Market Analysis and Planning Services (MAPS)

U.S. Information Services Industry-Specific Markets, 1987-1992

Utilities Sector

INPUT®

1280 Villa Street, Mountain View, CA 94041 (415) 961-3300

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U.S. INFORMATION SERVICES INDUSTRY-SPECIFIC MARKETS 1987-1992

UTILITIES SECTOR

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Issues, Trends, and Events

I

Issues, Trends, and Events

A

Definitions and Applications

INPUT divides the utilities market into three major segments:

- Electric.
- Gas.
- Water and sewage/waste disposal.

Telephone and telecommunications utilities are discussed in the telecommunications section.

Electric utilities are divided into five classifications:

- Investor-owned (those utilities with publicly traded stock).
- Cooperatives.
- Municipality-owned.
- Federal-owned.
- State projects/power districts.

The three primary types of gas utilities are:

- Transmission.
- Distribution (local gas utilities).
- Municipal companies.

Water utilities are divided into:

- Public or municipality ownership.
- Private ownership.

"Sewage and waste disposal services" completely describes this market segment.

Administrative computing applications encompass:

- Utility billing/meter reading.
- Customer service.
- Cost allocation services.
- Property records.
- Inventory management.
- Management reporting.
- Cash management.
- Route management and analysis.
- Meter reading.

General "operations" computing applications include:

- Outside plant mapping.
- Process monitoring and control.
- Simulation of system usage.
- Construction and contracting.
- Equipment fault/success analysis.
- Pipe network engineering.

Specific electric utility operation computing applications include:

- Piping layout and analysis.
- Network configuration and analysis.
- System state measurements, calculations, and analysis.
- Switching-surge insulation performance assessment.
- Load loss statistical calculations.
- Schedules for thermal unit and gas turbine operations.
- Electrical system topology.
- Generating capacity planning.

Gas utility operating computing applications include:

- Gas supply balancing.
- Pressure/flow simulation.
- Capacity planning.
- Inside plant mapping.

Water/waste utility operating computing applications encompass:

- Pressure/flow simulation.
- Inside plant mapping.
- Capacity planning.
- Environmental hazards monitoring and reporting.

B

Issues

Utilities' computer usage is diverse. The use of computers for financial and administrative applications differs significantly from computer systems used for operations.

- Financial and administrative applications software combines business-oriented information with state and federal regulatory compliance.

- Computer systems used in the operations side of utilities combine real-time process and control applications with engineering and technical simulations.

- As a result, few hardware vendors can provide a single hardware system to meet utilities' data processing requirements.

Electric utilities experience increased competition from gas utilities selling alternative energy sources and some large commercial customers who have installed cogeneration systems. Therefore, electric utilities are developing data bases of customer information to improve marketing efforts.

Cost containment has always been a major issue and will continue as one. Industry sales were basically flat in 1987, which will sustain the pressure to control costs.

Large public utilities that are under less severe cost pressures have issues and objectives encompassing data administration, formalizing end-user support organizations, and taking a more active role in the corporate planning process.

Competition has caused utilities to begin to pay more for data processing expertise. A recent survey showed that utilities pay 11% more than the average for IS personnel.

The purchase of departmental minicomputers and fourth-generation application development tools by end-user departments is changing the IS role to one of data manager and coordinator. Additionally, corporate IS can continue to help with cost justification of systems for end-user departments.

The federal government is gradually deregulating prices for electricity and natural gas, adding pressures on utilities to learn how to effectively compete, market their products, and perform like other private sector companies.

Utilities have always dealt with government regulations. However, "enlightened" utilities are learning to work with regulatory agencies in an effort to get necessary rate increases approved and receive these increases in a timely manner. Under the Reagan administration, the regulatory environment may have softened somewhat.

Interest rates directly affect utility operating costs. The high interest rates of the early 1980s dramatically increased the cost of capital for necessary improvements and plant additions and especially slowed the building of non-nuclear facilities.

As a result of decreasing oil prices since 1984, fuel oils offer strong competition to gas and electric utilities as alternate fuel sources. For new construction, builders and architects, through their designs, influence fuel consumption patterns in the short run by selecting one fuel source over another.

Hardware and software obsolescence will impact many utilities. Basic commercial applications (billing, financial reporting, accounts payable, accounts receivable) need to be upgraded and integrated.

- New billing and payment systems that take advantage of technological advances such as pay-by-phone and frequency-emitting meters are being developed.

- Engineering and operation systems are being integrated with modeling systems to project capacity requirements.

Administrative software modules are being integrated whereby one keystroke can transfer the data entered to all system modules requiring that information. Dividing a large application into smaller modules also

breaks a high-value sale into a series of smaller ticket sales, a valuable marketing tool for an industry with tight data-processing budgets.

Senior management at utility companies, selected generally for good day-to-day operations backgrounds, are beginning to use information as a competitive and strategic weapon.

Growth will occur in:

- Mainframe- and minicomputer-based operations and technical applications.
- Microcomputer-based business and operations applications.

C

Trends in Electric Utilities

Electric utilities have substantial excess generating capacity and construction is limited to completion of plants already underway.

Readily available excess electricity, made possible by cogeneration, has three interrelated effects:

- It has lessened the need to expand capacity.
- It has led to increased selling and buying of excess electricity.
- It has led to increased competition in selling electricity to municipalities and large industrial customers.

For the past two years, cost overruns in nuclear power plant construction have forced budget austerity. These budget cuts have affected the rate at which IS management has purchased or written software for new applications.

D

Trends in Gas Utilities

Conservation efforts, begun in the 1970s, indelibly changed the natural gas industry. Industrial consumption of natural gas, which decreased 20% since 1973 for commercial customers, will decrease 5% per year through 1991.

Fortunately, this decrease is offset by the steady increase in natural gas use among the natural gas industry's top three customers – retail trade, real estate, and service organizations. Natural gas consumption by these

three market segments, accounting now for 50% of total U.S. gas consumption, is expected to grow 5-10% annually through 1991.

The overall share of natural gas sold to commercial accounts under "special conditions" (i.e., at a discount) has decreased from 42% to 39% of total natural gas consumption, a positive trend for the gas industry.

Programs for recycling refuse into natural gas have begun and are successful on a relatively small scale. The technology challenge is to economically increase the scale and scope of refuse conversion.

Declining prices for natural gas and oil have resulted in reduced industry profits; hence, there is further pressure on IS to curtail or delay capital spending. Alternative fuels such as low- and high-sulphur heating oil are less expensive. Therefore, users tend to purchase these fuels before natural gas.

E

Trends in Water and Waste Utilities

Demand by homes and industry for water and waste services will steadily increase through 1991.

Hazardous-waste disposal and monitoring is becoming a more important application as a result of the current level of interest by state and federal legislatures and the public.

