A USERS' GUIDE FOR ELECTRIC

RETAIL WHEELING

By

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TABLE OF CONTENTS

CHAPTER I
INTRODUCTION 1
A. BACKGROUND 1
B. SCOPE AND OBJECTIVES 2
C. OUTLINE 3

CHAPTER II
DESCRIPTION OF THE NATIONAL ELECTRIC POWER SYSTEM 5
A. ELECTRIC POWER SYSTEM 5
1. Generation 6
2. Transmission 6
3. Subtransmission 7
4. Distribution 7
5. Use 7
B. INTERCONNECTED SYSTEMS 8
1. Synchronous ac Regions 9
2. NERC Regional Councils 10
3. Power Pools 12
4. Control Areas 13
5. Types of Transmission Service 14

CHAPTER III
REVIEW OF ELECTRIC WHOLESALE
REGULATION AND DEREGULATION 16
A. REGULATORS 16
B. UTILITY TYPES 17
C. REGULATION HISTORY 18
1. Federal Power Act 18
2. Public Utility Holding Company Act 19
3. Public Utility Regulatory Policies Act 19
4. Energy Policy Act of 1992 - Title VII 21
a) Exempt Wholesale Generators (Subtitle A) 22
b) Transmission Access and Pricing (Subtitle B) 22
c) Regional Transmission Groups (RTG) 24
5. FERC Rulings 25
a) Information Disclosure 25
b) Comparability Standard 26
c) Transmission Service Pricing Policy Statement 27
d) Stranded Cost NOPR 30
e) Regional Transmission Groups (RTG) 30
f) Notice of Inquiry on Power Pooling Institutions 31
g) Power Marketing 32
h) Mega-NOPR 32

CHAPTER IV
RETAIL WHEELING IMPLEMENTATION ISSUES
AND STATE ACTIVITIES 36
A. GENERAL 36
1. Potential Benefits and Costs 38
a) Potential Benefits 38
b) Potential Costs 39
B. ISSUES 40
1. Legal Issues 40
2. Economic and Regulatory Issues 41
3. Technical Issues 42
C. RETAIL WHEELING ACTIVITIES AT THE STATE LEVEL 44
1. California PUC Proposal ("Blue Book") 45
a) Order Highlights (May 24, 1995) 45
b) "Poolco" Policy 46
2. Michigan Experimental PUC Program 48

CHAPTER V
RETAIL WHEELING AND PSEUDO-RETAIL WHEELING
ACTIVITIES AND INITIATIVES 50
A. CRITERIA FOR SELECTION OF ACTIVITIES AND INITIATIVES 50
B. TYPES OF ACTIVITIES AND INITIATIVES 50
C. SOURCES OF INFORMATION 51
D. METHODOLOGY 51
E. WHEELING ACTIVITIES AND INITIATIVES 52
1. "Retail Wheeling" Activities and Initiatives 52
a) Bonneville Power Administration *(host utility)* and Direct Service Industries, Inc. *(customer)* ... 52
b) Consolidated Edison *(host utility)* and some industrial customers of Consolidated Edison 53
c) City of Columbia Water and Light Utility *(host utility)* and University of Missouri *(customer)* ... 54
d) Public Service Co. of New Hampshire *(host utility)* and Freedom Electric Power *(supplier)* ... 54
e) National Steel Corporation of Mishawaka *(customer)* 55
2. "Buy-Sell" Activities and Initiatives 56
a) PSI Energy *(host utility)* and NuCor Inc. *(customer)* 56
b) Mohave Electric Cooperative *(host utility)* and North Star Steel *(customer)* 57
c) Pacific Gas & Electric Co. *(host utility)* 58
3. Dedicated Line Wheeling Activities and Initiatives ... 59
a) Niagara Mohawk Power Corp. *(host utility)* and Alcan Rolled Products Inc. *(customer)* 59
b) Texas-New Mexico Power *(host utility)* and Amoco Corporation at Texas City *(customer)* 60

CHAPTER VI
ANALYSIS OF RETAIL AND PSEUDO-RETAIL WHEELING ACTIVITIES AND INITIATIVES 62
A. SITUATIONS THAT HELP INCREASE CUSTOMERS' ABILITY TO CHOOSE ELECTRIC POWER SUPPLIER 62
B. DEVELOPMENT OF RECOMMENDATIONS 67
1. Methodology 68
a) Survey Description 68
b) Results 69
2. Recommendations and Survey Results 69
a) Recommendations for Customers in a non-deregulated Retail Power Market 69
b) General Recommendations 73

CHAPTER VII
SUMMARY AND CONCLUSIONS 83

FOOTNOTES 89

BIBLIOGRAPHY 95

APPENDICES
APPENDIX A
SURVEY SAMPLE 99

APPENDIX B
EXEMPTION FROM THE OKLAHOMA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD 111

APPENDIX C
LIST OF ACRONYMS 113

LIST OF FIGURES

Figure		Page
1	Single-line diagram of an electric power system showing various levels distinguished by operating voltages	5
2	North American Synchronous ac Regions	10
3	Areas served by the nine Regional Reliability Councils, coordinated by NERC	11

LIST OF TABLES

Table Page

1 Selected Residential Rate Differences for Contiguous or Closely Proximate Electric Utilities 37

CHAPTER I

INTRODUCTION

A. BACKGROUND

The US electric market has been a regulated monopoly for several decades but now is changing rapidly. Regulation is introducing competition to the electric market to reduce electric costs and help make US industry more competitive. In the last years, legislation has also introduced competition in the airlines, natural gas and telecommunications industries. Parallels with the deregulation of the electric power industry can be drawn from these experiences.

The Public Utility Regulatory Policies Act of 1978 (PURPA) and the Energy Policy Act of 1992 (EPAct), brought competition to the electric generation sector and opened access to the transmission system for "wholesale wheeling" transactions. "Wholesale wheeling" is the transmission of electrical energy and power from a seller to a buyer (both of them power generators) through the transmission lines owned by a third party.

EPAct also encourages states to look at "retail wheeling" (retail customer-to-power generator transactions). "Retail wheeling" or "direct access" would probably give electric customers the option of buying electric power from any utility or other electric power generator and having it delivered through the grid.

Retail wheeling is attractive for electric customers since it would give access to lower-cost electricity produced in other parts of the US. States where the cost of electricity is high are also interested in reducing electric rates to foster economic development and the creation of new jobs.

State Public Utility Commissions (PUCs) and legislatures have begun to study the issues and the potential public benefit that could result from introducing retail wheeling. There is debate over the advantages and disadvantages of retail wheeling, but no state has yet enacted legislation, either requiring or granting authority to a PUC to order retail wheeling. Even though retail wheeling has not been legislated, a few "retail wheeling" and "pseudo-retail wheeling" activities and initiatives have occurred.

B. SCOPE AND OBJECTIVES

Although retail wheeling regulation is not defined yet and its details would probably change for each state, this work intends to provide large industrial and commercial electric customers with the issues that could be important in a retail wheeling market. The use of this knowledge could be translated into increased competitiveness and reduced operating costs. The objectives of this work are the following:

- Review the present developments in the direction of retail wheeling (PURPA, EPAct, FERC ruling, state PUCs initiatives, etc.).

- Present a probable retail wheeling scenario (or set of scenarios), based on retail wheeling cases, activities and analysts' comments.
- Develop recommendations that could help electric customers under this scenario. For example, retail users should now start to understand the complex nature of transmitting and distributing electricity (provided in this work). They should also have a broad understanding of Regional Transmission Groups (RTGs), various NOPRs (Notice of Proposed Regulation) and FERC rulings (provided in this work).

Thus, the deliverable is a Users Guide to Retail Wheeling, as far as present development allows.

C. OUTLINE

Chapter two presents a description of the national electric power system. Chapter three is a historical review of electric regulation and deregulation at the wholesale level. The effects of PUHCA, PURPA, EPAct, and several FERC rulings are presented.

Chapter four presents the potential benefits and costs of retail wheeling, as well as the issues associated with the implementation of retail wheeling. This chapter also reviews the retail wheeling activities from two state PUCs: (a) California Proposal ("Blue Book") and (b) Experimental Program in Michigan. Developments in the direction of retail wheeling will also be reviewed.

Chapter five presents several "retail wheeling" and "pseudo retail wheeling" activities and initiatives. Chapter

six reviews the situations under which the cases presented in Chapter five occurred. The development of a retail wheeling scenario proved to be impractical. There are too many possibilities and none of the experts agree as to what might happen. Based on situations reviewed in this chapter, recommendations were developed and a survey was used in an attempt to validate the results. This survey was sent to: (a) some large electric customers (both industrial and commercial) and (b) the customers, consultants and utility representatives involved in the cases presented in Chapter five. Some comments based on experiences in the deregulated natural gas industry are also presented.

Chapter seven summarizes the recommendations and presents the conclusions of this work. The appendices present a sample of the survey used in this work (Appendix A), the survey exemption from the Institutional Review Board (Appendix B) and a list of acronyms used through this work (Appendix C).

CHAPTER II

DESCRIPTION OF THE NATIONAL ELECTRIC POWER SYSTEM

A. ELECTRIC POWER SYSTEM

An electric power system can be divided into five subsystems (see Figure 1):

- Generation
- Transmission
- Subtransmission
- Distribution (primary and secondary)
- Use

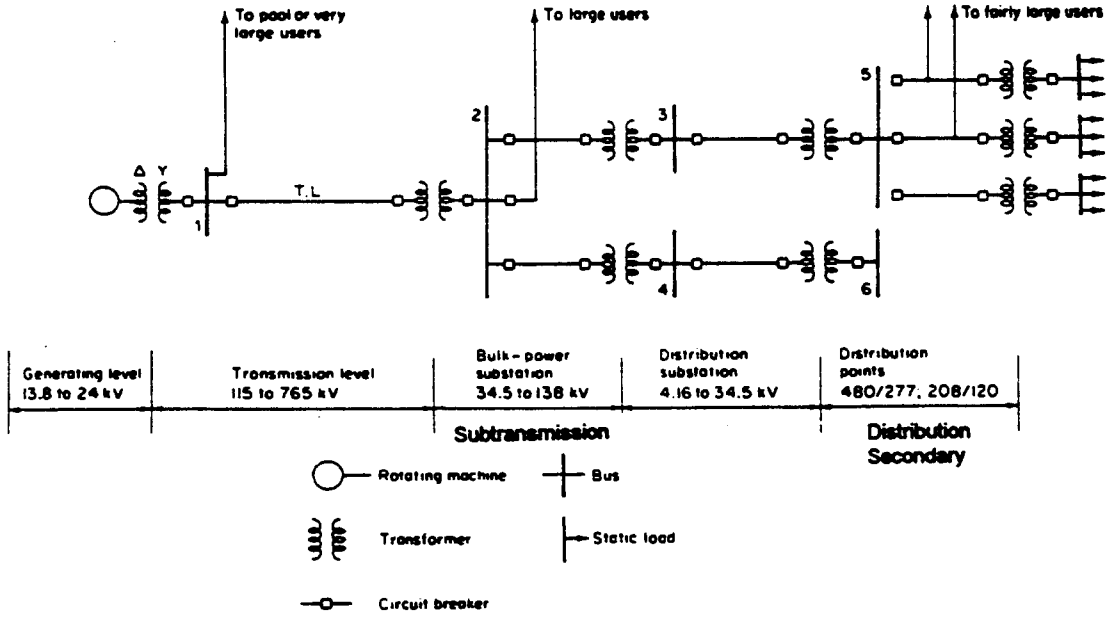

Figure 1. Single-line diagram of an electric power system showing various levels distinguished by operating voltages [1].

1. Generation

Almost all the electric power used in this country is generated and transmitted in the form of three phase alternating current (ac) at a frequency of 60 Hz. Most of the electric power generation units use an alternating current (ac) electric generator powered by a water driven turbine (hydroelectric plants) or a steam driven turbine. Approximately 85% of the electric generation in the US is obtained with steam-powered turbine generators while hydroelectric plants produce 10% of the total production [2]. Coal, natural gas, oil and uranium are usually used to produce steam. Other energy sources used to produce electricity are wind, geothermal, solar cells, and tidal power. Generator ratings range from 650 to 1300 MW [3]. Common generating voltages are 14-18 kV [4].

2. Transmission [5]

Transmission lines are used to: (a) carry electric power from the electric generators to the distribution systems and (b) connect the interconnected systems.

High transmission voltage is used to minimize losses when transmitting over long distances. Voltage is changed using power transformers. Electric power is converted from 15 to 20 kV (from the generator) to a higher voltage (115 kV to 765 kV). The voltage is chosen depending on the length of the transmission line (these lines span across up hundreds of km). Voltages used are:

- *Extra High Voltage* (EHV: 345 to 765 kV). Used for long lines.
- *High voltage* (HV: 115 to 230 kV).

Line capacities range from 100 to over 4000 MVA.

High Voltage Direct Current (HVDC) lines are used to transmit electric power for very long distances (>600 km) or to connect systems operating at different frequency. In these types of lines, ac power is converted to direct current (dc) power, transmitted through HVDC lines and then converted back to ac.

3. Subtransmission

Bulk power substations reduce the voltage to 34.5-138 kV. These lines are shorter and with less capacity than transmission lines (<100 MVA). Electric power is branched to distribution substations and supplied to large consumers.

4. Distribution

In the primary distribution system, distribution substations reduce voltage further to 4.16-34.5 kV. The voltage is finally reduced to the level required by the users at the distribution points (typically 208/120, 480/277 or 240/120 V). The circuit that normally serves the customer is the secondary distribution system. In some cases, large customers purchase electricity at higher voltages and run their own substations.

5. Use

There are three types of load: commercial, industrial and residential. This work concentrates on large industrial and commercial customers since they are the ones who would likely pursue retail wheeling first.

B. INTERCONNECTED SYSTEMS

Most adjacent power systems are interconnected forming regional, multi-state power systems. These systems produce most of the electricity sold in the US [6]. Interconnected ac systems operate at the same frequency.

Interconnected systems have several advantages [7]:

- Increased generation reliability. Reliability is defined as "...ability to deliver uninterrupted electricity to customers upon demand, to whatever degree required" [8]. For example, a loss of a generating unit in one area can be made up by increasing generation outputs in all connected areas until standby units are brought on line.

  More economic operation. The operating cost of the interconnected system is lower than the sum of the individual systems'. Power transfers can be scheduled to take advantage of incremental energy cost differences, seasonal or peaking hour differences, etc. Other transactions that are economically advantageous in interconnected systems are:

  - Sale of surplus power - Surplus power can be sold to an interconnected company on a long-term firm supply basis, or on a when, and if available basis (non-firm basis).
  - Capacity interchange - Reserve capacity from other systems can be used at certain hours to cover the predicted peak load plus a reserve.

