable to believe that those who can get into the new market first will have the best opportunity to maximize benefits. Thus, even if the "muni lite" efforts are successful, the timing of that success in terms of ultimate benefits is likely to be very important. Other parties such as existing utilities, investor-owned or municipal, could be the prime beneficiaries of an extended conflict over the "muni lite" concept at the same time that the wholesale power market is being opened to increased competition.

If successful in establishing the "muni lite" concept under existing statutes, communities without an existing municipal utility could be expected to generally favor this route over traditional municipalization due to its decreased cost. While stranded investment costs may be imposed under FERC or state regulatory rules, such costs are likely to reduce, rather than eliminate the real benefits available in a more competitive wholesale power market.

C.Automatic Aggregation of Customers By Local Governmental Units

The "muni lite" concept under existing statutes is a means to reduce the cost of forming a traditional utility to get to the wholesale power market. A range of new proposals seeks to create new entities by aggregating customers more as a large customer purchaser than a traditional utility. For purposes of this report, we will refer to these efforts as local governmental aggregation as opposed to"muni lite" efforts under existing statutes. These new proposals seek to use the ability to reach the wholesale power market provided under direct access schemes for retail customers, rather than rely on exclusively, or even primarily, on electric utility access to wholesale markets under FERC jurisdiction.

The primary, unifying characteristic of the current local governmental aggregation proposals is the retention of the "franchise" concept underlying the current regulation of utilities. The exclusive franchise in the past has been justified (in part) by the assumption that public utilities are natural monopolies. These new proposals would appear to be based more on the viewpoint that in a competitive world, market attractiveness and power determine who gets what benefits and who does not. As a result, automatic aggregation is a necessary and desirable means by which to ensure that some customers will not be unduly disadvantaged by a relative lack of individual market attractiveness and power to capture available benefits. Increasing the number of independent buyers in the wholesale power market could also increase potential benefits from energy services markets. These aggregate benefits would be distributed through the efforts of the local governmental aggregation entity among customers on the basis of collective "public interest" decision- making rather than on the basis of varying degrees of market power.

The retention of the franchise concept in these new local governmental aggregation proposals could be in direct antithesis to the concept underlying the "consumer choice" model. The involuntary aggregation of all consumers in an area with no ability to opt out would preclude individual consumer choice. But, proposals such as that made by TURN in California, avoid this result by allowing individual consumers to opt out of newly formed local governmental aggregation entities. Thus, such aggregation proposals are not per se inconsistent with consumer choice proposals and, as will be discussed, could further the development of a consumer choice environment.

A unifying characteristic of the local governmental aggregation proposals is that they attempt to reduce the cost of maintaining the franchise concept, whether this is done through a municipal utility type entity or a local governmental entity that will only act as a purchaser or broker of wholesale power or other services for automatically aggregated customers. These latter entities would be more analogous to a purchasing agent than a traditional utility. Indeed, the new proposals seek to expand the options for the franchise concept, not to limit them. Thus, the proposals uniformly recognize the right of a municipality to create or continue a traditional municipal utility or to pursue the "muni lite" concept under existing statutes. But, they also seek to expand the option for local government to serve as a practical and effective agent for aggregated customers without having to assume the responsibilities of a utility.

(1) Current Local Governmental Aggregation Proposals

This report will focus on specific local governmental aggregation proposals made in California and Massachusetts.[14] The reasons are that the range of proposal made in these states embody the range of options that have been discussed across jurisdictions and have been developed in sufficient detail to raise the myriad of issues that are likely to be the subjects of on-going debate.

●Massachusetts

Legislation has been proposed in Massachusetts to allow local municipal governments to establish Consumer Service Districts (CSDs). These CSDs could be created by a two-thirds vote of the existing municipal governing body (e.g., a Common Council). All customers within a municipal government's jurisdiction would be automatically aggregated as a customer under the CSD.

The CSDs created are authorized to negotiate wholesale power supply contracts. In doing so, a CSD may join with neighboring (i.e., adjacent) CSDs by means of a joint contract to increase negotiating power with potential suppliers.

A distinguishing feature of the CSD legislation is that a CSD will only act as an aggregator whose primary responsibility would be to conduct a competition among potential suppliers to serve the aggregated customers. The CSD would not act like a traditional municipal utility by establishing rates and rules for service nor would it perform normal billing and other administrative functions. Rather, these traditional regulatory and utility functions would be assured as part of the contract required of the winner for the "biddable franchise."

[18] Because proposals are made to solicit comments to improve what is proposed, the specific proposals discussed may have been changed by the time this report is available. Our review is intended to identify the scope of potential proposals, not to attempt to reflect every change that has or could be made in a specific proposal.

The proposed legislation provides that competitive bidders would have to agree to specific requirements included in any franchise contract. These requirements would include minimum standards concerning ratemaking, service rules, operation and quality of service as well as requirements to incorporate state standards for DSM and IRP. Revisions to these state standards by normal state rulemaking processes would be required to be adopted in the CSD by the local franchise contract. The Massachusetts Department of Public Utilities (DPU) would retain its current oversight authority to enforce the requirements of the franchise contract.

The Massachusetts legislation also addresses the issue of ownership of the existing distribution system for a community in which a CSD is formed. The legislation provides that unless the existing utility supplier wins the "biddable franchise" that either: (1) that the winning bidder will acquire the existing distribution system needed to provide service or (2) that the municipality forming the CSD will acquire the distribution system and other utility facilities within the CSD. In an attempt to reduce the potential cost for and acrimony from such an acquisition, the legislation provides a specific valuation formula and dispute resolution process.

The issue of potential stranded investment is also addressed in the legislation. The Massachusetts DPU, using a "used and useful" standard, would determine what constitutes stranded investment. The incumbent utility would need to demonstrate that it attempted to mitigate stranded investment costs by making good faith efforts to market any unused generation or transmission capacity. Ultimately, the DPU could order the utility to sell any stranded investment and divide any remaining costs between utility shareholders and ratepayers, with the ratepayers' share capped at one-third of such remaining costs.

