

**ANALYSIS OF CALIFORNIA R&D FUNDING
FROM 1994-1995 TO 1996-1997**

**A REPORT PREPARED FOR
THE CALIFORNIA COUNCIL ON SCIENCE AND TECHNOLOGY**

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SCIENCE AND TECHNOLOGY**

CCST's California Report on the Environment for Science and Technology (CREST) has analyzed the state's science and technology infrastructure to determine if California has the people, capital investment and necessary state governmental policies to maintain California's leadership in the face of increasing worldwide competition. Through eight individual research projects, CREST analyzes the state's ability to create and use new technology. By facilitating a dialog with policy makers, industry leaders, and academic communities, CCST hopes to enhance economic growth and quality of life for Californians.

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1. Background and Objectives

In 1997 the State Science and Technology Institute (SSTI) gathered California data on 1994-1995 R&D expenditures.¹ In early 1999 the California Council on Science and Technology (CCST) extended this database by obtaining expenditures for the following year, 1995-1996. During the data-gathering process several pieces of information were uncovered showing more work was needed. The current study was undertaken to:

- A. Assess funding consistency and variability within and across years by capturing missing data from the first study (1994-1995) and contributing data for a third year (1996-1997). This objective was designed to create a three-year database covering 1994-1995, 1995-1996, and 1996-1997.
- B. Increase validity by simplifying the data collection instrument to ensure that respondents understand definitions of research and development and submit accurate data.
- C. Check reliability of previously acquired data by asking respondents to review and reassess earlier submissions.
- D. Identify constraints or guidelines affecting the administration of research monies in the State of California, particularly those that may affect small and medium-sized businesses.

As part of this effort other top R&D performing states were interviewed about their experiences in collecting, maintaining and using this kind of data.

2. Research Methods

2.1 California Respondents

Since this study followed directly on the heels of a change in administration, it was hoped that by moving quickly information could be obtained from those who had participated in the earlier studies. Not only were people changing, but in some cases (such as the Department of Education) reorganizations meant earlier data came from programs that might no longer exist.

Another reason for speed was the fact that most government agencies are not required to keep data older than three years-- a constraint that makes it difficult to check the accuracy of 1994-1995 data. (In fact, during the early stages of this study one respondent said their office was moving to dispose of 1995-1996 data.) The study

¹ Survey of State Research and development Expenditures: Fiscal Year 1995. Jointly authored by Battelle and State Science and Technology Institute (SSTI) and published in September 1998.

also needed to be completed quickly because of time and budget constraints.

Due to these considerations we decided to limit the population of respondents to those programs whose expenditures reached, or were likely to reach, one million dollars or more in any of the three study years. Based on that definition, twenty-six entities were selected as study participants.² The sample was identified using the list of 41 government entities identified as R&D performers in earlier studies. It was expected that the 26 member subset would represent about 99% of total R&D expenditures made by the State for the years in question, based on the data from the prior study.

2.2 The Survey Instrument

The questions were identical to earlier requests, but the questionnaire was redesigned to help ensure a common understanding among participants, consistent with research objectives (see Appendix A).

State budget and contracting offices aren't familiar with research and development categories because the State of California doesn't require tracking or reporting of R&D expenditures as such. Therefore, a principle objective of the current study was to ensure that respondents understood and knew how to apply these definitions. The questionnaire was redesigned to increase the likelihood that respondents would accurately match each R&D effort with the appropriate questionnaire definition. The result has been an enhancement to the validity and the reliability of the data.

The redesign also made it easier for people to respond quickly and easily. Most responses were timely and eventually a 100% response rate was achieved.

The Battelle instrument was reduced from six fairly dense pages to two and a half pages including an introductory letter. The purpose of the study was explained using nontechnical language and the terms and categories were defined clearly. Examples given touched on a wide range of research interests.

Experiences with earlier data collection showed that respondents struggled to identify which programs qualified as "R&D" and which did not. The new instrument focused on describing and illustrating two stages of "research" and two stages of "development." These four stages amount to a full description of all of the possible kinds of R&D of interest to the present study.

The data-gathering format itself remained the same. As in the earlier studies, we asked seven questions:

- 1) Title or description of each R&D project
- 2) Total dollar amount in actual dollars.

² Appendix B shows those selected.

- 3) Source of R&D funds
- 4) Intended use or application of results
- 5) Discipline or professional field of the person(s) doing the research
- 6) Stage that the project was in during the period(s) of reporting
- 7) Organizational affiliation of person(s) conducting the work

Each questionnaire included a blank form and an example showing how to apply the above seven categories.

One new question about the administration of research and development monies was included. Respondents were asked to describe any constraints or guidelines they follow, particularly those affecting small and medium-sized businesses.

The new questionnaire was pilot tested using two programs outside the study and one study respondent. Subsequent interviews showed that the new instrument was interpreted in the same way by all three entities; there was general agreement on what R&D means and how it could be described using questionnaire categories 1-7 above.

2.3 The Data Collection Process

In early April 1999, the California Council on Science and Technology faxed the questionnaire to each respondent. They were thanked for previous assistance and asked to contribute whatever data was missing to complete the series: 1994-1995; 1995-1996; 1996-1997.

Each respondent was asked to take time to review earlier submissions to ensure accuracy and completeness. Copies of all earlier submissions were attached for their convenience. This reassessment and confirmation contributes strongly to the validity and reliability of the data represented in this report.

After initial fax-contact, follow-up phone calls and personal visits were made when necessary. Most responses were timely and complete even though many entities were experiencing internal changes with the development of the new administration. Within eight weeks we were able to achieve a 100% response rate, yielding three years of data.

A special effort was made to capture R&D related to information technology because these projects are increasingly important to the functioning of the government and are often quite large. Two data centers were looked at in detail: Health and Welfare Agency Data Center and Stephen P. Teale Data Center.

Although the Health and Welfare Agency Data Center made R&D expenditures during the first two years of this

study, by 1996-1997 funding had been reduced to zero. The 1994-1995, 1995-1996 project that did not show up as R&D in 1996-1997 was an automated kiosk project under development for a program called "InfoCal." The project was scrapped in 1996. All other projects conducted by the Data Center have been funded, not with Data Center money, but by the various governmental entities contracting for their services. This means that these dollars show up elsewhere.

The Stephen P. Teale Data Center located in the Business, Transportation and Housing Agency, offers CPU capacity and storage to approximately 250 government-customer entities. They have never committed R&D monies in the performance of this service. Information technology projects such as child support, welfare reform (SAWS), child welfare services, and various transactional systems (for intake, caseload management, payments, etc.) are conducted by the contracting agencies themselves. All applications belong strictly to the (customer) government entity, not the Teale Data Center.

2.4 Data Processing

Data were entered into an Excel format. This process was carefully designed to create a record for each entity so changes can be easily made as the need arises. The value of this protocol was demonstrated when, during the course of this study, two respondents made adjustments to earlier submissions and relevant data points were identified and quickly modified.

This data entry procedure can prove helpful in the future by allowing the tracking of particular programs and by serving as a resource for future researchers. This is not possible with the Battelle data.

3. Description of Data

This data base describes basic and applied research and work on the development and commercialization of a wide range of programs. Subjects include governmental, social, economic, and health issues in addition to economic development, science and technology. The questionnaire key (fourth page of Appendix A) describes 12 functions or uses for the research described in this database.

As mentioned earlier, each respondent was given an opportunity to review earlier submissions and asked to confirm their accuracy. As a result, the 1994-1995 R&D estimate was increased by \$21.6 million and the 1995-1996 database was decreased by \$5.7 million. Departments adjusting their data included:

- Health Services, Chronic Disease and Injury Control, Cancer Surveillance Section, adjusted 1994-1995

Table 1. State R&D Expenditures

Fiscal Year	CA Research Dollars	CA State Budget	% of R&D to Budget
1994-1995	\$302,815,032	\$86,109,800,000	0.35%
1995-1996	\$313,407,538	\$90,210,000,000	0.35%
1996-1997	\$315,927,434	\$95,908,500,000	0.33%

data downward by \$3.77 million and 1995-1996 data were reduced by \$4.07 million. Efforts that had been understood as R&D were subsequently identified as routine surveillance measures.

– Department of Education contributed data for 1994-1995--in the amount of \$25.33 million-- for the first time. They adjusted 1995-1996 dollars downward by \$1.64 million.

Simple observation of Appendix B shows that overall data, unadjusted for inflation, are quite similar for each of the three years. Growth is only about \$13 million.

Remembering that these data represent a part of the whole (but a very large part), and that they are not adjusted for inflation. The totals are shown in Table 1.

Table 1 also shows R&D spending (including federal funds) actually lost ground when compared with changes in the size of the State budget.

The knowledge that State R&D expenditures did not grow with the State budget across the three years of this study is a major finding suggesting a need for further analysis: Why is the trend so flat? How does this constancy compare with other research indicators? Can a similar trend be observed in expenditures of other states or nations?

Although overall change was small, a closer look shows which entities changed and in what direction. Rounding to the nearest million and comparing differences between Year 1 and Year 3 with difference between Year 2 and Year 3, each entity fits into one of five categories:

- ◆ Up both periods: budgets were increased during both periods.
- ◆ Up one period & remained the same one period: there was a budget increase during one of the time segments.
- ◆ Remained the same for both periods: budgets remained the same.
- ◆ Down one period & remained the same one period: there was a budget decrease during one of the time segments.
- ◆ Down both periods: there was a budget decrease during both periods.

Using this schema, here are what the data look like for R&D budgets:

UP BOTH PERIODS

CalTrans, New Technology (1)³
 Department of Education (2)
 University of California (2)
 Department of Conservation, Division of Mines and Geology (3)
 Trade and Commerce (5)
 Department of Health Services, AIDS (4)
 Department of Conservation, Technology Assessment Planning & Development (3)
 Department of The Youth Authority (4)

DOWN ONE PERIOD & REMAINED THE SAME ONE PERIOD

EPA, Air Resources Board (3)
 Department of Food and Agriculture (3)
 Department of Mental Health (4)
 Department of Health Services, Chronic and Injury (4)

REMAINED THE SAME BOTH PERIODS

California Research Bureau (2)
 State Universities (2)
 EPA, Waste Management (3)
 CalTrans, Capital Outlay (1)
 Department of Health Services, Communicable Diseases (4)

UP ONE PERIOD & REMAINED THE SAME ONE PERIOD

Energy Commission, R&D Office Programs (3)
 Department of Social Services (4)
 Office of Emergency Services, Planning & Technical Assistance (4)
 Department of Fish and Game (3)
 Department of Boating & Waterways, Facilities (3)

DOWN BOTH PERIODS

CalTrans, Research Program (1)
 Health and Human Services Data Center (4)
 Energy Commission, Energy Efficiency Programs (3)
 Energy Commission, Transportation Technology and Fuels (3)

³ Numbers in parentheses show policy area: 1 = transportation; 2 = education including higher education; 3 = energy, environment and natural resources; 4 = health, social services and prisons; 5 = economic development.

If we aggregate the first two categories showing *any increase* as an *overall increase*, and we aggregate the last two categories showing *any decrease* as an *overall decrease*, we create three categories: Increased, Stayed the Same, Decreased. Collapsing into five major policy areas (as shown in footnote 3), the number who increased, stayed the same, or decreased R&D expenditures are shown in Table 2. Assigning dollars to those entities provides the data in Table 3.

The sum of the net results from Table 3 is equal to the difference between fiscal year one and fiscal year three, which is equal to \$13 million, as previously stated.

In short, R&D funding for transportation, education/higher education, and economic development was up, while R&D funding for energy, environment, natural resources was down. Health, social services and prisons remained the same. This pattern reveals legislative and administrative research policy priorities – intended or unintended -- for these years. The question may be asked: Does our competitive position in relation to other states and nations require other priorities?

Tables 4 and 5 show expenditures by stage of research. They show that basic and applied research increased over the three-year period while development declined and commercialization moved up and down.

Appendix C provides tables with complete data sets for all three years. These data are arrayed by: source of R&D funds; intended use or application of results; discipline or professional field of the persons doing the research; stage that the project was in during the periods of interest; and organizational affiliation of persons conducting the work. Comparisons are also illustrated across years: year one with year two; year two with year three; year one with year three.

4. Administration of R&D Funds

Each respondent was asked whether there were any policy guidelines directing the administration of these funds. The question was worded in this way:

Please tell us how you administer research monies and whether there are any constraints or guidelines you follow. We are particularly interested in those that may affect small and medium-sized businesses.

Neither the California Code nor the 29 Statutory Codes governing state procurement have language specific to R&D expenditures. Only one government entity, The Office of Strategic Technology of the Trade and Commerce Agency (OST), has a program tying R&D expenditures directly to small and medium sized businesses.

