

## National Regulatory Research Institute

SURVEY OF STATE COMMISSION NEEDS FOR COMPUTER SOFTWARE

An NRRI survey to assess the computer modeling needs of state commissions was completed in May 1985. The survey found that regulatory software is currently used most extensively in the electric utility sector, followed by the telecommunications, gas, and water sectors, in that order. The survey also found that commissions want to increase their level of use of computer software in all utility sectors. Further, the survey results show that across all utility sectors:

- \* Software packages related to the general areas of rate design and revenue requirements are needed the most.
- \* Among individual applications, cost-of-service is in most demand.
- \* There is a substantial need for data/information management and financial/accounting programs.

Copies of the report may be ordered from the NRRI Publications Office.

AVAILABILITY OF PUBLIC DOMAIN SOFTWARE FROM STATE COMMISSIONS

The NRRI has acquired 8 computer programs from 3 state commissions, namely, California, Florida, and Illinois. These programs are non-proprietary and NRRI is making them available, free of charge, to state commissions. The following is a summary list of these programs.

<u>Name</u>	<u>Developed Under</u>	<u>Function/Purpose</u>	<u>Developed by</u>
FORMATRS	dBASE II	Case Processing	California PUC
ADVICLOG	dBASE II	Tariff Filings Processing	California PUC
TELCARS	dBASE II	Mailing Lists	California PUC
COSTOFCA	Lotus 1-2-3	Cost-of-Capital	Florida PSC
FERC 423 System	dBASE III	Fuel Cost Data Base	Florida PSC
WATER & SEWER AUDIT	Lotus 1-2-3	Accounting	Florida PSC
RRSPREAD	Lotus 1-2-3	Accounting	Florida PSC
EXHIBIT 1	Lotus 1-2-3	Revenue Requirements	Illinois CC

NRRI COMPUTER MODELS UPDATE

In the first issue of the NRRI SOFTWARE BULLETIN, we announced the availability of three microcomputer programs, namely, PROC, LOAD, and COST. PROC has currently been updated to resolve memory mapping problems that may

occur when run on some IBM compatible microcomputers. The NRRI also has a number of mainframe models. The following is a summary list of all the NRRI programs.

<u>Name</u>	<u>Function/Purpose</u>	<u>Host System</u>
BENCOST	Cost/benefit analysis of TOD rates	Mainframe
CERES	Generating capacity expansion planning	Mainframe
COST	Electric cost-of-service	Microcomputers
FACOS	Electric cost-of-service	Mainframe
FRED	Electric load analysis	Mainframe
IPUC	Utility COMPUSTAT interface	Mainframe
LOAD	Electric load analysis	Microcomputers
MARGINALCOST	Marginal cost of electricity calculation	Mainframe
PCS-A2	Electric production cost simulation	Mainframe
PROC	Electric production cost simulation	Microcomputers
RAM-II	Financial analysis (electric)	Mainframe

#### INTEGRATED SOFTWARE

The NRRI is completing development of an integration procedure that links together the capabilities of individual microcomputer programs. This will enable users to perform more efficiently analyses that require the use of several programs. At the nucleus of this procedure is a database management program that maintains a common database which is accessible to individual application programs. The three NRRI programs (PROC, LOAD, and COST) are being integrated using this procedure to form an integrated software package for electric load and cost analyses. The package is expected to be available by the end of September 1985.

#### WASHINGTON UTC TELEPHONE DISCONNECTION STUDY

The Washington UTC has completed a statistical study of telephone disconnections. The data collected for this study may be useful to other commissions. At the request of the Washington UTC, the NRRI is making this data set available to anyone interested in acquiring it. For more information on the contents of the data set, contact Mr. Steven King of the Washington UTC at (206) 753-1454.