Finally, under the Massachusetts CSD proposal, the municipality responsible for the CSD would receive a monthly franchise fee from the supplier which won the "biddable franchise."

●TURN Proposal in California: "Community Access To Competitive Electricity"

Toward Utility Rate Normalization (TURN), a well-known consumer advocacy organization in California, has proposed a local governmental aggregation mechanism in response to the California Public Utility Commission's Blue Book proposals for a direct access system. Like the Massachusetts CSD legislation, the TURN proposal is premised on the existence of local governmental entities to automatically aggregate all customers within their jurisdiction, and the use of bidding or private negotiations with potential bulk power and other energy service providers to capture benefits for these aggregated customers. The objectives are to minimize transaction costs, to aggregate load, and to increase the potential for small consumers to benefit from wholesale power markets as well as to prevent small consumers from being disadvantaged by vendor discrimination.

Under the TURN proposal (which is still being formulated as to certain specific details), a municipality, county, water district or other local body would be authorized under state law to automatically aggregate all customers within their jurisdiction to form a municipal aggregation unit. The local entity would also be responsible as the provider of last resort for aggregated consumers. This requirement discourages "cherry picking" of consumers which could characterize the actions of private providers in markets. The TURN proposal does not yet specify how the local governmental unit can create a municipal aggregation entity. But, it would appear that some form of representative decision-making such as at least a majority vote of the local governmental body and/or citizens within a proposed entity would be required.

Individual consumers would have a one-time opportunity to opt out of the new entity but would face return requirements (which are still being developed). An individual consumer could choose to stay with its existing provider, find another provider, or go with the municipal aggregation entity. The initial TURN proposal did not contain an opt-out provision and thus would have resulted in the "involuntary" aggregation of all consumers. The current TURN proposal, by including an opt-out provision, provides for the expedited formation of a municipal aggregation entity but avoids the monopolization of a specific set of consumers.

The municipal aggregation entity, like the entity proposed in Massachusetts, would serve as the negotiating party for the aggregated customers with power suppliers and other energy service providers. Private aggregators and marketers could offer supply and services in lieu of each entity having to deal directly with power suppliers. Potential stranded investment costs caused by the CPUC's actions to open up the wholesale power market, and authorized for recovery by the CPUC, would be recovered by the same Kwh charge imposed on all energy users by the California PUC in its recent restructuring decisions.

Like the Massachusetts proposal, the TURN proposal includes a provision in the enabling legislation which provides that new Community Access entities would continue to meet minimum state standards for social and environmental programs such as renewable power, diversity of resources, DSM, low-income rate assistance, research and development, etc. Local governmental aggregation entities, however, would be specifically empowered to go beyond these state minimum requirements. Thus, for example, some communities may choose to purchase a greater percentage of renewable power than state law requires. The exercise of this local control based on collective decision-making would constitute "consumer choice" by the local community.

There are however several important differences between the TURN model and the Massachusetts model. First, TURN's proposed municipal aggregation entity could in effect operate more like a traditional municipal utility in terms of setting rates and establishing policy on items such as service rules, IRP and DSM as well as performing billing and administrative functions. However, the "biddable franchise" option is also available. Second, unlike the Massachusetts legislation, the TURN proposal would not necessarily require the entity to own a distribution

system or any other major assets for that matter. Rather, the local governmental aggregation entity would pay a CPUC-established rate to use the existing distribution system that it needs. Third, as noted, the TURN proposal allows individual consumers to opt out of the aggregated entity.

●Aggregation Only Option

Both the Massachusetts and TURN proposals address issues concerning how a local governmental aggregation entity would be regulated or responsible for setting rates and operating the franchise. An alternative to utility franchise-type aggregation models is one that focuses on allowing all customers within a local governmental body's jurisdiction to be involuntarily aggregated solely for the purpose of allowing many individual customers to act like one large customer in negotiating for power supply or energy services at the wholesale level. The entity formed would have no other authority or responsibilities.

The League of California Cities has proposed a slight variation on this model. The League proposal would allow local governments to become an aggregator to negotiate the purchase of electricity with electricity suppliers. However, the local government could decide whether an individual consumer would be allowed an option to purchase directly from electricity suppliers. (This should be contrasted to TURN's proposal that allows a consumer the automatic right to opt out.) Simply, "consumer choice" would be a matter subject to local control. (League of California Cities, 1995.)

The aggregation only model would still require state legislation to authorize a municipal entity to involuntarily aggregate customers. It also raises a set of issues that would need to be resolved about how any aggregate benefits gained in the wholesale supply market would be distributed to customers. TURN has proposed that the core aggregation system for natural gas in California could provide an example of how to resolve these questions. Simply, customers in the aggregated entity would be credited with the cost of power acquired rather than the cost of power from the incumbent supplier. The aggregation entity would be able to include a brokering or marketing fee to cover the cost of its services. Other costs would be treated as they are now.

This aggregation only model could accomplish a potential objective of allowing customers to be aggregated with a minimum of transaction costs in order to allow them to participate in the wholesale power supply and energy services markets. But, in addition, permitting the local option to allow some consumers "direct access" would appear to shift many of the current issues surrounding restructuring to the local level, where there is no reason to think that they will be easier to resolve.

(2) Comparison of Proposed Local Governmental Aggregation Options[1]

[15] A good description and comparison of the Massachusetts and TURN proposals is presented in "Rolling Thunder

New local governmental aggregation proposals, particularly such as the TURN model, embody different approaches to a common objective: expedited aggregation without the creation of a monopoly that can coexist in a world of consumer choice and direct access. While the details of various proposals may vary in part, the framework they present is common to any effort to address maintaining the franchise concept.

Competitive bidding of or negotiations by the aggregated entity is seen as a means to both improve the competitiveness of the wholesale market as well as a potential source of benefits to aggregated consumers. While the "biddable franchise" concept of the Massachusetts model is potentially more expansive than the competitive bidding or negotiations for power supply and other energy services in the current TURN proposal, the use of aggregated franchises to protect and benefit aggregated small consumers is fundamental.