Established in 1993 as the “Defense Conversion Matching Grant Program,” this OST administered program is currently known as the “California Technology

Investment Partnership Program.” It was designed to fill the gap between prototype and production for businesses needing assistance in the range of \$.05 to \$2 million. Although California-based National Science Foundation Centers and others also received some grants during these years, it is estimated that 85% of these dollars went to small and medium-sized businesses. The intent of this program was to accelerate commercialization and production and to promote high wage jobs. State expenditures (of about \$5-6 million per year⁴) generated federal and grantee money in the following amounts: 1994-1995 \$65 million; 1995-1996 \$55.2 million; 1996-1997 \$117.4 million.

Since there is no statewide, overarching requirement to set aside a certain level of research-related funding for small and medium sized business, R&D dollars are administered in the same way as other, non-R&D activities. This means entities select bids based on lowest cost with no regard for size of bidder unless a small business bid comes within 5% of the lowest bid. In this case the Small Business Program,⁵ started in the 1970's, gives certified small businesses a preference (unless the cost of this preference exceeds \$50,000). It should be noted that this program is not a set-aside and it doesn't actually function as a constraint on contracting agencies.

Here are comments made by selected respondents:

CalTrans: CalTrans conducts applied research within the guidelines of the Federal Highway Administration Code of Federal Regulations. The vast majority of research funding goes to research centers that have been established on University of California campuses by the Office of New Technology. These centers are called Partners for Advanced Transit and Highways (PATH), and Advanced Highway Maintenance and Construction Technology (AHMCT). They provide some flow-through funding to private industry when specialized research is subcontracted out. Some funding also goes directly to small, private sector companies through AHMCT projects funded by CalTrans Office of Research. In the future CalTrans plans to fund more private sector companies in an effort to commercialize the maintenance automation equipment that is currently being developed by the AHMCT Program.

⁴ Matching grant contributions are roughly divided in this way: State funding up to 1/4, Federal funding up to 1/2 and company funding of at least 1/4. The ceiling on State contributions was \$200,000 to \$250,000 for a single grant.

⁵ Section 14835 of the California Government Code - Regulation Title 2, California Code of Regulations, Section 1896.

Table 2. Number of Government Entities whose Budgets Increased, Stayed the Same, or Decreased

Funding Level	(1) Transportation	(2) Education/ Higher Ed.	(3) Energy, Environment, Natural Resources	(4) Health, Social Services, Prisons	(5) Economic Development
Increased	2	2	2	1	1
Stayed the Same	0	2	2	3	0
Decreased	1	0	6	4	0

Table 3. Dollars Associated with Government Entities whose Budgets Increased, Stayed the Same, or Decreased

Funding Level	(1) Transportation	(2) Education/ Higher Ed.	(3) Energy, Environment, Natural Resources	(4) Health, Social Services, Prisons	(5) Economic Development
Increased	\$8,480,085	\$21,566,200	\$4,430,593	\$2,800,438	\$9,075,004
Stayed the Same	0	0	(\$626,323)	(\$577,882)	0
Decreased	(\$2,601,269)	0	(\$25,945,205)	(\$3,489,239)	0
Net Result	\$5,878,816	\$21,566,200	(\$22,140,935)	(\$1,266,683)	\$9,075,004

Table 4. Comparison Between Stages of R&D by Fiscal Year

Stage of Research	FY 1994-1995	FY 1995-1996	FY 1996-1997
Basic	\$147,663,643	\$152,899,549	\$161,651,924
Applied	\$83,683,273	\$87,375,743	\$96,651,943
Development	\$48,429,438	\$27,728,991	\$28,028,458
Commercialization	\$23,038,673	\$45,403,255	\$29,595,111
Total	\$302,815,027	\$313,407,538	\$315,927,436

Table 5. Stages of R&D Relative to Total R&D Dollars

Stage of Research	FY 1994-1995	FY 1995-1996	FY 1996-1997
Basic	49%	49%	51%
Applied	28%	28%	31%
Development	16%	9%	9%
Commercialization	8%	14%	9%
Total	100%	100%	100%

Department of Mental Health: All R&D dollars are used within the department or “passed-through” to a county. Normal State and Federal guidelines are followed.

Department of Conservation, Division of Mines and Geology: R&D monies are administered in accordance with standard state guidelines and constraints (State Administrative Manual, State Contracting Manual). Our research is primarily scientific/engineering and does not affect small and medium sized businesses.

Youth and Adult Correctional Agency: Most funding comes from the General Fund and may be supplemented by federal and foundation grants. Most work is in-house research. They also do a lot of interagency agreements like contracting with university researchers. They rarely put out an RFP because, they say, state contracting requirements are too cumbersome, but when they do they quote the 5% small business preference.

Department of Education: Contract awards are decided by either the State Board of Education or the elected State Superintendent. Contractors are subject to requirements of the Government Code, Public Contract Code and the State Contracting Manual. Federally funded contracts are regulated by the Code of Federal Regulations and Office of Management and Budget circulars.

University of California: The Industry University Cooperative Research program was established in 1996 to foster collaborative research in targeted fields critical to California’s economy. This is a competitive matching grant program with the objective of partnering University researchers and students with promising young companies as well as established companies. To date (1999) two-thirds of participating firms are small businesses and more than one-third have fifty or fewer employees.

California State University: The block of funds reported here (\$2.5 million) are allocated to CSU campuses in proportion to reported fall FTEF. Each campus determines the way these funds will be allocated using guidelines which focus on student learning and California’s social, cultural and economic well-being. Strictly speaking, these funds are used for scholarly and creative activity as well as research (they are impossible to separate).

Most respondents simply said no, they have no guidelines or constraints specific to the administration of R&D funds.

5. Research from Other States

There were several methodological difficulties to overcome in collecting valid and reliable R&D data for the State of California. This experience led us to

question whether other states have, or have had, similar difficulties.

To answer this question, telephone interviews were conducted with five of the other top R&D performing states (as reported in the Battelle study⁶): Texas, Florida, Pennsylvania, Georgia, and Illinois.

Interviews focused on research methods used in the Battelle study:

- ◆ How was the 1997 data collected?
- ◆ What was and was not included? (What about “plant,” or capital outlay data?)
- ◆ Was the researcher available to guide respondents and answer questions about format?

Two questions asked about usage:

- ◆ How did you use the Battelle information with respect to policy?
- ◆ Has it had any effect on policy?

The last questions were about current understanding:

- ◆ Is R&D data currently being collected? How?
- ◆ What is known about how R&D expenditures being made today?

All interviews were conducted during the summer of 1999—two years after the original (1997) data collection effort. Some of those contacted served as respondents for the original Battelle study. Some run their state’s science and technology programs.

The following is a summary of key points. More detailed descriptions of conversations are in Appendix D. The author of specific statements is not identified but a list of respondents can be obtained by contacting us at www.timestructures.com.

5.1 Research Methods

Comments suggest that the data collected was neither valid nor reliable for at least three reasons: (1) the language and format of the questionnaire was difficult to understand, (2) it was hard to ensure that every who should respond did so, and (3) some states can provide “plant” (capital expenditure) data relatively easily while others cannot provide it at all.

- ◆ “There was a disconnect between the questions and how agency budgets were formulated. My guess is that people either estimated or skipped answers” (Texas).

⁶ Ranking of top states by total expenditures are: Texas, California, New York, Florida, Pennsylvania, Georgia, Ohio, Illinois, North Carolina. p. 4 Survey of State Research and development Expenditures: Fiscal Year 1995.

- ◆ “Pulling together the data was difficult especially in the format Battelle wanted it. The format and forms were difficult” (Georgia).
- ◆ “I...remember the collection process was extremely difficult, particularly working with so many state agencies” (Illinois).
- ◆ “...including our universities would bias the results enormously...I haven’t seen the report but ... must be inflated with the academic” (Florida).
- ◆ Capital expenditures were thought to have been omitted from the Illinois submission.
- ◆ “We did include plant expenditures. Plant expenditures are part of the budget at the state level so to break it out was doable,” (Georgia). (Georgia included at least one building in their plant data.)

Many expressed surprise at the rankings

- ◆ “We were surprised we came out as high as we did...we didn’t think we would come out so high” (Georgia).
- ◆ “I would take [the finding that Texas was ranked #1] with a grain of salt. There were no strict parameters on what is an apple and what is an orange. Some may have put in the salaries of all their employees” (Texas).

5.2 Usage

Texas and Pennsylvania were unaware that the final report had been published. Ironically, Pennsylvania, Illinois, and Georgia volunteered that they thought the best way to get information on state R&D expenditures was through either Battelle or the National Science Foundation. (We are at a loss as to how to reconcile this with statements from those interviewed expressing skepticism about the validity of the Battelle study.)

Georgia is one state that is using their high ranking to improve their competitive advantage and attract business:

- ◆ “The publicity was great!” (Georgia) (They have used their ranking to attract at least one California communications technology firm.)

Apparently the study has had no direct effect on public policy for any of those interviewed.

5.3 Current Knowledge

None of the states contacted have made any attempt to assess total R&D expenditures since the Battelle study:

- ◆ Overall R&D money is unknown for the State of Pennsylvania.
- ◆ “We need statewide R&D knowledge. We need to know what others are doing. We need systematized data collection from all the states” (Georgia).

States contacted do, however, track R&D expenditures specifically associated with economic development. The question may be asked, what is and what is not included in the category of economic development? Does it include education? Does it include environmental and workforce investments? Interpretation of economic investment needs may be different for every state.

Overall, the foregoing data begin to paint a picture of California State investment in R&D. It may be asked whether posturing for a competitive future requires a different strategy than the one that obtained during the years of this study. Is it critical for California to know the current resource pattern of the State relative to its competition? In a rapidly changing global economy, does California need to position itself for the future by strategically investing R&D funds in critical priorities? Or can it count on continued success from private and federal investment as referred to by the Georgia interviewee who said of California: “It just happened there.”

6. Appendix A - The Questionnaire

5 April 1999

Address

Dear:

Thank you again for helping us identify State R&D expenditures for 1995-1996. Unfortunately, that study has shown us that in order to understand how California supports research and development, we need to have data extending over a three-year period: 1994-1995, 1995-1996 and 1996-1997. You have already submitted data for 1994-1995 and 1995-1996, (see attached) but we need data from you for the last year (1996-1997).

We are identifying all monies spent—or obligated—during this time period regardless of whether the work was done by government employees or contracting agencies. This includes all dollars that the State has discretion over (like “pass through” funds). The cost of things like photographs, tapes, books, and so forth—when used primarily for research and development rather than ongoing operations—should also be included.⁷

We are asking that you review your earlier submissions to make sure they are complete, and that you calculate the R&D expenditures for the missing year (1996-1997). Please fax the final forms to the Sacramento Office of the California Council on Science and Technology (Fax 916-492-0999; Voice 916-492-0996). We apologetically confess that our deadline is April 15th and we will be very grateful if you can accommodate us.

The questionnaire is a one-page form. We have enclosed a sheet showing four examples and a key. The questionnaire asks for:

- ◇ The title or description of each R&D project.
- ◇ The total dollar amount in actual dollars (3,000,000 rather than 3M).
- ◇ The source of the R&D funds (8 sources, A-H, are identified on the key).
- ◇ The intended use of the results or who benefits (the key gives 13 choices, A-M).
- ◇ Which of 9 fields of endeavor (A-I) were employed to accomplish the work.
- ◇ The stage that the project was in during this period (see below).
- ◇ Which of 7 choices (A-G on the key) performed the work (R&D performer).

⁷ Omit capital expenditures such as equipment, buildings and other facilities.

STAGE OF R&D

The following description of R&D stages (question 6) may help you understand what we are looking for.

There are two stages of research:

Basic research (A) is a systematic, hypothesis-testing study where the focus is on fuller understanding with no specific application in mind. This could apply to some of the following efforts:

- Pesticide evaluation
- Epidemiology studies
- Vital statistics special studies
- Economic research (but not standard data series collection)
- Health care and disease data, hospital studies, mental health, etc.

Applied research (B) is about discovering ways to solve specific problems. Here are some examples:

- Demonstrations to prove that a method or technology really works.
- Adaptations of new technology, making it applicable to specific needs.
- Economic studies such as utilization/expenditure data.
- The collection of statistical data as part of a research effort.
- Assessments, program evaluations, program planning, and implementation activities, when part of a systematic research effort.
- Applied research techniques include surveys, secondary data analysis, library research, etc.

As a rule of thumb, “research” is any systematic study with an evaluative component. Whether it’s basic or applied depends on intent.

We are identifying two stages of development:

Development (C) is the systematic use of knowledge gained from research—such as materials, devices, systems, methods, designs, prototypes, processes, etc. Consider:

- Pilot projects for testing new methods for organizing or delivering services.
- Software pilot projects.
- Demonstrations to show off new technologies or methods.
- Adopting and putting to use new technologies.
- Collecting statistical data as part of a development program.

Commercialization (D) is the application of this knowledge in private and/or public markets. It’s the reduction to practice of a technical idea. In addition to refining and testing a product or service, it includes everything involved in its initial introduction into a commercial market (such as defining markets, promoting and demonstrating).

Market analyses, surveys, and other efforts which help apply or “commercialize” research knowledge should be included here.