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STATE COMMISSION NEEDS FOR  
COMPUTER SOFTWARE

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## I. Introduction

Because of its ability to rapidly process large amounts of information and to accurately simulate and analyze the behavior of many diverse systems, the computer can greatly aid state commissions in regulatory ratemaking. It also serves as a tool for regulatory decision-making. Computer software has been used by some state commissions for at least a decade and its use continues to expand.

The National Regulatory Research Institute (NRRI) has been providing assistance to state commissions in the use of computer programs with regulatory applications. This activity consists of developing software, transferring it to state commissions and assisting them in running such programs. In order to assist the state commissions more effectively, it is necessary to determine their software needs more precisely. The survey reported on here was undertaken by the NRRI to achieve this objective.

### Objective of the Study

Since both the computer hardware resources currently available and the areas of application vary widely among commissions, so do their software needs. It is intended that the findings of this study will provide both a broad information base and a general framework, which can be used by individual state commissions, the NRRI, and the regulatory community as a whole to make computer software a more effective decision-making tool in public utility regulation.

### Preparation and Distribution of a Survey Form

In order to determine the software needs of state commissions, a survey form was prepared. It was designed to gather information in the following areas.

- (1) The general levels of software utilization by state commissions at present.
- (2) The anticipated or desired levels of software utilization by state commissions in the near future.





- (3) Areas where new or better software is needed.
- (4) Comments from state commission staff on the difficulties of software utilization, and suggestions on how they can be addressed.

Ninety-six survey forms were mailed to the senior staff member of every state commission, a few key individuals in regulatory areas, and members of the NARUC Staff Subcommittee on Computers. In all, 74 responses from commissions in 45 states and the District of Columbia were received.

#### Compilation of the Responses

The responses to the survey regarding software needs were collected and classified according to utility sector (e.g., electric, gas, telecommunications), and application area (e.g., cost-of-service, financial analysis, generation planning). Also, observable patterns with respect to software needs and software utilization difficulties were investigated and significant ones were noted.

#### The Organization of This Report

This report summarizes the findings of the survey. In section 2, state commissions' needs for software are summarized. The summary identifies these needs by utility sector and by application area. Section 3 describes the reported difficulties associated with software utilization. Finally, some possible approaches that may be used to improve software utilization in order to fulfill state commissions' needs are discussed in the appendix.

## II. State Commission Needs for Computer Software

The software needs of a state commission depend on the number and sizes of the utility companies under its jurisdiction, and the relative complexity of its regulatory methodology and procedures. For example, one state commission may use computer models extensively in the electric



sector, moderately in the telecommunications sector, and not at all in the gas sector. The pattern may be completely reversed for another state commission. Because of the functional differences among utility sectors, the programming logic and data requirements of individual application programs may vary from one sector to another. This may require application programs to be sector-specific, although it is sometimes possible to develop multi-utility application programs.

In the current study, the survey responses were classified by utility sector. Within each utility sector, they were further divided into broad functional categories and individual application areas. For example, the rate design category within the electric utility sector includes cost of service and fuel adjustment analysis. It should be mentioned here that the broad functional categories are neither independent nor mutually exclusive, and are only chosen to provide an easy, understandable ordering of the application areas.

In the following sections, the results of the survey are reported. Results on the current and the desired future usage levels of regulatory software by utility sector are presented first. This is followed by the results for regulatory software needs organized by utility sector, functional category, and application area.

#### Levels of Software Utilization

One important indicator of the software needs of a state commission is its current levels of use of software. Current usage reflects the relative volume of regulatory tasks being supported by computer software in various utility sectors. Table 2-1 shows the current levels of software utilization by utility sector. Regulatory software appears to be most extensively used in the electric utility sector, followed by telecommunications, gas, and water utility sectors, respectively.