F

Events

Public utilities (i.e., those with stockholders) are diversifying their business base to lessen earnings dependence on a single business. INPUT has identified the following diversification targets: real estate development, venture capital, financial services, retailing, and computer services.

In 1986, Pacific Lighting (Los Angeles, CA) acquired drug store chain Thrifty Corporation (Los Angeles, CA).

Portland General Electric (Portland, OR) has entered into real estate ventures (with Weyerhauser Corporation of Tacoma, WA), airplane leasing, and venture capital.

Mergers and acquisitions are likely to increase, and will result in larger but fewer utilities, especially electric. The recent takeover attempt at Public Services of New Hampshire, using senior debt to gain effective control, could be a forerunner to more outside investor takeover of debt-plagued utilities.

Philadelphia Suburban Corporation (the holding company for Philadelphia Area Water Company) acquired two computer software and services firms:

- Stoner Associates, Inc. (Carlisle, PA), a supplier of applications software for the utility market utilizing Prime minicomputers and IBM mainframes, was acquired in January, 1985.
- Philadelphia Suburban Corporation also acquired Digital Systems, Inc. (Columbia, SC), a supplier of DEC-based turnkey systems to electric/gas/water/waste utilities.

G

Factors Limiting Growth

Factors that have held back growth in the utility information services market include:

- Operations-oriented, rather than strategic-oriented, senior management that emphasizes cost cutting as opposed to using information as a competitive weapon or service differentiator.
- Mainframe-based, batch-oriented administrative and financial software that has been insufficient to accomplish basic tasks, consequently lessening the demand for more costly industry-specific solutions.
- Sales of minicomputer-based turnkey systems for plant operations (these systems do not have integrated hardware or software) increased rapidly following the problem at Three Mile Island but have slowed considerably in the past two years.

H

Factors Spurring Growth

Automation of repetitive tasks, such as meter reading, happened slowly in the utility business. Recently, many utilities are adopting hand-held meter-reading devices, which can automatically check for validity of data, store the data from hundreds of readings, then forward the data to the accounting mainframe for processing customers' bills.

Industry associations for electric, gas, and water/waste utilities are increasing their roles by adding on-line data bases through the association's computer or public on-line data bases, which include information on:

- Rates.
- State government elected representatives.

- Federal lawmakers and regulatory agency personnel.
- Consumer demographics.
- Business demographics.
- Status on key legislation.
- Headlines and news briefs from industry periodicals.
- Federal energy regulations.

Microcomputer-based applications, especially those designed for utility districts serving 40-500 customers, will spur sales of computer software.

Increases in the number of computer simulations, already proven cost-effective, will increase demand for specific applications available on supercomputers or the new minisupercomputers. Since each supercomputer system costs more than $15 million, processing/network services that sell time to users on these systems represent more cost-effective solutions than user purchase of the hardware and software.

II

Market Forecasts

II

Market Forecasts

A
Introduction

INPUT divides the utility market into three segments:

- Electricity.
- Gas.
- Water and waste disposal.

The SIC (Standard Industrial Classification) for this market sector is 49 (491-497), which includes:

- Electric services.
- Gas production and distribution.
- Combination electric and gas and other services.
- Water supply.
- Sanitary services.
- Steam supply.
- Irrigation systems.

The number of utility companies in the U.S. in 1986 is shown in Exhibit II-1, and the number of utility company employees as of 1986 is depicted in Exhibit II-2. All but 2,000 utilities (privately-owned water utilities) are candidates for some level of computerization. These 2,000 privately owned water companies, generally located in rural areas and serving fewer than 40 customers each, are sufficiently small that computerization may be uneconomical.

The utility market appears relatively homogeneous. Information requirements for administrative computing at electric utilities should be similar to those of gas or water/waste utilities. Operations computing require-

EXHIBIT II-1

NUMBER OF UTILITIES IN U.S. BY TYPE 1986

TYPE	NUMBER OF UTILITIES
ELECTRIC*	
• Investor-Owned	218
• Cooperatives	1,055
• Municipalities/Publicly Owned	1,900
• Federal-Owned	9
• State Projects/Power Districts	91
Total - Electric Utilities	3,273
GAS**	
• Transmission	150
• Distribution (Utilities)	450
• Municipal Companies	750
Total - Gas Utilities	1,350
WATER†	
• Public/Municipalities	18,000
• Private Ownership	6,000
Total - Water Utilities	24,000
SEWAGE AND WASTE DISPOSAL ††	
• Sewage Services	5,000
• Combined Services	340
Total - Sewage and Waste Disposal Utilities	5,340
Grand Total	33,963

*Source: Edison Electric Institute

**Source: American Gas Association

†Source: National Association of Water Companies

††Source: Sales and Marketing Management Magazine

EXHIBIT II-2

NUMBER OF EMPLOYEES BY TYPE OF UTILITY, 1986

UTILITY	TOTAL EMPLOYEES
Electric	686,000
Gas (Production and Distribution)	230,000
Combination Utility Services	110,000
Water	105,000
Sanitary Services	55,000
Total	1,186,000

ments are fundamentally similar, the key exception being government reporting requirements for electric utilities with nuclear power plants.

In reality, a utility is built around its people. No two utilities approach the business in the same manner. As a result, some level of software customization is always required.

B

Demographic Forecast

As a result of merger activity, the number of electric utilities will decline slightly between 1987 and 1992.

- Competition from alternate power sources, such as wind and solar, will force electric utilities to become even more efficient.
- Effective utilization of existing facilities may require some consolidation to meet changing economies of scale.
- To meet these new economies of scale, most mergers and consolidations will be among small- and medium-sized electric utilities.

- The consolidated utilities will be located near one another and may serve customers in more than one state.

The number of gas utilities will remain relatively constant, assuming very few mergers among medium and smaller gas utilities.

The number of water districts will also remain constant, assuming a minimum of merger and acquisition activity.

The number of combined sewage and waste disposal operations will hold steady for the next five years since these operations are also relatively mature businesses.

C

Electric Utilities

Although there are only about 3,000 electric utilities, expenditures for software and services by this segment account for approximately 55% of total utilities data processing expenditures.

The administration and accounting functions at the largest public electric utilities (i.e., utilities with publicly traded stock) are heavily mainframe-based, batch-processing-oriented. Large electric utilities, which have been converting to on-line transaction-oriented customer service systems, account for approximately 40% of total utilities data processing expenditures.

D

Gas Utilities

Information services expenditures by the 1,350 gas utilities account for 25% of total utility sector IS expenditures.

Production of synthetic natural gas (SNG) or methane from garbage and other waste materials is increasing the available supply of natural gas.

- More production and monitoring hardware and software will be necessary to support this burgeoning technology.