- Diversity interchange - Power can be interchanged between systems that have peak loads at different times (hours or seasons).
- Energy banking - Hydroelectric plants could sell energy to thermal systems during high water runoff. In exchange, hydroelectric plants would buy energy from thermal systems during low water runoff.
- Emergency power interchange - Neighboring systems would commit to supply emergency power.

Utilities in the US have grouped themselves into synchronous ac regions, North American Electric Reliability Council (NERC) Regional Councils, power pools, and control areas [9,10,11].

1. Synchronous ac Regions

There are four synchronous ac regions in North America (see Figure 2): the Eastern Interconnection, the Texas Interconnection, the Western Interconnection, and the Quebec Interconnection. Within each region, individual utilities operate in synchronism with each other (same system frequency). Electric power at any point of each region can be supplied by generation at any other point. Since these regions have different frequencies, HVDC lines are used to connect them.

The transfer of electricity between two areas generally can not be directed over a pre-determined path. Electricity will flow over all available transmission lines (including over the lines of other utilities not involved in the transfer). These flows are called parallel path or loop flows.

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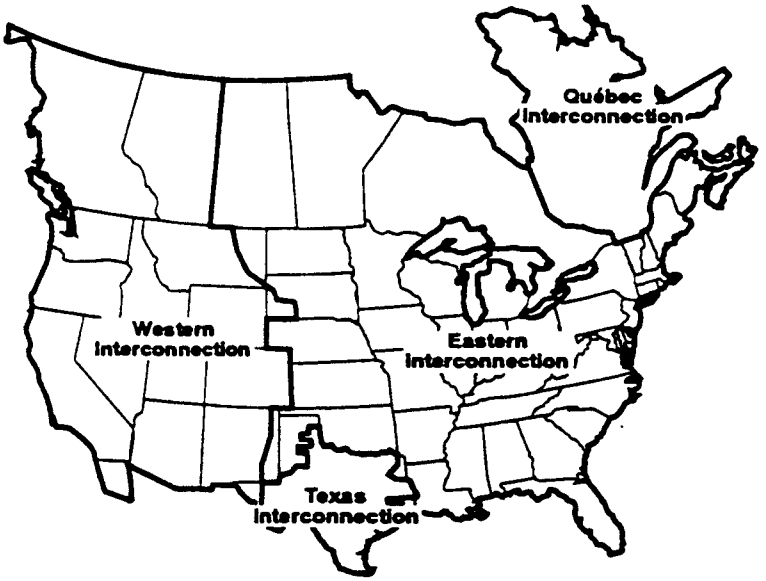
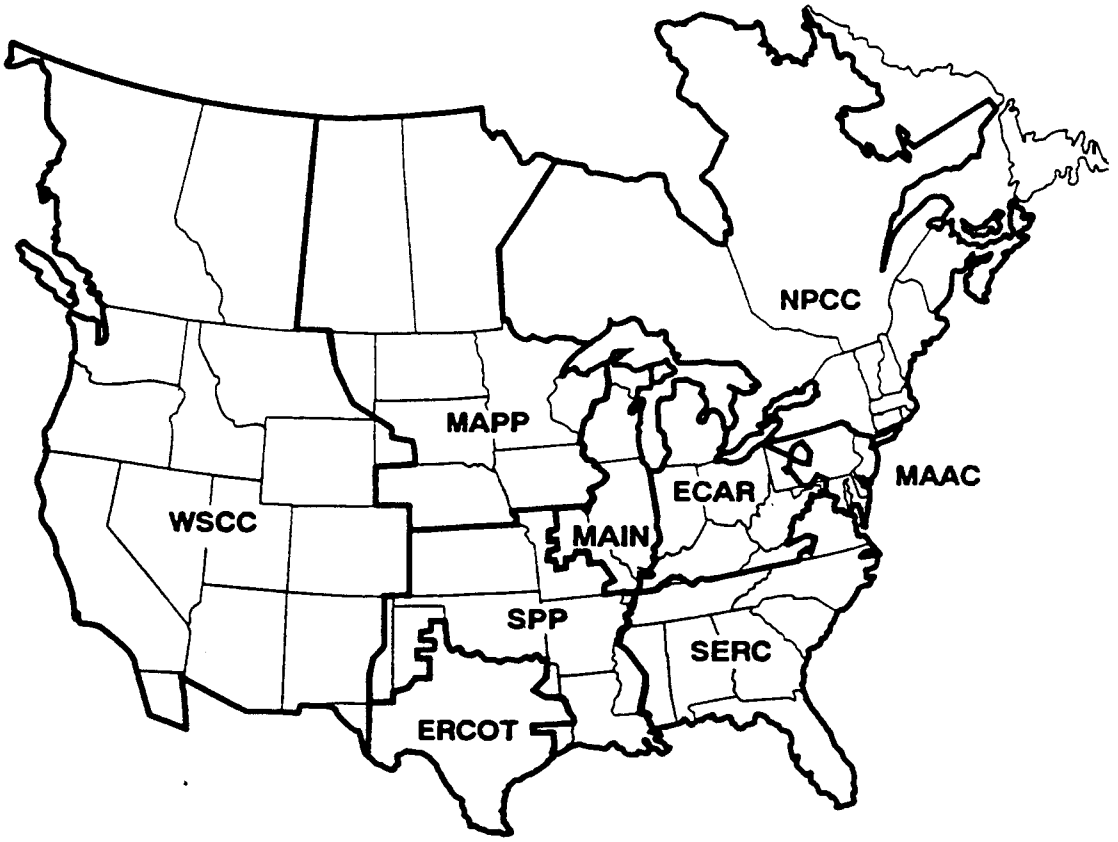


Figure 2. North American Synchronous ac Regions [12].

2. NERC Regional Councils

The North American Electric Reliability Council (NERC) and its nine regional councils were created in 1968 to ensure the reliable and efficient operation of the synchronous regions [13] (see Figure 3). Utilities in each region operate independently, but have obligations with the other members of the region related to the scheduling of operations and the addition of new generating capacity. The nine regional councils are interconnected into the North American Power Systems Interconnection.



ECAR
East Central Area Reliability Coordination Agreement

ERCOT
Electric Reliability Council of Texas

MAAC
Mid-Atlantic Area Council

MAIN
Mid-America Interconnected Network

MAPP
Mid-Continent Area Power Pool

NPCC
Northeast Power Coordinating Council

SERC
Southeastern Electric Reliability Council

SPP
Southwest Power Pool

WSCC
Western Systems Coordinating Council

AFFILIATE

ASCC
Alaska Systems Coordinating Council

Figure 3. Areas served by the nine Regional Reliability Councils, coordinated by NERC [14].

3. **Power Pools** [15]

Power pools consist of two or more interconnected electric systems that coordinate operations to achieve economy and reliability in supplying their combined loads. Power pools have several operating advantages. They:

- Minimize operating costs by using the combination of power generation units to obtain the lowest operating cost.
- Minimize the number of generation units in the system that operate unloaded to cover the maximum load.
- Minimize the reserves throughout the system.
- Coordinate maintenance scheduling to minimize costs and maximize reliability by sharing reserves during maintenance periods.
- Maximize the benefits of emergency procedures.

Existing power pools vary in the extent of their integration. They can be classified as "tight" (high integration) and "loose" pools (lower integration). A tight pool extensively coordinates its planning and operation and is controlled by a single control area. There are three tight power pools in the US: NEPOOL (with 90 members, operates in six New England states), New York Power Pool (NYPP: 8 members, operates in New York), and PJM (8 members, operates in the Mid-Atlantic region). Some utility holding companies also operate as tight power pools.

Tight power pools generally require that members provide transmission access to other members without a direct charge for

trades performed through the control area. In exchange, they receive a share of the pool's savings from these trades.

Loose power pools have a lower level of coordination and may have less joint planning. There have several control areas. An example is MAPP (Mid-Continent Area Power Pool).

4. Control Areas

The US interconnected system is divided into 150 control areas comprising one or more utilities [16,17]. Each control area monitors the:

- System frequency
- Net interchange of power over the tie lines

The system frequency must be kept at the synchronous region's frequency. The net interchange of power is the net power flow over the interconnecting lines. This value, which is agreed in advance, depends on the transactions scheduled by the control area.

The Area Control Error (ACE) is calculated based on the error in system frequency and net interchange of power. This value represents the shift in the generation output of the area that will restore frequency and net interchange to the desired values.

Utilities that wheel power also provide ancillary (or control area services). These are called "bundled" services since they are integral to the service provided by the utility. Ancillary services are necessary to control reliability of the transactions and include: frequency regulation, load regulation, provision for reserves, scheduling and coordination of services,

backup power provisions and voltage support (including reactive power supply). These services increase the operating costs of the utility. "Unbundling" services consist of providing ancillary services independent of the transmission service transaction.

Any wheeling transaction requires that the sending control area increase the net generation and the receiving control area decrease the net generation to receive the scheduled amount of power. This results in changes in the flows on the interconnected network through the entire region. If a third utility provides transmission across its system, it will experience changes in system losses, transmission system voltage conditions, reserve requirements and probably changes in its own economic system dispatch which could result in a net increase in operating costs.

5. Types of Transmission Service [18]

The types of transmission service are defined by the characteristics of the services requested:

- Amount of service (capacity and energy),
- Term of service (initial and termination dates, times, seasons, etc.),
- Firmness of service (conditions of curtailment),
- Specificity of sources and delivery points,
- Relationship to control area boundaries,
- Directionality (one or two way),
- Specified paths, distances and facilities involved

- Ancillary services needed.

The firmness (or conditions of curtailment) of transmission service can be classified into [19,20]:

- Firm - uninterrupted supply of electric energy. A specific power source or powerline feeds the electric load.
- Backup - electric energy that would be available during unscheduled outages.
- Maintenance - electric energy supplied during scheduled outages.
- Interruptible - electric energy supplied, subject to interruption by the electric utility under specified conditions (e.g. load curtailment riders).
- Non-firm - electric energy supplied on a when, as, if available basis, cancelable instantaneously.

Some typical examples include: short-term firm service, point-to-point firm service, firm network service, interruptible point-to-point service, long-term firm service, etc. Typically, the firmer the service, the higher the charges.

CHAPTER III

REVIEW OF ELECTRIC WHOLESALE REGULATION AND DEREGULATION

A. REGULATORS

The electric power industry is regulated at the federal and state levels. Regulators at the federal level are:

- Federal Energy Regulatory Commission (FERC) - FERC has jurisdiction over interstate transmissions and wholesale electric transactions.
- Securities Exchange Commission (SEC) - SEC regulates the structure, finances and operations of many utilities.
- Environmental Protection Agency (EPA) - EPA sets ambient air quality and technology standards for emissions controls at electric power plants. It also approves state implementation plans for meeting a variety of federal environmental standards.

Other regulators at the federal level are the Department of Energy (DOE) and the Rural Electrification Administration (REA).

States have the primary role in economic regulation of the electric power sector and are responsible for retail rate setting and associated issues. The principal regulators at the state level are the Public Utility Commissions (PUCs), state and/or regional energy planning agencies, siting agencies, state EPAs and municipalities.

Conflicts between state and federal jurisdiction arise when state retail rate setting determinations conflict with the

wholesale rate decisions given by FERC. Although federal preeminence is well established, the regional character of electric power systems has led to increased jurisdictional conflict. To maintain system reliability, the industry also regulates itself through the North American Electric Reliability Council (NERC) and its regional reliability councils.

B. UTILITY TYPES

The following are definitions of different type of utilities:

- Electric utility - seller of electric energy who has a legal obligation to sell over a contract. Includes IOUs, GOUs and COUs (see definitions below).
  - IOU - investor-owned utility.
  - GOU - government-owned utility. Includes municipal utilities, Federal power marketing agencies (PMAs), the Tennessee Valley Authority (TVA), and state power agencies.
  - COU - customer-owned utility. Includes rural electric cooperatives and generation and transmission cooperatives.
- TOU - transmission-owning utility.
- NUG - non-utility generators. Includes QFs, IPPs and EWGs (see definitions below).
  - QF - PURPA Qualifying Facility. Includes Cogeneration Facilities and Small Power Producers that satisfy certain requirements.
    - Cogeneration Facility - this type of facility produces: (a) electric or mechanical energy and (b) steam or other

forms of useful thermal energy used for industrial, commercial, heating or cooling purposes.

- Small power production facility - produces: (a) electric energy using biomass, waste, renewable or geothermal resources, and (b) has a power production capacity less than 80 MW (with some exceptions).

- IPP - independent power producer. Producers that do not own or control transmission system and have no affiliation with a traditional electric utility having a franchised service area.
- EWG - an exempt wholesale generator is a type of IPP. Owns or operates a facility within the US and generates electricity for resale. There are exceptions if the EWG is outside the US.

C. REGULATION HISTORY

1. Federal Power Act (FPA, 1935) [21]

Among other things, the Federal Power Act identifies FERC as the agency with primary jurisdiction to prevent undesirable anti-competitive behavior with respect to electric power generation. It also imposed a division of labor between FERC and state PUCs:

- FERC has the authority to price IOU unbundled interstate transmission services but limited ability to order construction of transmission assets [22].
- PUCs have no authority to price unbundled interstate transmission services and have questionable authority to

order an IOU to provide unbundled interstate transmission services. But the PUCs do have authority to require or deny right of construction of transmission lines and the power to locate them.

2. Public Utility Holding Company Act (PUHCA, 1935)

PUHCA was designed to break down a small number of large interstate holding companies that had gained control of about 75% of the private utilities in the US. PUHCA was designed to protect consumers, to stop high electric rates and to improve reliability in the electric utility industry.

Since economy of scale was the only way to expand efficiently the electric supply nationwide, PUHCA intended to limit the use of the holding company structure and to restrain the geographic size of utility monopolies. Since then, utilities have been regulated as natural monopolies. They were granted exclusive franchises to serve a specific area, but regulated to verify that they serve all customers and charge a reasonable rate.

3. Public Utility Regulatory Policies Act (PURPA, 1978)

Changes toward a competitive market place were originated by problems in the 1970s and 1980s: skyrocketing fossil-fuel prices, lower-than-expected electricity demand, surplus capacity and costly overruns on new powerplants causing financial pressures on electric utilities [23]. Also, inequities in electric markets (like wide variation of electric rates over the US and high electric prices relative to the cost of new

generation) created the perception that a market with a regulated generating sector was no longer viable [24,25].

Cogeneration facilities (see definition in p.18) for industrial users became popular since they could reach efficiencies of 80% compared to the 30-40% of most power plants. Although cogenerators could produce power economically, they did not legally have access to transmission.

