

SUPPORTING STATEMENT

for

FY 2019 and FY 2021 Science and Engineering Research

Facilities

3145-0101

PART A: JUSTIFICATION

A.1. Circumstances Necessitating Collection of Information

The National Science Foundation Act of 1950, as amended by Title 42, United States Code, Section 1862, required the Foundation to:

...“provide a central clearinghouse for the collection, interpretation, and analysis of data on scientific and engineering resources and to provide a source of information for policy formulation by other agencies of the Federal Government...” (Attachment A – NSF Act of 1950 and America COMPETES Reauthorization Act of 2010.)

The Survey of Science and Engineering Research Facilities (Facilities survey) conducted by the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation (NSF) is a congressionally mandated biennial survey that has been conducted since 1986. The Facilities survey collects data on “bricks and mortar” research facilities, including total research space by field, condition of research space, and expenses for construction, repairs and renovation of research space.

Background

Academic research facilities in the fields of science and engineering (S&E) are an important national resource. Extensive hearings were held during the 99th Congress in the House and Senate committees on science and technology to examine the research facilities needs of universities and colleges. Both committees found “sufficient evidence to suggest the presence of a serious and growing problem...” and expressed concern that the Federal government did not have in place an ongoing analytical system to document the current status of and needs for research facilities by major field of science and engineering.

In recognition of the need for objective information about research facilities, Congress directed NSF, in the Authorization Act of November 22, 1985 (P.L. 99-159, Section 108) as follows:

The National Science Foundation is authorized to design, establish, and maintain a data collection and analysis capability in the Foundation for the purpose of identifying and assessing the research facilities needs of universities. The needs of universities, by field of science and engineering, for construction and modernization of research laboratories,

including fixed equipment and major research equipment, shall be documented. University expenditures for the construction and modernization of research facilities, the sources of funds, and other appropriate data shall be collected and analyzed. The Foundation, in conjunction with other appropriate Federal agencies, shall conduct the necessary survey every 2 years and report the results to the Congress.

In response to this directive, NCSES has conducted seventeen surveys, generally on a biennial basis. The National Institutes of Health (NIH) cosponsored the surveys with NCSES beginning with the initial survey and ending with the 2009 survey. At the request of NIH, the survey also collected data from nonprofit, biomedical research organizations and hospitals that received NIH research funds.

Since 1986, NCSES has modified the survey several times with the goals of improving data quality and reducing respondent burden. The original survey was limited to a small set of prescribed questions sent to a sample of institutions using NCSES's Quick Response Survey questionnaire capability in order to meet the Congressional timeframes. Data collection was subsequently expanded to a census of institutions in order to make the data more useful to Federal and State agencies and to the higher education community.

NCSES undertook a major review of the survey prior to the FY 2003 data collection. This included improving the research space questionnaire and adding a second questionnaire addressing the growing use of computing and networking resources (cyberinfrastructure) in conducting research. NCSES continually reviewed the second questionnaire in an attempt to stay current with the rapidly changing developments in academic R&D cyberinfrastructure.

Despite these efforts, NCSES believed that the cyberinfrastructure questionnaire provided little utility to policymakers and researchers. A 2013 review of the survey by the NSF Division of Advanced Cyberinfrastructure (ACI) provided feedback on shortcomings and potential changes to improve the survey. The assessment indicated that the "information is not useful for program planning at NSF and is probably not very useful to campuses either." Anecdotal evidence solicited through several interviews and meetings with groups of field experts indicated that these data are rarely used by those who are aware of this survey. This view was substantiated by analysis of low web traffic to the relevant data files on the NCSES website. Further inquiries revealed that many potential data users believed the data would be difficult to incorporate into their decision making processes. Consequently, the questionnaire on computing and networking capacity was discontinued starting with the FY 2015 survey.

NCSES conducted a review from 2010 to 2015 of the S&E fields used in its portfolio of surveys to ensure consistency and comparability across national academic surveys. The review resulted in a modified taxonomy of S&E discipline that reassigned a number of subfields and relabeled some field names. These changes were thereafter employed by all NCSES academic surveys, including the Facilities survey.

NCSES revised the FY 2017 survey and data collection materials based on a methodological review of several items. These included a new question on shared research space, changes to the definition of start date for new construction, and changes to the instructions for completion costs. NCSES also revised the definition of research in order to better align the definition across NCSES surveys. No substantive changes have been made to the FY 2019 survey and minimal changes are expected for the FY 2021 survey.

General survey description

NCSES now requests approval to conduct the next two cycles of the Facilities survey for fiscal years 2019 and 2021. The following is a broad overview of the survey. The complete questionnaire can be found in Attachment B.

Contact information is not collected on the questionnaire. Rather, it is collected through the president's office of each eligible institution. Greater detail is provided in section B2 under Survey Procedures.

Questions 1 through 5 request data on the amount and types of space used for science and engineering research. The questions request specific information about institutional research facilities (e.g., how much research space is located in medical schools) because different kinds of space have different costs and requirements for preparing and using the space.