- More applications software for simulating SNG plant design and transportation and storage will be required to support utilities. Furthermore, the growing number of municipalities determining the feasibility of converting effluent from waste water treatment to methane generation require software to aid in their analyses.

Gas utilities will install hardware and software for improved gas transportation and storage monitoring.

E

Water, Sewage, and Waste Disposal Utilities

Similar to other utilities, water and waste utilities must improve asset management. Software to help allocate people, vehicles, heavy equipment, and computers and yielding an immediate, measurable return is desirable.

F

Total Industry Forecast, 1987-1992

From a base of $698 million in 1987, industry expenditures will grow at a rate of 15% during the 1987-1992 period, to $1.41 billion in 1992.

Individual applications not requiring interface with the administrative mainframe or minicomputer will increasingly run on a PC.

G

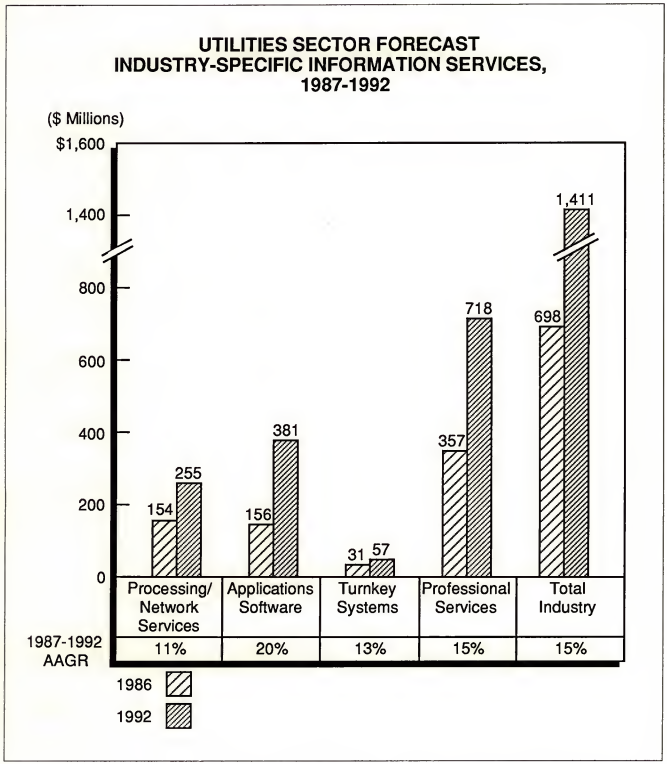
Processing Services

As more organizations convert from minicomputer- to microcomputer-based solutions, processing services will grow more slowly than overall computer services in the utilities market. Revenues of $154 million in 1987 will grow to $255 million in 1992.

- Note, however, that INPUT's IS spending forecast does not portend a negative growth rate. Rather, it indicates slower than average growth.
- Many utilities, satisfied with the level and quality of processing service and not willing to hire and manage staff, will maintain the status quo relationship with processing services.
- As processing services move from batch to interactive processing and install the expensive, full-function software required to completely manage a utility, more utilities will migrate to processing services rather than compete for data processing administrative, programming, and operations staff.

The facilities management growth rate is declining, to 12%, due to the proliferation of minicomputer- and microcomputer-based turnkey systems. Revenues of $23 million in 1987 will grow to $41 million in 1992, as shown in Exhibit II-3. However, many medium and large utilities wanting to avoid hiring, training, and management problems will remain loyal to facilities management services.

EXHIBIT II-3



Concerns for safety arising out of the Three Mile Island operating problem have led to a steady increase in disaster recovery services, much of which are processing service based.

To retain customers, many remote computing services now offer micro-to-mainframe communication links. This trend will continue.

H

Turnkey Systems

Turnkey systems, especially microcomputer-based systems, will grow at 13%. Factors stimulating this growth are:

- Certain administrative functions, such as gas transmission analysis or vehicle maintenance management and scheduling, can be initially implemented on a microcomputer and sold as a turnkey system.
- Existing micro-based applications can be networked or set up to run on multiuser micros or minicomputers. Turnkey systems, with single-supplier accountability, represent a competitive alternative.
- UNIX- or Pick-based technical or commercial applications, which were initially written for a minicomputer and are becoming more popular, can be easily ported to a microcomputer.

The new 80386 microprocessor will soon open up a new class of computers offering highly competitive price/performance. While new software must be written to accommodate these machines, this is an opportunity for improved operating systems, better user interfaces, and, most importantly, integrated applications software.

I

Applications Software

Mainframe and minicomputer-based applications software will grow at 20%, the fastest-growing market segment for all utility-related computer services. The factors influencing the growth of the market are more important than those factors impeding market growth.

Factors influencing the growth of mainframe/mini-based software for utilities include:

- Integrated software modules.
- Growth in ownership of voice and data communication facilities by large utilities.

- More federal and state government reporting requirements.

- Mainframe- and mini-based software will grow from $103 million in 1987 to $219 million in 1992, a 16% growth rate.

Factors slowing the growth in demand for mainframe/mini-based application software include:

- Lack of organizational plans for effective utilization of computers and application software.

- Migration of current minicomputer applications to microcomputers. However, applications migration to micros will be limited by departmental needs for shared information.

Microcomputer-based applications software will grow at 25%, fastest of all computer services delivery modes, since more detailed subapplications will initially be micro-based. 1987 revenues of $53 million will become $162 million by 1992 (see Exhibit II-4). Vehicle management, which includes vehicle maintenance and operation scheduling, could initially be implemented on a micro rather than an integrated module as part of the utility administrative mainframe or minicomputer. The power of the new 80386 chip, as an example, will accelerate this trend.

Large utilities are striving to install one microcomputer for every two professional employees. The growth in installed systems and the offering of site licensing by leading vendors will spur sales of micro-based software.

J

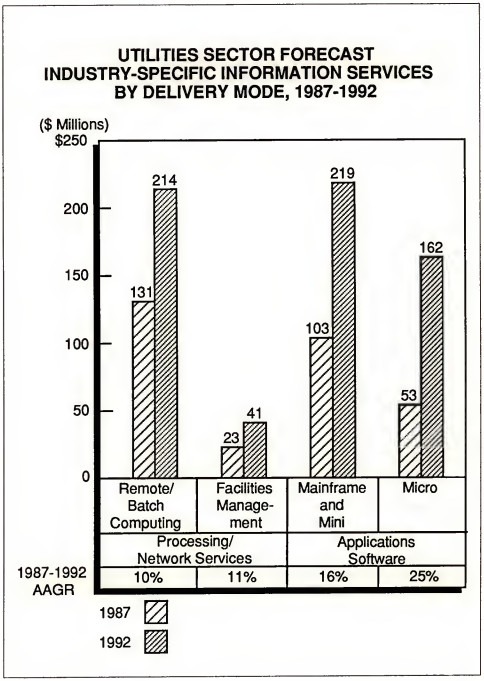
Professional Services

The largest utilities have implemented a number of specialized applications. In this case, the challenge is linking the processors and applications through system integration. Professional services for utilities will grow at a 15% rate during the forecast period, from $357 million to $718 million. This segment represents the largest opportunity for vendors.