The respondents were also asked to indicate the level of desired future use of computer software in each utility sector, and the responses are summarized in table 2-2. It shows significant increases from current usage levels in all sectors, especially in the telecommunications and gas



TABLE 2-1

NUMBER OF COMMISSIONS (OUT OF 46 RESPONDING) THAT  
USE COMPUTER SOFTWARE FOR REGULATORY ANALYSIS, BY LEVEL OF USE  
AND BY UTILITY SECTOR

<u>Utility Sector</u>	<u>Number of Commissions at the Level of Use</u>			
	<u>Heavy</u>	<u>Moderate</u>	<u>Light</u>	<u>Total</u>
Electric	21	12	4	37
Telecommunications	5	15	11	31
Gas	10	13	6	29
Water	4	8	12	27
Other	5	4	2	11

TABLE 2-2

NUMBER OF COMMISSIONS (OUT OF 46 RESPONDING) THAT  
WANT TO USE COMPUTER SOFTWARE, BY DESIRED LEVEL OF USE  
AND UTILITY SECTOR

<u>Utility Sector</u>	<u>Number of Commissions at the Level of Use</u>			
	<u>Heavy</u>	<u>Moderate</u>	<u>Light</u>	<u>Total</u>
Electric	33	7	1	41
Telecommunications	22	17	2	41
Gas	20	14	5	39
Water	11	11	7	29
Other	7	4	0	11



sectors in terms of percentage increases. There is also an obvious shift in usage levels from the moderate and light categories to the heavy category across all utility sectors. While the above results are based on subjective perceptions of software users in the regulatory community, they correspond well to the current trend of proliferation of software and penetration of its usage in the information management and analytical functions of almost every sector of business and industry.

### Regulatory Software Needs

Respondents to the survey were asked to indicate their needs for new or better software and the results are shown in the following five tables. Each table summarizes the results for a given utility sector. As mentioned in section 1, there were 74 respondents from 46 commissions. While tables 2-1 and 2-2 deal with numbers of commissions, the remaining tables concern the number of respondents. In each table, the number of respondents expressing a need in each application area is reported. Respondents had the option of indicating needs in more than one application area; therefore, the total number of expressions of need for software usually exceeds the number of respondents. This number is shown in a footnote to each table where appropriate. The following is a summary of results obtained for each utility sector.

#### Electric Utility Sector

By far the largest number of respondents (45 out of 74) expressed a need for electric utility-related software (table 2-3). Among the broad categories, rate design scored the highest on the number of responses, which is 33. Within the rate design category as well as among all individual application areas, the highest number of responses (i.e., 20) was received in the cost-of-service area. A close second to the rate design category is the revenue requirements category, with the highest demand for a production costing program (11 responses). Among individual application areas, cost of service is followed by load forecasting (16





TABLE 2-3

STATE COMMISSION NEEDS FOR NEW OR BETTER SOFTWARE  
IN THE ELECTRIC UTILITY SECTOR

<u>Application Area</u>	<u>Number of Responses<sup>1</sup></u>
Rate Design	
General	7
Billing Analysis	4
Cost of Service	20
Fuel Adjustment	1
Small Power Producer Rates	1
	<u>33</u>
Revenue Requirements	
General	7
Depreciation	4
Fixed Charge Computation	1
Fuel Cost	2
Rate Base	1
Production Costing	13
Income Tax Analysis	1
	<u>29</u>
Forecasting	
General	7
Fuel Price Forecasting	1
Fuel Supply Forecasting	1
Load Forecasting	16
	<u>25</u>
Financial/Accounting	
General	7
Accounting	3
Audits	2
Capital Structures	1
Cost of Capital/Rate of Return	8
Stock Analysis	1
	<u>22</u>
Planning	
Capacity Planning	14
Corporate Planning	1
Utility Resource Planning	2
	<u>17</u>
Data/Information Management	
General	8
Legal Decisions Data Base	1
Rate Case Management	2
Utility Data Base	3
Statistical Analysis	1
	<u>15</u>
Monitoring/Management	
Construction Monitoring/Management	3
Load Analysis	4
Power Plant Performance	1
Capacity Utilization	1
Job Scheduling	1
Safety Analysis	1
Fuel Inventory	4
	<u>15</u>

<sup>1</sup>Of the respondents, 45 expressed a need for electric utility-related software. Individual respondents may have software needs in more than one application area, i.e., more than one response.



responses) and capacity planning (14 responses) underscoring the importance of the forward-looking component of regulatory decision-making.