Prior to PURPA, a cogenerator or small power producer wanting to establish interconnected operations with another utility had three major obstacles [26]: (a) the utility was not generally required to purchase the electric output, (b) some utilities charged discriminatory high rates for back-up service and (c) they could be subject to state and federal regulations as an electric utility. PURPA objectives were: (a) to make on-site generation a viable alternative for large industrial users of steam and (b) to open the electric generation sector to competition. PURPA provides several benefits to Qualifying Facilities (QFs) [27]. PURPA:

- Requires electric utilities to offer to purchase available electric energy from QFs at rates equal to, or less than, the utility's avoided cost.
- Requires electric utilities to provide electric service at non-discriminatory rates.
- Exempts QFs from various state and Federal laws. QFs rates are exempted from FERC regulation and also state regulations in regard to organization and finance.

To obtain the QF status a cogenerator must: (a) generate electricity or mechanical power and useful thermal energy from a single fuel source, (b) be less than 50% owned by an electric utility or an electric utility holding company, and (c) meet the minimum annual operating efficiency standard established by FERC when using oil or natural gas as the principal fuel source. According to this standard, the useful electric power output plus one half of the useful thermal output must be no less than 42.5% of the total oil or natural gas energy input. If the useful thermal energy is less than 15% of the total energy output of the plant, the minimum efficiency must be 45%.

A Small Power Producer must satisfy the following requirements for a QF status: (a) use as the primary energy source biomass, waste, renewable, geothermal resources or any combination of those and (b) more than 75% of the total energy input must be from these sources. FERC must certify the QF status and establish rules under which QFs may sell power to and buy power from utilities. PUCs have to implement FERC rules.

4. Energy Policy Act of 1992 - Title VII (EPAct, October 1992)

QFs from PURPA began generating large amounts of power. By 1990 and 1991, QFs accounted for nearly 50% of the US added capacity. But many believed that it was not rational to rely on QFs to meet the national electricity requirements [28].

PUHCA was a major impediment to the development of independent power projects. The developer of an IPP project turned into a holding company (subject to PUHCA restrictions),

making it difficult for electric generators to operate if they were not tied to a distribution franchise.

Title VII of EPAct brought a more competitive structure to the electric power market industry. EPAct defines policy objectives, creates a framework to develop them, and gives responsibility for the regulation to the PUCs and FERC [29]. One of EPAct's objectives is to stimulate competition in the generation sector, increase efficiency in the electric industry and lower consumer's energy bills.

EPAct:

- Creates a new class of generating facility called Exempt Wholesale Generators (EWGs).
- Opens the transmission grid to utilities and NUGs by giving FERC authority to order transmission access.

a) Exempt Wholesale Generators (Subtitle A)

An EWG owns or operates a facility that generates electricity exclusively for resale (no retail sale). EWGs are certified by FERC and they are exempted from PUHCA's corporate ownership and geographic provisions. EWGs can be subsidiaries of utility-holding and non-utility companies.

EWGs must obtain rate approval from FERC. They are not exempted from state regulation regarding their organization and finances.

b) Transmission Access and Pricing (Subtitle B)

Any electric utility, Federal power marketing agency, or other person generating electric energy for resale, can request a transmission access order. The application may require the

transmission owner to increase its transmission capacity if there is not enough capacity, but he/she would be excused from it if, after a "good faith" effort, he/she fails to obtain the necessary approvals on property rights under Federal, State and local laws.

A transmission order would be issued unless FERC finds that the order would: (a) decrease the reliability of the electric system, (b) replace contractual obligations and (c) result in a retail or sham wholesale transaction (which involve brokers and other entities not owning transmission and distribution systems). FERC must assure that the order is issued in the public interest. Transactions between a utility and affiliates are prohibited unless the state PUC determines that it will benefit consumers, is in public interest and does not violate the State law.

(1) Retail Wheeling

FERC can not issue a wheeling order to an ultimate customer (retail wheeling) or an entity that will sell it to an ultimate customer. The Tennessee Valley Authority, municipals and cooperatives (entities that have been given a public service obligation) are exceptions to this rule. This prohibition does not affect state law.

EPAct does not prohibit a utility from voluntarily selling wholesale power to its own customers or those of another company[30], but this is limited by state legislation. For example, if state regulators accept, a utility can give to its customers access to other utility's electricity, or a customer

can build its own line, and purchase electricity from other suppliers.

(2) Pricing

Transmission rates should promote economically efficient transmission and generation of electricity [31]. Transmitting utilities may recover "all the costs incurred in connection with the transmission services and necessary associated services, including, but no limited to, an appropriate share, if any, of legitimate, verifiable and economic costs" [32]. Costs incurred in providing the wholesale transmission services should be recovered from the applicant for the order and not from the existing customers.

c) Regional Transmission Groups (RTG)

A provision not included in EPAct was a negotiated agreement between all affected parties to form Regional Transmission Groups (RTGs). RTGs would be voluntary organizations of transmission owners, transmission users, and other entities interested in coordinating transmission planning, operation and use on a regional (or inter-regional) basis.

According to the agreement, FERC would certify RTGs if they meet several requirements and provide service within the provisions of EPAct. FERC would have regulatory authority over RTGs.

Since FERC does not have the resources to manage the entire network by issuing transmission access orders, RTGs would help FERC by providing a forum for wheeling requests agreements, and by using the electric utility industry expertise to solve

technical issues and planning [33]. It is expected that if RTGs act in the public interest, competitive markets will evolve quicker [28].

5. FERC Rulings

FERC rulings are determined by Policy Statements, cases and rulemakings. FERC also issues Notices of Inquiry and Notices of Proposed Rulemaking (NOPR) to obtain comments from the interested parties on a specific topic. A Policy Statement is finally issued considering those comments. Up to now, the most important FERC rulings include:

- Information Disclosure
- Comparability Standard
- Transmission Pricing Policy Statement
- Stranded Cost NOPR
- Ruling on RTGs Applications
- Notice of Inquiry on Alternative Power Pooling Structures
- Power Marketing
- Mega-NOPR

a) Information Disclosure

In 1993, FERC issued the "Good Faith" Policy Statement and the Information Rulemaking. These rulings are designed to force parties to divulge sufficient information to facilitate negotiations and speed a FERC decision if needed.

(1) "Good Faith" Policy Statement

The applicant can file a FERC open access application after 60 days of requesting this service to a transmitting

utility. After the applicant files a "good faith" request for transmission services, the utility has to respond with a "good" faith" reply or a transmission agreement.

A "good faith" request has twelve components and has to address the terms, type and conditions of the requested service (dates, degree of firmness, amount, etc.). A "good faith" reply has five components. The transmitting utility has to respond within 60 days of receiving the request (or other mutually agreed period), offer an executable agreement or provide specific information on the modifications needed on its facilities to provide the requested service.

(2) Information Rulemaking (Form 715)

Starting on April 1, 1994, transmitting utilities that operate integrated transmission facilities rated at more than 100 kV must submit to FERC a Form 715. This form requires information on the transmission system characteristics (maps, diagrams), system reliability, power flow, planning assessment practices and system performance. The new rule also requires reporting of system lambda information each hour (which represents the marginal cost of producing electricity).

This information is available at a Bulletin board (202-208-1397). For more information on how to access this Bulletin Board, you can contact the Federal Energy Regulatory Commission - Electronic Power Data Section at 202-208-2474.

b) Comparability Standard

The comparability standard is key in FERC's decisionmaking. Line owners must offer transmission services to

third parties on a comparable basis, and at comparable terms to those provided to themselves.

The "golden rule of pricing": a transmission owner should charge itself on the same or comparable basis that it chargers for the same service. This does not mean that all customers will pay the same price. Prices should be disaggregated which would permit different customers to pay different prices.

In a recent case, FERC limited the comparability standard, ruling that native load has priority over non-firm transactions [34]. The native load consists of the customers on whose behalf the utility (by statute, franchise or contract) undertook the obligation to plan, construct, and operate its system to provide reliable service. These include retail native load customers and wholesale customers [35].

c) Transmission Service Pricing Policy Statement (October 26, 1994)

The pricing statement essentially does three things [36]:

- Caps permissible profits based on the total company revenue requirement. The total revenue requirement consists of the utility's permissible expenses plus a return on its capital investment.
- Promotes RTGs by giving them greater flexibility than individual companies.
- Extends the comparability doctrine.

The policy statement allows two types of transmission filings:

- Conforming - traditional revenue requirement with comparability in access and pricing (but with flexible use of innovative rate design).
- Nonconforming - non traditional revenue requirement, but comparability in access and pricing.

(1) Conforming Proposals

A conforming proposal must meet five principles: use cost-based rates, provide comparability, promote economic efficiency, offer fairness, and afford practicability. Conforming proposals must also specify the following:

- Method for measuring costs for purposes of rate design. It can be any of these five methods:
  - Embedded cost - consists of all costs (plus a reasonable profit for shareholders) allocated among all the kWh the utility sells.
  - Transmission upgrade cost
  - "Or" policy - consists of the higher of the average embedded cost or the transmission upgrade cost, but not both.
  - Short-run marginal - consists in the operating costs incurred (no investments) if a small amount of kWh is produced.
  - Long-run marginal - consists in the operating costs and additional investments required to produce more kWh.
- Method for treating power flows. Two methods are accepted:

- Contract path - this method assumes that all the electricity flows over a particular path on the transmission lines that link two utilities (this is not what really happens) [37].
- Flow-based approach - considers the electricity "loop flows" (or "parallel paths"). When power is transmitted through the interconnected system, only part of the electricity flows over the "contract path" while the rest flows over the transmission lines of several utilities and power pools.

• Method for grouping transmission facilities. The following methods are accepted: corporate postage-stamp or disaggregated approaches (such as zones), or line-by-line methods. For example, a "postage stamp rate" sets a transmission rate regardless of the distance the electricity travels (based on the average historical costs of the entire transmission system of each utility on the contract path)[38].

(2) Non-conforming Proposals

Before filing a non-conforming proposal, the utility must have a conforming comparable tariff on file. Market-based proposals will be considered non-conforming. Non-conforming proposals must produce greater overall consumer benefits than the conforming proposals: greater access, projected price decreases to customers, service flexibility, and promote competitive bulk power markets [36].

d) **Stranded Cost NOPR (June 1994)** [39]

Stranded costs are those costs incurred by a utility when a customer stops buying power from the utility and, instead, purchases transmission services from that utility to get power purchased from somewhere else. The NOPR covers wholesale stranded costs. The issue of retail stranded costs was left to the state PUCs.

FERC proposes that stranded costs could be recovered by contracts or transmission rates. To recover wholesale stranded costs, the a utility must demonstrate that:

- It had a reasonable expectation that it needed to plan for the needs of the departing customer.
- Customer contribution is no more than if it had remained with the utility.
- It will take reasonable mitigation measures (sell stranded investments).

Old wholesale contracts (set prior to June 1994) that do not address stranded costs would have a three-year transition period in which the parties would try to reach an agreement. If an agreement is not reached, the utility could seek to recover the stranded cost with transmission rates. Utilities with new wholesale power contracts may recover their stranded costs only if the contract specifically allows it.

e) Regional Transmission Groups (RTG)

Components of an RTG agreement were defined by FERC in 1993 (like broad and open membership, fair-non-discriminatory

governing and voting procedures, etc.) [40]. The following are perceived benefits of RTGs [41]:

- Decision making is more regionally focused.
- Technical issues will be handled by transmission experts familiar with the local situation.
- Coordinated planning and data collection will be simpler and more efficient.
- Members would mediate in disputes within the RTG. FERC could review these processes to assure validity.
- A more favorable treatment from FERC will occur in issues like:
  - Proposals that deal with "loop flows".
  - Conforming pricing proposals that are innovative.

FERC accepted RTG filings for the Northwest Regional Transmission Association (NRTA), the Southwest Regional Transmission Association (SWRTA) and the Western Regional Transmission Association (WRTA) but imposed two conditions for the approval of these agreements:

- RTGs must develop a regional transmission plan.
- All transmitting utility members have to offer comparable services to the other members (or non-members).

f) **Notice of Inquiry on Power Pooling Institutions** [15]

This Notice of Inquiry solicits comments on US traditional power pooling and alternative pooling structures. FERC stated its belief that the alternative power pooling institutions have

great potential and may help resolve or minimize stranded costs issues.

g) Power Marketing

FERC has permitted power marketers (persons who "buy-sell" power) affiliated with electric utilities to charge market based rates provided they meet seven standards.

h) Mega-NOPR [42,43,44,45,46]

On March 29, 1995, FERC issued a comprehensive NOPR (known as "mega-NOPR" or "giga-NOPR") designed to promote competition in the wholesale electric industry. This NOPR deals with the following issues:

- Stranded cost recovery
- Unbundling of services
- Transmission pricing

(1) Stranded Investment Recovery

The NOPR supplements the Stranded Costs NOPR of June 1994. Some important points are:

- Utilities have the right to full recovery of their "legitimate and verifiable" stranded costs.
- Customers terminating wholesale service would be have to pay "exit fees".
- FERC and state jurisdictions are defined. Stranded costs from retail wheeling would be left to the state PUCs, but FERC would have the authority to step in:
  - if the PUCs do no have authority,
  - when municipalization occurs,

- when customers go from retail to wholesale.

A FERC Commissioner said that FERC should also have the authority to step in when PUCs do not address the stranded cost issue.

(2) Unbundling of Services

The NOPR proposes functional unbundling (of power sales from transmission) for new transmission contracts. This would require a single tariff for all parties, with separately stated rates for all tariff components.

(3) Transmission Pricing

Utilities would be required to file comparable open-access transmission tariffs that would be available to all wholesale buyers and sellers of electricity. Transmission utilities would have to offer point-to-point and network transmission services (including ancillary services). There are two generic "pro-forma" tariffs that set the minimum requirements for these types of services. Utilities would have to file their tariffs within 60 days after the final rule date (which is expected in 1996). Otherwise, FERC will file the tariffs for them. Utilities would also be required to enlarge their transmission capacity if they cannot provide the requested transmission service.

According to FERC, network transmission service "allows the customer to vary its schedule and points of delivery and receipt on the grid without paying an additional charge for each change" [47]. There are different types of network service: points to point (several "points" of power delivery to one

"point" of receipt), point to points, points to points. Point-to-point service is a subset of network transmission service.

For example, there is a customer (located within a host utility control area) that has a network service "points-to-point". There are three adjacent utilities (A, B, C) interconnected with the host utility. For a single transmission fee, the customer can buy power from A, B and/or C. Having three independent sources of power may be the equivalent of a "relative firm" power supply at a non-firm price.

(4) Other issues

The NOPR also includes a Request for Comments on Real-time Information Networks (RINs). According to this, utilities would have to develop RINs to provide outside parties with the same real-time information on transmission and operations that the owner utilities have access to. Some of the categories of data to include in RINs are: availability of firm and non-firm transmission and ancillary services and associated prices, projected hourly transfers capabilities, transmission-specific information on all transmission requests, etc. RINs are necessary to assure fairness in the marketplace since the "mega-NOPR" only requires utilities to unbundle their functions but not to break down their operations into unaffiliated companies.

(5) Reactions [45]

Power marketers, utilities, analysts say that the changes proposed in this NOPR are not enough because:

- Open-access tariffs are applicable only to new contracts.