ONE LAST QUESTION

We are also interested in learning how research and development monies are administered by State entities. Please tell us how you administer research monies and whether there are any constraints or guidelines you follow. We are particularly interested in those that may affect small and medium-sized businesses.

If you have any questions please contact Dr. Victoria Koehler Jones at (916) 564-8683 and she will be glad to do whatever she can to assist you. Again, please remember our deadline is April 15th.

Thank you sincerely,

Susan Hackwood, Executive Director
California Council on Science and Technology

Victoria Koehler Jones, Ph.D.

Enclosures

Project Title/Description (1)	Dollar Amount (2)	Source of R&D Funds (3)	Function or Use of R&D (4)	Field of Science or Engineering (5)	State of R&D (6)	R&D Performer (7)

AGENCY NAME:	YOUR NAME:
DIVISION:	PHONE:
ADDRESS:	FAX:
CITY/STATE/SIP:	E-MAIL:

Project Title/Description (1)	Dollar Amount (2)	Source of R&D Funds (3)	Function or Use of R&D (4)	Field of Science or Engineering (5)	State of R&D (6)	R&D Performer (7)
EXAMPLE #1:						
State Renewable Energy Technology Dev. Center	300,000	A	G	E	C	D
State Renewable Energy Technology Dev. Center	450,000	C	G	E	C	D
EXAMPLE #2:						
Student Research Awards in Microbiology	47,500	E	1/2 A 1/2 B	1/2 F 1/2 H	A	E
EXAMPLE #3:						
Recycled Tire Content in Paving Material	864,345	F	G	L	B	C
EXAMPLE #4:						
Research Grant #95-AGR-49385	521,029	A	K	B	A	B

(3) Source of R&D Funds	(4) Function or Use of R&D	(5) Field of Science or Engineering	(6) State of R&D	(7) R&D Performer
A. Federal Sources	A. Community Development, Housing & Public Services	A. Biological Sciences	A. Basic Research	A. Within State Government
B. Industry	B. Crime Prevention & Control	B. Medical Sciences	B. Applied Research	B. Local or County Government
C. Direct State Appropriations	C. Economic Development	C. Psychology	C. Development	C. Industry or Business
D. State-issued Bonds	D. Education	D. Physical Sciences	D. Commercialization	D. Academic Institution
E. Lottery Proceeds	E. Energy	E. Environmental Sciences		E. Private Individual
F. Restricted or Special Tax Funds	F. Environment	F. Mathematics & Computer Sciences		F. Non-profit Organization
G. Other State Sources	G. Food, Fiber & Other Agricultural Products	G. Engineering		G. Other
H. Other Non-state Sources	H. Health	H. Social Sciences		
	I. Income Security & Social Services	I. Other		
	J. Natural Resources			
	K. Science & Technology Base			
	L. Transportation			
	M. Other			

7. Appendix B-Data Summary California R&D

Table 6. Non-plant Expenditures > 1 Million (June 4, 1999)

Agency and Department Division or Office	R & D Reported 1994-1995	R & D Reported 1995-1996	R & D Reported 1996-1997
Business, Transportation & Housing - CALTRANS Capital Outlay	5,000,000	Zero	5,024,599
Business, Transportation & Housing - CALTRANS New Technology Program	11,388,464	14,017,824	19,843,950
Business, Transportation & Housing - CALTRANS Research Program	8,192,389	7,112,728	5,591,120
California Research Bureau	3,000,000	3,000,000	3,000,000
Department of Education	25,329,800	26,363,800	28,222,000
University of California Board of Regents	160,413,000	168,367,000	179,087,000
Trustees of State Universities	2,500,000	2,500,000	2,500,000
EPA -Air Resources Board	6,970,000	7,415,544	6,658,058
EPA - California Integrated Waste Management Board	1,740,499	1,626,669	1,542,204
Department of Food and Agriculture	3,194,224	1,820,562	2,142,134
Health and Human Services Agency - Dept. of Social Services	2,106,932	2,124,000	2,146,950
Health and Human Services Agency - Dept. of Mental Health	1,218,000	Zero	414,000
Health and Human Services Agency - Data Center	1,344,000	661,900	Zero
Health and Human Services Agency - Dept. Health Services: Chronic & Injury	7,073,790	7,708,417	6,901,652
Health and Human Services Agency - Dept. Health Services: Communicable	1,064,779	3,327,000	3,865,217
Health and Human Services Agency - Dept. Health Services: AIDS	2,880,000	2,308,000	2,241,000
Office of Emergency Services -Planning & Technical Assistance Branch	1,258,165	552,710	89,064
Resources Agency Dept. Fish and Game	5,048,665	3,599,564	3,899,671

Table 6 (Continued). Non-plant Expenditures > 1 Million (June 4, 1999)

Agency and Department Division or Office	R & D Reported 1994-1995	R & D Reported 1995-1996	R & D Reported 1996-1997
Resources Agency Dept. Boating & Waterways: Facilities	1,020,500	1,489,750	755,000
Resources Agency Dept. Conservation: Technology Assessment Planning & Development	1,239,021	742,376	810,993
Resources Agency Dept. Conservation: Division of Mines & Geology	5,197,093	11,048,350	8,933,122
Resources Agency Energy Commission: R&D Office Programs	6,548,436	6,878,215	7,243,000
Resources Agency Energy Commission: Energy Efficiency Programs	9,024,000	6,212,000	4,078,000
Resources Agency Energy Commission: Transportation Technology & Fuels	24,112,679	26,253,228	5,892,000
Secy. of Youth and Adult Correctional Agency -Dept. of The Youth Authority	1,225,600	1,236,600	1,246,700
Trade and Commerce Agency	4,724,996	7,040,000	13,800,000

Notes:

Other California State government entities that have performed R&D, but were not included in this study, include:

Business, Transportation & Housing: Department of Motor Vehicles; Highway Patrol.

Environmental Protection Agency: State Water Resources Control Board; Department of Toxic Substances Control.

Health & Human Services Agency: Dept. of Alcohol & Drug Programs; Office of Statewide Health Planning & Development; Employment Development Department; Dept. of Developmental Services.

Resources Agency: Dept. of Forestry & Fire, Resource Management Program; Dept. of Forestry & Fire, Fire Protection; Bay Conservation & Development Commission; Dept. of Boating & Waterways, Operations; Office of Mine Reclamation; Energy Commission, Facilities Siting & Environmental Protection; Energy Commission, Energy Information & Analysis Programs.

8. Appendix C-Complete Data Set

Table 7. Source of Funds – Comparison between Year One and Year Two

DIFFERENCE FROM 1994-1995 TO 1995-1996 NON-PLANT R&D EXPENDITURES BY SOURCE	Federal Sources (A)	Industry (B)	State Sources					Other Non-state Sources (H)	Total (I)	% of Total
			Direct Appropriation (C)	Bonds (D)	Lottery Proceeds (E)	Restricted Funds (F)	Other (G)			
Research Function or Use										
1. Total	3,731,737.50	1,474,738.00	(25,856,295.00)	1,662,068.00	0.00	32,455,953.00	(22,641,949.00)	(1,418,761.50)	(10,592,509.00)	1
1a. Community Development, Housing & Public Services	225,520.50	0.00	(40,090.00)	0.00	0.00	0.00	(717,722.50)	(693,150.00)	(1,225,442.00)	11.57%
1b. Crime Prevention and Control	359,000.00	0.00	(3,000.00)	0.00	0.00	0.00	0.00	0.00	356,000.00	-3.36%
1c. Economic Development	(36,885.50)	0.00	(5,693,572.00)	0.00	0.00	6,789,036.00	(3,874,193.50)	(815,173.00)	(3,630,788.00)	34.28%
1d. Education	(272,400.00)	0.00	(535,448.00)	(4,600.00)	0.00	2,499,010.00	(2,843,545.50)	(20,600.00)	(1,177,583.50)	11.12%
1e. Energy	(21,333.00)	0.00	(267,838.00)	0.00	0.00	3,339,203.50	(3,323,657.50)	695,547.00	421,922.00	-3.98%
1f. Environment	732,897.50	0.00	(209,947.00)	0.00	0.00	2,814,773.50	(2,017,764.00)	776,223.50	2,096,183.50	-19.79%
1g. Food, Fiber, Other Agricultural Products	0.00	0.00	17,415.00	0.00	0.00	665,077.00	11,778.00	(126,000.00)	568,270.00	-5.36%
1h. Health	(2,376,247.00)	1,474,738.00	(2,585,038.50)	0.00	0.00	3,385,766.50	(3,936,048.50)	(355,363.00)	(4,392,192.50)	41.47%
1i. Income Security & Social Services	(8,534.00)	0.00	(8,534.00)	0.00	0.00	0.00	0.00	0.00	(17,068.00)	0.16%
1j. Natural Resources	(47,868.50)	0.00	(44,863.00)	0.00	0.00	294,993.50	4,809.50	0.00	207,071.50	-1.95%
1k. Science & Technology Base	152,604.50	0.00	(8,045,571.50)	0.00	0.00	2,697,788.00	(3,436,521.50)	(639,001.00)	(9,270,701.50)	87.52%
1l. Transportation	3,631,983.00	0.00	(8,713,833.00)	1,666,668.00	0.00	9,867,805.00	(3,191,183.50)	(241,245.00)	3,020,194.50	-28.51%
1m. Other functional areas, not elsewhere classified	1,393,000.00	0.00	274,025.00	0.00	0.00	102,500.00	682,100.00	0.00	2,451,625.00	-23.14%
Field of Science or Engineering										
2. Total	3,731,737.50	1,474,738.00	(25,856,295.00)	1,662,068.00	0.00	32,455,952.00	(22,641,950.00)	(1,418,761.50)	(10,592,511.00)	1
2a. Biological Sciences	344,280.75	0.00	(1,981,084.52)	0.00	0.00	709,929.69	1,093,890.00	(307,224.25)	(140,208.33)	1.32%
2b. Medical Sciences	(1,715,870.00)	1,474,738.00	(347,519.32)	0.00	0.00	78,646.00	0.00	(181,249.00)	(691,254.32)	6.53%
2c. Psychology	1,218,000.00	0.00	147,819.98	0.00	0.00	143.22	0.00	0.00	1,365,963.20	-12.90%
2d. Physical Sciences	67,467.00	0.00	(2,971,651.72)	0.00	0.00	(428,250.00)	(1,012,309.50)	(1,153,500.00)	(5,498,244.22)	51.91%
2e. Environmental Sciences	496,520.75	0.00	(337,944.22)	0.00	0.00	12,482,319.00	(10,637,372.50)	(296,547.25)	1,706,975.78	-16.11%
2f. Mathematics & Computer Science	440,818.00	0.00	(1,236,144.72)	0.00	0.00	1,437,540.00	882,017.00	477,417.00	2,001,647.28	-18.90%
2g. Engineering	3,129,855.00	0.00	(15,702,394.22)	1,666,668.00	0.00	18,856,981.00	(12,902,884.00)	(299,474.00)	(5,251,248.22)	49.58%
2h. Social Sciences	(177,734.00)	0.00	(369,878.02)	(2,300.00)	0.00	260,559.09	(76,000.00)	(125,300.00)	(490,652.93)	4.63%
2i. Other Sciences, not elsewhere classified:	(71,600.00)	0.00	(3,057,498.22)	(2,300.00)	0.00	(941,916.00)	10,709.00	467,116.00	(3,595,489.22)	33.94%
Stage of R&D										
3. Total	3,731,737.50	1,474,738.00	(25,856,295.00)	1,662,068.00	0.00	32,455,952.00	(22,641,949.00)	(1,418,761.50)	(10,592,510.00)	1
3a. Basic Research	1,787,918.00	1,184,500.00	(9,465,971.00)	555,556.00	0.00	533,949.00	170,405.00	(2,262.50)	(5,235,905.50)	49.43%
3b. Applied Research	374,070.50	290,238.00	(2,748,869.50)	553,256.00	0.00	2,615,384.00	(1,250,266.00)	(3,526,283.00)	(3,692,470.00)	34.86%
3c. Development	1,704,352.00	0.00	(3,240,380.00)	553,256.00	0.00	22,542,800.00	(855,530.50)	(4,050.00)	20,700,447.50	-195.43%
3d. Commercialization	(134,603.00)	0.00	(10,401,074.50)	0.00	0.00	6,763,819.00	(20,706,557.50)	2,113,834.00	(22,364,582.00)	211.14%
R&D Performer										
4. Total	3,731,737.50	1,474,738.00	(25,856,295.00)	1,662,068.00	0.00	32,455,951.00	(22,641,948.50)	(1,418,761.50)	(10,592,510.50)	1
4a. Within State Government	1,431,342.49	299,000.00	(4,075,573.82)	(766.66)	0.00	8,438,523.00	(6,915,818.24)	(2,771,531.27)	(3,594,824.49)	33.94%
4b. Local or County Government	(329,560.51)	275,000.00	(3,805,824.82)	(766.66)	0.00	7,460,559.00	(7,644,135.24)	528,983.73	(3,515,744.49)	33.19%
4c. Industry or Business	90,997.49	181,000.00	(10,124,500.82)	(766.66)	0.00	12,776,666.00	(7,468,213.24)	603,982.73	(3,940,834.49)	37.20%
4d. Academic Institution	3,634,689.99	1,316,000.00	(7,079,989.82)	1,665,901.34	0.00	2,717,046.00	(130,224.74)	303,002.73	2,426,425.51	-22.91%
4e. Private Individual	(228,820.48)	0.00	(174,577.37)	(766.69)	0.00	(595,231.01)	(652,975.01)	(120,695.97)	(1,773,066.52)	16.74%
4f. Non-profit Organization	(747,597.48)	(596,262.00)	(253,367.37)	(766.69)	0.00	951,756.99	(730,350.01)	51,566.53	(1,325,020.02)	12.51%
4g. Other Performer:	(119,314.00)	0.00	(342,461.00)	0.00	0.00	706,631.00	899,768.00	(14,070.00)	1,130,554.00	-10.67%