#### Gas Utility Sector

Twenty-three of the respondents expressed a need for gas utility-related software (table 2-4). As in the electric utility sector, the highest number of responses was received in the rate design category (21 responses). It was followed by revenue requirements, which received 15 responses. Cost of service received the highest number of responses (11 responses) among individual application areas. It was followed by the cost-of-capital/rate-of-return area (7 responses).

#### Telecommunications Utility Sector

Thirty-two of the respondents expressed a need for telecommunications utility-related software (table 2-5). Again, the highest demanded category was rate design (30 responses). In this sector, however, the revenue requirements category scored lower (14 responses) than the financial/accounting category (18 responses). Among individual application areas, cost of service again scored the highest (18 responses).

#### Water Utility Sector

Sixteen of the respondents expressed a need for water utility-related software (table 2-6). Among the broad categories, roughly equal numbers of responses were received for financial/accounting (9 responses), rate design (9 responses), and revenue requirements (10 responses).

#### Multi-Utility and Other Sectors

A very small number of responses (less than 4) called for application areas in multi-utility or other utility sectors. They are presented, without further discussion, in table 2-7.



TABLE 2-4

STATE COMMISSION NEEDS FOR NEW OR BETTER SOFTWARE  
IN THE GAS UTILITY SECTOR

<u>Application Area</u>	<u>Number of Responses</u> <sup>1</sup>
Rate Design	
General	6
Billing Analysis	2
Cost of Service	11
Fuel Adjustment	1
Fuel Cost	<u>1</u>
	21
Revenue Requirements	
General	5
Depreciation	3
Production Costing	4
Rate Base	1
Fixed Charge Computation	1
Income Tax Analysis	<u>1</u>
	15
Financial/Accounting	
General	2
Accounting	2
Audits	2
Cost of Capital/Rate of Return	<u>7</u>
	13
Data/Information Management	
General	4
Utility Data Base	1
Rate Case Management	<u>2</u>
	7
Forecasting	
General	2
Load Forecasting	<u>5</u>
	7
Monitoring/Management	
Construction Monitoring/Management	2
Flow Analysis	2
Safety Analysis	1
Job Scheduling	<u>1</u>
	6
Planning	
Dispatch and Supply Planning	1
Utility Resource Planning	<u>2</u>
	3

<sup>1</sup>Of the respondents, 23 expressed a need for gas utility-related software. Individual respondents may have software needs in more than one application area, i.e., more than one response.



TABLE 2-5

STATE COMMISSION NEEDS FOR NEW OR BETTER SOFTWARE  
IN THE TELECOMMUNICATIONS UTILITY SECTOR

<u>Application Area</u>	<u>Number of Responses<sup>1</sup></u>
Rate Design	
General	8
Access Charge Analysis	1
Billing Analysis	1
Cost of Service	18
Separations Model	<u>2</u>
	30
Financial/Accounting	
General	5
Accounting	2
Audits	2
Cost of Capital/Rate of Return	8
Stock Analysis	<u>1</u>
	18
Data/Information Management	
General	8
Legal Decisions Data Base	1
Rate Case Management	3
Tariff Computerization	1
Survey Questionnaire Analysis	<u>1</u>
	14
Revenue Requirements	
General	7
Depreciation	5
Fixed Charge Computation	1
Income Tax Analysis	<u>1</u>
	14
Forecasting	
General	2
Load Forecasting	<u>5</u>
	7
Monitoring/Management	
Construction Monitoring/Management	2
Field Engineering	1
Load Analysis	2
Quality of Service	<u>1</u>
	6
Other	
Independent Settlements	1
Territorial Boundaries	<u>1</u>
	2

<sup>1</sup>Of the respondents, 32 expressed a need for telecommunications utility-related software. Individual respondents may have software needs in more than one application area, i.e., more than one response.