Question 6, added in FY 2017, asks about shared research space and whether space reported in Question 2 is shared with any other field(s) or used for purposes other than research.

Question 7 asks about the condition of the research facilities because of a recurring concern about aging research infrastructure in the U.S. Also, this question may provide data on whether existing research space is appropriate for the rapidly changing needs of scientific research.

Questions 8 and 9 ask about the costs of repairs and renovations in the current and immediately previous fiscal year. Similar to Question 7, these questions also relate to the issues of a potentially aging infrastructure and the changing needs of science, but from a financial perspective.

Question 10 and an accompanying project worksheet ask about new construction in the current and immediately previous fiscal year. New construction allows institutions to increase the total amount of research space, to replace inadequate facilities, and to adjust to the changing needs of science. The worksheet requests information on individual projects such as costs per square feet of new construction.

Question 11 asks about the sources of project funding for repairs/renovations and new construction to determine the roles various sectors play in funding research facilities.

Questions 12 through 15 ask about planned new construction and planned repairs and renovations over the next two fiscal years. These provide data on the extent to which institutions are addressing their research space needs.

Questions 16 through 19 ask about deferred repairs/renovation and new construction. These provide another measure of institutions' anticipated need for space, while also examining the ability of institutions to meet their needs.

Question 20 is an open field where participants can comment on the questionnaire.

A.2. Purposes and Use of the Data

Data from this survey serve several audiences. At the national level, the data provide Congress and federal agencies with a broad, quantitative picture of the inventory and condition of existing S&E research space at research-performing academic institutions. The survey also provides data on the current and future capital expenditures for research facilities by universities and colleges; sources of funding for research facilities at these institutions and; plans for future repair/renovation and new construction of science and engineering research facilities. Congress uses the Facilities survey data to assist them in estimating appropriations and programmatic decisions.

At the state and local level, state legislatures, state agencies, and individual universities and colleges use the data to assist them in making budgetary decisions and in planning future activities. Private sector architectural, engineering, and construction firms use the data for several purposes including forecasting the demand for their products and services. Finally, professional associations such as the Federation of American Societies for Experimental Biology use the data to assist them in assessing needs related to their associated fields of science.

Data are publicly available through an InfoBrief and detailed statistical tables on the NCSES website at <http://nsf.gov/statistics/srvyfacilities/>. Users can run custom data reports from the Facilities survey and other NCSES surveys through the Integrated Science and Engineering Resources Data System at <https://ncesdata.nsf.gov/ids>.

A.3. Use of Improved Information Technology

The survey is a mixed mode survey: respondents have the option of completing a printable PDF version or a web version. The large majority of institutions (99% in FY 2017 cycle) respond to the survey via the web.

The web version of the survey is a .NET application with a real-time monitoring system, which allows NCSES to monitor data, response status, and comments from respondents. From the perspective of the respondents, the web version is more convenient and simplifies the survey (e.g., by automating skip patterns, and automatically calculating totals). NCSES also benefits from use of the web version by receiving improved data quality. Data quality is improved using several techniques such as data checks, skip pattern checks, and consistency checks. For example, data checks are used to calculate totals and inform respondents if percentages do not add to 100. For inconsistent data, respondents will receive messages while completing their survey if their responses do not appear consistent with their responses to other relevant questions.

A.4. Efforts to Identify Duplication

NCSES monitors the availability and release of higher education facilities data. While some sources provide data on amount of construction or costs of construction, no organization provides data on higher education research facilities, individual fields of science, or science and engineering in the aggregate. For example, at the national level, data on the book value of higher education physical plant

assets is collected periodically on the National Center for Education Statistics' Integrated Postsecondary Education Data System. However, these data are only collected in the aggregate for an institution; the data are not available for research space, and the data are not available by S&E field. The Facilities survey is the only survey to collect data from research-performing higher education institutions on research space and fields of S&E. The data do not duplicate statistical data from any other sources.

A.5. Collection of Data from Small Businesses

Data are not collected from small business.

A.6. Consequences of Less Frequent Data Collection

The Congressional mandate requires that data collection occur every two years, which ensures that the data are current. This also lessens burden when compared with an annual survey. Conducting the survey less frequently could adversely affect the relevance of the data both for policymakers and other data users. NCSES has consulted with numerous individual institutions on the periodicity of data collection (see section A.8. on public comment and consultations outside the agency). These institutions believe that more frequent data collection would not benefit the data-user community due to the relatively slow processes of space management (construction, repairs and renovations). It would only result in greater burden on the institutions.

A.7. Special Circumstances

No special circumstances.

A.8. Public Comment and Consultations Outside the Agency

In preparation for the FY 2017 survey cycle, sixteen universities were contacted to get their feedback on revisions to the research definition, the definition of the project start date for new construction, and the definition of completion costs for new construction. The interviews also collected feedback on the new question about shared research space. The purpose of this investigation was to learn whether the proposed revisions and additions had the desired effect and collected the desired data without introducing new problems or undue burden for the respondents. No major concerns were

identified. Participants generally felt that the revisions to the definitions were helpful and the new question about the shared research space was not difficult to complete.