- Stranded cost provisions may discourage customers from leaving utilities.
- "Functional unbundling" is not required for retail services.

CHAPTER IV

RETAIL WHEELING IMPLEMENTATION ISSUES AND STATE ACTIVITIES

A. GENERAL

Although EPAct opened the electric transmission system to wholesale wheeling, it did not do the same for retail wheeling. With "retail wheeling", customers would be able to obtain transmission service (and probably other unbundled ancillary services) from their host utility to purchase power from another power supplier.

There is great interest in retail wheeling for the following reasons [48]:

- There is a wide variation of electric rates across the US. This is caused in part by the different levels of capital expenditures of the utilities (see Table 1).
- Electricity prices are high (after deducting transmission and distribution costs) compared to the cost of new generation (marginal cost). There is a strong correlation between the higher prices and the largest differentials of price and marginal cost.
- Economic development and the creation of new jobs depend on competitive electricity rates.
- Industrial customers argue that Demand-Side Management (DSM) programs have caused electricity prices to rise while the benefits have gone to non-industrial customers [49].

Company Pair	Residential Rates (cents per kwh)	Percent Difference
Iowa Electric Light & Power	13.4	
Interstate Power	7.1	89
Long Island Lighting	16.4	
Pennsylvania Power and Light	9.0	82
Cleveland Electric	13.5	
Cincinnati Gas & Electric	7.5	80
Mississippi Power and Light	11.0	
Mississippi Power	6.4	72
Philadelphia Electric	14.8	
Pennsylvania Power and Light	9.0	64
El Paso Electric	11.1	
Southwestern Public Service	7.0	59
Interstate Power	8.5	
Minnesota Power	5.4	57
Baltimore Gas and Electric	10.3	
Potomac Edison	6.7	54
Arkansas Power and Light	11.5	
Southwestern Electric	7.5	53
Union Electric	10.3	
St. Joseph Light and Power	6.8	51
Northern Indiana Public Service	10.5	
PSI Energy	7.6	38
Commonwealth Edison	12.4	
Central Illinois Public Service	9.2	36
Commonwealth Electric	13.8	
Massachusetts Electric	10.3	34
Bangor Hydro-Electric	12.2	
Maine Public Service	9.9	23

Table 1. Selected Residential Rate Differences for Contiguous or Closely Proximate Electric Utilities [54].

- Belief that competition is desirable in the electric power market.

Proponents of retail wheeling (industrial consumers, non-utility power producers and market-liberal economists) think that inefficiencies in the electric power industry can only diminish with retail competition. Opponents of retail wheeling include most electric utilities (even though many of them believe it is inevitable), small consumer groups, the financial community and environmentalists.

Retail wheeling would affect the electric power industry in five major ways:

- Enhance competition at the retail level
- Change rate-making practices by state regulators
- Stimulate vertical disintegration of the industry
- Change the "regulatory compact"
- Make the electric power industry operate more efficiently

1. Potential Benefits and Costs [51]

There is no empirical data showing that retail wheeling is beneficial to society [52]. Potential benefits would appear in the long-term and are difficult to measure whereas the potential costs would appear sooner.

a) Potential Benefits

- More efficient pricing - Electric rates would be based on the utilities long-run marginal cost. Utilities with high marginal cost would be left out of the market, which would reduce the price of electricity.

- More efficient utility operations and investments - Utilities would be forced to reduce their costs and improve their operational efficiency to stay in business.
- Stronger US economy - US companies would reduce their energy costs and increase their competitiveness.

b) Potential Costs

- Lower electric power system reliability and stability - Technical difficulties could impair the reliability of the electric power system. Utilities could neglect coordinated long-term regional planning if they are focused on short-term costs and contracts.
- Stranded investments costs - Stranded investment costs are those investments incurred by a utility that are no longer profitable because of competition in the electric power industry (e.g. retail customers stop buying power from the utility and buy it from other power suppliers).
- Electric transmission grid expansion or upgrading cost - Retail wheeling transactions could overload the electric transmission grid. Utilities owning transmission facilities would need to invest on their expansion or upgrade to accommodate these transactions.
- Higher prices to captive customers - Retail wheeling could result in lower prices to wheeling customers and higher prices to captive customers (those who do not have access to retail wheeling).

- "Uneconomic bypass" - Customers could choose a supplier with lower electric rates but higher marginal costs than the local utility, increasing the economy's total cost [53]. This could be possible since existing retail-pricing procedures are based on the utility's embedded cost (not on marginal cost).
- Disappearance of Integrated Resource Planning (IRP) activities - IRP is a planning process for selecting reliable generation plants at the lowest system cost. This is achieved by opening the process to public review and considering both the supply and demand side scenarios. In a competitive market, confidential strategic planning would be necessary to stay in business, which is opposite to the open process of IRP.
- Disappearance of DSM programs - Utilities would be focused on short-term costs and would not invest in DSM programs.

B. ISSUES [54]

The implementation of retail wheeling brings highly divisive issues. Up to now, no state has enacted broad legislation, requiring or granting authority to a state public commission to order retail wheeling. The following is a summary of the legal, technical and economical/political issues involved in the implementation of retail wheeling.

1. Legal Issues

The authority of state PUCs and legislatures to order retail wheeling is questioned because EPAct is not clear about

it. This is a subject that must be decided in courts. Regardless of this, several state legislatures and commissions have already addressed their authority to mandate retail wheeling. Even if state commissions could permit retail wheeling, FERC would have jurisdiction in setting the price, terms and conditions of the transmission service (retail wheeling could be considered an *interstate* transaction because of the interconnection to the transmission grid which permits the occurrence of interstate parallel or loop flows).

2. **Economic and Regulatory Issues**

- Change of the "regulatory compact" - the traditional "regulatory compact" gives utilities monopoly over franchised areas, in exchange for: (a) an obligation-to-serve and (b) an opportunity to recover their investment (cost-of-service regulation). Under retail wheeling, utilities would not have exclusivity over their franchised areas, so the obligation-to-serve and the cost-of-service regulation would have to be redefined.

  Obligation-to-serve - currently, utilities must serve all customers who apply for service from within their service area. The utility's obligation-to-serve in a competitive market will have to be redefined to answer the following questions:

  - Will the utility have an obligation to serve captive customers?
  - Will the utility have an obligation to serve wheeling customers who want to return to the system?

- Will the utility have to provide system back-up or standby power to wheeling customers? And at what rates?
- Will the utility have to provide system support?

Cost-of-service regulation - the utility's total revenue requirement is allocated across the customer classes according a rate-of-return developed for each class. If the utility receives fewer revenues from wheeling customers, it could increase the rates for the other customers.

- Stranded investments - some of the investments made by utilities to fulfill their obligation-to-serve could become "stranded" in a competitive market. The issue is who (wheeling customers, shareholders, captive customers) will pay for these investments.
- Unbundling and pricing of the generation and transmission services.
- Protection of captive customers from higher electric rates.
- Effect of retail wheeling on IRP and DSM activities.

3. Technical Issues

Technical difficulties could affect the reliability of the electric system. These difficulties restrict wheeling transactions at the wholesale and retail level, but are more severe in the latter case. Compared to wholesale wheeling, retail wheeling utilities would have to provide not only transmission but also distribution services. Retail transactions will also be more numerous, frequent and diverse in

time and location. The following are the most obvious technical issues that could affect retail wheeling:

- Parallel path or loop flow problems - Wheeling transactions could overload transmission lines and increase control area operating costs of utilities not in the "contract path" of the transactions.
- Electric grid congestion and line capacity - Congestion could prevent the use of the most economical generating plants. Congestion could be caused by the maximum current capacity of the lines and voltage constraints at buses [55].
- Line losses - Wheeling transactions could increase transmission line power losses.
- Metering problems - A network of meters and a telemetering system would have to installed from the retail customers to the utilities generating and supplying power to keep track of the transmitted power.
- Generation and transmission planning - The issue is whether utilities have to plan for generation and transmission capacity to serve retail wheeling customers or not ("obligation-to-serve").
- Construction or upgrade of transmission lines - Improvements to the present transmission systems may be necessary to satisfy the requirements of retail wheeling transactions.

Loop flow, metering, planning and distribution problems could be corrected with legal, administrative and pricing

policies. Investment and new technologies could maintain the integrity of the local electric power system.

C. RETAIL WHEELING ACTIVITIES AT THE STATE LEVEL

Retail wheeling is generally not supported by legislation or regulatory policy (it is prohibited in seven states, discouraged in one and allowed in two [56]). The following list of retail wheeling activities conducted by states was compiled by Costello, Burns and Hegazy [25]:

- Legislation for limited retail wheeling program (Nevada). Retail wheeling could be ordered for a particular new type of industrial load (the legislation was enacted to attract a specific steel company to the state).
- Comprehensive PUC Proposal (California)
- Experimental PUC Program (Michigan)
- Legislative investigation (New Mexico)
- PUC rejection (Connecticut)
- PUC formal investigation of wheeling and competition (Arizona, Maryland, Washington)
- Gubernatorial investigation of retail wheeling and regulatory reform (Delaware, Massachusetts)
- PUC workshops and informal discussions (Illinois, Iowa, Kentucky, New York, Pennsylvania, Wisconsin)
- Legislative rejection of proposed bills (Florida ,Ohio)

The California and Michigan PUCs are leading the country in the implementation of retail wheeling with their activities. To get an idea on how the electric power market could be

restructured, the main points of the California PUC Proposal and the Michigan Experimental PUC program will be presented.

1. **California PUC Proposal ("Blue Book")** [57, 58,59]

The California Public Utilities Commission (CPUC) issued a comprehensive proposal (known as the "Blue Book") to restructure California's electric industry (April 20, 1994). The "Blue Book" proposed that customers could choose whether to continue receiving bundled services (power and ancillary services) from their host utilities or to obtain retail wheeling (also called "direct access"). According to the proposal, large electric customers were scheduled to obtain "direct access" by January 1, 1996. Smaller electric customers would progressively be phased in until all customers have "direct access" by January 1, 2002.

Hearings on the "Blue Book" (which were conducted from June to October 1994), revealed that several issues had to be resolved before "direct access" could be implemented. For this reason, in May 24, 1995, the CPUC issued an order requesting comments on two policies ("Poolco" and "Direct Access").

a) Order Highlights (May 24, 1995)

The important points of the order are the following:

- CPUC advocates the establishment of a "Poolco", while the "Direct Access" policy is left as an alternative. Comments from interested parties on both policies are requested before issuing a final decision in January 1, 1996.
- California's investor-owned-utilities (IOUs) would be functionally separated into transmission, distribution, and generation functions.

- Access to transmission services would be opened to all power suppliers.
- Stranded costs would be recovered through a Competitive Transition Charge (CTC).
- Utilities should continue to provide stranded benefits (e.g. social programs, energy efficiency programs, renewable energy programs, etc.). Funding could be obtained from a surcharge on electric bills.

b) "Poolco" Policy

The "Poolco" would be a central wholesale pool, run by an independent party. California IOUs (Southern California Edison, San Diego Gas & Electric, and Pacific Gas & Electric) would have to join the pool, while municipally-owned utilities and other out-of-state utilities would be encouraged to join it.

The "Poolco" would: (a) be a central marketplace for parties buying and selling electricity (b) establish a market-clearing price for all electric energy based on an hourly (or half-hourly) auction (c) dispatch all electric generation resources in an economically efficient manner and (d) ensure and maintain system reliability.

The "Poolco" Policy would allow customers to:

- Obtain "Virtual Direct Access" - customers would be able to control their electricity usage and cost. To obtain this, customers would need:
  - Real-time electric meters (that allow them to track their electricity consumption).

- The "Poolco" electricity clearing price.
- Time-of-use electric rates that would encourage them to use electricity during off-peak hours.

Customers would try to shift their electric consumption to the period in which electricity is cheaper than the Poolco's clearing price. In this way, customers would reduce their electricity cost and utilities would reduce the need to build new generating plants or have large generating reserves during the peak hours.

- Establish "Contracts for differences" - these contracts would allow customers to enter into financial contracts with generators, marketers, and brokers to fix electric power prices.

(1) Implementation Steps

The following briefly describes the CPUC's proposed implementation steps for the "Poolco" policy:

1. Establish open access to transmission services.
2. Unbundle the functions of generation, transmission and distribution. All generation and transmission facilities would be under the control of the "Poolco".
3. Establish the "Poolco" by January 1, 1997.
4. Request comments on the need to address market power of the "Poolco" members (since members with large market power could manipulate the price of electricity).
5. Develop methods to recover stranded costs.

6. Continue providing social programs, energy efficiency programs, and energy diversity and renewable energy goals currently being carried out by the utilities.
7. Install real-time metering capability for electric customers. This is planned to start by January 1 of 1997 (for large customers) and finish by January 1, 2003 (all customers).
8. Establish "direct access" between end-user consumers and generators once the CPUC has resolved all issues. This is expected to occur by January 1, 1999.

2. **Michigan Experimental PUC Program** [60,61,62,63,64,65]

On April 11, 1994, The Michigan Public Service Commission (MPSC) ordered a five-year, experimental retail wheeling program for the customers of Detroit Edison and Consumers Power Co. A limited experiment was considered to determine if retail wheeling would benefit the public. The experiment is focused on the administrative and technical feasibility of retail wheeling and not on industry restructuring and regulatory reform issues.

Detroit Edison challenged the MPSC's authority to order the experiment with a filing before the US District Court for the Western District of Michigan. However, on August 26, 1994, both Detroit Edison and Consumers Power filed retail wheeling tariff proposals with MPSC.

The Michigan experimental PUC program:

- Limits the program to 60 MW for Consumers Power and 90 MW for Detroit Edison.

- Limits a customer's wheeling capacity to between 2 and 10 MW at each location served under the tariff. No single customer may acquire more than 75 MW.
- Is available only to customers served at transmission or subtransmission voltage.
- Places responsibility for wheeled power purchases on the wheeling customers.
- Requires third-party power generators to obtain a Certificate of Convenience and Necessity from the MPSC. They would also be required to obtain a franchise from the municipality where the customer is located.
- Becomes effective only when Consumers Power or Detroit Edison need new capacity (to avoid stranded investment).
- Permits participant customers to return to full utility service, on the same term available to customers who did not participate, after the experiment ends.

Participant customers who choose to return to full bundled service before the end of the experiment will have to pay any incremental fixed or variable power costs and take interruptible service. The experiment is considered an unbundling of rates for existing firm retail sales service. Detroit Edison and Consumers Power Co. would deliver purchased power to their retail customers from suppliers that are connected or can connect to their grids.

CHAPTER V

RETAIL WHEELING AND PSEUDO-RETAIL WHEELING ACTIVITIES AND INITIATIVES

A. CRITERIA FOR SELECTION OF ACTIVITIES AND INITIATIVES

The activities and initiatives presented in this chapter involve industrial customers switching, partially or completely, from their host utility to another power supplier. The time period reviewed started from the signature of EPAct (1992) up to the present.