TABLE 2-6

STATE COMMISSION NEEDS FOR NEW OR BETTER SOFTWARE  
IN THE WATER UTILITY SECTOR

<u>Application Area</u>	<u>Number of Responses</u> <sup>1</sup>
Revenue Requirements	
General	5
Depreciation	1
Fixed Charge Computation	1
Income Tax Analysis	1
Production Costing	2
	<u>10</u>
Financial/Accounting	
General	2
Accounting	4
Cost of Capital/Rate of Return	3
	<u>9</u>
Rate Design	
General	2
Billing Analysis	3
Cost of Service	4
	<u>9</u>
Data/Information Management	
General	3
Legal Decisions Data Base	1
Rate Case Management	2
Utility Data Base	1
	<u>7</u>
Monitoring/Management	
Construction Monitoring/Management	2
Pressure Flow Analysis	1
Weather Program	1
Water System Analysis	1
Utility Comparative Analysis	1
	<u>6</u>

<sup>1</sup>Of the respondents, 16 expressed a need for water utility-related software. Individual respondents may have software needs in more than one application area, i.e., more than one response.



TABLE 2-7

STATE COMMISSION NEEDS FOR NEW OR BETTER  
SOFTWARE IN THE MULTI-UTILITY AND OTHER SECTORS

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<u>Application Area</u>	<u>Number of Responses</u>
Multi-Utility	
Complaints Tracking	1
Legal Decisions Data Base	1
Rate Base Analysis	1
Rate Case Management	2
Utility Data Base	<u>3</u>
	8
Steam	
Cost Analysis	1
Data Management	1
Forecasting	1
Safety Analysis	1
Utility Data Base	<u>1</u>
	5
Cable TV	
Cost of Service	1
Revenue Analysis	<u>1</u>
	2
Transportation	
Accounting	1
Cost of Service	<u>1</u>
	2

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Summary and Commentary

The following observations can be made on the basis of the survey results.

- (1) Regulatory software is in highest demand in the electric utility sector followed by that in the telecommunications utility sector, both currently and in the immediate future. A dramatic increase in software usage appears to be imminent in both the telecommunications and gas utility sectors.
- (2) Across all utility sectors, software packages related to rate design and revenue requirements are needed the most.



- (3) Across all utility sectors, cost of service is the most demanded application area for computer software.
- (4) Across all utility sectors, there is a substantial need for data/information management and financial/accounting programs.

In addition, a majority of survey respondents indicated that they either have or are in the process of acquiring microcomputers and would prefer to see the development of new microcomputer-based application programs and the conversion of existing mainframe programs for use on microcomputers. This suggests that the microcomputer is emerging as the preferred hardware tool for regulatory software use.

The state commissions' software needs, as presented in the preceding sections, should be viewed in the light of several interrelated factors. Two such factors are discussed here.

The availability of computer resources may indirectly influence the perception of need. Such computer resources can include internal resources, such as computer hardware installed and application programs developed at the commission, as well as external resources such as software packages available from commercial vendors. For example, suppose that a state commission selected a particular computer system for use at a particular division. The decision may have been dictated by conditions and resources available then. This particular commission may now wish to acquire only software compatible with the existing computer system because the cost of replacing it would be prohibitive. In addition, since the staff may be more experienced in using this computer, the assessment of software needs of the commission may be slanted toward those of that division. This hypothetical example reflects a case in which a completely objective assessment of needs may be difficult because of historical factors and practical constraints.

This leads to another factor that is important in the evaluation of software needs of state commissions, namely, that these needs change over time. This is because (1) regulatory policies, methods, and procedures are subject to change in individual utility sectors and (2) data processing



technology continues to make significant advances leading to vastly increased storage capabilities and processing speeds on the hardware side, and enhanced user interface and programming flexibility on the software side.