Table 8. Source of Funds – Breakdown of State vs. Other Sources – Comparison between Year One and Year Two

DIFFERENCE FROM 1994-1995 TO 1995-1996 NON-PLANT R&D EXPENDITURES BY SOURCE	All State Sources	% of Total	All Other Sources	% of Total	Total
Research Function or Use					
1. Total	(14,380,223.00)	1	3,787,714.00	1	(10,592,509.00)
1a. Community Development, Housing & Public Services	(757,812.50)	5.27%	(467,629.50)	-12.35%	(1,225,442.00)
1b. Crime Prevention and Control	(3,000.00)	0.02%	359,000.00	9.48%	356,000.00
1c. Economic Development	(2,778,729.50)	19.32%	(852,058.50)	-22.50%	(3,630,788.00)
1d. Education	(884,583.50)	6.15%	(293,000.00)	-7.74%	(1,177,583.50)
1e. Energy	(252,292.00)	1.75%	674,214.00	17.80%	421,922.00
1f. Environment	587,062.50	-4.08%	1,509,121.00	39.84%	2,096,183.50
1g. Food, Fiber, Other Agricultural Products	694,270.00	-4.83%	(126,000.00)	-3.33%	568,270.00
1h. Health	(3,135,320.50)	21.80%	(1,256,872.00)	-33.18%	(4,392,192.50)
1i. Income Security & Social Services	(8,534.00)	0.06%	(8,534.00)	-0.23%	(17,068.00)
1j. Natural Resources	254,940.00	-1.77%	(47,868.50)	-1.26%	207,071.50
1k. Science & Technology Base	(8,784,305.00)	61.09%	(486,396.50)	-12.84%	(9,270,701.50)
1l. Transportation	(370,543.50)	2.58%	3,390,738.00	89.52%	3,020,194.50
1m. Other functional areas, not elsewhere classified	1,058,625.00	-7.36%	1,393,000.00	36.78%	2,451,625.00
Field of Science or Engineering					
2. Total	(14,380,225.00)	1	3,787,714.00	1	(10,592,511.00)
2a. Biological Sciences	(177,264.83)	1.23%	37,056.50	0.98%	(140,208.33)
2b. Medical Sciences	(268,873.32)	1.87%	(422,381.00)	-11.15%	(691,254.32)
2c. Psychology	147,963.20	-1.03%	1,218,000.00	32.16%	1,365,963.20
2d. Physical Sciences	(4,412,211.22)	30.68%	(1,086,033.00)	-28.67%	(5,498,244.22)
2e. Environmental Sciences	1,507,002.28	-10.48%	199,973.50	5.28%	1,706,975.78
2f. Mathematics & Computer Science	1,083,412.28	-7.53%	918,235.00	24.24%	2,001,647.28
2g. Engineering	(8,081,629.22)	56.20%	2,830,381.00	74.73%	(5,251,248.22)
2h. Social Sciences	(187,618.93)	1.30%	(303,034.00)	-8.00%	(490,652.93)
2i. Other Sciences, not elsewhere classified:	(3,991,005.22)	27.75%	395,516.00	10.44%	(3,595,489.22)
Stage of R&D					
3. Total	(14,380,224.00)	1	3,787,714.00	1	(10,592,510.00)
3a. Basic Research	(8,206,061.00)	57.06%	2,970,155.50	78.42%	(5,235,905.50)
3b. Applied Research	(830,495.50)	5.78%	(2,861,974.50)	-75.56%	(3,692,470.00)
3c. Development	19,000,145.50	-132.13%	1,700,302.00	44.89%	20,700,447.50
3d. Commercialization	(24,343,813.00)	169.29%	1,979,231.00	52.25%	(22,364,582.00)
R&D Performer					
4. Total	(14,380,224.50)	1	3,787,714.00	1	(10,592,510.50)
4a. Within State Government	(2,553,635.71)	17.76%	(1,041,188.78)	-27.49%	(3,594,824.49)
4b. Local or County Government	(3,990,167.71)	27.75%	474,423.22	12.53%	(3,515,744.49)
4c. Industry or Business	(4,816,814.71)	33.50%	875,980.22	23.13%	(3,940,834.49)
4d. Academic Institution	(2,827,267.21)	19.66%	5,253,692.72	138.70%	2,426,425.51
4e. Private Individual	(1,423,550.08)	9.90%	(349,516.44)	-9.23%	(1,773,066.52)
4f. Non-profit Organization	(32,727.08)	0.23%	(1,292,292.94)	-34.12%	(1,325,020.02)
4g. Other Performer:	1,263,938.00	-8.79%	(133,384.00)	-3.52%	1,130,554.00

Table 9. Source of Funds – Comparison between Year Two and Year Three

DIFFERENCE FROM 1995-1996 TO 1996-1997 NON-PLANT R&D EXPENDITURES BY SOURCE	Federal Sources (A)	Industry (B)	State Sources					Other Non-state Sources (H)	Total (I)	% of Total
			Direct Appropriation (C)	Bonds (D)	Lottery Proceeds (E)	Restricted Funds (F)	Other (G)			
Research Function or Use										
1. Total	(601,387.00)	130,540.00	(18,232,991.50)	(1,600.00)	0.00	(2,592,131.00)	20,927,121.50	(2,149,450.00)	(2,519,898.00)	1
1a. Community Development, Housing & Public Services	(464,213.00)	0.00	(7,263.00)	0.00	0.00	0.00	621,586.50	(216,850.00)	(66,739.50)	2.65%
1b. Crime Prevention and Control	(457,500.00)	0.00	30,200.00	0.00	0.00	0.00	0.00	0.00	(427,300.00)	16.96%
1c. Economic Development	36,885.50	0.00	(7,511,724.00)	0.00	0.00	703,244.00	3,884,511.50	(169,360.00)	(3,056,443.00)	121.29%
1d. Education	(753,000.00)	0.00	(1,017,611.00)	(1,600.00)	0.00	(800,740.00)	2,781,546.50	(10,400.00)	198,195.50	-7.87%
1e. Energy	(23,667.00)	0.00	264,413.00	0.00	0.00	(385,529.50)	3,577,632.50	425,380.00	3,858,229.00	-153.11%
1f. Environment	299,396.00	0.00	(392,436.00)	0.00	0.00	(479,168.50)	4,264,173.00	(54,395.50)	3,637,569.00	-144.35%
1g. Food, Fiber, Other Agricultural Products	(25,000.00)	0.00	180,260.00	0.00	0.00	(1,043,480.00)	18,087.00	126,000.00	(744,133.00)	29.53%
1h. Health	1,358,083.25	130,540.00	2,663,403.75	0.00	0.00	(286,983.00)	3,975,773.25	(1,177,449.25)	6,663,368.00	-264.43%
1i. Income Security & Social Services	(11,475.00)	0.00	(11,475.00)	0.00	0.00	0.00	0.00	0.00	(22,950.00)	0.91%
1j. Natural Resources	162,895.00	0.00	65,154.00	0.00	0.00	110,048.50	(86,037.50)	(180,147.00)	71,913.00	-2.85%
1k. Science & Technology Base	865,545.25	0.00	(8,861,273.25)	0.00	0.00	(401,524.50)	3,000,066.25	(948,473.25)	(6,345,659.50)	251.82%
1l. Transportation	(1,139,337.00)	0.00	(3,324,640.00)	0.00	0.00	(7,998.00)	(1,772,117.50)	56,245.00	(6,187,847.50)	245.56%
1m. Other functional areas, not elsewhere classified	(450,000.00)	0.00	(310,000.00)	0.00	0.00	0.00	661,900.00	0.00	(98,100.00)	3.89%
Field of Science or Engineering										
2. Total	(601,387.00)	130,540.00	(18,232,991.50)	(1,600.00)	0.00	(2,592,131.00)	20,927,121.50	(2,149,450.00)	(2,519,898.00)	1
2a. Biological Sciences	(348,154.75)	0.00	(7,099,024.03)	0.00	0.00	(189,626.00)	191,467.00	(1,308,683.75)	(8,754,021.53)	347.40%
2b. Medical Sciences	2,274,315.50	686,262.00	311,322.22	0.00	0.00	(337,039.00)	(534,058.50)	(1,048,220.50)	1,352,581.72	-53.68%
2c. Psychology	(414,000.00)	0.00	112,935.22	0.00	0.00	58,619.00	0.00	0.00	(242,445.78)	9.62%
2d. Physical Sciences	999,040.00	0.00	4,328,315.72	0.00	0.00	132,250.00	1,004,405.50	128,500.00	6,592,511.22	-261.62%
2e. Environmental Sciences	403,503.25	0.00	(3,470,073.78)	0.00	0.00	(3,595,392.00)	10,980,723.50	(928,785.75)	3,389,975.22	-134.53%
2f. Mathematics & Computer Science	(1,698,900.00)	(555,722.00)	48,607.72	0.00	0.00	(2,332,167.00)	821,483.00	418,583.00	(3,298,115.28)	130.88%
2g. Engineering	(931,616.00)	0.00	(10,431,701.78)	0.00	0.00	3,479,555.00	7,787,738.00	276,519.00	180,494.22	-7.16%
2h. Social Sciences	(569,875.00)	0.00	(456,383.03)	(800.00)	0.00	(22,320.00)	45,500.00	109,800.00	(894,078.03)	35.48%
2i. Other Sciences, not elsewhere classified:	(315,700.00)	0.00	(1,576,989.78)	(800.00)	0.00	213,989.00	629,863.00	202,838.00	(846,799.78)	33.60%
Stage of R&D										
3. Total	(601,387.00)	130,540.00	(18,232,991.50)	(1,600.00)	0.00	(2,592,131.00)	20,927,121.50	(2,149,450.00)	(2,519,898.00)	1
3a. Basic Research	137,644.00	0.00	(7,701,408.50)	0.00	0.00	77,430.00	(36,725.00)	(1,229,316.00)	(8,752,375.50)	347.33%
3b. Applied Research	(1,093,124.00)	130,540.00	(3,106,190.00)	(800.00)	0.00	(1,177,508.00)	(1,609,267.50)	(2,419,850.00)	(9,276,199.54)	368.12%
3c. Development	231,333.00	0.00	(429,133.50)	(800.00)	0.00	(1,814,712.00)	1,704,795.50	9,050.00	(299,467.00)	11.88%
3d. Commercialization	122,760.00	0.00	(6,996,259.50)	0.00	0.00	322,659.00	20,868,318.50	1,490,666.00	15,808,144.00	-627.33%
R&D Performer										
4. Total	(601,387.00)	130,540.00	(18,232,991.50)	(1,600.00)	0.00	(2,592,131.00)	20,927,121.00	(2,149,450.00)	(2,519,898.50)	1
4a. Within State Government	(3,474,248.88)	0.00	(1,469.93)	(266.65)	0.00	(826,233.82)	8,600,775.60	(2,391,616.45)	1,906,939.88	-75.68%
4b. Local or County Government	(533,034.63)	0.00	(88,417.18)	(266.65)	0.00	(461,205.32)	7,302,124.85	281,649.80	6,500,850.88	-257.98%
4c. Industry or Business	(493,178.19)	0.00	(586,840.91)	(266.68)	0.00	(612,068.34)	6,626,474.57	281,650.60	5,215,771.06	-206.98%
4d. Academic Institution	2,492,106.31	0.00	(8,421,347.41)	(266.68)	0.00	55,739.66	(3,190,828.93)	557,631.60	(8,506,965.44)	337.59%
4e. Private Individual	162,106.31	0.00	(398,774.91)	(266.68)	0.00	37,902.66	758,643.07	(167,951.90)	391,658.56	-15.54%
4f. Non-profit Organization	399,483.06	130,540.00	(9,480,804.16)	(266.68)	0.00	(544,861.84)	567,699.82	(760,001.65)	(9,688,211.44)	384.47%
4g. Other Performer:	845,379.00	0.00	744,663.00	0.00	0.00	(241,404.00)	262,232.00	49,188.00	1,660,058.00	-65.88%