The range of proposals to maintain the franchise concept by allowing local governmental units to automatically aggregate all customers within their jurisdiction can be distinguished by five primary factors:

(1)The scope of the franchise responsibilities that will be put out to bid to be performed by some party other than the local governmental aggregation entity;

(2)Who owns the distribution system to provide service to consumers;

(3)The scope of traditional utility functions such as rate setting and establishing and administering service rules for aggregated customers;

(4)The scope of mandated functions by state legislation or regulatory bodies; and

(5)Whether and how an individual consumer can opt out of the aggregated entity.

Under the first factor, the minimum scope of competitive bidding efforts is for power supplies in the wholesale power market. Putting out other energy services such as DSM for competitive bid is also likely. Beyond these products and services, one could expect to see proposals that range from including other services up to the full bundled offering of the "biddable franchise" encompassed in the Massachusetts and TURN models. It is important to highlight that the franchise responsibilities would cover all consumers to avoid discrimination and “cherry picking” by the aggregated entity. The inclusion of a requirement that potential bidders include a menu of differentiated products and services that would be valuable to individual consumers within the aggregated entity would increase the consistency of this model with the “consumer choice” model.

Over Retail Competition” by Scott Ridley in *Public Power*, March-April, 1995 at pp. 15-19.

Each of the other four factors are important from a legal or policy perspective. It is for this reason that the TURN and Massachusetts proposals, which address each of these four factors in a distinctly contrary fashion present a broad range of the potential forms of local governmental aggregation options that are likely to be proposed.

It can be expected that advocates of a local governmental aggregation model may disagree on how to specifically address these four factors. The issue of ownership of the local distribution system raises a legal issue concerning whether a "taking" of the incumbent utility's assets has occurred if the right to supply and the ownership of the distribution system are separated. Some aggregation advocates may wish to avoid the expected cost and time to litigate this issue to ensure that local governmental entities can participate in competitive markets within a reasonable time frame. Indeed, the Massachusetts CSD proposal explicitly tries to resolve this issue while at the same time attempting to mitigate the cost of ensuring that ownership and supply remain united. Other advocates, as embodied in TURN's proposal, may opt in favor of avoiding potentially unnecessary costs to acquire a distribution system. Rather, the aggregated entity would pay a tariffed rate to the owner of the distribution system for its use.

Similar differences might be expected to arise between aggregation advocates concerning the scope and nature of state mandates on local governmental aggregation entities, particularly concerning IRP, DSM and including the treatment of environmental costs. The current TURN proposal creates a two-tier system in which the local governmental aggregation entity can exceed mandatory state minimum requirements if a local entity's members want more aggressive DSM programs or to buy from "green" power sources, than required by state standards. The Massachusetts CSD proposal to incorporate such state mandates as part of the "biddable franchise" is also premised on this view that policy on these issues should be established and promoted on at least a statewide level, although local implementation will be necessary for the policy's ultimate success.

The TURN proposal would allow consumers to opt out of a local governmental aggregation entity. The Massachusetts proposal does not provide for the ability to opt out. The benefit of an opt-out provision in promoting more competitive energy services markets will be discussed in a subsequent section of this chapter.

D.Joint Action Agencies

Joint action agencies are voluntary associations of individual public power utilities. We include them in this section of the report because their experience has indicated that the creation of franchises on a local governmental basis, by itself, may not be adequate to increase market attractiveness or market power to an extent that can maximize the potential benefits captured in a competitive market.

Joint action agencies have been a part of the electric industry over the last 30 years. Their purpose has been and is to: (1) enhance the ability of municipal utilities to capture economies of scale through joint planning and purchasing, and (2) to increase the ability to negotiate and compete in the

wholesale power and other markets. Most joint action agencies were formed because individual public power utilities did not possess the size, resources or sophistication to build new, large generation and/or transmission projects and/or to effectively negotiate in the bulk power and transmission markets (Yaffe, 1995, pp. 14-25). In addition, municipal utilities or agencies are typically prevented from serving outside their traditional service territories, resulting in coverage far less extensive than most investor-owned utilities (Russell, 1994).

The experience from traditional municipal utilities suggests that if the franchise concept is to be maintained to promote competition in the electric industry, that new local governmental aggregation entities should also be authorized to form and/or participate in joint action agencies. Just as new state legislation is necessary to authorize a local governmental aggregation, new state legislation would also appear necessary to allow such entities to further aggregate for purposes of participating in competitive wholesale markets. Indeed, existing joint action agencies may need specific legislative authorization to expand their role into new endeavors such as brokering power off-system. This does not appear however to be the case in California however as Joint Power Agencies (JPAs) can be set up for any purpose under existing California law.

The Massachusetts CSD legislation contains a limited form of joint action authorization. As previously noted, a CSD is allowed to act jointly with an adjacent CSD to contract for an alternative power supply. However, this limited authorization for joint action is far more limited than that available to public power utilities which may form joint action agencies for a broad variety of purposes within an entire state. (See for example Wisconsin Statute §66.073 authorizing a statewide joint action agency.)

In states like California, it may not be necessary to recreate joint action agencies such as the Northern California Power Agency or the Southern California Utility Power Pool (SCUPP), but rather to authorize new local governmental aggregation entities to join existing agencies. If market attractiveness and market power are predicated at least in part on size and technical and legal sophistication, then allowing new local governmental aggregation entities to join or form joint action agencies would appear to be an important means to increase the competitiveness of wholesale power markets by increasing buyer market power.

E.Effectiveness of "Franchise" Options

Based on a consideration of expected cost, effort and timeliness in protecting consumers from potential market discrimination, it would appear that the preferred option ought to be a combination of (1) some form of the proposed local governmental aggregation model (e.g., a TURN type model) and (2) explicit legislative authorization that would allow local governmental aggregation entities to participate in or form joint action agencies with prescribed authority to provide a broad range of joint services such as off-system power brokering. The local governmental aggregation model in which the created entity could pay a commission-established rate for the use of the existing distribution system, as opposed to buying it, could be a least-cost option.