### III. Difficulties of Software Utilization

In spite of its extensive use by state commissions, the full potential of computer software as a tool for regulatory decision-making is far from being realized. Certain difficulties hinder development, dissemination, and implementation of computer software from being truly responsive to the regulatory needs of state commissions. These difficulties, as reported by survey respondents, are listed in summary form in table 3-1 and are discussed in the following sections.

TABLE 3-1

DIFFICULTIES WITH SOFTWARE UTILIZATION  
IN PUBLIC UTILITY REGULATION

<u>Difficulty</u>	<u>Number of Responses</u> <sup>1</sup>
Internal Resources	28
Acquisition	20
Applicability	12
User Interface	8
Compatibility	7
Cost	6
Reliability	5
Communication	3

<sup>1</sup>A total of 74 respondents returned the completed survey questionnaire.





### Internal Resources

By far the largest number of respondents (28) cited lack of internal resources as an obstacle to software utilization. The perceived problem consisted of lack of trained personnel, insufficient time allocation for computer jobs, and lack of computer equipment. This set of constraints hinders the efficient use and proper maintenance of regulatory software. They also make the in-house development of software particularly difficult.

### Acquisition

Due to funding and administrative constraints that may be present in a state commission, the process of acquiring computer software and useful data can be significantly hindered. Among those surveyed, 20 cited acquisition as a major problem of computer software utilization.

### Applicability

Among those surveyed, 12 cited lack of applicability as a difficulty in software utilization. A given software package is usually developed on the basis of a chosen set of assumptions and uses an appropriate analytical scheme. Also, the input and output features of the package may also be chosen according to some criterion. All of the above choices may be dictated by the particular needs of a state commission at a given time. If another state commission chooses to use the same software package, it may run into difficulties. The basic assumptions of the model may not hold equally for another state commission due to different regulatory policies, standards, and practices. Examples of such intercommission policy differences exist in the areas of cost-of-service analysis (e.g., marginal vs. embedded costs) and rate base determination (e.g., CWIP vs. AFUDC). Further, the level of analytical sophistication incorporated into the model may be inadequate to suit the needs of other commissions. Finally, the



input requirements and desired output features may also be different among state commissions. The choice of output features is especially important when these outputs are used in regulatory proceedings. Therefore, two state commissions may not be able to use the same application program even if it is based on the same regulatory principle because other features of the package do not match their needs equally.

The problem of inapplicable methodology may be avoided by carefully prescreening the related documentation before acquiring any program--and should be done at all instances. Some of the problems regarding data requirements and output features can also be avoided by the same practice. However, inadequate documentation can obstruct a clear understanding of how to operate the program and what to expect from its outputs, and thus make all attempts at prescreening ineffective.

### User Interface

One problem, perhaps most widely discussed in the software community, is the unacceptably high amounts of time, effort, and skills needed by users of a new program to learn its features, to make it operational, and to produce meaningful outputs. This problem of insufficient user interface was cited as an obstacle by 8 respondents. This problem is usually caused by hard-to-follow programming structures, lack of user options, too high a requirement for input preparation, and poor documentation. Among the 8 respondents who cited inadequate user interface as a problem, 6 identified poor documentation as a major cause. It can lead to improper understanding of the methodology, programming structure, input requirements, and output features of the program.

### Compatibility

The last decade has seen a dramatic proliferation of operating systems, programming languages, and application software, especially for microcomputers. The resulting diversity presents a rather significant



problem of program compatibility, such as those between different operating systems. There are other, more subtle forms of incompatibility, which are not discovered until after attempting to use a program. For example, so called "IBM compatible" computer hardware usually requires special interfaces before it can support IBM software. Similarly, much of the "IBM compatible" software may not run on either IBM or "IBM compatible" machines without some conversions because of minor differences in coding detail (e.g., special characters) between them and original IBM software. The new users, and in many cases even experienced users, are caught by surprise by such incompatibilities and their work may be delayed considerably by such unanticipated problems. Among those surveyed, 7 cited compatibility as a problem in software utilization.