B. TYPES OF ACTIVITIES AND INITIATIVES

Although most of the states' legislation do not allow retail wheeling, the electric retail power market is in transition to complete deregulation. For this reason, most of the reviewed activities and initiatives are not "pure" retail wheeling but involve a degree of customer choice of its power supplier. These types of activities and initiatives (which will be called "pseudo-retail wheeling") will also be presented in this chapter to help understand what changes have occurred and what could occur in the electric power market at the retail level.

To facilitate the understanding of these changes, these activities and initiatives will be grouped into three types:

- "Retail" wheeling - a customer buys power from a supplier while the host utility provides the transmission service.

- "Buy-sell" - the host utility is the broker (buys power from other supplier and sells it to the customer) in the wheeling transaction.
- Dedicated line wheeling - a customer receives power from another supplier through a dedicated transmission line.

C. SOURCES OF INFORMATION

The main sources of information used to search for these types of activities and initiatives were publications from: (a) the Electricity Consumers Resource Council (ELCON) [66] and (b) the National Regulatory Research Institute (NRRI) [67]. Both groups are advocates of retail wheeling. Journals, periodical articles, and several publications related to the electric power market were also reviewed for other activities and initiatives and will be referenced as needed.

D. METHODOLOGY

Information from the sources referenced above was used to understand the selected activities and initiatives. More information on each selected activity was obtained by contacting representatives of the involved parties (power supplier, customer, or state PUC). These representatives were also asked for an opinion on the factors that affected the success of their activity and suggestions for other companies seeking to obtain retail wheeling. The information presented in this chapter is public domain.

E. WHEELING ACTIVITIES AND INITIATIVES

1. "Retail Wheeling" Activities and Initiatives

a) Bonneville Power Administration *(host utility)* and Direct Service Industries, Inc. *(customer)*

The Bonneville Power Administration (BPA) is a federal agency that transmits and sells hydroelectric power in seven states of the US Pacific northwest region, supplying electricity to 170 utilities and numerous large industrial customers. Eleven of these industrial, electric-intensive customers form a group called Direct Service Industries (DSI). The situation of DSI members is unique because by federal law they are considered wholesale customers.

In January 1993, BPA and DSI reached an agreement to cut back the amount of delivered electricity by 25 percent increments. BPA would broker power for DSI when it can not supply service [68].

Currently, BPA is voluntarily negotiating with DSI customers access to other power suppliers. It is expected that by October 1995, some DSI customers would be buying non-firm power from other suppliers (including BPA) with BPA providing the transmission service. The wheeled power would be used in addition to the power supplied by BPA. It is probable that BPA would also provide emergency power to DSI customers who are involved in these types of transactions [69].

b) Consolidated Edison *(host utility)* and some industrial customers of Consolidated Edison

Consolidated Edison (ConEd) has an exclusive franchise (with some exceptions set by state legislation) for the sale of electricity in New York City and most of Westchester County [70]. The New York Power Authority (NYPA) is a public wholesale power supplier that owns generation and transmission facilities throughout the state of New York. NYPA's electric rates are lower than ConEd's rates at least partially because it is a state agency and does not have to pay state taxes.

Under the 1987 state legislation, private-sector companies can access NYPA's power in situations that involve expansion, job retention or job revitalization. In cases of job retention, the applicant must demonstrate that there is a possibility that it will leave the state. Prospective customers must apply for NYPA's "economic development power" to the State Economic Development Power Allocation Board. NYPA helps these customers during the application process.

Currently, NYPA supplies approximately 12% of ConEd load. The electric load of customers supplied with "economic development power" ranges from hundreds of kW to several thousands of MW. Selected customers buy power from NYPA while ConEd provides the transmission service at rates set by the New York Public Service Commission [71].

c) City of Columbia Water and Light Utility *(host utility)* and University of Missouri *(customer)*

The University of Missouri (UM), which is an electric customer of the City of Columbia Water and Light utility (City of Columbia), has a cogeneration plant capable of supplying the entire electric load of the university (approximately 35 MW)[72].

UM can generate electricity at low cost ($24 /MWh on-peak and $20 /MWh off-peak). This gave UM leverage on its negotiations with the City of Columbia to obtain first, discounted electric rates and later, a voluntary retail wheeling agreement. A power marketer (Enron), and the City of Columbia are involved in retail wheeling transaction, providing up to 10 MWh per hour of non-firm power to UM.

d) Public Service Co. of New Hampshire *(host utility)* and Freedom Electric Power *(supplier)*

In August of 1994, Freedom Electric Power Co. filed an application with the New Hampshire PUC for permission to purchase low cost wholesale electricity from suppliers outside New Hampshire and resell it to some of Public Service Co. of New Hampshire (PSNH)'s customers [73,74,75,76]. Freedom plans to pay PSNH for line usage and then deliver electricity to large, transmission-level industrial customers. Freedom officials have said that it could save some industrial users 30 percent in annual electricity costs. PSNH's electric rates averaged 9.19 ¢/kWh while the industry average was 5.03 ¢/kWh. Under state law, electric utilities do not have exclusive franchise

territories and an alternative supplier can serve a customer of an existing utility if the PUC considers it in the public good. The application is still being reviewed by the State PUC and a decision is expected soon. If the application is approved, Freedom would be considered a utility and FERC regulations for wholesale transactions could be applied to it. The issue is whether Freedom activities qualify it as a utility according to state law or not [77].

e) National Steel Corporation of Mishawaka *(customer)*

The National Steel Corporation of Mishawaka (National), which has four facilities located in different states, has approached their host utilities with proposals for an experimental form of retail wheeling [78]. The size of their electrical load (varies from 40 to 200 MW) and the utilities' willingness to learn about retail wheeling facilitate the negotiations of these proposals.

It has been reported that National reached an agreement with Illinois Power to establish a retail wheeling tariff for one of its facilities, with rates set by the Illinois Municipal Electric Agency in 1994. No documents have been filed at the state PUC yet. As an example, a representative from National Steel, said that he estimated the average cost of wheeled power from 3.5 to 3.7 ¢/kWh, which would be less than their present electric cost.

2. "Buy-Sell" Activities and Initiatives

a) PSI Energy *(host utility)* and NuCor Inc. *(customer)*

NuCor has a steel manufacturing plant located in Crawfordsville, Indiana and is one of PSI Energy (PSI)'s largest electric power customers. PSI and NuCor signed a contract with the following features [79,80,81]:

- Contract is valid through year 2009, with automatically renewable 5 year terms after this period. A five year notice prior to the end of each term is required to terminate this contract.
- NuCor must purchase 150 MWh per hour of firm power from PSI.
- NuCor can purchase up to 50 MWh per hour of non-firm power (above the 150 MWh of firm energy) from other suppliers [82].
- PSI would broker these transactions.
- Rates and charges consist of:
  - A transmission charge of 0.88 $/kW-mo.
  - PSI's costs incurred in the transaction multiplied by a factor of 1.13
  - Transaction fees

A transmission tariff (Rider 19), based on the contract negotiated with NuCor has been approved by the Indiana Utility Regulatory Commission. This tariff will allow PSI's largest industrial and commercial customers to shop around for cheaper power, using PSI as a broker. Up to now, NuCor is the only customer under this tariff.

b) Mohave Electric Cooperative *(host utility)* and North Star Steel *(customer)*

North Star Steel (NSS) selected a site in Arizona (Mohave county) for the construction of steel recycling plant. This plant will be electric-intensive since it will use an electric furnace to recycle scrap steel. The plant, which is still under construction and would probably start operations by 1997, is expected to create 150 new jobs [83,84].

To attract NSS to Arizona, several incentives were given to NSS: (a) exemption from property taxes on the site for 20 years, (b) exemption from sales taxes on purchased electricity for 15 years and (c) the ability to shop around for electric power.

The Western Area Power Administration (WAPA) is a federal agency that distributes hydroelectric power in the southwestern US; Arizona Electric Power Cooperative Inc. (AEPCO) is a generation and transmission utility. Mohave Electric Cooperative (Mohave), is a local power distributor in the plant's area and is a member of AEPCO.

In October 1994, the Arizona Corporation Commission (ACC) approved an agreement, valid through year 2010, between Mohave, AEPCO, WAPA and NSS to provide a maximum of 80 MWh per hour of non-firm power to NSS. Mohave will sell power to NSS. This power will be bought from AEPCO who will, in turn, obtain it from a supplier chosen by NSS. WAPA will provide the transmission service to AEPCO and will construct a switching station and interconnection facilities.

The energy would be provided when available, and could be canceled instantaneously. For emergency requirements, the plant is expected to install a 1.5 MW natural gas electricity generator. The monthly non-firm energy charge would consist of:

- AEPCO's actual incurred costs for purchasing, transmitting and scheduling energy (multiplied by a factor of 1.15)
- AEPCO's actual incremental cost of generation (multiplied by a factor of 1.15)
- Charges billed to AEPCO by Western
- Mohave's actual costs as a result of all agreements

NSS's electric cost savings from this agreement are estimated in $5/ton of raw steel (plant capacity is 500,000 ton/yr) compared to more conventional methods [85].

c) Pacific Gas & Electric Co. *(host utility)*

In February 1995, Pacific Gas & Electric Co. (PG&E) filed a wheeling proposal that is still under consideration at the California PUC. PG&E would offer voluntary retail wheeling in exchange for the opportunity to negotiate a discounted generation price with its large industrial customers [86]. The proposal consists in the following:

- Depending on the annual average demand of a customer, it would be eligible according to the following schedule:

Annual Average Demand (kW)	Starting Year
> 7500	1996
> 4000	1997
> 2000	1998

- Eligible customers would select a supplier (including PG&E) and negotiate with PG&E a confidential "buy-sell" agreement. Then, PG&E would buy power at the negotiated price and resell it to the customer.
- Charges to the customer would consist on PG&E's bundled tariff, but with PG&E's generation cost replaced by the negotiated "buy-sell" generation price. PG&E's generation cost component would be obtained from avoided-costs used to set Qualifying Facilities payments.

With this proposal, PG&E would be able to compete with other suppliers for the customer's purchase without pricing regulatory constraints.

3. Dedicated Line Wheeling Activities and Initiatives

a) Niagara Mohawk Power Corp. *(host utility)* and Alcan Rolled Products Inc. *(customer)*

Alcan Rolled Products (Alcan), located in New York, is one of Niagara Mohawk Power Corp.'s (NiMo) largest electric customers [87,88]. Sithe Energies Inc. constructed a 1040 MW-cogeneration facility (called "Independence Station") in Oswego County, New York. Alcan, NiMo and the New York Power Authority (NYPA), are neighbors of the Independence Station.

According to PURPA and state law, a qualifying cogenerating facility can sell electricity through a dedicated line to an on-site user [89]. Although Alcan and the Independence Station do not satisfy this "on-site requirement", the New York Public Service Commission (NYPSC) approved Sithe to

sell electricity directly to Alcan because it was in the "public interest" (Alcan is a large industrial customer that was considering leaving the state) [90,91]. This is an important decision for the New York utility industry because is the first time a retail customer will be permitted to buy its electricity from a non-utility generator (NUG).

Sithe has signed long-term contracts to sell:

- Steam and electricity (44 MW) to Alcan through a dedicated transmission line (this contract is for 22 years).
- Electricity to ConEd and NiMo.

Sithe is also planning to provide electricity to a proposed cardboard recycling plant (Liberty Co.) which will be built in Sithe's property (estimated load: 15 MW). Alcan would obtain savings since Sithe's electric rate is 4.46 ¢/kWh, compared to NiMo's rate of 8 ¢/kWh [90]. In January of 1994, Alcan's savings were estimated in $5 to $7 million compared to NiMo's best offer to that date [89]. The NYPSC ordered Sithe to pay an "entry fee" of $19.6 million over a 10-year period to compensate NiMo for the loss of Alcan as customer.

b) Texas-New Mexico Power *(host utility)* and Amoco Corporation at Texas City *(customer)*

In February 1995, Gulf Coast Power Connect Inc. (Gulf), filed with the Public Utility Commission of Texas for permission to build a 138 kV transmission line to connect Amoco facilities in Texas City. These two facilities are being served by Texas-New Mexico Power. A decision on this issue is expected by the end of this year [92]. The proposed transmission line will

connect the Amoco's Texas City refinery to an Amoco's chemical plant located less than 200 ft away.

Using the common carrier concept (similar to natural gas pipelines), Gulf will offer transmission services to customers who have power in one place and could use it in another. These are considered wholesale transactions [93]. According to Gulf's proposal, a customer would purchase a specific amount of capacity on the line and pay for it whether or not it is used. The rate will be based on the cost of the line and the number of customers using it.

Gulf also filed for a permission to build another transmission line to transport cogeneration power from one Exxon facility to another. These facilities are customers of Houston Lighting & Power (HL&P).

CHAPTER VI

ANALYSIS OF RETAIL AND PSEUDO-RETAIL WHEELING ACTIVITIES AND INITIATIVES

A. SITUATIONS THAT HELP INCREASE CUSTOMERS' ABILITY TO CHOOSE ELECTRIC POWER SUPPLIER

The cases presented in Chapter five were analyzed to identify situations that helped customers obtain retail or pseudo-retail wheeling transactions. These principles thus identified should prepare other customers for retail wheeling. The principles are listed and explained below:

- State economic development incentives

  Some states provide special incentives to companies that help develop the economy within the state by creating or keeping jobs. These incentives regarding retail wheeling help reduce the electricity cost of these companies, encouraging them to locate or remain in the state.

  These incentives could consist of: accessibility to cheap electric power (e.g., NYPA's "economic development power"), electricity sales tax exemptions, rate discounts, and the ability to shop around for electric power and others special agreements. Although large customers are likely to obtain these incentives, some of them are not restricted to large customers (e.g., NYPA's "economic development power").

  This situation can be seen in the following cases: Consolidated Edison and some industrial customers of Consolidated Edison (p.53), Mohave Electric Cooperative and

North Star Steel (p.57), Niagara Mohawk Power Corp. and Alcan Rolled Products Inc. (p.59).

- Partnerships between customer and host utility

Most of the cases presented in Chapter five present a degree of partnership between the customer and host utility. In these partnerships, usually set with long-term contracts (5 to 10 years), customers obtain transmission service, rate discounts or brokering of "buy-sell" transactions from the host utility. Since transmission access for retail wheeling transactions is not regulated and customers have little experience with this type of transaction, customers could benefit from these partnerships. Utilities gain by getting broker fee, transmission fees and keeping the customer in the area.

This situation can be seen in the following activities: City of Columbia Water and Light Utility and University of Missouri (p.54), National Steel Corporation of Mishawaka (p.55), PSI Energy and NuCor Inc. (p.56), Mohave Electric Cooperative and North Star Steel (p.57), Pacific Gas & Electric Co. (p.58).