The preferred form of local governmental aggregation entity, in our opinion, would include: (1) a provision that ensures the flexibility to capture "consumer choice" benefits including allowing consumers to opt out; (2) a commitment to pursue minimum state standards for social and environmental objectives, but which allows the local entity to exceed state minimums; (3) the broad ability of an entity to aggregate or coordinate its efforts with other parties; and (4) provisions that prevent the aggregation entity from unfairly discriminating between consumers. The first provision accommodates, at least to some degree, consumer choice that allows a consumer to choose the best rates and/or services to meet their needs. The second provision would recognize that social and environmental objectives are generally necessary to be addressed on a broader basis than by locality. Minimum state standards would ensure a necessary level of collective effort and direction, while the ability to exceed state minimums would recognize local or community "consumer choice." The third provision would enable a local entity to maximize its ability to capture competitive benefits by partnering with others to increase market attractiveness and/or market power. The fourth provision is to avoid the discrimination that it is feared market forces may create which underlie the justification for the aggregated entity.

The choice between a completely "biddable franchise" or a local governmental aggregation entity that performs many of the traditional functions of a municipal utility would appear preferable to leave to local decision-makers. As long as the "biddable franchise" contract or the local entity jurisdiction ensures the ability to provide non-discriminatory and comprehensive services and protections, it would appear that a local community should be able to decide how to use its limited resources.

Indeed, there is another aspect of the local governmental aggregation model that is important to recognize. The presence of many such entities could serve as a "yardstick" to both help assess the extent of competition in wholesale and retail markets, as well as to allow consumers in one entity to assess what is the most desirable and effective mix of functions by looking at the rates and services offered by other entities.

The formation of a traditional municipal utility does not appear to be a generally viable option due to the expected opposition of the incumbent utility and large customers and the potential cost and time required to acquire the existing distribution system.

The formation of a "muni lite" entity under existing statutes could be a potentially effective option depending on the timely and favorable resolution of the legal issues that underlie its creation. For that reason, it is desirable that some parties continue to pursue this alternative, regardless of whether a "consumer choice" model is adopted or not. However, the creation of the local governmental aggregation model would appear to involve less time and cost if state legislation authorizing such a model was enacted.

4.4Conclusion

The local governmental aggregation model, as exemplified by TURN's proposal, would appear to have several impacts on energy service markets.

First, the local governmental aggregation model is not primarily proposed to create more competitive energy services markets that can be relied on in lieu of regulation or public control over the distribution of the benefits and costs from providing essential services such as electricity service. Rather, the primary attribute of proposals such as TURN's is to shift the aggregation of small or core electric consumers from existing private utility suppliers to aggregated entities subject to local control. Local control would become the substitute for traditional regulation to ensure that small consumers are not unduly and adversely discriminated against in a "consumer choice" environment's reliance on market forces and to provide and distribute benefits and costs equitably among consumers.

Second, while the primary objective of the local governmental aggregation model is protection from competitive markets, the model will also contribute to the development of potentially more competitive energy services markets. This result is likely to occur because of the following impacts of the local governmental aggregation model.

(1)The formation of local governmental aggregation entities would reduce the transaction costs for aggregated customers to participate in wholesale markets. It would do so in two basic ways: (a) by reducing the transaction costs including marketing to aggregate customers, and (b) by potentially reducing other costs that may be created in a restructured industry such as a requirement that all customers participating in a market have real-time pricing (RTP) meters. An aggregated entity could provide the point for real-time pricing thereby mitigating the cost and need for each individual customer to have their own RTP meter and communications system.

(2)Experience from wholesale markets indicates that some customers have found it desirable and necessary to aggregate to be able to effectively participate in bulk power and transmission markets (e.g., joint action agencies). There is little reason to assume that comparable benefits would not accrue to similar aggregation efforts as a result of the formation of local governmental aggregation entities. Size, resources and access to specialized skills and knowledge have been valuable assets for buyers operating in wholesale power markets. By increasing the number and size of buyers in the wholesale power market, the local aggregation model could increase the extent of competition in that market.

(3)The local aggregation model, as embodied in the TURN proposal, can coexist with the "consumer choice" model, including contributing to the development of a competitive power and energy services markets. As we discussed in Chapter 3, one potential major obstacle to the development of competitive markets for small consumers may be the potentially high transaction costs to market to or aggregate small consumers and the limited benefit potential for many individual small consumers.

The local governmental aggregation model would both (1) reduce transaction, particularly marketing costs, and (2) present aggregated benefit potentials that could be quite attractive to private marketers and aggregators. "Automatic aggregation" may in fact allow aggregation of entities and individual consumers at the marketer/aggregator level that would not have occurred because private firms were unable or unwilling to aggregate most or all individual small consumers.

The increase in the viability, number of, and market power of, marketers and aggregators vis-a-vis suppliers could contribute to more competitive wholesale power and energy service markets in which a "fair" or significant share of competitive benefits flow to small consumers.

(4)The creation of local governmental aggregation entities could also address another potentially significant obstacle to the development of competitive markets: incumbent utility advantage. Incumbent utility advantage results from existing utilities having been granted a monopoly franchise to serve all consumers. In addition to consumers having had experience with the only sanctioned service provider, many restructuring schemes provide that a consumer who fails to proactively choose a new supplier remains a customer of the existing supplier. This "automatic" market share and competitive advantage could make it difficult for private marketers and aggregators to effectively compete for individual consumers.

The ability of a local governmental aggregation entity to automatically aggregate existing customers of investor-owned utilities (and acting as the provider of last resort) could help overcome this incumbent advantage by increasing the potential number of buyers in the wholesale power market. However, this result may only transfer the incumbent advantage problems faced by private providers from the existing utility to the local aggregation entity.