#### Cost

Regulatory software can often be purchased from commercial vendors. Six of the respondents cited the relatively high cost of commercial software as a significant problem.

#### Reliability

One significant roadblock to software utilization in public utility regulation is the lack of validation or bench-marking of application programs. Commission staff are often surprised by unanticipated "bugs" during the operation of a program. One respondent even complained of problems during installation (copying programs, data files, etc.) of a program. Reliability was cited as a problem by 5 of the respondents.

#### Communication

Three of the respondents complained of ineffective communication between the users and suppliers of software. Two different kinds of communication problems were cited. One is the lack of follow-up assistance



from the suppliers to the users. The other is the lack of published information on available software. (The latter problem should be partly alleviated by the publication of the 1984 NARUC Catalog of Computer Programs and Data Bases.)





## APPENDIX

### Commentary on Fulfilling Software Needs

It is apparent from the results presented in section 2 that there are several areas where many state commissions have common software needs. It would, therefore, be expedient to devise a common strategy to fulfill many of these needs. One approach, of course, is to purchase the needed software, if it is already commercially available. Some other possible approaches are discussed below. It should be understood that these approaches are by no means mutually exclusive and may have to be combined in a fashion chosen according to the needs of each state commission.

#### Sharing of Existing Software

Many state commissions have either developed or acquired public domain software for various applications and have used them successfully. Other state commissions that have a need for such software can acquire them by contacting commissions that have them. This approach may be helpful in the following ways.

- (1) It saves the cost and effort of developing software packages that might already exist at other commissions.
- (2) Software acquired from another commission has been already tested and "debugged," and the time and cost involved in those efforts could be saved.
- (3) The communication between two commissions on the use of software is usually more effective because of their common perspective than that between a commission and a software developer such as a commercial vendor.

There are already three resources that can be very helpful in such sharing. The first is the 1984 NARUC Catalog of Computer Programs and Data Bases. This catalog lists software packages by application area, utility sector, and supporting hardware system. It also contains brief descriptions of the function and input-output features of each software package



and provides the name, address, and phone number of the contact person. For copies of the catalog, interested users should contact the NARUC publication office. The second is the NARUC Subcommittee on Computers. Commission staff may wish to actively communicate their needs and concerns to the subcommittee so that these are taken into account in its meetings. These meetings are held periodically to discuss problems of software utilization in state commissions and to plan future actions. The third resource is the NRRI.

#### Enhancement of Existing Software

There are software packages, either available in-house at a commission or available from other sources, that could be useful if some needed features were added. Possible features include improved user interface, increased range of options for "what if" type analyses, improved computational efficiency, added analytical capability (e.g., adding financial analysis capability to a generation planning program), and improved output features (e.g., graphic presentation). Because of the current popularity of microcomputers, another and perhaps a significantly more drastic form of enhancement, is the conversion of a mainframe program for use on a microcomputer. Such enhancements can be performed in-house by the state commission or by hired software developers. In some cases, if the intended software package is not proprietary, the NRRI may be able to perform the needed enhancements.

#### Development of New Software

In some cases, development of a new software package may be needed by a commission for any of the following reasons. One, new areas of regulatory analysis may emerge requiring completely new software. Good examples are the growing needs for telephone separations models and cogeneration models. Two, a completely new analytical method with significant advantages over the old one may develop. In this case, modification of the related software may be unable to incorporate the new method, which may



require the development of completely new software. Three, there are cases where the total effort and cost of improving a software package may be comparable to that of developing a completely new one incorporating the intended features.

NRRI intends to play a role in developing new software to meet state commission needs.