Systems integration in the utility segment will be a major opportunity for vendors because:

- Many utility districts (3,500) can effectively utilize system integration services.

EXHIBIT II-4



- Integration of existing systems is more cost-effective than retraining users on new hardware and software.
- Large system integration projects will start with mainframe data bases used in administrative and accounting applications, and then will spread to technical applications.
- Mainframe-based system integration projects imply a captive market for IBM services since the IBM account representative is in close contact with IS management in large utilities.

III

Competitive Developments

III

Competitive Developments

A

Introduction

The utility information systems market is characterized by:

- Large vendors selling mainframe-based administrative software.
- A few large and numerous small vendors selling minicomputers and microcomputer software to manage operations.
- Fewer than six large processing/network vendors providing specialized information services to utilities.
- Lack of a single dominant vendor.

The market shares of leading vendors in the utility sector are shown in Exhibit III-1.

- Revenues for the top ten vendors represent 24% of total sector information services revenues. If professional services are excluded, the top ten vendors account for 37% of software and services.

Information services for the utilities sector can also be divided into administrative and operations computing.

The leaders in the administration systems market segment are:

- Babcock & Wilcox's Power Computing Company.
- Utility and Municipal Services.
- Philadelphia Suburban Corporation.

EXHIBIT III-1

LEADING VENDORS IN THE UTILITY SECTOR
1987

VENDOR	Processing/ Network Services	Software	Turnkey Systems	Professional Services	Total ($ Millions)	Percent of Market
Energy Incorporated	-	10	5	15	30	4.3
Babcock & Wilcox	20	-	-	5	25	3.6
GEISCO	14	4	-	2	20	2.9
Utility & Municipal Services	14	-	-	-	14	2.0
Philadelphia Suburban Corporation**	1	3	8	-	12	1.7
Quadrex Corporation	-	-	9	3	12	1.7
Equifax	10	2	-	-	12	1.7
CAP Gemini DASD	-	-	-	10	10	1.4
Flow General	-	5	-	5	10	1.4
Network Computing Corporation	9	-	-	-	9	1.3
TERA	-	12	-	3	15	2.1
Subtotal	68 (44%)	36 (30%)	22 (71%)	43 (12%)	169 (24%)	-
All Other Vendors	86	120	9	314	529	
Total	154	156	31	357	698	

*Formerly: UCCEL
**Combines: Stoner Associates and Digital Systems, Inc.

The leaders in the operations market segment are:

- Energy Incorporated.
- Quadrex Computer Systems, Inc.
- GEISCO.
- Equifax.

B
Acquisitions

No significant mergers took place among information services suppliers to the utility market segment in 1987, which is likely a statement that:

- This is a relatively mature market dominated by a limited number of large, and profitable companies.
- Second-tier companies have not introduced significant new products or applications that would make them attractive takeover targets.
- Information services vendors' internally generated cash has been sufficient to fund research and development, product marketing, and customer support activities.

In the utility market segment for 1985-1986, INPUT identified two significant acquisitions:

- In December 1985, Babcock & Wilcox Corporation (a subsidiary of McDermott Co.), which manufactures process control equipment for utilities, purchased the Dallas (TX) processing/network service of UCCEL Corporation for $4.8 million. This operation was combined with other B & W computer services and renamed the Power Computing Company.

In 1985 and 1986, Philadelphia Suburban Corporation, the parent company of Philadelphia Suburban Water Company, acquired Stoner Associates (Carlisle, PA) and Digital Systems, Inc. (Columbia, SC). Philadelphia Suburban Corporation intends to become a major player in the utilities-based information services business.

C
Companies Exiting the Utility Market

No major vendors stopped supporting the utility market in 1986 or 1987. However, several companies that formerly received 100% of their revenues from the utility industry are broadening their focus to include other vertical applications.

- Digital Systems, Inc. (subsidiary of Philadelphia Suburban Corporation) is targeting local and county governments in addition to the utility industry.

- Quadrex Computer Systems (Campbell, CA) is also selling turnkey systems to process industries, such as petrochemical and biological research.

D
Vendor Profiles

1. Energy Incorporated (One Energy Drive, P.O. Box 736, Idaho Falls, ID 83402, (208) 529-1000

a. Products/Services

Energy Incorporated (EI) sells software, services, and computer systems for power generation applications for the electrical power industry.

The company's 26 applications software products serve three key areas:

- Engineering (utilizes IBM PCs).

- Plant management (utilizes IBM mainframes, DEC VAX, Prime).

- Real-time monitoring and control (utilizes DEC VAX and MicroVAX, Gould, Modcomp, and CDC Cyber systems).

Professional services include consulting on quality assurance, nuclear operations, facilities management, education, and training.

b. Markets Served

Before 1985, EI served two markets – electric power utilities and companies disposing of hazardous toxic waste materials. In 1985, EI spun off the firm serving the hazardous waste material business.

EI is now 100% focused on the electric power utility industry.

c. Company Strategy

EI provides a full range of software and services to the electric power industry, designed to help manage existing and new power generation plants.

d. Recent Activities

In 1985, EI spun off Waste-Tech Services, Inc., its subsidiary for the safe destruction of hazardous and toxic wastes.

e. Future Direction

Energy Incorporated will emphasize its proprietary software products, consulting and risk assessment services, and real-time process monitoring and control systems.

EI will offer its monitoring and control systems on more vendors' hardware platforms.

2. Equifax, Inc. (1600 Peachtree Street, N.W., Atlanta, GA 30309, (404) 885-8000)

a. Products/Services

Equifax offers a range of applications software products to the utilities industry through its Enercom division.

Applications software packages include:

- Advanced Commercial Evaluation System (ACES) – commercial building energy audits.
- Residential energy audit system, via PCs.
- Graphics software to show energy usage (ENER GRAF).
- PC-based energy conservation educational programs.
- Utility customer information.
- Scheduling and job tracking weatherization programs for utility customers.
- Irrigation pumping programs.
- "Exchange" program to match "skip accounts" with new connections across geographic boundaries.

b. Markets Served

Equifax targets all utility companies, emphasizing electrical utilities.

Sales of utility industry software represent less than 5% of corporate revenues.

c. Company Strategy

Since nearly 95% of company revenues are derived from processing services, Equifax will continue to emphasize those services, targeting the insurance industry, which accounts for nearly one-half of corporate revenues.