Despite these potential benefits from the continuation of the franchise model, it does not necessarily follow that the best public policy choice is to simply continue the use of the franchise concept for consumers without more proactive efforts to increase the competitiveness of energy services markets.

There are two concerns raised by the local governmental aggregation model. First, it does not attempt to increase the market attractiveness or market power of individual small consumers, to increase the strength of competition in energy services markets, or to increase the potential share of potential benefits created in such markets that could be captured by the individual small consumer. The first concern is that, absent proactive efforts to develop more competitive markets in which individual small consumers have more market attractiveness and market power, directly or indirectly, the franchise model will become a self-fulfilling prophecy like the proposed core aggregation of consumers within an existing utility provider under a performance-based regulation scheme. If the aim is simply to protect small consumers from market forces, then increasing the options for the

aggregation of small consumers in multiple franchises may be sufficient and desirable. If the aim is to seek to maximize small consumer benefits by attempting to develop more competitive energy service markets, then local aggregation is potentially useful, but insufficient by itself.

The second concern is that the local governmental aggregation model may inhibit the development of more competitive energy services markets by limiting the opportunities for alternative providers. To the extent that the franchise model limits the potential market power of marketers or aggregators vis-a-vis suppliers or the size of the market for new or expanded product and service offerings, potential benefits for all consumers could be lost. It should be highlighted however that this latter concern is equally applicable to consumers aggregated by existing utility providers.

The local government aggregation model, embodied in the current TURN proposal, seeks to create a mechanism that can coexist with consumer choice and direct access. Indeed, if competitive markets are developed that can flow benefits to individual small consumers, it could be expected that local municipal aggregation options may not need to be exercised. But, the local governmental aggregation model is important because it creates other potential aggregation options available to consumers rather than remaining part of the existing utility's aggregated customers or facing potential market discrimination in being aggregated by private market providers.

While we believe that it also is desirable to increase proactive efforts to promote more competitive energy services markets, there seem to be no clear public policy reasons why it is not desirable to, at the same time, increase the aggregation options available to consumers and local governments as proposals such as TURN's would do.

To analyze whether the franchise model as reflected in the TURN or Massachusetts proposals is a preferred public policy choice by itself or combined with other policy options, it is necessary to consider in more detail, the nature and extent of the potential distribution of benefits to small consumers in a "consumer choice" environment. This inquiry should include:

- What is the nature of the benefits that may be available to small consumers in competitive markets that may not be available in the aggregated franchise?

- Will competitive forces be strong enough to ensure that small consumers will not only be able to attain benefits in a competitive market but protect small consumers from having costs shifted to them?

- Will all or most small consumers benefit, or are there some small consumers who are substantially at risk in a "consumer choice" environment such as low-income customers?

- Will certain potential benefits that result from collective action such as IRP and DSM be lost because voluntary, decisions by individual customers will be inadequate to produce such benefits?

The analysis of these issues involves a need to understand both the motivations and interests of consumers and potential providers of products and services in a competitive market. It also entails the need to differentiate among small consumers and to analyze a variety of submarkets that may have differing strengths of competitive forces to generate benefits for small consumers. But, even before these matters are analyzed, it is necessary to determine if indeed there will even be markets for certain small consumers.

4.5References

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Interviews

TURN Proposal

Eugene Coyle, TURN
Lenny Goldberg, Lenny Goldberg and Associates

5. COSTS AND BENEFITS TO TYPICAL RESIDENTIAL CUSTOMERS

5.1Summary

In this chapter we examine the likely impacts of restructuring on residential customers under two fundamentally different sets of assumptions: simple consumer choice under which each customer is required to participate as an individual, and aggregation in which customers can participate as part of a group. The basic results of our analysis are the following:

- The single most important factor determining if individual customers will see higher benefits with RTP and retail wheeling is load shape: the flatter the customers' load, the more likely they are to benefit.

- If is very likely that individual small or average-sized customers with significant on-peak usage will not be able to benefit from RTP and retail wheeling. Energy management systems may help such customers, but not enough to overcome cost increases, due to meters and communications. Only the largest residential customers with high load factors have the potential to benefit from RTP and retail wheeling.

- Aggregation allows small customers to spread metering and other costs. Further, benefits from overall reductions in electricity costs due to restructuring can be obtained without the RTP effects due to individual load factor. Thus, with aggregation, small residential customers would be as likely as large residential customers to benefit from restructuring.

5.2The Scenario Analysis Process

In the body of this chapter we describe a set of scenarios relevant to direct access and RTP for small customers. These scenarios draw upon and incorporate technological and marketing information presented in the preceding three chapters. First, however, we explain the scenario analysis process in general and how we intend to apply it. We will draw heavily on the discussion of scenario analysis presented in the well-known textbook; C.W.J. Granger, *Forecasting for Business and Economics*, Second Edition, Academic Press, 1989.

Scenario analysis is a form of what Granger calls technological forecasting. Over periods of less than five years, it is reasonable to develop analyses against a background of no

technical change. However, when considering the longer run, as we are here, an assumption of no technological change becomes quite unreasonable. Technological forecasting is generally concerned with the long run, particularly what technology is likely to be available in the future and what the impacts of technological developments and innovations will be. In the case of electricity industry restructuring, technological developments in metering, communications and Energy Management Systems (EMS) are central factors. These technological developments, along with various assumptions about marketing, will in large part define the scenarios we consider.

There are two basic approaches to the technological forecasting, exploratory and normative. Exploratory techniques provide forecasts of what will happen. Normative forecasts start with a future objective and then, by "working back" to the current situation, determine the extent to which the objective can be realized as well. Normative analyses address the technological and other requirements for, and limitations to, realization of the objective. Scenario analysis is a type of normative technological forecasting. Starting with the current situation, a scenario sets up a logical sequence of events designed to indicate how the future might unfold and might or might not be achievable. Since there are a variety of ways this might occur, a set of alternative scenarios will arise. The primary purpose of scenarios is not to predict the future but rather to facilitate a systematic exploration of the possible paths to a specific objective.