- Utilities trying to obtain a competitive edge in the future retail market

Although most of the players in the electric power market (electric utilities, NUGs, power marketers, regulators, etc.) agree that the retail power market is going to be deregulated, there is uncertainty on the contents of

the deregulation and when it would happen. The current "regulatory compact" gives utilities monopoly over a franchised area. Yet, some utilities are proposing limited retail wheeling experiments, special rates and "buy-sell" agreements to large industrial customers.

Utilities engage in this type of activities to obtain a competitive edge by: (a) learning how to work in a competitive retail market (they do not have the experience since they were treated as monopolies), (b) having the opportunity to restructure their organizations ahead of other utilities (according to their vision of the market) and (c) having the opportunity to move state regulations in a direction beneficial to the utilities.

This situation can be seen in the following activities: National Steel Corporation of Mishawaka (p.55), PSI Energy and NuCor Inc. (p.56), Pacific Gas & Electric Co. (p.58).

- Customers with large electric loads

Retail wheeling experiments (e.g., the Pacific Gas & Electric Co. initiative, and Michigan's limited retail wheeling experiment) and the California's "Blue Book" proposal define schedules for customer eligibility based on electric load size. Large customers would be involved in these activities first followed by smaller customers years later. This is done to implement the change at a smaller scale (there are fewer large industrial customers) and obtain the necessary expertise to implement retail wheeling at a larger scale.

- Customers with "bypass" capability

Large-electric-load customers with "bypass" capability can self-generate electricity (usually through cogeneration) or are planning to close operations and move to other state. Utilities facing the possibility of loosing these customers (if they exercise their "bypass" capability) are willing to provide them with "buy-sell" agreements, brokering or transmission services. In "buy-sell" agreements, host utilities not only provide transmission services, but they are also potential power suppliers.

This situation can be seen in the following activities: Bonneville Power Administration and Direct Service Industries, Inc. (p.52), City of Columbia Water and Light Utility and University of Missouri (p.54), Public Service Co. of New Hampshire and Freedom Electric Power (p.54), National Steel Corporation of Mishawaka (p.55), PSI Energy and NuCor Inc. (p.56), Mohave Electric Cooperative and North Star Steel (p.57), Niagara Mohawk Power Corp. and Alcan Rolled Products Inc. (p.59).

- Customers located close to alternative power suppliers build their own transmission line

In the Niagara Mohawk Power Corp. and Alcan Rolled Products Inc. case (p.59), a customer located close to an alternative power supplier (a Qualifying Cogeneration Facility) built a transmission line to obtain power from it, bypassing the host utility. Because customers "bypass"

completely their host utility, this situation is the opposite of establishing a partnership with the utility. In the Niagara Mohawk case, the host utility was compensated for the stranded costs originated from the departure of the customer.

- Building transmission lines to interconnect facilities

  Companies with facilities located close to each other could build interconnecting transmission lines to transmit electric power from one facility to the other. This situation is presented in the Texas-New Mexico Power and Amoco Corporation at Texas City case (p.60).

- Customers that can operate with non-firm power

  It was not possible to determine if all the cases presented in Chapter five involve non-firm power due to confidentiality requirements and the present development status in some of them. It seems that customers involved in agreements negotiated with their host utilities can operate with non-firm power at a certain degree. To satisfy their requirements for firm power, customers would:

  - contract backup power from their host utility (e.g. Bonneville Power Administration and Direct Service Industries, Inc., p.52),
  - buy a minimum amount of firm-power from their host utility (e.g., PSI Energy and NuCor Inc., p.56), or
  - have capacity to self-generate power to supply their whole load or a minimum "emergency" load (e.g. City of Columbia Water and Light Utility and University of Missouri, p.54

and Mohave Electric Cooperative and North Star Steel, p.57).

- Other situations[94]

Other situations that could play an important role in other cases (in which customers have a choice of power supplier) are the following:

- DSM programs - utilities could prefer transmitting power from other suppliers instead of constructing new generation plants. By avoiding the construction of new plants, utilities avoid increasing their potential stranded investments.
- Low load factor customers - low load factor customers have a peak demand much higher than their average demand. Because utilities have an "obligation to serve", they must commit generation reserves enough to supply the customer's peak demand. By transmitting power from other suppliers, utilities could reduce committed generating reserves, thus reducing their operating costs and avoid constructing new generation plants.
- Low profit and unstable customers - it could be more profitable for utilities to transmit power from another supplier instead of providing power and "bundled" services to these customers.

B. DEVELOPMENT OF RECOMMENDATIONS

The objective of the recommendations developed in this chapter is to provide potential retail wheelers with the issues

that could be important for retail wheeling. These recommendations were classified in two types:

- Recommendations for customers in a non-deregulated retail power market.
- General recommendations (for both non-deregulated and deregulated retail power markets).

1. Methodology

Some of the recommendations developed in this chapter are based on the opinions of representatives from the companies involved in the cases presented in Chapter five while others are based on observations of the case studies. A survey was developed in an attempt to validate the recommendations developed in this chapter and to obtain other points of view. A total of 21 survey participants were identified from:

- Representatives of companies involved in retail and pseudo-retail wheeling transactions (cases presented in Chapter five).
- Energy managers of some large electric customers (industrial and commercial) across the US.

a) Survey Description

The survey (a survey sample is presented in Appendix A and the exemption from the Oklahoma State University Institutional Review Board is presented in Appendix B), was divided in two sections:

- The first section presented the recommendations developed in this chapter. Survey participants were asked to provide their comments and points of view on each recommendation.
- The second section was open for ideas and other points of view that the survey participants thought could also be important in a retail wheeling market.

The names of the survey participants were kept confidential.

b) Results

The four responses received are from participants that belong to a utility, a law firm and potential retail wheeling customers.

2. Recommendations and Survey Results

The recommendations developed in this chapter and the summarized survey responses for each recommendation are presented below.

a) Recommendations for Customers in a non-deregulated Retail Power Market

The following recommendations should help customers in a non-deregulated retail power market (which is the present status of deregulation in the US) obtain some of the benefits of retail wheeling before deregulation occurs.

- Establish partnerships with the host utility to obtain retail wheeling sooner

  Current market developments show that some utilities are willing to establish partnerships with customers for

transactions that resemble retail wheeling. Since it is uncertain when deregulation will occur, by establishing partnerships, customers could obtain some of the benefits of retail wheeling before the retail market is deregulated.

Customers would benefit from these partnerships by obtaining rate discounts, brokering of buy/sell transactions or transmission services. Utilities, on the other side, would benefit by learning how to work in a competitive environment and by keeping their current customers.

For example, a large industrial customer could approach its utility to look for ways to reduce its electricity cost. Besides the need to have negotiating power, the customer could point out the competitive advantages that the utility would obtain if it engages in retail wheeling (or transactions that resemble retail wheeling): learning to work in a competitive retail market, opportunity to restructure its organization and shape state regulations to benefit the utility. Utilities also seem to like conducting these partnerships as experiments because they would have control over the restructuring process (it could be reversed if it does not work), the amount of restructuring, and an opportunity to try different approaches to address the issues of retail wheeling.

Survey Comments

* Electric utilities are already engaged in the equivalent of retail wheeling now. Discounts and buy/sell agreements are common (lawyer).

* Partnerships may not always work and "battling" the host utility could be the best approach. A non-willing host utility could set a long-term contract that requires years of prior notice before the customer could get out of it (utility).
* Utilities "tend not to move this fast" (customer).
* Partnerships encourage the creation of the deregulated market (customer).

- Be prepared to negotiate transmission tariffs

The "mega-NOPR" left the issue of retail stranded cost to the state PUCs. Before deregulation comes, retail customers should use transmission charges of past wholesale transactions or buy/sell agreements as a reference when negotiating transmission tariffs with utilities.

The problem faced by several customers involved in transactions resembling retail wheeling is that transmission tariffs were not always available since utilities have been reluctant to publish this information. This would change with the operation of RTGs, which are expected to file wholesale regional transmission rates, which could be a source of information.

Survey Comments

* Electric utilities would file wholesale rates with the FERC or state PUCs. Real-time Information Networks (which are required by the "mega-NOPR") would likely be a better source of information than RTGs (lawyer).

* With retail wheeling, there could be problems setting rates that differentiate firm power from power just passing through the lines. Also, customer could obtain lower rates if the transmission voltage is higher. In this case, the customer's maintenance cost goes up (utility).

- Follow the development of the electric power market

Retail wheeling is a hot topic, and there is significant literature and articles that are being published on retail power market restructuring in specialized journals and magazines. Follow the developments on the leading retail wheeling activities (California's "Blue Book", Michigan's retail wheeling experiment) as well as utility-initiated contracts and agreements in different states to see where the retail power market is heading.

Survey Comments

* It is better to hire an expert rather than having customers doing it by themselves (lawyer).
* This is important for customers willing to get into retail wheeling (generally those whose electric cost are high compared to their total operating cost) (utility).
* This information is not as available as it should be (customer).
* This is not enough since there is no way to predict how the market will develop (trends could change) (customer).

b) General Recommendations

These recommendations should help potential retail wheelers (both in a deregulated and non-deregulated retail power market) get prepared for a retail wheeling market.

- Analyze electric loads requirements

  Currently, host utilities supply customers with both firm power and "bundled" (provided as a "package") ancillary services. There is no choice. In a deregulated market, customers would have access to firm power, non-firm (interruptible) power and "unbundled" ("individual") ancillary services provided by different suppliers.

  Non-firm power is cheaper than firm power but it could be interrupted when power is needed. Customers looking to reduce their electricity cost should consider buying non-firm power. For this, customers need to analyze the firmness requirements of their electric loads and determine which loads could operate with non-firm power, which ones need firm power, backup power, etc.

  Ancillary services (frequency regulation, load regulation, provision for reserves, scheduling and coordination of services, backup power, reactive power for voltage support) are currently provided as "bundled" services by host utilities. In an "unbundled" market, customers would be able to choose suppliers of "unbundled" ancillary services, different than their host utility, that provide these services at lower cost and with the required reliability.

For example, a manufacturing plant determines that its firm loads consist of critical plant equipment (e.g., equipment cooling pumps and material handling equipment) and emergency lighting. Non-firm loads could be other manufacturing equipment, lighting, etc. Firm and non-firm loads need to be in separate circuits so that backup power (or firm power) could be supplied to the firm loads in case of power interruption. Backup power could be provided by the plant itself (or contracted from a supplier) to supply the plant loads if the interruption of power lasts longer than permissible. Reactive power for voltage support could also be provided by the plant itself.

Survey Comments

* By analyzing the different loads, customers could also obtain differentiated rates (from rate discounts provided by their host utility or from wheeled power) for their different needs (e.g. applying special riders or rates for backup power, non-firm power, Time-of-Use, firm power, etc.) (lawyer).
* Most industrial users do not know where their electric power is used. Customers could break down their loads into: firm loads, critical loads, non-firm loads, the time of day when they occur. They could also analyze if their loads could be changed without jeopardizing the manufacturing process. Many of these loads could fit into rate riders or special programs (utility).

* Customers need to know how to do this process (customer).
* Determining the amount and type of power sources that minimize costs and risk of a customer is a big challenge. The simplest case consists in a customer that obtains power from its host utility and wants to install a "peak-shaving" electric generator for its peak loads (since peak power is the most expensive, this would reduce the customer's electric cost). The problem is how to determine the optimal size of the "peak-shaving" generator. This problem could be extended to include other sources of power: firm power, cogeneration power, non-firm power, backup power (customer).

- Determine power supply and ancillary services options in the region

After analyzing their electric loads, customers would need to know the power supply and ancillary services options available in the region. With this information, for example, a plant could contract the following services from:

- Host utility: 80 MW of firm power, transmission service and some ancillary services (frequency regulation, load regulation, scheduling and coordination of services, voltage support).
- Supplier A: 100 MW of non-firm power, and generation reserves (ancillary service).
- Customer: Backup power (e.g. cogeneration plant).

Power supply and ancillary services options could be determined by contacting:

- *Consultants* - they could perform a power flow analysis on the regional grid to calculate power flow constraints and determine the possible routes for power flow. Information needed to perform this analysis would be available from FERC's Form 715 filings[95]. Consultants with this expertise usually have experience working at the utilities in the local region.
- *Power marketers* - most of them have experience with the deregulated natural gas market. They would have the expertise necessary to determine possible routes for power flow, identifying potential power suppliers and setting up power transactions. Power marketers could be contacted through the Power Marketing Association (PMA)[96].
- *Potential suppliers* - customers could issue Requests For Proposals (RFPs) for power supply to utilities, power marketers and NUGs in the region.

  For example, in 1994, the University of Missouri (UM) issued an RFP for power supply[97]. In this particular RFP, suppliers had to: (a) offer delivered prices at levels guaranteed to be below UM's electricity cost, (b) demonstrate financial capabilities to make such guarantees, and (c) be credible power suppliers of the quantities and qualities required by UM.

- *Host utilities* - most of the utilities have been involved in wholesale transactions and thus, should have the expertise necessary for setting up retail wheeling transactions. Once the customer establishes a partnership (or if retail wheeling is regulated), it could approach the host utility to determine potential suppliers of power in the region. Utilities would probably set up power marketing departments for this type of transactions.
- *RTGs* - these are expected to file regional transmission pricing systems and set up region-wide-wholesale power trading systems. Although RTGs were conceived to deal with wholesale level transactions, these trading systems could probably be extended to include retail level transactions.

Survey Comments

* In the long run, all electric utilities will be offering these services. But, as the deregulated natural gas market shows, certain services (e.g. reliability and power quality) can only be obtained from host utilities since they (and not the consultants or marketers) operate the system (utility).
* Some companies are trying to create a network of interested parties to encourage cooperation (customer).

• <u>Locate new facilities in locations with cheap supply of electric power</u>

A deregulated market would create new options for companies seeking to build facilities with cheap supply of electric power. Potential locations for new facilities would be found after conducting a study on power supply options on the region. Examples of these locations could be: areas close to NUGs (a transmission line to connect the facility to the NUGs might also need to be built, which requires approval from the state PUC), industrial parks supplied by cogeneration facilities (in areas where electric power is expensive), and areas served by utilities willing to transmit or buy power from other suppliers.

Survey Comments

* Customers must be careful to assure power supply flexibility with a short penalty (stranded costs) in the long run (lawyer).
* This only applies to energy-intensive users. Customers should also consider costs of transportation, labor, taxes, etc. (utility, customer).

- Form groups of customers to increase negotiating power

Current developments in the power market show that large customers get the benefits from a deregulated power market before smaller customers do. Small to medium-sized industrial customers (in particular, those fed by the same substation or bus) could form groups to increase their negotiating power in transactions and negotiations with utilities. These groups could be similar to municipalities

and school districts[98] (municipalities are treated by EPAct as wholesale customers) which are already seeking approval for retail wheeling transactions in the state of New York.