Table 10. Source of Funds – Breakdown of State vs. Other Sources – Comparison between Year Two and Year Three

DIFFERENCE FROM 1995-1996 TO 1996-1997 NON-PLANT R&D EXPENDITURES BY SOURCE	All State Sources	% of Total	All Other Sources	% of Total	Total
Research Function or Use					
1. Total	100,399.00	1	(2,620,297.00)	1	(2,519,898.00)
1a. Community Development, Housing & Public Services	614,323.50	611.88%	(681,063.00)	25.99%	(66,739.50)
1b. Crime Prevention and Control	30,200.00	30.08%	(457,500.00)	17.46%	(427,300.00)
1c. Economic Development	(2,923,968.50)	-2912.35%	(132,474.50)	5.06%	(3,056,443.00)
1d. Education	961,595.50	957.77%	(763,400.00)	29.13%	198,195.50
1e. Energy	3,456,516.00	3442.78%	401,713.00	-15.33%	3,858,229.00
1f. Environment	3,392,568.50	3379.09%	245,000.50	-9.35%	3,637,569.00
1g. Food, Fiber, Other Agricultural Products	(845,133.00)	-841.77%	101,000.00	-3.85%	(744,133.00)
1h. Health	6,352,194.00	6326.95%	311,174.00	-11.88%	6,663,368.00
1i. Income Security & Social Services	(11,475.00)	-11.43%	(11,475.00)	0.44%	(22,950.00)
1j. Natural Resources	89,165.00	88.81%	(17,252.00)	0.66%	71,913.00
1k. Science & Technology Base	(6,262,731.50)	-6237.84%	(82,928.00)	3.16%	(6,345,659.50)
1l. Transportation	(5,104,755.50)	-5084.47%	(1,083,092.00)	41.33%	(6,187,847.50)
1m. Other functional areas, not elsewhere classified	351,900.00	350.50%	(450,000.00)	17.17%	(98,100.00)
Field of Science or Engineering					
2. Total	100,399.00	1	(2,620,297.00)	1	(2,519,898.00)
2a. Biological Sciences	(7,097,183.03)	-7068.98%	(1,656,838.50)	63.23%	(8,754,021.53)
2b. Medical Sciences	(559,775.28)	-557.55%	1,912,357.00	-72.98%	1,352,581.72
2c. Psychology	171,554.22	170.87%	(414,000.00)	15.80%	(242,445.78)
2d. Physical Sciences	5,464,971.22	5443.25%	1,127,540.00	-43.03%	6,592,511.22
2e. Environmental Sciences	3,915,257.72	3899.70%	(525,282.50)	20.05%	3,389,975.22
2f. Mathematics & Computer Science	(1,462,076.28)	-1456.27%	(1,836,039.00)	70.07%	(3,298,115.28)
2g. Engineering	835,591.22	832.27%	(655,097.00)	25.00%	180,494.22
2h. Social Sciences	(434,003.03)	-432.28%	(460,075.00)	17.56%	(894,078.03)
2i. Other Sciences, not elsewhere classified: _____	(733,937.78)	-731.02%	(112,862.00)	4.31%	(846,799.78)
Stage of R&D					
3. Total	100,399.00	1	(2,620,297.00)	1	(2,519,898.00)
3a. Basic Research	(7,660,703.50)	-7630.26%	(1,091,672.00)	41.66%	(8,752,375.50)
3b. Applied Research	(5,893,765.50)	-5870.34%	(3,382,434.00)	129.09%	(9,276,199.50)
3c. Development	(539,850.00)	-537.70%	240,383.00	-9.17%	(299,467.00)
3d. Commercialization	14,194,718.00	14138.31%	1,613,426.00	-61.57%	15,808,144.00
R&D Performer					
4. Total	100,398.50	1	(2,620,297.00)	1	(2,519,898.50)
4a. Within State Government	7,772,805.21	7741.95%	(5,865,865.32)	223.86%	1,906,939.88
4b. Local or County Government	6,752,235.71	6725.43%	(251,384.82)	9.59%	6,500,850.88
4c. Industry or Business	5,427,298.65	5405.76%	(211,527.59)	8.07%	5,215,771.06
4d. Academic Institution	(11,556,703.35)	-11510.83%	3,049,737.91	-116.39%	(8,506,965.44)
4e. Private Individual	397,504.15	395.93%	(5,845.59)	0.22%	391,658.56
4f. Non-profit Organization	(9,458,232.85)	-9420.69%	(229,978.59)	8.78%	(9,688,211.44)
4g. Other Performer: _____	765,491.00	762.45%	894,567.00	-34.14%	1,660,058.00

Table 11. Source of Funds – Comparison between Year One and Year Three

DIFFERENCE FROM 1994-1995 TO 1996-1997 NON-PLANT R&D EXPENDITURES BY SOURCE	Federal Sources (A)	Industry (B)	State Sources					Other Non-state Sources (H)	Total (I)	% of Total
			Direct Appropriation (C)	Bonds (D)	Lottery Proceeds (E)	Restricted Funds (F)	Other (G)			
Research Function or Use										
1. Total	3,130,350.50	1,605,278.00	(44,089,286.50)	1,660,468.00	0.00	29,863,822.00	(1,714,827.50)	(3,568,211.50)	(13,112,407.00)	1
1a. Community Development, Housing & Public Services	(238,692.50)	0.00	(47,353.00)	0.00	0.00	0.00	(96,136.00)	(910,000.00)	(1,292,181.50)	9.85%
1b. Crime Prevention and Control	(98,500.00)	0.00	27,200.00	0.00	0.00	0.00	0.00	0.00	(71,300.00)	0.54%
1c. Economic Development	0.00	0.00	(13,205,296.00)	0.00	0.00	7,492,280.00	10,318.00	(984,533.00)	(6,687,231.00)	51.00%
1d. Education	(1,025,400.00)	0.00	(1,553,059.00)	(6,200.00)	0.00	1,698,270.00	(61,999.00)	(31,000.00)	(979,388.00)	7.47%
1e. Energy	(45,000.00)	0.00	(3,425.00)	0.00	0.00	2,953,674.00	253,975.00	1,120,927.00	4,280,151.00	-32.64%
1f. Environment	1,032,293.50	0.00	(602,383.00)	0.00	0.00	2,335,605.00	2,246,409.00	721,828.00	5,733,752.50	-43.73%
1g. Food, Fiber, Other Agricultural Products	(25,000.00)	0.00	197,675.00	0.00	0.00	(378,403.00)	29,865.00	0.00	(175,863.00)	1.34%
1h. Health	(1,018,163.75)	1,605,278.00	78,365.25	0.00	0.00	3,098,783.50	39,724.75	(1,532,812.25)	2,271,175.50	-17.32%
1i. Income Security & Social Services	(20,009.00)	0.00	(20,009.00)	0.00	0.00	0.00	0.00	0.00	(40,018.00)	0.31%
1j. Natural Resources	115,026.50	0.00	20,291.00	0.00	0.00	405,042.00	(81,228.00)	(180,147.00)	278,984.50	-2.13%
1k. Science & Technology Base	1,018,149.75	0.00	(16,906,844.75)	0.00	0.00	2,296,263.50	(436,455.25)	(1,587,474.25)	(15,616,361.00)	119.10%
1l. Transportation	2,492,646.00	0.00	(12,038,473.00)	1,666,668.00	0.00	9,859,807.00	(4,963,301.00)	(185,000.00)	(3,167,653.00)	24.16%
1m. Other functional areas, not elsewhere classified	943,000.00	0.00	(35,975.00)	0.00	0.00	102,500.00	1,344,000.00	0.00	2,353,525.00	-17.95%
Field of Science or Engineering										
2. Total	3,130,350.50	1,605,278.00	(44,089,286.50)	1,660,468.00	0.00	29,863,821.00	(1,714,828.50)	(3,568,211.50)	(13,112,409.00)	1
2a. Biological Sciences	(3,874.00)	0.00	(9,080,108.55)	0.00	0.00	520,303.69	1,285,357.00	(1,615,908.00)	(8,894,229.86)	67.83%
2b. Medical Sciences	558,445.50	2,161,000.00	(36,197.10)	0.00	0.00	(258,393.00)	(534,058.50)	(1,229,469.50)	661,327.40	-5.04%
2c. Psychology	804,000.00	0.00	260,755.20	0.00	0.00	58,762.22	0.00	0.00	1,123,517.42	-8.57%
2d. Physical Sciences	1,066,507.00	0.00	1,356,664.00	0.00	0.00	(296,000.00)	(7,904.00)	(1,025,000.00)	1,094,267.00	-8.35%
2e. Environmental Sciences	900,024.00	0.00	(3,808,018.00)	0.00	0.00	8,886,927.00	343,351.00	(1,225,333.00)	5,096,951.00	-38.87%
2f. Mathematics & Computer Science	(1,258,082.00)	(555,722.00)	(1,187,537.00)	0.00	0.00	(894,627.00)	1,703,500.00	896,000.00	(1,296,468.00)	9.89%
2g. Engineering	2,198,239.00	0.00	(26,134,096.00)	1,666,668.00	0.00	22,336,536.00	(5,115,146.00)	(22,955.00)	(5,070,754.00)	38.67%
2h. Social Sciences	(747,609.00)	0.00	(826,261.05)	(3,100.00)	0.00	238,239.00	(30,500.00)	(15,500.00)	(1,384,730.96)	10.56%
2i. Other Sciences, not elsewhere classified:	(387,300.00)	0.00	(4,634,488.00)	(3,100.00)	0.00	(727,927.00)	640,572.00	669,954.00	(4,442,289.00)	33.88%
Stage of R&D										
3. Total	3,130,350.50	1,605,278.00	(44,089,286.50)	1,660,468.00	0.00	29,863,821.00	(1,714,827.50)	(3,568,211.50)	(13,112,408.00)	1
3a. Basic Research	1,925,562.00	1,184,500.00	(17,167,379.50)	555,556.00	0.00	611,379.00	133,680.00	(1,231,578.50)	(13,988,281.00)	106.68%
3b. Applied Research	(719,053.50)	420,778.00	(5,855,059.50)	552,456.00	0.00	1,437,876.00	(2,859,533.50)	(5,946,133.00)	(12,968,669.50)	98.90%
3c. Development	1,935,685.00	0.00	(3,669,513.50)	552,456.00	0.00	20,728,088.00	849,265.00	5,000.00	20,400,980.50	-155.59%
3d. Commercialization	(11,843.00)	0.00	(17,397,334.00)	0.00	0.00	7,086,478.00	161,761.00	3,604,500.00	(6,556,438.00)	50.00%
R&D Performer										
4. Total	3,130,350.50	1,605,278.00	(44,089,286.50)	1,660,468.00	0.00	29,863,820.00	(1,714,827.50)	(3,568,211.50)	(13,112,409.00)	1
4a. Within State Government	(2,042,906.39)	299,000.00	(4,077,043.75)	(1,033.30)	0.00	7,612,289.18	1,684,957.36	(5,163,147.72)	(1,687,884.61)	12.87%
4b. Local or County Government	(862,595.14)	275,000.00	(3,894,242.00)	(1,033.30)	0.00	6,999,353.68	(342,010.39)	810,633.53	2,985,106.39	-22.77%
4c. Industry or Business	(402,180.70)	181,000.00	(10,711,341.73)	(1,033.33)	0.00	12,164,597.66	(841,738.67)	885,633.33	1,274,936.57	-9.72%
4d. Academic Institution	6,126,796.30	1,316,000.00	(15,501,337.23)	1,665,634.67	0.00	2,772,785.66	(3,321,053.67)	860,634.33	(6,080,539.93)	46.37%
4e. Private Individual	(66,714.16)	0.00	(573,352.28)	(1,033.36)	0.00	(557,328.35)	105,668.06	(288,647.87)	(1,381,407.96)	10.54%
4f. Non-profit Organization	(348,114.41)	(465,722.00)	(9,734,171.53)	(1,033.36)	0.00	406,895.15	(162,650.19)	(708,435.12)	(11,013,231.46)	83.99%
4g. Other Performer:	726,065.00	0.00	402,202.00	0.00	0.00	465,227.00	1,162,000.00	35,118.00	2,790,612.00	-21.28%

Table 12. Source of Funds – Breakdown of State vs. Other Sources – Comparison between Year One and Year Three