In the utility area, Equifax will add more applications for portable micro-computers and hand-held calculators.

Equifax will offer some of its applications on mainframe computers through GEISCO processing/network services.

d. Recent Activities

C.B. Rogers, former senior vice president of IBM, became Equifax president and C.O.O. on October 1, 1987.

e. Future Direction

Since all other company business segments are relatively large, INPUT expects Equifax to either enlarge the utility software business through acquisition or spin it off.

3. Power Computing Company (a business unit of Babcock & Wilcox, a McDermott Company) (1930 Hi Line Drive, Dallas, TX 75207, (214) 655-8694)

a. Products/Services

Network/processing services to electric utility companies. Products include a quality assurance program and tools for regulatory, analytical, and record keeping requirements. Engineering and scientific applications software are available for a wide variety of uses.

Professional services are offered to provide solutions to unique, technically complex scientific, engineering, and data management problems.

PCC utilizes CDC Cyber, IBM 3083, and Prime 750 systems to support its customers, using a proprietary communications network, or Tymnet/Telenet.

b. Markets Served

Electric power and energy industries.

c. Company Strategy

PCC was created in 1986 as a result of Babcock & Wilcox purchasing the Computing Services Division of UCCEL. PCC combined the UCCEL acquisition with existing B & W computer services facilities.

PCC's mission is to provide services to utility companies, using B & W's knowledge of this industry as a springboard.

Professional services have been added to computer processing power and the software library to broaden PCC's offerings to its target vertical market.

4. General Electric Information Services Company (GEISCO) (401 North Washington Street, Rockville, MD 20850, (301) 340-4000)

a. Products/Services

GEISCO provides interactive, remote batch, applications software, and inquiry/response processing services to the utilities market sector.

b. Markets Served

Electric utilities.

c. Company Strategy

GEISCO provides a full range of integrated applications software for utility billing and other commercial activities.

GEISCO-developed software can be accessed through the company's MARK III and MARK 3000 processing/network services.

d. Recent Activities

The company introduced modules with additional features and capabilities for its integrated utility management software.

e. Future Direction

GEISCO will maintain its position as a leading supplier of processing/network services and applications software to the utility industry.

5. Quadrex Corporation (1700 Dell Avenue, Campbell, CA 95008, (408) 866-4510)

a. Products/Services

Quadrex Corporation's division, Quadrex Computer Systems, sells turnkey systems for plant monitoring and control and provides professional services to utilities. Products include Emergency Response Facility and advanced FLIC for process control and plant automation.

Its turnkey systems are based on Prime and Digital Equipment Corporation superminicomputers.

b. Markets Served

Quadrex derives 80% of its revenue from utilities; the remaining 20% comes from process manufacturing industries.

c. Company Strategy

Previously, Quadrex was a leading vendor of plant monitoring and control systems for nuclear power plants. The company is changing its direction away from utilities.

d. Recent Activities

The company is lessening its dependence on the relatively saturated market for nuclear power plant monitoring and control systems. Quadrex now generates 40% of its revenues from industrial companies.

QCSI completed a maintenance management data base project for the City of New York, and has been awarded a major contract for ongoing services.

e. Future Direction

Based on its turnkey system experience, Quadrex could increase its system integration activities.

6. General Research Corporation (Division of Flow General Corporation) (7655 Old Springhouse Road, McLean, VA 22101, (703) 893-5900)

a. Products/Services

Develops and markets applications software for the utilities industry and also markets processing/network services.

Applications software products, which run on the DEC VAX minicomputer and IBM mainframes, include:

- Environmental Information System.
- Occupational Health Information System.

b. Markets Served

General Research Corporation targets the utility industry, concentrating on utilities with nuclear power generation capabilities.

c. Company Strategy

Provide software and services for the storage, retrieval, and analysis of information pertaining to occupational health and environmental safety.

d. Future Direction

GRC will expand its base of software, services, and supported hardware for this well-defined niche.

7. CAP Gemini DASD (9045 North Deerwood Drive, Milwaukee, WI 53223, (414) 355-3405)

a. Products/Services

CAP Gemini DASD provides contract programming and consulting services to the utility market sector.

b. Markets Served

CAP Gemini provides services to electric, gas, water, and sewage utilities.

c. Company Strategy

CAP Gemini leverages its strengths in project management and internally developed software to help sell to Fortune 1000 companies and large utilities.

d. Recent Activities

The company helped many large customers implement fourth-generation language applications and information centers.

e. Future Direction

Cap Gemini plans to integrate new technologies such as CD ROM disks in service offerings.

It also intends to maintain its existing base of contract programmers, a difficult task in light of recruiting efforts by other firms, including CAP Gemini's customers.

8. TENERA (formerly TERA) Corporation (1995 University Avenue, Berkeley, CA 94704, (415) 845-5200)

a. Products/Services

TENERA provides computer-aided services and software products to the elective utility and manufacturing industries.

The company has developed and marketed its Plant Information Management System (PIMS), an on-line system that coordinates and controls plant maintenance for the utility industry.

PIMS operates on IBM 43XX and 30XX mainframes with MVS or DOS operating systems.

b. Markets Served

Electric utilities and manufacturing firms.

Sales to utilities represent 85% of total revenue.

c. Company Strategy

TENERA provides computer-aided services and software products to the utility and manufacturing industries. Four separate divisions focus on utilities: systems and software, environmental services, engineering services, and, in 1987, a new management consulting division.

d. Recent Activities

TENERA has announced a teaming agreement with Bechtel to cooperatively market selected products and services.

A key 1987 objective for TENERA was to reduce the concentration of revenue from its largest client. From 65% in 1986, these revenues increased to for 51% of the total in mid-1987.

TENERA added a new operating division in 1987 to focus on management consulting for electric utilities in the areas of case management, litigation, regulatory support, and organizational effectiveness.

e. Future Directions

TENERA will increase the value of its services through the acquisition of computer-related products and services.

9. Digital Systems, Inc. (a division of Philadelphia Suburban) (P.O. Box 12, Columbia, SC 29202, (803) 799-4094)

a. Products/Services

Digital Systems markets and supports turnkey systems for the utility industry and local/county governments.

Specific products include:

- Integrated utility management, utilizing DEC VAX or PDP-11 hardware.
- Fund and encumbrance package, based on DEC VAX or PDP-11 hardware.

b. Markets Served

Digital Systems sells to utilities and local/county governments.

Sales to utilities represent about 75% of total revenues.

c. Company Strategy

Digital Systems provides a full range of products and services to the electricity/gas/water/waste utilities market.

d. Recent Activities

Since market requirements for its products are so different, the company recently formed two divisions to sell its products.

e. Future Direction

Digital Systems will emphasize sales of its fund and encumbrance package to local and county governments as a second product line.