The negotiating power of these groups would increase if they are considered a single customer since their electric loads would add. Most these groups do not have "bypass" capacity, so they would probably not obtain retail wheeling (or transactions that resemble retail wheeling) unless state PUCs approve these transactions (or issue the appropriate legislation) or these groups develop "bypass" capacity.

For example, customers at an industrial park could approach their host utility as a group ("the industrial park"), instead of individually, to have more power in negotiating access to other power suppliers. The possibility of installing a cogeneration plant to supply the entire industrial park should be considered since this would increase the park's "bypass" capacity and provide it with backup power in case of power curtailment. Finally, thermal energy could also be supplied to the companies in the industrial park.

Survey Comments

* The market would probably need to be completely deregulated at the retail level before this happens. Electricity buyer cooperatives are possible, but they could be considered to be regulated utilities under some state laws (lawyer).

* The problem is that sometimes, the members of these groups do not agree on what's best for the group (utility, customer).
* These groups could probably not have much negotiating power. It could be easier if they improve their processes first (e.g. energy efficiency) (customer).

- Consider the use of financial instruments to hedge risk

Electric power would become a commodity in a deregulated market. Utilities, cogenerators, financial houses and others are forming Independent Power Marketers affiliates. Financial instruments (or "derivatives") would provide risk management opportunities to the different players for the power market (IOUs, NUGs, retail customers). Some of the derivatives that could be created in the next years are:

- *Forward contracts* - agreements for delivery of power in the future for a period of time.
- *Electricity futures* - standardized contract traded on an exchange. The New York Mercantile Exchange (NYMEX) is planning a contract for electricity futures.
- *Electric rate swaps* - a customer buying power at a fixed rate and another buying power at a variable rate (e.g. based on marginal cost), could swap their rates (or part of them). This is done when the risk profiles of the customers do not match their electric rate.
- *Options* - contracts in which a fee is paid for the right to enter into a forward contract.

The Association of Power Marketers could help customers choose the appropriate derivative for their needs. Once NYMEX starts working with electricity futures, it is expected that the use of derivatives will become more common in the electric industry.

Survey Comments

* Financial instruments are proper for mature markets and they are still far off for electricity (lawyer).
* These may help some customers, but their use depend on how the market develops (utility).
* Financial instruments are for "sophisticated" users. They may require a lot of investment of time and money (customer).
* These may work for large users that can invest in futures and options. In general, the commoditization of power could be limited due to the characteristics of electric power (customer).

ADDITIONAL SURVEY COMMENTS

Survey participants also provided the following comments:

- The secrecy of rate discounts provided by utilities to some customers is a big issue. Utilities with market power like to keep rate discounts secret to reduce the risk of competition at the retail level. This helps them keep their market dominance while destroying competitive opportunities for retail customers.

- The big issue is the deregulation of the electric market. Instead of retail wheeling, customers have less contentious ways to obtain the same benefits. For example, utilities provide rate discounts, but they oppose retail wheeling.
- A manual for retail wheeling customers would have to consider the different needs of retail customers. Negotiation techniques would have change for each type of customer because their needs vary tremendously. Recommendations could be grouped into those specific to different groups of customers:
  * Big load (flexible load)
  * Big load (inflexible load)
  * Moderate load
  * Small loads
- Only time will tell if these recommendations are right.

CHAPTER VII

SUMMARY AND CONCLUSIONS

The electric wholesale power market is presently being deregulated by FERC. FERC's final regulation on transmission tariffs, comparability, and wholesale stranded costs would be issued by 1996. The next step would be the deregulation of the retail power market. State PUCs are still studying how to deal with the issues involved with the implementation of retail wheeling and have chosen to smooth the transition to a deregulated retail market instead of implementing "pure" retail wheeling rapidly.

The development of a retail wheeling scenario proved to be impractical. There are too many possibilities and none of the experts agree as to what might happen.

Presently, some utilities and customers are involved in pseudo-retail wheeling transactions which would probably become more common in the next years, but "pure" retail wheeling transactions would only be available to only a few large electric customers. In summary, the most important characteristic of customers engaged in these types of transactions is their "negotiating power", which derives from the customer's electric load size and its "bypass" capability. This "negotiating power" allows customers to set up partnerships to obtain rate discounts, buy/sell agreements or retail wheeling transactions. Since small and medium-sized customers lack of "negotiating power", they would have to wait until state PUCs or

their host utilities set up retail or pseudo-retail wheeling programs.

Other factors that helped customers obtain these types of transactions are the following:

- States providing economic development incentives to customers.
- Utilities trying to obtain a competitive edge in the future retail market.
- Utilities implementing DSM programs.
- Customers located close to alternative power suppliers that build their own transmission line.
- Customers that can operate with non-firm power.
- Customers that have low load factor.
- Customers that generate low profit to the utility and are unstable.

Customers do not need retail wheeling to reduce their electricity cost. Other less radical ways (e.g. rate discounts, special riders, buy/sell agreements) which are favored by utilities, can be used to obtain savings. Saving money to electric customers, and not retail wheeling is the final objective of this work.

The responses from the survey do not validate the recommendations developed in this work. They reinforce them and provide other points of view. According to survey participants, the recommendations developed in this work seem to point the right direction on how to get prepared for retail wheeling.

There is no certainty since it is unknown how the future electric retail power market would operate. These recommendations are summarized below:

- **Recommendations for Customers in a non-deregulated Retail Power Market**
  - Establish partnerships with the host utility to obtain retail wheeling sooner

    Partnerships could be beneficial for both the customer and the utility.
  - Be prepared to negotiate transmission tariffs

    During the early stages of deregulation of the electric power market, retail customers would probably have to negotiate transmission rates based on past wholesale transactions, tariff filings and information from the utilities' Real-time Information Networks (RINs). As deregulation progresses, retail and pseudo-retail wheeling agreements, filed with the state PUCs, will be a source of information for other customers.
  - Follow the development of the electric power market

    Knowing what is occurring in the electric power market is important for customers that are willing to take the risks of retail wheeling. Small to medium-sized customers would probably have to hire consultants (engineers, power marketers, lawyers) to set up these types of transactions, while large customers would probably develop in-house expertise.

- **General Recommendations**

  These recommendation would help customers in a deregulated and non-deregulated retail power market.

  - Analyze electric loads requirements

    Customers need to know where the electricity is used in their facilities. Electric loads should be analyzed and separated into firm, critical, non-firm, time-of-use, etc. loads. Savings could be obtained by assigning them to discount rates, special riders, buy/sell or retail wheeling agreements.

  - Determine power supply and ancillary services options in the region

    Power supply and ancillary services options could be determined by contacting host utilities, RTGs, consultants, power marketers, or issuing RFPs to potential power suppliers. In a deregulated retail power market, some services would still have to be provided by the host utility to assure power quality and reliability.

  - Electric-intensive customers should locate new facilities in locations with cheap supply of electric power

    A deregulated market would create new options for electric-intensive customers seeking to build facilities with cheap supply of electric power. Customers should also consider the flexibility in choosing alternative power suppliers in that particular location.

  - Form groups of customers to increase negotiating power

Ideally, small to medium-sized industrial customers could form groups to increase their negotiating, but deregulation of the retail power market would probably be required before this could happen. Experiences from the deregulated natural gas market show that groups will not work well unless the members have a common goal.

- Consider the use of financial instruments to hedge risk

  Depending on how the electric power market develops, electric power could become a commodity in the next years. Financial instruments would provide risk management opportunities to the different players for the power market, but, according to experiences in the deregulated natural gas market, they would probably only work for large customers willing to invest a lot of time and money.

TOPICS FOR FURTHER RESEARCH

The following topics should be given special consideration:

- Publish the results of this work. This is a way of obtaining more comments and improving the quality of the recommendations presented in this work.
- The electric market is changing fast. To maintain the principles presented in this work updated, it is important to review the latest regulation at the wholesale and retail level (FERC's NOPRs, Notices of Inquiry, state PUCs activities; e.g. California, Michigan and others).

- In the next years, other retail wheeling and pseudo-retail wheeling activities will occur. Those cases will provide other principles for this work.
- The PMA encourages the use of financial instruments in a deregulated market. Although customers think that those are appropriate only for "large" electric customers, they could be wrong. The study of the development of these instruments (e.g. NYMEX, California's "contracts for differences", etc.) would show if these instruments would play an important factor in the deregulated market.
- Information from FERC (regulation, technical information, etc.), and state PUCs is already available through the Internet and bulletin boards (some of the information presented in this work was obtained from these sources). These sources of information should be explored in more detail. These Internet sources could also be used to obtain more opinions and validate this work.
- Finally, the best validation of this work would be to apply these concepts to a real case or to receive more feedback from customers, IPPs, utilities, power marketers and consultants.

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APPENDIX A

SURVEY SAMPLE

SAMPLE OF COVER LETTER 1

THIS IS SAMPLE OF THE COVER LETTER FOR THE SURVEY THAT WILL BE PROVIDED TO *REPRESENTATIVES OF COMPANIES INVOLVED IN TRANSACTIONS THAT RESEMBLE RETAIL WHEELING*

Friday, June 16, 1995

NAME
TITLE
COMPANY

Dear John:

My name is Javier A. Mont, member of the Oklahoma EADC/IAC, a group sponsored by the DOE that conducts Energy and Waste Management Assessments at industrial plants in the State of Oklahoma.

As part of my MS thesis, I am working on developing a manual for industrial and commercial customers on issues that could be important in a retail wheeling market. I understand that retail wheeling is not defined yet, but my intention is to develop a list of recommendations as far as present developments of the electric power market allow.

I am enclosing for your review:

- List of recommendations (this list was developed from activities that resemble retail wheeling). See pages 1-4.
- Explanation of the recommendations. See pages 5-8.
- List of acronyms used in these recommendations. See page 9.

Since you are involved this type of transactions, your contribution will be invaluable in this study. I would appreciate that you mail back to me any comments you had on these recommendations and suggest other issues that you consider would be important in a retail wheeling market. These comments and suggestions would be considered in my study. Any information that you provide will be kept confidential.

If you have any questions, please do not hesitate to contact me. I am looking forward to hearing from you soon.

Yours faithfully,

Javier A. Mont
Research Assistant, Oklahoma EADC/Industrial Assessment Center
Oklahoma State University
Department of Industrial Engineering & Management
322 EN
Stillwater, OK 74078
Phone: (405) 744-9146
FAX: (405) 744-6187

SAMPLE OF COVER LETTER 2

THIS IS SAMPLE OF THE COVER LETTER FOR THE SURVEY THAT WILL BE PROVIDED TO *ENERGY MANAGERS OF SOME LARGE INDUSTRIAL COMPANIES ACROSS THE US*

Friday, June 16, 1995

NAME
TITLE
COMPANY

Dear John:

My name is Javier A. Mont, member of the Oklahoma EADC/IAC, a group directed by Dr. Wayne C. Turner and sponsored by the DOE that conducts Energy and Waste Management Assessments at industrial plants in the State of Oklahoma.

As part of my MS thesis, I am working on developing a manual for industrial and commercial customers on issues that could be important in a retail wheeling market. I understand that retail wheeling is not defined yet, but my intention is to develop a list of recommendations as far as present developments of the electric power market allow.

As you know, retail wheeling would allow customers to buy electric power from any supplier and have it delivered through their host utility's transmission system. This can lead to large energy cost savings for industrial customers.

I am enclosing for your review:

- List of recommendations (this list was developed from activities that resemble retail wheeling). See pages 1-4.
- Explanation of the recommendations. See pages 5-8.
- List of acronyms used in these recommendations. See page 9.

Since your company is the type of industry for which these recommendations were developed, I would appreciate that you mail back to me any comments or suggestions you had on these recommendations and suggest other issues that you consider would be important in a retail wheeling market. These comments and suggestions would be considered in my study. Any information that you provide will be kept confidential.

If you have any questions, please do not hesitate to contact me. I am looking forward to hearing from you soon.

Yours faithfully,

Javier A. Mont
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Oklahoma State University
Department of Industrial Engineering & Management
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Stillwater, OK 74078
Phone: (405) 744-9146
FAX: (405) 744-6187

SURVEY INSTRUCTIONS

REVIEW THESE RECOMMENDATIONS, WRITE COMMENTS AND PROVIDE OTHER IDEAS.
CONTACT ME IF YOU HAVE ANY QUESTIONS.
WHEN YOU FINISH, USE THE BUSINESS REPLY ENVELOPE TO SEND THE SURVEY BACK.

LIST OF RECOMMENDATIONS

The objective of these recommendations is to provide potential retail wheelers with the issues that could be important for retail wheeling. These recommendations were classified in two types:
Recommendations for customers in a not deregulated retail power market.
General recommendations.

1. Recommendations for customers in a not deregulated retail power market

Establish partnerships with your host utility to obtain retail wheeling sooner

By establishing partnerships, customers could obtain the benefits of retail wheeling before the retail market is deregulated. Customers would obtain rate discounts, brokering of "buy-sell" transactions or transmission services. Utilities, on the other side, would benefit by learning how to work in a competitive environment and by keeping their current customers.
COMMENTS:

Be prepared to negotiate transmission tariffs

Retail customers should use transmission charges of past wholesale transactions (or "buy-sell" agreements) as a reference when negotiating transmission tariffs with utilities. The problem is that up to now, utilities have been reluctant to publish this information. This would change with the operation of RTGs, which are expected to file wholesale regional transmission rates, and they could be contacted to obtain this information.
COMMENTS:

Follow the development of the electric power market

Follow the developments on the leading retail wheeling activities (California's "Blue Book", Michigan's retail wheeling experiment) as well as utility-initiated contracts and agreements in different states to see where is the market heading.

COMMENTS:

2. General Recommendations

Analyze electric loads requirements

To reduce their electricity cost, customers should analyze the firmness requirements of their electric loads and determine which loads could operate with non-firm power, which ones need firm power, backup power, etc. Customers should also analyze which ancillary services could be provided by suppliers different than their host utility.

COMMENTS:

Determine power supply and ancillary services options in the region

Power supply and ancillary services options could be determined by contacting:

Consultants
Power marketers
Potential suppliers
Host utilities
RTGs

COMMENTS:

Locate new facilities in locations with cheap supply of electric power

Examples of these locations could be: areas close to NUGs (a transmission line to connect to the NUGs might also need to be built, which requires approval from the state PUC), industrial parks supplied by cogeneration facilities (in areas where electric power is expensive), and areas served by utilities willing to transmit power from other suppliers.

COMMENTS:

Form groups of customers to increase negotiating power

Small to medium-sized industrial customers (in particular, those fed by the same substation or bus) could form groups to increase their negotiating power in transactions and negotiations with utilities.

COMMENTS:

Consider the use of financial instruments to hedge risk

The use of financial instruments (or "derivatives") would provide risk management opportunities to the different players for the power market (IOUs, NUGs, retail customers).