DIFFERENCE FROM 1994-1995 TO 1996-1997 NON-PLANT R&D EXPENDITURES BY SOURCE	All State Sources	% of Total	All Other Sources	% of Total	Total
Research Function or Use					
1. Total	(14,279,824.00)	1	1,167,417.00	1	(13,112,407.00)
1a. Community Development, Housing & Public Services	(143,489.00)	1.00%	(1,148,692.50)	-98.40%	(1,292,181.50)
1b. Crime Prevention and Control	27,200.00	-0.19%	(98,500.00)	-8.44%	(71,300.00)
1c. Economic Development	(5,702,698.00)	39.94%	(984,533.00)	-84.33%	(6,687,231.00)
1d. Education	77,012.00	-0.54%	(1,056,400.00)	-90.49%	(979,388.00)
1e. Energy	3,204,224.00	-22.44%	1,075,927.00	92.16%	4,280,151.00
1f. Environment	3,979,631.00	-27.87%	1,754,121.50	150.26%	5,733,752.50
1g. Food, Fiber, Other Agricultural Products	(150,863.00)	1.06%	(25,000.00)	-2.14%	(175,863.00)
1h. Health	3,216,873.50	-22.53%	(945,698.00)	-81.01%	2,271,175.50
1i. Income Security & Social Services	(20,009.00)	0.14%	(20,009.00)	-1.71%	(40,018.00)
1j. Natural Resources	344,105.00	-2.41%	(65,120.50)	-5.58%	278,984.50
1k. Science & Technology Base	(15,047,036.50)	105.37%	(569,324.50)	-48.77%	(15,616,361.00)
1l. Transportation	(5,475,299.00)	38.34%	2,307,646.00	197.67%	(3,167,653.00)
1m. Other functional areas, not elsewhere classified	1,410,525.00	-9.88%	943,000.00	80.78%	2,353,525.00
Field of Science or Engineering					
2. Total	(14,279,826.00)	1	1,167,417.00	1	(13,112,409.00)
2a. Biological Sciences	(7,274,447.86)	50.94%	(1,619,782.00)	-138.75%	(8,894,229.86)
2b. Medical Sciences	(828,648.60)	5.80%	1,489,976.00	127.63%	661,327.40
2c. Psychology	319,517.42	-2.24%	804,000.00	68.87%	1,123,517.42
2d. Physical Sciences	1,052,760.00	-7.37%	41,507.00	3.56%	1,094,267.00
2e. Environmental Sciences	5,422,260.00	-37.97%	(325,309.00)	-27.87%	5,096,951.00
2f. Mathematics & Computer Science	(378,664.00)	2.65%	(917,804.00)	-78.62%	(1,296,468.00)
2g. Engineering	(7,246,038.00)	50.74%	2,175,284.00	186.33%	(5,070,754.00)
2h. Social Sciences	(621,621.96)	4.35%	(763,109.00)	-65.37%	(1,384,730.96)
2i. Other Sciences, not elsewhere classified: _____	(4,724,943.00)	33.09%	282,654.00	24.21%	(4,442,289.00)
Stage of R&D					
3. Total	(14,279,825.00)	1	1,167,417.00	1	(13,112,408.00)
3a. Basic Research	(15,866,764.50)	111.11%	1,878,483.50	160.91%	(13,988,281.00)
3b. Applied Research	(6,724,261.00)	47.09%	(6,244,408.50)	-534.89%	(12,968,669.50)
3c. Development	18,460,295.50	-129.28%	1,940,685.00	166.24%	20,400,980.50
3d. Commercialization	(10,149,095.00)	71.07%	3,592,657.00	307.74%	(6,556,438.00)
R&D Performer					
4. Total	(14,279,826.00)	1	1,167,417.00	1	(13,112,409.00)
4a. Within State Government	5,219,169.49	-36.55%	(6,907,054.10)	-591.65%	(1,687,884.61)
4b. Local or County Government	2,762,067.99	-19.34%	223,038.40	19.11%	2,985,106.39
4c. Industry or Business	610,483.94	-4.28%	664,452.63	56.92%	1,274,936.57
4d. Academic Institution	(14,383,970.56)	100.73%	8,303,430.63	711.27%	(6,080,539.93)
4e. Private Individual	(1,026,045.93)	7.19%	(355,362.03)	-30.44%	(1,381,407.96)
4f. Non-profit Organization	(9,490,959.93)	66.46%	(1,522,271.53)	-130.40%	(11,013,231.46)
4g. Other Performer: _____	2,029,429.00	-14.21%	761,183.00	65.20%	2,790,612.00

Table 13. Source of Funds – Fiscal Year 1994-1995

FISCAL YEAR 1994-1995 NON-PLANT R&D EXPENDITURES BY SOURCE	Federal Sources (A)	Industry (B)	State Sources				Other Non-state Sources (H)	Total (I)	% of Total	
			Direct Appropriation (C)	Bonds (D)	Lottery Proceeds (E)	Restricted Funds (F)				Other (G)
Research Function or Use										
1. Total	36,900,235	2,161,000	195,178,982	1,963,468	0	43,077,216	16,906,018	6,628,109	302,815,028	1
1a. Community Development, Housing & Public Services	481,700	0	1,060,051	0	0	0	231,515	0	1,773,266	0.59%
1b. Crime Prevention and Control	435,600	0	1,407,000	0	0	0	0	0	1,842,600	0.61%
1c. Economic Development	0	0	1,128,241	0	0	9,007,193	1,044,823	55,000	11,235,257	3.71%
1d. Education	14,660,800	0	5,995,541	296,800	0	2,834,981	2,974,085	1,990,200	28,752,407	9.50%
1e. Energy	0	0	271,575	0	0	4,528,676	2,060,740	1,405,325	8,266,316	2.73%
1f. Environment	2,496,998	0	8,877,336	0	0	5,861,563	4,464,089	1,488,264	23,188,250	7.66%
1g. Food, Fiber, Other Agricultural Products	0	0	545,496	0	0	667,947	125,110	0	1,338,553	0.44%
1h. Health	3,148,042	2,161,000	3,279,851	0	0	4,851,812	2,793,747	1,405,326	17,639,778	5.83%
1i. Income Security & Social Services	1,053,466	0	1,303,466	0	0	0	0	0	2,356,932	0.78%
1j. Natural Resources	161,708	0	660,333	0	0	430,042	259,899	0	1,511,982	0.50%
1k. Science & Technology Base	1,317,211	0	163,232,743	0	0	4,647,289	976,730	58,994	170,232,967	56.22%
1l. Transportation	11,751,712	0	4,643,324	1,666,668	0	10,145,213	631,280	225,000	29,063,197	9.60%
1m. Other functional areas, not elsewhere classified	1,393,000	0	2,774,025	0	0	102,500	1,344,000	0	5,613,525	1.85%
Field of Science or Engineering										
2. Total	36,900,235	2,161,000	195,178,982	1,963,468	0	43,077,215	16,906,017	6,628,109	302,815,026	1
2a. Biological Sciences	504,545	0	85,009,754	0	0	2,064,529	1,473,777	36,930	89,089,535	29.42%
2b. Medical Sciences	3,494,278	2,161,000	15,020,038	0	0	97,646	0	16,667	20,789,629	6.87%
2c. Psychology	1,218,000	0	2,248,533	0	0	58,762	0	0	3,525,295	1.16%
2d. Physical Sciences	1,143,071	0	22,179,205	0	0	459,000	283,496	0	24,064,772	7.95%
2e. Environmental Sciences	1,982,407	0	7,533,222	0	0	14,362,103	4,305,910	1,163,917	29,347,559	9.69%
2f. Mathematics & Computer Science	440,818	0	3,042,778	0	0	1,524,873	2,477,250	1,009,750	8,495,469	2.81%
2g. Engineering	11,717,250	0	15,062,000	1,666,668	0	23,427,036	4,205,962	1,400,895	57,479,811	18.98%
2h. Social Sciences	8,527,466	0	21,327,073	148,400	0	456,148	1,357,400	995,100	32,811,587	10.84%
2i. Other Sciences, not elsewhere classified: _____	7,872,400	0	23,756,380	148,400	0	627,118	2,802,222	2,004,850	37,211,370	12.29%
Stage of R&D										
3. Total	36,900,235	2,161,000	195,178,982	1,963,468	0	43,077,215	16,906,018	6,628,109	302,815,027	1
3a. Basic Research	3,609,347	1,184,500	141,119,302	555,556	0	853,533	341,405	0	147,663,643	48.76%
3b. Applied Research	18,692,039	976,500	47,568,655	703,956	0	7,404,430	7,152,018	1,185,675	83,683,273	27.64%
3c. Development	13,008,031	0	5,065,499	703,956	0	24,662,190	3,790,496	1,199,266	48,429,438	15.99%
3d. Commercialization	1,590,818	0	1,425,526	0	0	10,157,062	5,622,099	4,243,168	23,038,673	7.61%
R&D Performer										
4. Total	36,900,235	2,161,000	195,178,982	1,963,468	0	43,077,214	16,906,018	6,628,109	302,815,026	1
4a. Within State Government	7,831,764	299,000	10,479,019	49,467	0	9,321,756	6,224,346	1,483,428	35,688,779	11.79%
4b. Local or County Government	3,615,146	275,000	1,065,674	49,467	0	8,587,686	2,088,038	1,396,450	17,077,460	5.64%
4c. Industry or Business	4,088,582	181,000	3,425,123	49,467	0	15,386,761	2,305,704	1,471,450	26,908,086	8.89%
4d. Academic Institution	12,824,582	1,316,000	175,245,099	1,716,135	0	6,586,972	2,837,873	1,446,451	201,973,111	66.70%
4e. Private Individual	2,590,405	0	975,032	49,467	0	325,838	754,967	331,700	5,027,409	1.66%
4f. Non-profit Organization	5,175,088	90,000	3,083,588	49,467	0	2,039,330	1,133,422	386,700	11,957,595	3.95%
4g. Other Performer: _____	774,668	0	905,447	0	0	828,873	1,561,668	111,930	4,182,586	1.38%

Table 14. Source of Funds – Breakdown of State vs. Other Sources – Fiscal Year 1994-1995

FISCAL YEAR 1994-1995 NON-PLANT R&D EXPENDITURES BY SOURCE	All State Sources	% of Total	All Other Sources	% of Total	Total
Research Function or Use					
1. Total	257,125,684	1	45,689,344	1	302,815,028
1a. Community Development, Housing & Public Services	1,291,566	0.50%	481,700	1.05%	1,773,266
1b. Crime Prevention and Control	1,407,000	0.55%	435,600	0.95%	1,842,600
1c. Economic Development	11,180,257	4.35%	55,000	0.12%	11,235,257
1d. Education	12,101,407	4.71%	16,651,000	36.44%	28,752,407
1e. Energy	6,860,991	2.67%	1,405,325	3.08%	8,266,316
1f. Environment	19,202,988	7.47%	3,985,262	8.72%	23,188,250
1g. Food, Fiber, Other Agricultural Products	1,338,553	0.52%	0	0.00%	1,338,553
1h. Health	10,925,410	4.25%	6,714,368	14.70%	17,639,778
1i. Income Security & Social Services	1,303,466	0.51%	1,053,466	2.31%	2,356,932
1j. Natural Resources	1,350,274	0.53%	161,708	0.35%	1,511,982
1k. Science & Technology Base	168,856,762	65.67%	1,376,205	3.01%	170,232,967
1l. Transportation	17,086,485	6.65%	11,976,712	26.21%	29,063,197
1m. Other functional areas, not elsewhere classified	4,220,525	1.64%	1,393,000	3.05%	5,613,525
Field of Science or Engineering					
2. Total	257,125,682	1	45,689,344	1	302,815,026
2a. Biological Sciences	88,548,060	34.44%	541,475	1.19%	89,089,535
2b. Medical Sciences	15,117,684	5.88%	5,671,945	12.41%	20,789,629
2c. Psychology	2,307,295	0.90%	1,218,000	2.67%	3,525,295
2d. Physical Sciences	22,921,701	8.91%	1,143,071	2.50%	24,064,772
2e. Environmental Sciences	26,201,235	10.19%	3,146,324	6.89%	29,347,559
2f. Mathematics & Computer Science	7,044,901	2.74%	1,450,568	3.17%	8,495,469
2g. Engineering	44,361,666	17.25%	13,118,145	28.71%	57,479,811
2h. Social Sciences	23,289,021	9.06%	9,522,566	20.84%	32,811,587
2i. Other Sciences, not elsewhere classified: _____	27,334,120	10.63%	9,877,250	21.62%	37,211,370
Stage of R&D					
3. Total	257,125,683	1	45,689,344	1	302,815,027
3a. Basic Research	142,869,796	55.56%	4,793,847	10.49%	147,663,643
3b. Applied Research	62,829,059	24.44%	20,854,214	45.64%	83,683,273
3c. Development	34,222,141	13.31%	14,207,297	31.10%	48,429,438
3d. Commercialization	17,204,687	6.69%	5,833,986	12.77%	23,038,673
R&D Performer					
4. Total	257,125,682	1	45,689,344	1	302,815,026
4a. Within State Government	26,074,587	10.14%	9,614,192	21.04%	35,688,779
4b. Local or County Government	11,790,864	4.59%	5,286,596	11.57%	17,077,460
4c. Industry or Business	21,167,054	8.23%	5,741,032	12.57%	26,908,086
4d. Academic Institution	186,386,078	72.49%	15,587,033	34.12%	201,973,111
4e. Private Individual	2,105,304	0.82%	2,922,105	6.40%	5,027,409
4f. Non-profit Organization	6,305,807	2.45%	5,651,788	12.37%	11,957,595
4g. Other Performer: _____	3,295,988	1.28%	886,598	1.94%	4,182,586