10. Tres Computer Systems, Inc. (Division of Control Data Corporation) (14801 Quorum Drive, Dallas, TX 75240, (214) 385-5800)

a. Products/Services

Tres Systems provides applications software and professional services primarily for utilities and municipalities.

Tres' Customer Billing and Information System and its Materials Management System utilize IBM mainframe computers.

Professional services include system design, software customization, and consulting.

b. Markets Served

Tres Systems markets to investor-owned utilities, municipal-owned utilities, and local transportation agencies.

c. Company Strategy

Tres' strategy concentrates on providing a full range of services and applications software for large utilities and transportation agencies.

To lock in customers, the company's software is full featured and contains more than 1.1 million lines of code, an accomplishment that would be hard to duplicate in a timely manner.

d. Recent Activities

The company began emphasizing sales to transportation authorities of its Material Management package, which provides about 20% of revenues.

11. Other Vendor Activity

A number of new meter-reading products are appearing, which automate this previously labor-intensive activity using radio signals, cable TV lines, power lines, or telephone lines. Enscan, Base Ten, and Data Beam are three such firms.

Software products to evaluate water quality are available from Henco and Environmental Systems Research Institute.

IV

Information Systems Planning

IV

Information Systems Planning

A
Major Issues

1. Driving Forces

Merger and acquisition activities among utilities are increasing and will result in larger, but fewer, utilities, especially electric.

- Pacific Lighting Corporation (Los Angeles, CA) acquired drugstore chain Thrifty Corporation (Los Angeles, CA) in an effort to diversify its operations.

- Pacific Gas & Electric Company (San Francisco, CA) has made an offer to merge with the Sacramento (CA) Municipal Utilities District.

The cost of building new nuclear power plants continues to force budget austerity. Although building nuclear power plants may be necessary to provide sufficient capacity, building costs for such plants have escalated in the last few years to where a new plant costs $4 - $6 billion.

State utility commissions are separating power generation from power distribution activities. Rate changes are divided into the cost of power production and the cost of power transmission.

The federal government is gradually deregulating prices for electricity and natural gas, adding pressure on utilities to learn how to effectively market their products. Further pressure comes from certain state governments, which are permitting utilities in their state to sell electricity or gas to customers in neighboring states.

Cogeneration is now a reality in the power business. Large industrial customers can purchase generators capable of providing internal capacity and excess power. The excess power must, by law, be purchased back by the local electric utility at comparatively high rates.

As a result of deregulation and cogeneration, utilities face more competition. New systems to address market-based requirements must be established. To prosper, utilities must learn marketing. Marketing efforts will be directed mainly at the largest customers, which must be retained spread the fixed costs across a wider user base. Exhibit IV-1 illustrates the above issues.

EXHIBIT IV-1

UTILITY SECTOR—DRIVING FORCES

- Mergers and Acquisition Will Lead to Fewer Utilities
- Flattening Demand for Electricity
- Building of Nuclear Power Plants Forces Budget Austerity
- Separate Power Generation and Distribution Activities
- Federal Government Deregulation
- Power Cogeneration
- More Emphasis on Marketing
- Continued Conversion to On-Line by Rural Utilities

As part of an improved service orientation, smaller, rural utilities are continuing the conversion from batch to on-line systems. Department managers strongly influence the operations of smaller utilities. In the past, near-monopoly rural utilities spent as little as possible on technology. Now they must invest in new systems to meet a changing economic and regulatory environment.

2. Issues and Objectives

Cost containment has always been a major issue in this industry. Service requirements must be balanced against funds available for increases through rate hikes and the need to pay shareholders of investor-owned utilities a fair return on their investments.

More regulatory changes mean more changes to the existing software to accommodate the wishes of state legislatures or other governmental bodies. Minor changes are not a problem; however, major regulatory changes mean major software rewrites, testing, and debugging.

Interestingly, a few large utilities have installed and tested Local-Area Networks (LANs). Now that users have seen what they can do, virtually every user wants to be part of the network, whether or not the network is relevant to that person's job.

Utilities are coping with the problem of how to structure the organization's data processing operation. Should it be centralized, distributed, or a "hybrid" in order to best accomplish necessary tasks? Decentralization is being discussed as a means to delay the purchase of an additional mainframe, since the existing mainframe is already burdened by the growth of applications/power needs.

Office automation, especially in IBM environments, is being implemented slowly, with calendar functions and electronic mail as the primary applications.

Utilities are buying used computers to help stretch their budgets. While the purchase of used disk and tape drives is relatively commonplace, buying used CPUs is a major, but necessary, step for many utilities.

IS managers appear to have a broader organization perspective than many utility company senior managers. They want to use IS to improve customer service through on-line inquiry, on-line posting, and relational

DBMS-based customer information systems, thus providing vital marketing information.

Senior management must begin to use information for a strategic or competitive advantage. While one electric company does not compete with another, many factors influence a developer's choice of gas or electric heat for a new shopping center or office building.

In a couple instances, IS managers wanted to use IS to foster better organizational teamwork and cooperation. The utility industry may be the last business where department managers run the company, rather than senior management providing organizational leadership and direction.

Exhibits IV-2 and IV-3 expand on these points.

EXHIBIT IV-2

UTILITIES SECTOR—ISSUES

- Cost Containment
- More Regulatory Changes
- Control Growth of LANs
- Centralized/Distributed/Hybrid Processing
- Office Automation
- More Used Computers

EXHIBIT IV-3

UTILITES SECTOR—OBJECTIVES

- Use IS to Improve Customer Service
- Get Senior Management to Strategically Use Information
- Use IS to Foster Organizational Teamwork and Cooperation

3. Impact of Technology

Exhibit IV-4 highlights five key aspects of what technology has done for end users in the utility industry.

EXHIBIT IV-4

UTILITIES SECTOR—IMPACT OF TECHNOLOGY

- Office Automation Helps Daily Operations
- New Technology Results in Decreasing Maintenance Costs
- Users Get More Hardware Power for the Money
- Routine Work Moves from Programmers to End Users
- IBM PS/2 will Increase User Expenditures

First, office automation helps manage the daily operations in electric, gas, and water/waste utilities. Better communications are a must for improving customer service and becoming more competitive.

Second, new hardware technology has resulted in steadily decreasing maintenance costs over the past two years. While manpower requirements to operate an IBM mainframe have not changed much, IBM decreased its direct charges for maintenance under its CSA program.

Third, for the same amount of money spent three years ago, a user now gets ten times the raw hardware power. However, increases in the number of applications supported and the increasing memory required to support each application results in a minimal overall gain. More robust software continues to help sell more hardware.