The "current situation" from which we begin is traditional utility regulation, including current metering and supply arrangements. The "objective" is that all residential customers achieve benefits sufficient to offset their costs due to restructuring. We will describe scenarios under which this might or might not come about. Our approach will basically be normative: what will result from these analyses is an identification of technological changes, marketing developments and/or regulatory initiatives which would reasonably be required to provide the desired linkage.

In order to see how residential customers might benefit from restructuring, a number of scenarios describing transition paths to a restructured future were explored. We began by considering the likely impact of RTP and retail wheeling on individual customers. The bulk of our numerical analysis focuses on individual customers. With these results in hand we went on to explore aggregation, that is the implication of applying RTP and retail wheeling to groups of customers rather than individuals.

5.3Restructuring Based on Consumer Choice

In our analysis of the impact of restructuring on individuals we begin by considering RTP. As one might expect, the impact of RTP depends on load factor: compared to current rates RTP will lower Kwh-based charges to high load factor customers and increase them for those with low load factors, while increasing metering costs for all. We analyze the value of load shifting, as well as the related cost of increased meter and energy management systems (EMS) related investments. Based on usage data and other information, we explore the usage levels required to permit net benefits. We use this analysis to see how the evolution of new market arrangements and technology might permit

small customers to obtain the type of benefits which would be enjoyed by large customers under restructuring. These benefits flow from a combination of initial load factor, load management and choice of supplier.

In our analysis we consider two sets of scenarios. In the first we explore the situation of customers in a "basic RTP" environment. Additional providers do not appear at this stage of our analysis. In the next set of scenarios we explore the way in which retail wheeling might change our results. In each of our two sets of scenarios we consider scenarios which reflect the impact of five different sets of meter and/or EMS costs and capabilities, particularly degree of achievable load shifting, on nine different types of residential customers, reflecting independent variation in load factor and usage. The result is a total of 90 combinations (2 sets x 5 meter/EMS options x 9 customer types). For each combination we have conducted a benefit-cost analysis, to determine the net change in the annual cost of electricity which customers might experience. Ninety is a fairly large number of combinations to consider. It would certainly be possible to consider fewer. However, this approach allows us to add complexity gradually, and so make the logic of our analysis clearer.

Our scenarios are defined by our metering/EMS/load shifting assumptions. The five scenarios are as follows:

1. Low Meter Cost, No EMS
2. High Meter Cost, No EMS
3. Low Meter Cost, Low Cost EMS, Load Shift One-Third Toward Flat
4. High Meter Cost, High Cost EMS, Load Shift Two-Thirds Toward Flat
5. High Meter Cost, High Cost EMS, Load Flattened.

These scenarios have been selected to span a reasonable range of technical cost variation, as indicated by the analysis presented in Chapter 2. Scenarios 1 and 2 assume no EMS. Variation in customer costs is due only to initial usage and load factor, as well as metering costs. The low meter cost reflects the use of an inexpensive meter reading option, such as Cell Net, to provide one-way communications. Cell Net "reads" a standard kWh hour meter at hourly intervals. Customers are assumed to receive information on prices through the publication of these prices on the preceding day. High meter cost reflects a true, two-way communications system and an RTP meter.

Scenarios 3 to 5 introduce EMS costs. Scenario 3 is a "low tech" alternative: it combines the simple metering technology with our least-costly EMS option. Nonetheless, we assume a one-third shift from existing load pattern toward a flat load. In Scenarios 4 and 5 we use "high tech" and higher cost EMS together with a two-way metering and communications system to explore the full potential for load shifting. Scenarios 1 to 5 are not meant to be exhaustive. However, they are sufficient to explore a wide range of likely future developments, including some which are not explicitly modeled. Each scenario is considered twice; once with RTP only and once with RTP and retail wheeling.

For each scenario we ask the same question: Does it reach our objective? That is, does it provide a plausible explanation of how customers might all reasonably share in the benefits of

restructuring? In the process of answering this question we provide a description of the customers likely to benefit. To identify these customers we use Benefit-Cost analysis. The benefits and costs associated with the scenarios have been evaluated using a standard Benefit-Cost spreadsheet developed for this purpose. An example of the spreadsheet is provided in Table 5.1 below.

The structure of the spreadsheet is as follows:

- Costs, Benefits and Net Impacts are developed in the top, middle and bottom sections, respectively. Net impacts are simply Benefits minus Costs.

- Costs are simply the additional metering and EMS costs minus a credit for avoided meter readings.

- Benefits are the difference between the electric bill at a flat kWh rate and the results of RTP pricing, with load shifting and retail wheeling effects as appropriate.

The basis for the technical assumptions made in the spreadsheet is explained in Appendix D, which also contains our spreadsheets.

A crucial part of our spreadsheet is the "rate design" which is part of the spreadsheet's structure. In our analysis we have used a flat charge of $.11 per kWh to approximate current residential per-kWh charges. Since the incremental cost of RTP metering, communications and EMS are treated separately in the Benefits portion of our spreadsheet, we assume no change in customer charges with restructuring, and so drop the customer charge out of the rate design. The portion of the spreadsheet labeled Electric Bill With Flat Rate shows the annual customer bill, net of customer charges, before the implementation of RTP.

TABLE 5.1
ILLUSTRATIVE BENEFIT-COST ANALYSIS OF RESIDENTIAL RTP
(SMALL RESIDENTIAL CUSTOMER, HIGH LOAD FACTOR, LOW METER COST, NO EMS, NO MARKETING)

In order to approximate the impact of RTP we have used a more complex rate design consisting of three components:

- On-, mid- and off-peak energy charges which are based on current incremental production costs.

- A demand charge per kW of annual coincident peak demand which is based on the annual levelized cost of a peaking unit.

- A residential flat, per kWh charge which is set to collect the remaining costs.