Table 15. Source of Funds – Fiscal Year 1995-1996

FISCAL YEAR 1995-1996 NON-PLANT R&D EXPENDITURES BY SOURCE	Federal Sources (A)	Industry (B)	State Sources				Other Non-state Sources (H)	Total (I)	% of Total	
			Direct Appropriation (C)	Bonds (D)	Lottery Proceeds (E)	Restricted Funds (F)				Other (G)
Research Function or Use										
1. Total	33,168,498	686,262	221,035,277	301,400	0	10,621,263	39,547,967	8,046,871	313,407,537	1
1a. Community Development, Housing & Public Services	256,179	0	1,100,141	0	0	0	949,238	693,150	2,998,708	0.96%
1b. Crime Prevention and Control	76,600	0	1,410,000	0	0	0	0	0	1,486,600	0.47%
1c. Economic Development	36,886	0	6,821,813	0	0	2,218,157	4,919,017	870,173	14,866,045	4.74%
1d. Education	14,933,200	0	6,530,989	301,400	0	335,971	5,817,631	2,010,800	29,929,991	9.55%
1e. Energy	21,333	0	539,413	0	0	1,189,473	5,384,398	709,778	7,844,394	2.50%
1f. Environment	1,764,100	0	9,087,283	0	0	3,046,790	6,481,853	712,041	21,092,066	6.73%
1g. Food, Fiber, Other Agricultural Products	0	0	528,081	0	0	2,870	113,332	126,000	770,283	0.25%
1h. Health	5,524,289	686,262	5,864,890	0	0	1,466,046	6,729,796	1,760,689	22,031,970	7.03%
1i. Income Security & Social Services	1,062,000	0	1,312,000	0	0	0	0	0	2,374,000	0.76%
1j. Natural Resources	209,576	0	705,196	0	0	135,049	255,090	0	1,304,910	0.42%
1k. Science & Technology Base	1,164,607	0	171,278,315	0	0	1,949,501	4,413,252	697,995	179,503,669	57.27%
1l. Transportation	8,119,729	0	13,357,157	0	0	277,408	3,822,464	466,245	26,043,003	8.31%
1m. Other functional areas, not elsewhere classified	0	0	2,500,000	0	0	0	661,900	0	3,161,900	1.01%
Field of Science or Engineering										
2. Total	33,168,498	686,262	221,035,277	301,400	0	10,621,263	39,547,967	8,046,871	313,407,537	1
2a. Biological Sciences	160,264	0	86,990,839	0	0	1,354,599	379,887	344,154	89,229,743	28.47%
2b. Medical Sciences	5,210,148	686,262	15,367,558	0	0	19,000	0	197,916	21,480,884	6.85%
2c. Psychology	0	0	2,100,713	0	0	58,619	0	0	2,159,332	0.69%
2d. Physical Sciences	1,075,604	0	25,150,857	0	0	887,250	1,295,806	1,153,500	29,563,016	9.43%
2e. Environmental Sciences	1,485,886	0	7,871,166	0	0	1,879,784	14,943,283	1,460,464	27,640,583	8.82%
2f. Mathematics & Computer Science	0	0	4,278,923	0	0	87,333	1,595,233	532,333	6,493,822	2.07%
2g. Engineering	8,587,395	0	30,764,394	0	0	4,570,055	17,108,846	1,700,369	62,731,059	20.02%
2h. Social Sciences	8,705,200	0	21,696,951	150,700	0	195,589	1,433,400	1,120,400	33,302,240	10.63%
2i. Other Sciences, not elsewhere classified:	7,944,000	0	26,813,878	150,700	0	1,569,034	2,791,513	1,537,734	40,806,859	13.02%
Stage of R&D										
3. Total	33,168,498	686,262	221,035,277	301,400	0	10,621,263	39,547,967	8,046,871	313,407,537	1
3a. Basic Research	1,821,429	0	150,585,273	0	0	319,584	171,000	2,263	152,899,549	48.79%
3b. Applied Research	18,317,969	686,262	50,317,525	150,700	0	4,789,046	8,402,284	4,711,958	87,375,743	27.88%
3c. Development	11,303,679	0	8,305,879	150,700	0	2,119,390	4,646,027	1,203,316	27,728,991	8.85%
3d. Commercialization	1,725,421	0	11,826,601	0	0	3,393,243	26,328,657	2,129,334	45,403,255	14.49%
R&D Performer										
4. Total	33,168,498	686,262	221,035,277	301,400	0	10,621,263	39,547,967	8,046,871	313,407,537	1
4a. Within State Government	6,400,422	0	14,554,593	50,233	0	883,233	13,140,164	4,254,959	39,283,604	12.53%
4b. Local or County Government	3,944,707	0	4,871,499	50,233	0	1,127,127	9,732,173	867,466	20,593,205	6.57%
4c. Industry or Business	3,997,585	0	13,549,624	50,233	0	2,610,095	9,773,917	867,467	30,848,921	9.84%
4d. Academic Institution	9,189,892	0	182,325,089	50,233	0	3,869,926	2,968,098	1,143,448	199,546,686	63.67%
4e. Private Individual	2,819,225	0	1,149,610	50,233	0	921,069	1,407,943	452,396	6,800,475	2.17%
4f. Non-profit Organization	5,922,685	686,262	3,336,956	50,233	0	1,087,573	1,863,773	335,133	13,282,615	4.24%
4g. Other Performer:	893,982	0	1,247,908	0	0	122,242	661,900	126,000	3,052,032	0.97%

Table 16. Source of Funds – Breakdown of State vs. Other Sources – Fiscal Year 1995-1996

FISCAL YEAR 1995-1996 NON-PLANT R&D EXPENDITURES BY SOURCE	All State Sources	% of Total	All Other Sources	% of Total	Total
Research Function or Use					
1. Total	271,505,907	1	41,901,630	1	313,407,537
1a. Community Development, Housing & Public Services	2,049,379	0.75%	949,329	2.27%	2,998,708
1b. Crime Prevention and Control	1,410,000	0.52%	76,600	0.18%	1,486,600
1c. Economic Development	13,958,987	5.14%	907,059	2.16%	14,866,045
1d. Education	12,985,991	4.78%	16,944,000	40.44%	29,929,991
1e. Energy	7,113,283	2.62%	731,111	1.74%	7,844,394
1f. Environment	18,615,926	6.86%	2,476,141	5.91%	21,092,066
1g. Food, Fiber, Other Agricultural Products	644,283	0.24%	126,000	0.30%	770,283
1h. Health	14,060,731	5.18%	7,971,240	19.02%	22,031,970
1i. Income Security & Social Services	1,312,000	0.48%	1,062,000	2.53%	2,374,000
1j. Natural Resources	1,095,334	0.40%	209,576	0.50%	1,304,910
1k. Science & Technology Base	177,641,067	65.43%	1,862,602	4.45%	179,503,669
1l. Transportation	17,457,029	6.43%	8,585,974	20.49%	26,043,003
1m. Other functional areas, not elsewhere classified	3,161,900	1.16%	0	0.00%	3,161,900
Field of Science or Engineering					
2. Total	271,505,907	1	41,901,630	1	313,407,537
2a. Biological Sciences	88,725,325	32.68%	504,419	1.20%	89,229,743
2b. Medical Sciences	15,386,558	5.67%	6,094,326	14.54%	21,480,884
2c. Psychology	2,159,332	0.80%	0	0.00%	2,159,332
2d. Physical Sciences	27,333,912	10.07%	2,229,104	5.32%	29,563,016
2e. Environmental Sciences	24,694,233	9.10%	2,946,351	7.03%	27,640,583
2f. Mathematics & Computer Science	5,961,489	2.20%	532,333	1.27%	6,493,822
2g. Engineering	52,443,295	19.32%	10,287,764	24.55%	62,731,059
2h. Social Sciences	23,476,640	8.65%	9,825,600	23.45%	33,302,240
2i. Other Sciences, not elsewhere classified: _____	31,325,125	11.54%	9,481,734	22.63%	40,806,859
Stage of R&D					
3. Total	271,505,907	1	41,901,630	1	313,407,537
3a. Basic Research	151,075,857	55.64%	1,823,692	4.35%	152,899,549
3b. Applied Research	63,659,555	23.45%	23,716,189	56.60%	87,375,743
3c. Development	15,221,996	5.61%	12,506,995	29.85%	27,728,991
3d. Commercialization	41,548,500	15.30%	3,854,755	9.20%	45,403,255
R&D Performer					
4. Total	271,505,907	1	41,901,630	1	313,407,537
4a. Within State Government	28,628,223	10.54%	10,655,381	25.43%	39,283,604
4b. Local or County Government	15,781,032	5.81%	4,812,173	11.48%	20,593,205
4c. Industry or Business	25,983,869	9.57%	4,865,052	11.61%	30,848,921
4d. Academic Institution	189,213,345	69.69%	10,333,341	24.66%	199,546,686
4e. Private Individual	3,528,854	1.30%	3,271,621	7.81%	6,800,475
4f. Non-profit Organization	6,338,534	2.33%	6,944,081	16.57%	13,282,615
4g. Other Performer: _____	2,032,050	0.75%	1,019,982	2.43%	3,052,032

Table 17. Source of Funds – Fiscal Year 1996-1997

FISCAL YEAR 1996-1997 NON-PLANT R&D EXPENDITURES BY SOURCE	Federal Sources (A)	Industry (B)	State Sources				Other Non-state Sources (H)	Total (I)	% of Total	
			Direct Appropriation (C)	Bonds (D)	Lottery Proceeds (E)	Restricted Funds (F)				Other (G)
Research Function or Use										
1. Total	33,769,885	555,722	239,268,269	303,000	0	13,213,394	18,620,846	10,196,321	315,927,435	1
1a. Community Development, Housing & Public Services	720,392	0	1,107,404	0	0	0	327,651	910,000	3,065,447	0.97%
1b. Crime Prevention and Control	534,100	0	1,379,800	0	0	0	0	0	1,913,900	0.61%
1c. Economic Development	0	0	14,333,537	0	0	1,514,913	1,034,505	1,039,533	17,922,488	5.67%
1d. Education	15,686,200	0	7,548,600	303,000	0	1,136,711	3,036,084	2,021,200	29,731,795	9.41%
1e. Energy	45,000	0	275,000	0	0	1,575,002	1,806,765	284,398	3,986,165	1.26%
1f. Environment	1,464,704	0	9,479,719	0	0	3,525,958	2,217,680	766,436	17,454,497	5.52%
1g. Food, Fiber, Other Agricultural Products	25,000	0	347,821	0	0	1,046,350	95,245	0	1,514,416	0.48%
1h. Health	4,166,205	555,722	3,201,486	0	0	1,753,029	2,754,022	2,938,138	15,368,602	4.86%
1i. Income Security & Social Services	1,073,475	0	1,323,475	0	0	0	0	0	2,396,950	0.76%
1j. Natural Resources	46,681	0	640,042	0	0	25,000	341,127	180,147	1,232,997	0.39%
1k. Science & Technology Base	299,061	0	180,139,588	0	0	2,351,026	1,413,185	1,646,468	185,849,328	58.83%
1l. Transportation	9,259,066	0	16,681,797	0	0	285,406	5,594,581	410,000	32,230,850	10.20%
1m. Other functional areas, not elsewhere classified	450,000	0	2,810,000	0	0	0	0	0	3,260,000	1.03%
Field of Science or Engineering										
2. Total	33,769,885	555,722	239,268,269	303,000	0	13,213,394	18,620,846	10,196,321	315,927,435	1
2a. Biological Sciences	508,419	0	94,089,863	0	0	1,544,225	188,420	1,652,838	97,983,765	31.01%
2b. Medical Sciences	2,935,833	0	15,056,235	0	0	356,039	534,059	1,246,137	20,128,302	6.37%
2c. Psychology	414,000	0	1,987,778	0	0	0	0	0	2,401,778	0.76%
2d. Physical Sciences	76,564	0	20,822,541	0	0	755,000	291,400	1,025,000	22,970,505	7.27%
2e. Environmental Sciences	1,082,383	0	11,341,240	0	0	5,475,176	3,962,559	2,389,250	24,250,608	7.68%
2f. Mathematics & Computer Science	1,698,900	555,722	4,230,315	0	0	2,419,500	773,750	113,750	9,791,937	3.10%
2g. Engineering	9,519,011	0	41,196,096	0	0	1,090,500	9,321,108	1,423,850	62,550,565	19.80%
2h. Social Sciences	9,275,075	0	22,153,334	151,500	0	217,909	1,387,900	1,010,600	34,196,318	10.82%
2i. Other Sciences, not elsewhere classified:	8,259,700	0	28,390,868	151,500	0	1,355,045	2,161,650	1,334,896	41,653,659	13.18%
Stage of R&D										
3. Total	33,769,885	555,722	239,268,269	303,000	0	13,213,394	18,620,846	10,196,321	315,927,435	1
3a. Basic Research	1,683,785	0	158,286,682	0	0	242,154	207,725	1,231,579	161,651,924	51.17%
3b. Applied Research	19,411,093	555,722	53,423,715	151,500	0	5,966,554	10,011,552	7,131,808	96,651,943	30.59%
3c. Development	11,072,346	0	8,735,013	151,500	0	3,934,102	2,941,231	1,194,266	28,028,458	8.87%
3d. Commercialization	1,602,661	0	18,822,860	0	0	3,070,584	5,460,338	638,668	29,595,111	9.37%
R&D Performer										
4. Total	33,769,885	555,722	239,268,269	303,000	0	13,213,394	18,620,846	10,196,321	315,927,435	1
4a. Within State Government	9,874,671	0	14,556,063	50,500	0	1,709,466	4,539,388	6,646,576	37,376,664	11.83%
4b. Local or County Government	4,477,741	0	4,959,916	50,500	0	1,588,332	2,430,048	585,817	14,092,354	4.46%
4c. Industry or Business	4,490,763	0	14,136,465	50,500	0	3,222,163	3,147,442	585,817	25,633,150	8.11%
4d. Academic Institution	6,697,786	0	190,746,436	50,500	0	3,814,186	6,158,926	585,817	208,053,651	65.85%
4e. Private Individual	2,657,119	0	1,548,385	50,500	0	883,166	649,299	620,348	6,408,817	2.03%
4f. Non-profit Organization	5,523,202	555,722	12,817,760	50,500	0	1,632,435	1,296,073	1,095,135	22,970,826	7.27%
4g. Other Performer:	48,603	0	503,245	0	0	363,646	399,668	76,812	1,391,974	0.44%