Fourth-generation application development software helps move more routine work from programmers to end users, enabling programmers to catch up on the applications backlog.

Finally, IBM's new PS/2 system will have the effect of forcing end users to spend more money to adapt and integrate this new technology into existing IBM PC/XT/AT-based operations. This need for an increased budget comes at a difficult time for utilities, when management would rather watch all IS spending.

B

New Applications

Application development within the utilities sector continues its focus on asset management and customer-oriented systems. Exhibit IV-5 highlights the specific applications to be started or continued in 1988.

Better utilization of people's time and the capital assets in place represents a major means of improving overall financial performance. The installation of customer-oriented systems may be the result of:

- A different regulatory environment.
- The financial community's perception of what makes for a "better" investor-owned utility.
- Utilities' responses to increased competition.

Shareholder systems are also being updated to foster better relations with

EXHIBIT IV-5

**UTILITIES SECTOR—
NEW APPLICATIONS IN 1988**

- Shareholder Systems
- Repetitive Maintenance for Nuclear Facility
- Distributed Work Information Power Plant Maintenance System
- On-line Financials (AP/AR/GL/Billing)
- Conversion from Batch to On-Line Systems

shareholders, in the increasingly likely event of a takeover offer. Better relations should result in increased loyalty to the organization and, indirectly, to current management.

People and asset management applications include:

- Repetitive maintenance for nuclear facilities.
- Distributed work information systems.
- Power plant maintenance system.

Medium-sized gas, electric, and water/waste utilities are continuing to convert financial systems from batch to on-line operations.

The utility sector has few IS needs that respondents believe are not well-served by vendors. Specifically, users want:

- More networking options available through each vendor.
- More involvement by vendors to help hold costs down.

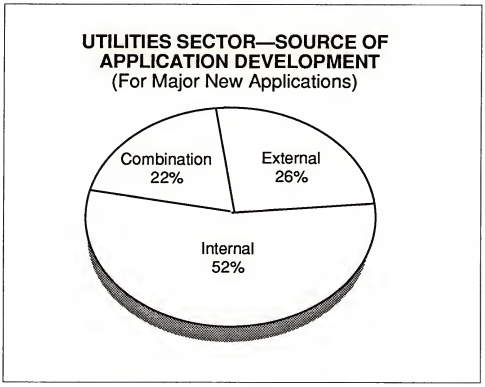
Without prompting by INPUT interviewers, users remarked favorably about the decreasing mainframe hardware maintenance costs under

IBM's new Corporate Service Amendment (CSA). However, the CSA is designed generally for large accounts that must meet such requirements as setting up a first-line of contact for internal users (to minimize "no fault found" service calls), agreeing to a long-term contract with heavy cancellation penalties, and having staff members trained at certain IBM-determined levels of competency for the user's computer system.

However, users believe that, in general, vendors are trying to sell too much technology too fast.

According to the information depicted graphically in Exhibit IV-6, the utilities sector is divided in its approach to software development.

EXHIBIT IV-6



- Larger utilities tend to develop new applications in-house, while smaller organizations generally rely on third-party software vendors for new applications.

- Maintenance and enhancement of existing applications takes far greater resources than developing new applications. Larger utilities devote approximately 50% of software development staff to developing new applications. Smaller utilities devote less than 30% of their software development staff to developing new applications.

One respondent expressed a caveat for third-party software vendors. Specifically, although utilities must accomplish the same basic tasks, no two utilities approach the problem in the same way. Therefore, some level of software customization is necessary to help make the sale. Customization requirements can be minimized by offering menu-driven choices within the application software package, thereby simplifying user support requirements.

The cost range of new applications, whether developed in-house or purchased from a third party are:

- Mainframe Based: $90,000 - $2,000,000
- Minicomputer Based: $18,500 - $950,000
- Microcomputer Based: $165 - $9,300

The average costs of purchased application software are:

- Mainframe Based: $550,000
- Minicomputer Based: $67,500
- Microcomputer Based: $1,175

C
Budget Analysis

In 1987, respondents experienced limited growth in their IS budgets, due primarily to increased in salaries and fringe benefits and the negative effects of nuclear power plant construction cost overruns.

- Overall IS spending in 1988 is projected to decrease 0.2%.

- Exhibit IV-7 shows the 1987 budget distribution and projects the growth in specific budget categories in 1988.

In general, IS budgets at large utilities are growing faster than those at medium and smaller utilities. The unique staffing and equipment requirements at nuclear power plants account for the difference. If nuclear plants are deleted from the analysis, then budgets at medium and small utilities are increasing 0.7% faster than those of large, investor-owned utilities.

A comparison of data from 1985, 1986, and 1987 indicates that 1987 was an unusual year. Generally speaking, more utilities took one of the following actions than in either of the two previous years:

- Purchased new equipment.
- Leased more equipment.

EXHIBIT IV-7

UTILITIES SECTOR—1987 BUDGET DISTRIBUTION AND 1987-1988 CHANGES

BUDGET CATEGORY	1987 I.S.BUDGET (Percent)	1987-1988 EXPECTED BUDGET GROWTH
PERSONNEL (Salaries & Fringe Benefits)	36.3	2.5
HARDWARE		
Mainframes	12.2	(9.7)
Minicomputers	6.6	(4.2)
Microcomputers	4.3	2.5
Mass Storage Devices	2.9	3.0
Other Hardware	2.2	(2.4)
TOTAL HARDWARE	28.2	(2.2)
Data & Voice Communicatons	4.8	4.9
External Software	6.5	8.3
Professional Services	4.5	(6.6)
Turnkey Systems	2.1	0.2
Software Maintenance	3.4	3.5
Hardware Maintenance	9.3	(11.2)
Outside Processing Services	0.1	2.3
Supplies	3.5	2.1
Travel, Subscriptions, Etc.	1.3	(6.8)
Subtotal - Maintenance, Services & Other	35.5	(1.3)
TOTAL	100.0	(0.2)

- Upgraded existing equipment.
- Bought used equipment.

As shown in Exhibit IV-8, nearly 60% of the respondents project that their IS budgets will decrease or remain the same in 1988 as in 1987.

Indirect factors contributing to decreases in the IS budget include:

- The effects of nuclear power plant construction.
- Managing reported "earnings per share."

Factors directly contributing to increases in the IS budget include:

- Personnel expenses.
- New application software development projects.

Four factors were listed as the major contributors to decreases in the IS budget, namely:

- Declining state/local economies (resulting in a smaller customer base for services).

- Significant reduction in the purchases of software development (professional services).

- Declining hardware maintenance for IBM mainframes, resulting from adoption of IBM's Corporate Service Amendment (CSA).