The first and second components of this rate design approximate the cost of generation obtained on a real-time basis. The first reflects the variable cost of production. The second is a "congestion charge" which might actually be levied on a per-kWh basis during a few peak hours of the year. Treating the second component on the basis of annual coincident demand, rather than converting it to a higher (i.e., $2 to $3 per kWh) charge for a few hours of the year, is simply a matter of convenience. However, the reader should be aware that our analysis approximates the impact likely to be seen if there are very high per-kWh charges during a few ours of the year.

Finally, it is important to note that the third component reflects such things as distribution system costs, stranded cost recovery, system benefits charges, etc. The costs to be recovered are largely independent of a customer's current consumption pattern. Shifts in response to RTP would simply lead to insufficient cost recovery and so the need for a "rate increase." To avoid such complexity we have used the flat charge.

Table 5.2 was developed to present the "bottom line" from 90 spreadsheet analyses, each similar to that shown in Table 5.1, on a single page. Briefly, each entry in Table 5.2 represents Net Impact (benefits-costs) as shown at the bottom of Table 5.1. The left-hand column of Table 5.2 identifies scenarios. The other column headings identify customer types considered to evaluate the scenarios. We considered three levels of customer usage: small, average and large customers. These correspond to 50, 100 and 200 percent of the average usage level of 6,000 kWh per year. For each usage level load factors of 30, 50 and 100 percent are considered.

The data in the top half of the table show that RTP alone will result in net benefits to high load factor customers while increasing electricity costs for other residential customers. Further, the data show that a wide range of EMS options cannot fully offset these costs. This follows from the fact that, in the top half of the table, all of the entries in columns with average or low load factors are negative. The result is that, with individual customer RTP alone, many types of residential customers will not benefit.

TABLE 5.2

SUMMARY OF SCENARIO RESULTS
NET IMPACT: BENEFIT - COST
($ PER CUSTOMER PER YEAR)

In the bottom half of Table 5.2 we show the impact of retail wheeling. We assume for the purposes of our analysis that retail wheeling will result in a 10 percent reduction in per-kWh cost to all customers. We further assume that electricity sellers incur a marketing cost of $40 per customer, spread over two years. However, this reduction in costs is not enough to turn things around. Our analysis shows that, while large customers with an average load factor may now achieve positive net impacts, many types of customers will still not benefit with RTP and retail wheeling.

The results in Table 5.2 underscore the importance of load factor in determining whether RTP and retail wheeling, on a customer-by-customer basis, will provide net benefits. To further investigate this point we have developed Table 5.3, which explores the possible impact of Bundling on average and low load factor customers. By Bundling we mean an arrangement by which the two-way communications cost is partially covered by another service, and the "intelligence" required for EMS is provided by a computer. This cuts costs and so expands the pool of customers who can benefit.

To quantify the impact of Unbundling we have adjusted the results of Scenario 3--low meter and EMS costs--to reflect a two-thirds shift towards load flattening. The "extra" one-third shift is simply the difference in our results for Scenarios 3 and 4. We assume, in effect, that Bundling reduces the high costs in Scenario 4 to the level of the costs in Scenario 3, while preserving the additional reductions due to a two-thirds shifting.

The last row in Table 5.3 shows there is some improvement with Bundling. All large customers have an opportunity to achieve positive net impacts. However, small and average customers who don't have high load factors still have negative impacts.

It is also important to note that the ability to participate in Bundling is not universal. The likelihood of a household to be wired rises with income, since the "free" wiring costs will be part of the price of another service. Further, the reduction in EMS costs requires a home computer. Table 5.4 shows data on the ownership of such computers. Here again we draw particular attention to the linkage with income. Even if computer ownership grows substantially, it will likely remain correlated with income.

TABLE 5.3

ANALYSIS OF BUNDLING

		Small Customer		Average Customer		Large Customer	
Base Case Scenarios		Avg. LF	Low LF	Avg. LF	Low LF	Avg. LF	Low LF
Low meter cost, low cost EMS (shift 33% to flat)		(27)	(51)	(19)	(67)	(1)	(98)
Value of "extra" 1/3 shift	9	21	17	41	37	83	
Bundling		(18)	(30)	(2)	(26)	36	(15)
Optimistic Retail Wheeling Scenarios							
Low meter cost, low cost EMS (shift 33% to flat)		(37)	(58)	(17)	(61)	21	(66)
Value of "extra" 1/3 shift	8	18	16	37	32	75	
Bundling		(29)	(40)	(1)	(24)	42	9

TABLE 5.4

PERSONAL COMPUTERS BY INCOME LEVEL (1993 DATA)

Income (' 000$)	Households (Millions)	Own Computer (Percent)
Under 5	4.1	9.7
5-10	10.6	4.7
10-15	11.1	9.0
15-25	18.3	7.1
25-35	14.1	31.2
35-50	17.5	20.6
Over 50	21.1	54.0

When considering the results in Tables 5.2 and 5.3 it is important to be aware of the assumptions that underlie our analysis. Consider, for example, our treatment of the benefits of retail wheeling. We have assumed that a market involving "consumer choice" for millions of individual customers will produce a 10 percent savings for all the participants. We aren't assuming that a few large manufacturers will make good deals; rather, we are assuming a massive gain in efficiency that results in everyone being offered a 10 percent reduction in electricity costs. In addition, we are assuming that this can be achieved at levels at what the results in Chapter 3 on Marketing suggest is a rather modest cost per customer. We made these assumptions because our goal is to probe the outer limits of benefits from restructuring. Tables 5.2 and 5.3 show the "absolute best it could get."

However, we do not claim that benefits would actually be as large as we show. Indeed, there is every reason to think they would be much smaller. Despite all of this optimism, even when we throw in Bundling, we still find a significant number of customer types with negative net impacts. Viewed in this light the results in Tables 5.2 and 5.3 provide a simple message: restructuring that relies on individual consumer's choice cannot be relied upon to benefit all residential customers. In our introduction we asked "Can we get there from here?" The portion of the answer provided by Tables 5.2 and 5.3 is "Not on the basis of consumer choice alone." Even if technology evolves, markets develop effectively and there is Bundling, many types of customers will not benefit.