Table 18. Source of Funds – Breakdown of State vs. Other Sources – Fiscal Year 1996-1997

FISCAL YEAR 1996-1997 NON-PLANT R&D EXPENDITURES BY SOURCE	All State Sources	% of Total	All Other Sources	% of Total	Total
Research Function or Use					
1. Total	271,405,508	1	44,521,927	1	315,927,435
1a. Community Development, Housing & Public Services	1,435,055	0.53%	1,630,392	3.66%	3,065,447
1b. Crime Prevention and Control	1,379,800	0.51%	534,100	1.20%	1,913,900
1c. Economic Development	16,882,955	6.22%	1,039,533	2.33%	17,922,488
1d. Education	12,024,395	4.43%	17,707,400	39.77%	29,731,795
1e. Energy	3,656,767	1.35%	329,398	0.74%	3,986,165
1f. Environment	15,223,357	5.61%	2,231,140	5.01%	17,454,497
1g. Food, Fiber, Other Agricultural Products	1,489,416	0.55%	25,000	0.06%	1,514,416
1h. Health	7,708,537	2.84%	7,660,066	17.21%	15,368,602
1i. Income Security & Social Services	1,323,475	0.49%	1,073,475	2.41%	2,396,950
1j. Natural Resources	1,006,169	0.37%	226,828	0.51%	1,232,997
1k. Science & Technology Base	183,903,799	67.76%	1,945,530	4.37%	185,849,328
1l. Transportation	22,561,784	8.31%	9,669,066	21.72%	32,230,850
1m. Other functional areas, not elsewhere classified	2,810,000	1.04%	450,000	1.01%	3,260,000
Field of Science or Engineering					
2. Total	271,405,508	1	44,521,927	1	315,927,435
2a. Biological Sciences	95,822,508	35.31%	2,161,257	4.85%	97,983,765
2b. Medical Sciences	15,946,333	5.88%	4,181,969	9.39%	20,128,302
2c. Psychology	1,987,778	0.73%	414,000	0.93%	2,401,778
2d. Physical Sciences	21,868,941	8.06%	1,101,564	2.47%	22,970,505
2e. Environmental Sciences	20,778,975	7.66%	3,471,633	7.80%	24,250,608
2f. Mathematics & Computer Science	7,423,565	2.74%	2,368,372	5.32%	9,791,937
2g. Engineering	51,607,704	19.01%	10,942,861	24.58%	62,550,565
2h. Social Sciences	23,910,643	8.81%	10,285,675	23.10%	34,196,318
2i. Other Sciences, not elsewhere classified: _____	32,059,063	11.81%	9,594,596	21.55%	41,653,659
Stage of R&D					
3. Total	271,405,508	1	44,521,927	1	315,927,435
3a. Basic Research	158,736,561	58.49%	2,915,364	6.55%	161,651,924
3b. Applied Research	69,553,320	25.63%	27,098,623	60.87%	96,651,943
3c. Development	15,761,846	5.81%	12,266,612	27.55%	28,028,458
3d. Commercialization	27,353,782	10.08%	2,241,329	5.03%	29,595,111
R&D Performer					
4. Total	271,405,508	1	44,521,927	1	315,927,435
4a. Within State Government	20,855,417	7.68%	16,521,246	37.11%	37,376,664
4b. Local or County Government	9,028,796	3.33%	5,063,558	11.37%	14,092,354
4c. Industry or Business	20,556,570	7.57%	5,076,580	11.40%	25,633,150
4d. Academic Institution	200,770,049	73.97%	7,283,603	16.36%	208,053,651
4e. Private Individual	3,131,350	1.15%	3,277,467	7.36%	6,408,817
4f. Non-profit Organization	15,796,767	5.82%	7,174,059	16.11%	22,970,826
4g. Other Performer: _____	1,266,559	0.47%	125,415	0.28%	1,391,974

9. Appendix D-Interviews with Other States

The following notes and transcripts provide relevant detail from interviews conducted with contacts from the top seven R&D performing states.

Rankings and dollar amounts were taken from the *Survey of State Research and development Expenditures: Fiscal Year 1995*, which was jointly authored by Battelle and the State Science and Technology Institute (SSTI), and published in September 1998.

Interview technique was open format, focusing on research methods used in the Battelle study, usage of findings from that study, and current knowledge of R&D expenditures.

9.1 TEXAS #1 with \$319 Million (FY 1995)

9.1.1 Research Methods

The Texas data collection effort was different from other states. SSTI FedEx'd the questionnaires to a member of the Texas State Comptroller's Office who had them mailed out under the comptrollers' signature. This person remembered the study and some of the problems:

First person: "We created a cover letter and stuffed and mailed envelopes to 274 separate state agencies, offices, board, commissions, etc. The information went directly to the super-subagency level... but they [SSTI] did all the work."

"I don't know what was in the responses but we looked at the format and it was difficult. I know it [the format] was an issue. There was a disconnect between the questions and how agency budgets were formulated. My guess is that people either estimated or skipped answers."

This interviewee was critical of the validity of the study: "I would take [the finding that Texas was ranked #1] with a grain of salt. There were no strict parameters on what is an apple and what is an orange. Some may have put in the salaries of all their employees."

9.1.2 Usage

This contact was unaware that the report had been published.

9.1.3 Current Knowledge

Second person: "The Texas Comptroller's Annual Report details everything throughout the year, but R&D specifically? I don't know."

Third person: "The Lieutenant Governor just came out with an interim charge on economic development, asking for state expenditures on biotech, but otherwise, no efforts

are going on. Something that big would require a senate committee so it would probably be an interim study. As I said there is [an R&D investigation] going on in biotech but that's all I know about. I'd be surprised [to find they are collecting whole-state R&D data]. We would know about it. It would be major."

Developing Texas' Technology-Based Economy: Report of the Texas Science and Technology Council, April 1998: In 1985 Texas Legislature created the Advanced Research Program and Advanced Technology Program to encourage new basic research in universities. Funding has remained constant at \$60 million per biennium.

9.2 FLORIDA #3 with \$256 Million (FY 1995)

9.2.1 Research Methods

The Department of Commerce was dismantled in 1996. In its place, Enterprise Florida Incorporated was created. (They might have been involved in the Battelle study but after several attempts I was unable to make contact.)

First person: "Florida is the fourth largest state in the union so including our universities would bias the results enormously. Our state University system has eight universities and all of them do research. I haven't seen the report but [Florida's standing] must be inflated with academic."

9.2.2 Usage

(No data)

9.2.3 Current Knowledge

There has been no attempt to assess total state R&D expenditures.

9.3 NEW YORK #4 with \$239 Million (FY 1995)

(Contacted 6 times and failed to conduct an interview)

9.4 PENNSYLVANIA #5 with \$196 Million (FY 1995)

9.4.1 Research Methods

The Battelle/SSTI data collection process was not remembered.

9.4.2 Usage

The contact person was unaware that the final report had been published but he said: "Battelle is the best source for this kind of information. Battelle has a web site describing state plans for economic development but

some of the numbers have changed so it's probably not that good."

9.4.3 Current Knowledge

Overall R&D money is unknown for the State of Pennsylvania: "The money in different departments is unknown. No current effort is going on to assess overall state R&D expenditures. If there were, it would be difficult because no one person has it all."

But R&D money labeled "economic development" is closely tracked. Current economic development R&D equals \$37.35 million, plus \$1.35 million in legislative items.

In 1982 the Ben Franklin Program was established putting four technology centers in four geographic regions. The stated objective was tech transfer, applying basic research, by matching projects with industry. The match is mandated at one-to-one but in practice it's more like two-to-one or three-to-one. The program has \$75-100 million total, \$25 million of which is state expenditures. Each of the centers gets \$6.7 million. (They used to compete the centers but now they just split it evenly.⁸) This year Pennsylvania will enter into a 5-year amendable contract with them.

Pennsylvania also has seven Industrial Resource Centers which focus on providing tech transfer services to manufacturing programs: \$10 million overall. And the Penn State Technical Assistance Program gets about \$350 thousand a year for R&D.

Other states (like New York, Ohio, North Carolina and Virginia) occasionally call to ask how much R&D Pennsylvania has... they're asking specifically about economic development.

9.5 GEORGIA #6 with \$164 Million (FY 1995)

9.5.1 Research Methods

First person: "Pulling together the [Battelle/SSTI] data was difficult especially in the format Battelle wanted it. The format and forms were difficult. We used the universities to help pull it together and we had them call Mark Skinner directly with their problems."

"We did include plant expenditures. Plant expenditures are part of the budget at the state level so to break it out was doable. We could estimate. We included at least one building. We just had trouble with the forms."

⁸ The numbers don't add up so there may be a second source.

9.5.2 Usage

When asked about outcome the response was, "The publicity was great!" "We were surprised we came out as high as we did. We do put equipment in labs, etc. but we didn't think we would come out so high. Even on a per-capita basis we were in the top ten!" (This respondent knew the rankings by heart.)

"We weren't surprised California wasn't ranked #1 because it just happened there. It happened with private and federal dollars and the state didn't need to do anything. It just happened. Everyone is playing catch up to California. We need to make state investments to carve out a little piece."

When asked further about the effects of the Battelle study, this contact said they are using the high ranking to attract business: "Cadence is a California company that came to us to develop specialties in electronic chips, software, interconnections, etc. in advanced communications. We're working with them."

9.5.3 Current Knowledge

First person: "The Georgia Research Alliance is composed of six universities. They each do R&D in special areas like environmental sciences, biotech, medical, non-medical, and so on. Since 1993 we've spent \$243 million in state funds for scholars, equipment and buildings. So we've invested in R&D. We consider it economic development. We also invest in more traditional areas like food processing, textiles, etc. But we need statewide R&D knowledge. The State of Georgia is not doing any follow-on to the Battelle study.⁹ And we need to know what others are doing. We need to systematize data collection from all the states."

"The Feds provide reports on R&D. NSF I believe. They would be the best source today."

9.6 ILLINOIS #7 with \$109 Million (FY 1995)

9.6.1 Research Methods

First person: "The survey data was collected by an intern here at The [Illinois] Coalition who is no longer here. But I monitored his activities and remember the collection process was extremely difficult, particularly working with so many state agencies. The governor at the time also refused to sign a letter to request their cooperation (his staff thought the study findings would put his administration in a poor light)."

⁹ Mark Skinner, Principal investigator for the Battelle/SSTI study, says after the study Georgia talked about institutionalizing the survey for their own annual uses. Staff changes and activities surrounding the Atlanta Olympics caused the idea to be tabled indefinitely

This contact thought capital expenditures had been omitted from their submission.

9.6.2 Usage

First person: “To my knowledge the report has not been used to affect public policy.”

9.6.3 Current Knowledge

Second person: “Illinois has not tried to conduct its own survey of R&D activities. Since we estimate there are about 700 R&D product development facilities in Illinois, a survey would not necessarily be a routine task. Rather, we rely on National Science Foundation statistics. Although NSF data may undercount some private sector efforts, it, most likely, catches the bulk of leading activities.”

“...the state’s nonprofit affiliate [is] the Illinois Coalition...I think they rely mostly on standard NSF reports for R&D stats.”

Third person: “We do know that tax expenditures for the Research and Development Credit granted under the Corporate Income Tax are reported by our Comptroller.”

9.7 NORTH CAROLINA #8 with \$101 Million (FY 1995)

(Contacted 6 times and failed to conduct an interview)