Some of the derivatives that could be created are:

Forward contracts
Electricity futures
Electric rate swaps
Options

COMMENTS:

ADDITIONAL COMMENTS

EXPLANATION OF RECOMMENDATIONS

The objective of these recommendations is to provide potential retail wheelers with the issues that could be important for retail wheeling. These recommendations were classified in two types:
Recommendations for customers in a not deregulated retail power market.
General recommendations.

Some of the following recommendations are based on the opinions and suggestions of representatives from the companies involved in the retail and pseudo-retail wheeling cases presented in Chapter 5, while others are based on personal philosophy.

1. Recommendations for customers in a not deregulated retail power market

The following recommendations should help customers in a not deregulated retail power market (this is present status of deregulation in the US) obtain the benefits of retail wheeling before deregulation occurs.

Establish partnerships with the host utility to obtain retail wheeling sooner

Current market developments show that some utilities are willing to establish partnerships with customers for transactions that resemble retail wheeling. Since it is uncertain when deregulation would occur, by establishing partnerships, customers could obtain some of the benefits of retail wheeling before the retail market is deregulated.

Customers would benefit from these partnerships by obtaining rate discounts, brokering of "buy-sell" transactions or transmission services. Utilities, on the other side, would benefit by learning how to work in a competitive environment and by keeping their current customers.

For example, a large industrial customer could approach its utility to look for ways to reduce its electricity cost. Besides the need to have negotiating power, the customer could point out the competitive advantages that the utility would obtain if it engages in retail wheeling (or transactions that resemble retail wheeling): learning to work in a competitive retail market, opportunity to restructure its organization and shape state regulation to benefit the utility. Utilities also seem to like conducting these partnerships as experiments because they would have: control over the restructuring process (it could be reversed if it does not work), the amount of restructuring, and an opportunity to try different approaches to address the issues of retail wheeling.

Be prepared to negotiate transmission tariffs

The "mega-NOPR" left the issue of retail stranded cost to the state PUCs. Before deregulation comes, retail customers should use transmission charges of past wholesale transactions or "buy-sell" agreements as a reference when negotiating transmission tariffs with utilities.

The problem faced by several customers involved in transactions resembling retail wheeling is that transmission tariffs were not always available since utilities have been reluctant to publish this information. This would change with the operation of RTGs, which are expected to file wholesale regional transmission rates, which could be a source of information.

Follow the development of the electric power market

Retail wheeling is a hot topic, and there is plenty of literature and articles that are being published on retail power market restructuring in specialized journals and magazines.

Follow the developments on the leading retail wheeling activities (California's "Blue Book", Michigan's retail wheeling experiment) as well as utility-initiated contracts and agreements in different states to see where the retail power market is heading.

2. General Recommendations

These recommendations should be help potential retail wheelers (both in a deregulated and not deregulated retail power market) get prepared for a retail wheeling market.

Analyze electric loads requirements

Currently, host utilities supply customers with both firm power and "bundled" (provided as a "package") ancillary services. There is no choice. In a deregulated market, customers would have access to firm power, non-firm (interruptible) power and "unbundled" ("individual") ancillary services provided by different suppliers.

Non-firm power is cheaper than firm power but it could be interrupted when power is needed. Customers looking to reduce their electricity cost should consider buying non-firm power. For this, customers need to analyze the firmness requirements of their electric loads and determine which loads could operate with non-firm power, which ones need firm power, backup power, etc.

Ancillary services (frequency regulation, load regulation, provision for reserves, scheduling and coordination of services, backup power, reactive power for voltage support) are currently provided as "bundled" services by host utilities. In an "unbundled" market, customers would be able to choose suppliers of "unbundled" ancillary services, different than their host utility, that provide these services at lower cost and with the required reliability.

For example, a manufacturing plant determines that its firm loads consist on critical plant equipment (e.g., equipment cooling pumps and material handling equipment) and emergency lighting. Non-firm loads could be other manufacturing equipment, lighting, etc. Firm and non-firm loads need to be in separate circuits so that backup power (or firm power) could be supplied to the firm loads in case of power interruption. Backup power could be provided by the plant itself (or contracted from a supplier) to supply the plant loads if the interruption of power lasts longer than permissible. Reactive power for voltage support could also be provided by the plant itself.

Determine power supply and ancillary services options in the region

After analyzing their electric loads, customers would need to know the power supply and ancillary services options available in the region. With this information, for example, a plant could contract the following services from:
Host utility: 80 MW of firm power, transmission service and some ancillary services (frequency regulation, load regulation, scheduling and coordination of services, voltage support).
Supplier A: 100 MW of non-firm power, and generation reserves (ancillary service).
Customer: Backup power (e.g. cogeneration plant).

Power supply and ancillary services options could be determined by contacting:
Consultants - they could perform a power flow analysis on the regional grid to calculate power flow constraints and determine the possible routes for power flow. Information needed to perform this analysis would be available from FERC's Form 715 filings. Consultants with these expertise usually have experience working at the utilities in the local region.
Power marketers - most of them have experience with the deregulated natural gas market. They would have the expertise necessary to determine possible routes for power flow, identifying potential power suppliers and setting up power transactions. Power marketers could be contacted through the Power Marketing Association (PMA)[1].
Potential suppliers - customers could issue Requests For Proposals (RFPs) for power supply to utilities, power marketers and NUGs in the region.

For example, in 1994, the University of Missouri (UM) issued an RFP for power supply[2]. In this particular RFP, suppliers had to: (a) offer delivered prices at levels guaranteed to be below UM's electricity cost, (b) demonstrate financial capabilities to

make such guarantees, and (c) be credible power suppliers of the quantities and qualities required by UM.

Host utilities - most of the utilities have been involved in wholesale transactions and thus, should have the expertise necessary for setting up retail wheeling transactions. Once the customer establishes a partnership (or if retail wheeling is regulated), it could approach the host utility to determine potential suppliers of power in the region. Utilities would probably set up power marketing departments for this type of transactions.

RTGs - these are expected to file regional transmission pricing systems and set up region-wide-wholesale power trading systems. Although RTGs were conceived to deal with wholesale level transactions, these trading systems could probably be extended to include retail level transactions.

Locate new facilities in locations with cheap supply of electric power

A deregulated market would create new options for companies seeking to build facilities with cheap supply of electric power. Potential locations for new facilities would be found after conducting a study on power supply options on the region.

Examples of these locations could be: areas close to NUGs (a transmission line to connect the facility to the NUGs might also need to be built, which requires approval from the state PUC), industrial parks supplied by cogeneration facilities (in areas where electric power is expensive), and areas served by utilities willing to transmit or buy power from other suppliers.

Form groups of customers to increase negotiating power

Current developments in the power market show that large customers get the benefits from a deregulated power market before smaller customers do.

Small to medium-sized industrial customers (in particular, those fed by the same substation or bus) could form groups to increase their negotiating power in transactions and negotiations with utilities. These groups could be similar to municipalities and school districts[3] (municipalities are treated by EPAct as wholesale customers) which are already seeking approval for retail wheeling transactions in the state of New York.

The negotiating power of these groups would increase if they are considered a single customer since their electric loads would add up. Most these groups do not have "bypass" capacity, so it is probably that they would probably not obtain retail wheeling (or transactions that resemble retail wheeling) unless state PUCs approve these transactions (or issue the appropriate legislation) or these groups develop "bypass" capacity.

For example, customers at an industrial park could approach their host utility as a group ("the industrial park"), instead of individually, to have more power in negotiating access to other power suppliers. The possibility of installing a cogeneration plant to supply the entire industrial park should be considered since this would increase the park's "bypass" capacity and provide it with backup power in case of power curtailment. Finally, thermal energy could also be supplied to the companies in the industrial park.

Consider the use of financial instruments to hedge risk

Electric power would become a commodity in a deregulated market. Utilities, cogenerators, financial houses and others are forming Independent Power Marketers affiliates. Financial instruments (or "derivatives") would provide risk management opportunities to the different players for the power market (IOUs, NUGs, retail customers).

Some of the derivatives that could be created in the next years are:

Forward contracts - agreements for delivery of power in the future for a period of time.

Electricity futures - standardized contract traded on an exchange. The New York Mercantile Exchange (NYMEX) is planning a contract for electricity futures.

Electric rate swaps - a customer buying power at a fixed rate and another buying power at a variable rate (e.g. based on marginal cost), could swap their rates (or part of them). This is done when the risk profiles of the customers do not match their electric rate.

Options - contracts in which a fee is paid for the right to enter into a forward contract.

The Association of Power Marketers could help customers choose the appropriate derivative for their needs. Once NYMEX starts working with electricity futures, it is expected that the use of derivatives will become more common in the electric industry.

REFERENCES

1 The Power Marketing Association: 1619 22nd St. S-200, Arlington, VA22202, Phone: (703) 892-0010.

2 More information on this particular RFP can be obtained by contacting Scott Spiewak, Cogen Power Marketing, 747 Leigh Mill Rd., Great Falls, VA 22066. Phone: (703) 759-5060.

3 From a NYPA representative.

LIST OF ACRONYMS

EPAct - The Energy Policy Act of 1992 (October 1992). EPAct brought a more competitive structure to the electric power market industry. One of EPAct's objectives is to stimulate competition in the generation sector, increase efficiency in the electric industry and lower consumer's energy bills. EPAct defines policy objectives, creates a framework to develop them, and gives responsibility for the regulation to the PUCs and FERC.

FERC - Federal Energy Regulatory Commission. This entity has jurisdiction over interstate transmissions and wholesale electric transactions.

IOU - Investor-owned utility.

NOPR - FERC's Notice of Proposed Regulation. FERC issues NOPRs to obtain comments from the interested parties on a specific topic. The "mega-NOPR" was issued March 29, 1994 and deals with the following issues:
stranded cost recovery,
"unbundling" of services and
transmission pricing

NUG - non-utility generators. Includes QFs, IPPs and EWGs (see definitions below).
QF - Qualifying Facility. Includes cogenerators and Small Power Producers that satisfy certain requirements.
IPP - independent power producer. Producers that do not own or control transmission system and have no affiliation with a traditional electric utility having a franchised service area.
EWG - an exempt wholesale generator is a type of IPP. Owns or operates a facility within the US and generates electricity for resale. There are exceptions if the EWG is outside the US.

PUC - State Public Utility Commission. Each state has a PUC that regulates the utility industry at the state level. PUCs have the responsibility for setting retail rates and associated issues as well as the authority to require or deny right of construction of transmission lines.

RTG - A provision not included in EPAct was a negotiated agreement between all affected parties to form Regional Transmission Groups (RTGs). RTGs would be voluntary organizations of transmission owners, transmission users, and other entities interested in coordinating transmission planning, operation and use on a regional (or inter-regional) basis.

APPENDIX B

SURVEY EXEMPTION FROM INSTITUTIONAL REVIEW BOARD

APPENDIX C

LIST OF ACRONYMS

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ACC - Arizona Corporation Commission.

AEPCO - Arizona Electric Power Cooperative Inc. AEPCO is a generation and transmission utility.

Cogenerator - a cogenerator produces: (a) electric or shaft energy and (b) steam or other forms of useful thermal energy used for industrial, commercial, heating or cooling purposes.

ConEd - Consolidated Edison. ConEd is a utility that operates in the state of New York.

CPUC - California Public Utilities Commission.

DSM - Demand-Side Management. The objective of DSM programs is to reduce the electric demand on utilities.

ELCON - Electricity Consumers Resource Council.

EPAct - Energy Policy Act of 1992 (October 1992). EPAct brought a more competitive structure to the electric power market industry. One of EPAct's objectives is to stimulate competition in the generation sector, increase efficiency in the electric industry and lower consumer's energy bills.

EWG - Exempt Wholesale Generator. An EWG is an IPP that owns or operates a facility within the US and generates electricity for resale. There are exceptions if the EWG is outside the US.

FERC - Federal Energy Regulatory Commission. FERC has jurisdiction over interstate transmissions and wholesale electric transactions.

IOU - Investor-owned utility.

IPP - Independent Power Producer. Producers that do not own or control transmission system and have no affiliation with a traditional electric utility having a franchised service area.

IRP - Integrated Resource Planning. IRP is a planning process for selecting reliable generation plants at the lowest system cost. This is achieved by opening the process to public review and considering both the supply and demand side scenarios.

MWh - Mega-Watt-hr.

MPSC - Michigan Public Service Commission.

NERC - North American Electric Reliability Council. The NERC and its nine regional councils ensure the reliable and efficient operation of the synchronous ac regions.

NOPR - FERC's Notice of Proposed Rulemaking. FERC issues NOPRs to obtain comments from the interested parties on specific topics.

NRRI - National Regulatory Research Institute.

NSS - North Star Steel. NSS selected a site in Arizona for the construction of steel recycling plant.

NUG - Non-Utility Generators. Includes QFs, IPPs and EWGs.

NYPA - New York Power Authority. NYPA is a public wholesale power supplier that owns generation and transmission facilities in the state of New York.

NYPSC - New York Public Service Commission.

PG&E - Pacific Gas & Electric Co. PG&E filed a wheeling proposal that is still under consideration at the CPUC (February 1995).

PMA - Power Marketing Association. The PMA can be contacted at: 1619 22nd St. S-200, Arlington, VA22202, Phone: (703) 892-0010.

Poolco - This is policy proposed by the CPUC in the order issued on May 24, 1995. The "Poolco" would be a central wholesale pool, run by an independent party.

PUC - State Public Utility Commission. Each state has a PUC that regulates the utility industry at the state level. PUCs have the responsibility for setting retail rates and associated issues as well as the authority to require or deny right of construction of transmission lines.

PUHCA - Public Utility Holding Company Act (1935). PUHCA was designed to protect consumers, to stop high electric rates and to improve reliability in the electric utility industry.

PURPA - Public Utility Regulatory Policies Act (1978). PURPA objectives were: (a) to make on-site generation a viable alternative for large industrial users of steam and (b) to open the electric generation sector to competition.

PSI - PSI Energies. PSI is a utility located in Indiana.

PSNH - Public Service Commission of New Hampshire.

QF - PURPA Qualifying Facility. Includes cogenerators and Small Power Producers that satisfy certain requirements defined by PURPA.

RFP - Requests For Proposals.

RIN - Real-time Information Networks. RINs would provide outside parties with the same real-time information on transmission and operations that the owner utilities have access to.

RTG - Regional Transmission Groups. RTGs would be voluntary organizations of transmission owners, transmission users, and other entities interested in coordinating transmission planning, operation and use on a regional (or inter-regional) basis.

Small power production facility - this facility produces: (a) electric energy using biomass, waste, renewable or geothermal resources, and (b) has a power production capacity less than 80 MW (with some exceptions).

WAPA - The Western Area Power Administration. The WAPA is a federal agency that distributes hydroelectric power in the southwestern US.

VITA

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