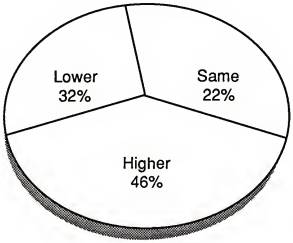
- Less travel to conferences and seminars, especially from rural locations.

Headcounts within utilities sector IS departments decreased somewhat from 1986 to 1987. Larger utilities tended to add personnel, while head counts in smaller utilities decreased. These decreases can be attributed to increased efficiency resulting from automation, or to not replacing employees who quit or retire.

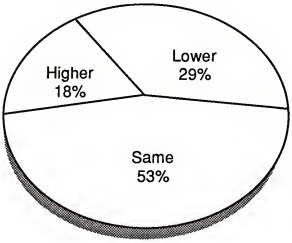
- 17% reported the head count increased.
- 56% reported the head count remained the same.
- 27% reported the head count decreased.

EXHIBIT IV-8

UTILITIES SECTOR—MOST BUDGETS WILL REMAIN FLAT OR WILL DECREASE



Comparison of
1988 and 1987
I.S. Budget



Comparison of
Changes in Growth Rates of
1987 and 1988 I.S. Budgets
(Among Sites with Increasing Budgets)

V

New Opportunities

V New Opportunities

A Administrative Market Sector

Cost-effective applications software development is very important to users.

- Vendors should offer the means to develop mainframe applications on personal computers that can be tested and debugged locally, then uploaded to the corporate mainframe.

- At $600 per hour for timesharing on a mainframe, the use of micros for program development has a tremendous payback.

Software and professional services in support of local-area networks (LANs) represents a growing area. Software must retain its functionality on the network. Professional services such as consulting with the LAN vendor may be necessary to sell more software and ensure that the software actually works.

There is continued interest in the "next generation" customer information system, which features on-line data bases with information that can be updated by designated operators.

While large utilities continue to use IBM mainframes for administrative and accounting applications, medium and small utilities have a large installed base of superminicomputers manufactured and serviced by (in descending order of installed base):

- Digital Equipment Corporation (DEC).
- Hewlett-Packard (HP).
- Prime Computer.
- Data General Corporation (DG).

Providing integrated software for accounting and administrative applications running on these superminis represents an opportunity for software vendors.

Discussions with data processing managers at large utility companies revealed a trend toward combined telecommunications and other information services. Vendors can help these managers devise the means to effectively combine telecommunications and IS technologies.

Fiber optic communications increase telecommunications capabilities in two ways:

- The number of simultaneous voice and/or data transmissions.
- The ability to transmit more graphics-based information.

Advanced communications systems for automated meter reading are of high interest.

Developing high-quality industry-oriented software is always a vendor opportunity. Vendors who start with a clean sheet of paper and talk to many utilities to learn their software requirements have an advantage over vendors taking generic software and modifying it to fit the regulated utility industry. State and federal government reporting requirements for utilities are very specific; "generic" software cannot fully address these user needs.

Partnerships between hardware vendors and other suppliers represent a "ground floor" opportunity. Examples include:

- Turnkey systems for setting up, reading, and verifying data from hand-held meters.

- Microcomputer-based systems using bar code readers for inventory management, paperwork management, and asset control.

- Desktop publishing systems for newsletters and forms development and modification.

- Automation of purchase requisitions and followup.

- Automation of work orders and followup.

B

Operations and Maintenance Market Segment

Wide year-to-year variations in data processing budgets will accelerate the need for improved asset management. Utilities' major assets include buildings, vehicles, and the computer system.

The most popular minicomputers in small and medium utilities are (in decreasing order of installed base):

- DEC MicroVAX.
- Hewlett-Packard 1000.
- IBM System/36 and IBM PC.

Microcomputer-based applications software or turnkey systems for asset management are needed.

Low-cost microcomputers enable suppliers to sell redundant monitoring and control systems at very low prices compared to redundant minicomputer-based systems.

Small utilities typically hire consultants to design specifications for systems used in operational applications. The consultant really determines the level of hardware and software integration. Savvy vendors will keep in close contact with consultants and help plan the system to be installed or the modifications necessary.

VI

Conclusions and Recommendations

VI

Conclusions and Recommendations

Trends toward deregulation and increased availability of other fuel sources are forcing utilities to become even more efficient.

The most promising products and services will improve asset management, monitoring, and control systems, and will provide turnkey solutions for such applications as desktop publishing, meter reading, and many business problems that can be effectively solved using bar-code-based peripherals.

UT-A

Appendix: User Expenditure Forecast, 1986-1992

UT-A

Appendix: User Expenditure Forecast, 1986-1992

Exhibit UT-A-1 contains the industry specific user expenditure forecast for the utilities industry sector for 1986 to 1992.

EXHIBIT UT-A-1

UTILITIES SECTOR
INDUSTRY-SPECIFIC USER EXPENDITURE FORECAST, 1986-1992

SEGMENTATION BY DELIVERY MODE	1986 ($M)	1986-1987 Growth (%)	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	AAGR 1987-1992 (%)
Processing/ Neworks Services									
Remote Computing/ Batch	119	10	131	145	161	177	194	214	10
Facility Management	21	10	23	26	29	32	36	41	12
Total Processing Services	140	10	154	171	190	209	230	255	11
Applications Software									
Mainframe/Mini	88	17	103	121	142	164	190	219	16
Micro	42	26	53	67	84	105	130	162	25
Total Application Software	130	20	156	188	226	269	320	381	20
Turnkey Systems	27	15	31	35	40	46	51	57	13
Professional Services	305	17	357	418	480	552	630	718	15
Sector Total	602	16	698	812	936	1,076	1,231	1,411	15

UT-B

Appendix: Forecast Reconciliation

UT-B

Appendix: Forecast Reconciliation

This appendix indicates the changes made to this year's forecast as compared to last year's.

EXHIBIT UT-B-1

UTILITIES DATA BASE RECONCILIATION OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	$ Millions 1986 Revenues From 1986 Forecast	$ Millions 1986 Revenues From 1987 Report	1986 Revenue Variance as a Percent of 1987 Report	1991 Revenues From 1986 Forecast	1991 Revenues From 1987 Forecast	1991 Revenue Variance as a Percent of 1987 Forecast	86-91 AAGR Forecast in 1986 Report (Percent)	86-91 AAGR Forecast in 1987 Report (Percent)
Processing Services								
Remote Computing/ Batch	117	119	-2	181	194	-7	9	10
Facility Management	21	21	0	38	36	6	13	12
Total Processing	138	140	-1	219	230	-5	10	11
Applications Software	122	130	-6	267	320	-17	17	20
Turnkey Systems	29	27	7	51	51	0	12	13

About INPUT

INPUT provides planning information, analysis and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international planning services firm. Clients include over 100 of the world's largest and most technically advanced companies.

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