If one remains committed to a pure consumer choice approach in which it is up to each individual customer to benefit as best they can from restructuring, there are steps one might take to offset the difficulties revealed by our analysis. With that in mind we consider two options designed to expand the range of beneficiaries.

- Full Wiring. This option is a social program to ensure that all or most households are wired for two-way communications.

- Universal Service Funding. As in telecommunications, this involves setting aside funds to help "high cost" or "low value" customers benefit from new market developments

Full Wiring addresses the development of the two-way communications network. In our analysis we assumed that this was an incremental cost for individual customers. Here we consider whether, in the alternative, the communications network might be mandated and the cost recovered from all potential users. On a technological basis Full Wiring seems quite reasonable. There is no reason to duplicate a communications network, any more than there is reason to duplicate an electric utility's distribution system. The difficulty arises when one tries to envision how Full Wiring might be implemented. All the available options seem unlikely.

- Direct state implementation, on the "highway system" model. The costs as well as the state's lack of expertise would appear to rule this out.

- Use of the local telecommunications companies, who have a monopoly franchise. This would create conflict with other existing actual and potential communications services suppliers.

- Creation of a new monopoly to supply two-way communications. This is not on the regulatory or political agenda.

We would also point out that these alternatives, as well as any others one might consider, would require all to pay for communications, whether they wanted to or not. This runs contrary to the prevailing climate which emphasizes consumer sovereignty over social planning. There is no way to decide with certainty if Full Wiring will be implemented. However, in light of the preceding discussion, we believe it makes most sense to dismiss it from consideration.

It is an open question whether Universal Service Funding could bring benefits to all customers. We are inclined to conclude that they will not. The basis for our view is the experience in telecommunications. Table 5.5 shown the percentages of household with their own telephones by income for various groups. Telephones are two-way communications for which the fixed costs are much lower than we are discussing here. There is no reason to expect better results than are shown in Table 5.5.

TABLE 5.5

TELEPHONE SERVICE BY INCOME AND RACE/ORIGIN

	TOTAL	WHITE	BLACK	HISPANIC ORIGIN
Under $5,000	74.3 77.7	66.4		64.6
$5,000 - $7,499	82.3	84.9	75.2	70.0
$7,500 - $9,999	87.4	89.8	77.4	83.6
$10,000 - $12,499	90.1	91.5	83.6	82.3
$12,500 - $14,999	92.1	93.2	87.6	81.0
$15,000 - $19,999	92.8	94.0	86.7	85.1
$20,000 - $24,999	95.4	96.2	91.4	90.8
$25,000 - $29,999	96.6	97.4	91.5	92.4
$30,000 - $34,000	97.5	97.9	92.8	94.6
$35,000 - $39,999	98.6	98.8	97.9	98.8
$40,000 - $49,999	98.6	98.9	96.6	96.1
$50,000 - $59,999	99.1	99.1	99.3	97.0
$60,000 - $74,999	99.1	99.1	99.1	97.2
$75,000 and Above	99.0	99.0	97.9	98.6
TOTAL	93.9	95.3	85.1	85.7

Data are for March 1995.

Source: Alex Belinfante, FCC.

5.4Aggregation

Consumer choice is one approach to the application of RTP and retail wheeling. Aggregation provides a fundamentally different approach. In this approach a large group of residential customers or, as we argue in Chapter 4, a group consisting of residential and non-residential customers becomes the unit to which RTP and retail wheeling apply. There are a variety of ways to arrange for aggregation. Two examples are the following:

- The right to represent small customers might be auctioned off, one distribution circuit at a time, to those offering the best deal to those on the circuit.

- Towns or other governmental entities might be given the opportunity to aggregate those in their jurisdiction, with those on the boundaries assigned by circuit.

Other examples could clearly be created. Many are discussed in Chapter 4. Here we will focus on the impact of aggregation on customer costs and benefits.

Aggregation provides avenues for greatly extending the benefits of restructuring and RTP among small customers. Large and small customers cannot benefit equally from restructuring and RTP because costs--RTP meter, two-way communications and EMS--are to a great extent fixed, while benefits depend roughly on usage and ability to shift/shape load. Aggregation offers the obvious remedy to this fundamental inequity. It allows customers to be considered in groups which would be large enough to carry the fixed costs required to achieve benefits. Even if the absolute metering and marketing costs are much higher for an aggregate, the benefit-cost balance is much better than for an individual customer.

In order to illustrate the impact of aggregation we begin with an individual customer who would not benefit from aggregation. Consider, for example, an average-size customer with average load factor and usage who has a low cost RTP meter who participates in retail wheeling but does not invest in any EMS. This customer will see a net increase in the annual cost of electricity of $7. Examination of the other scenarios on Table 5.2 shows that, as an individual, such a customer can do no better. However, if three such customers could aggregate their load, the situation would change. Three customers sharing fixed meter, communications and marketing costs would be sufficient to turn the situation around: together they would see a net benefit.

Aggregates are quite unlikely to be as small as three. Thus, as an aggregate, the per-customer communications costs for the small number of RTP metering points at which the aggregate might take supply are likely to be minimal. This situation is described in Table 5.6. This is a spreadsheet similar in logic to Table 5.1, but set up to show the average use per customer, served as part of an aggregate. We include Marketing costs of $5 per customer, a high figure in our opinion. The net impact of this aggregation is a savings of $18. The point is clear: if the aggregate prices service to its members based on current utility-type rates, net benefits will flow to all.

Our analysis, therefore, supports the intuitive notion that aggregation will increase the potential for small customers to benefit from RTP and retail wheeling.

TABLE 5.6

ILLUSTRATIVE BENEFIT-COST ANALYSIS OF RESIDENTIAL RTP (AVERAGE RESIDENTIAL CUSTOMER, AVERAGE LOAD FACTOR, NO SPECIAL METER, NO EMS, AGGREGATION)