Additionally, prior to the FY 2017 survey cycle, eight institutions were contacted in an effort to better understand the reporting of deferred cost by universities through gaining insights into the process used by, and data available to, respondents. The goal was to learn whether a change needed to be made to the survey instrument or instructions related to the deferred cost questions. As a result, no changes were made to the deferred cost questions as most respondents in this investigation agreed that the questions were clear and easy to understand, and that the ability of institutions to report on these questions was directly related to how data were maintained and kept at their respective institutions.

NCSES published a 60-day Federal Register Notice (84 FR 9840) on March 18, 2019 to solicit public feedback on the reinstatement and approval of data collection for the Facilities Survey (Attachment C). No comments were received.

A.9. Payments or Gifts to Respondents

Respondents will not be paid or receive gifts.

A.10. Assurance of Confidentiality

Data on individuals are not collected. Based on the idea that the data should be available to all interested parties and that making the institutional level data more accessible will provide institutions with a reason to respond to the survey, NCSES makes the data publicly available at the institution level with a few key exceptions (see section A.11 on sensitive questions). Institutions are clearly informed of NCSES's confidentiality policy at the front of the survey and the confidentiality of specific questions. Institutions are informed of the plans for public release of institution-level data before they complete the survey. This information is included in the questionnaire. In addition, institutions are informed that the survey is voluntary and they can decline to answer any or all questions.

A.11. Sensitive Questions

While NCSES decided to make the large majority of the survey data publicly available, three survey items are deemed particularly sensitive. The public release of data on those questions could make institutions less inclined to respond to the survey. Also, during pretests of the 2001 survey

redesign, respondents expressed concern about the confidentiality of the following survey items: condition of research space (question 7), and the presence and amount of research animal space (questions 1i, 3, and 10f). Publicly reporting the condition of research space might motivate institutions to overstate their facilities' condition as a way to recruit researchers or gain research funding. Animal research space has always been a sensitive area due to public concerns of animal treatment. Based on the 2001 pretest and the 2014–15 interviews, NCSES believes these data points might not be responded to correctly, if at all, if they were published on the institutional level. Therefore, data on these fields are only published at the national level.

A.12. Estimated Response Burden

Burden hours

The Facilities survey is a biennial survey of approximately 600 academic institutions. The burden for any particular institution will be affected by two major factors: the size of the institution (in terms of number of S&E departments and/or the number and size of research facilities) and the status of the institution's computerized central records system. Previous surveys showed that many institutions, as part of their compliance with OMB Circular A-21 and 2 CFR 220, have created centralized databases, including a measure of space devoted to research.

Because of these factors, the completion time varies among institutions. A question on survey completion time was added to the FY 2013 questionnaire. The average time to complete the research space questionnaire was 19 hours. The survey typically has a 98% response rate (based on the FY 2015 – 2017 response rates). The estimated total burden for FY 2019 is 11,400 hours, with a similar burden estimated for FY 2021 (600 institutions x 19 hours x 2 data collection cycles = 22,800 total burden hours over the total clearance period.).

Costs to responding institutions

Costs that will be incurred by responding institutions involve the completion time of the survey and the time of an institutional coordinator associated with managing the distribution of survey forms and transmittal to the contractor. The institutional coordinator makes the initial contacts with the relevant individual offices at the institution informing them of the survey, distributes the forms, follows

up on the return of the forms or data to the coordinator's office, and transmits the forms or data to the contractor.

At an estimated cost of \$39 an hour for institution staff (based on an average across categories of the Bureau of Labor Statistics May 2017 average hourly wages for "Administrative Services Managers," "Budget Analysts," and "Financial Analysts" within NAICS 611300 - Colleges, Universities, and Professional Schools), the average cost to each academic institution is \$741 for FY 2019 and a similar cost for FY 2021. The total respondent costs for the FY 2019 survey are estimated to be \$444,600 (600 institutions x \$741).

These costs are expected to be similar for the FY 2021 cycle of the survey.

A.13. Annualized Cost to Respondents

There are no capital or startup costs for the respondents of the Facilities survey.

A.14. Annualized Cost to the Federal Government

The estimated total cost of the FY 2019 Facilities survey to the Federal Government is approximately \$1,740,000 over a period of 24 months, for an annualized cost of \$870,000. The estimate includes labor costs of \$295,000 for NCSES staff [project manager (full time), NCSES management, and statistical support] and the survey management contractual cost of \$1,445,000.

The contract will include all direct and indirect costs of data collection, analysis, reporting, and the production of public and proprietary data sets. These costs are expected to be similar for the FY 2021 survey cycle.

A.15. Reasons for Program Changes

No program changes.

A.16. Publication Plans and Project Schedule

The FY 2019 survey implementation is scheduled to begin in October of 2019. Data collection will take place over a six-month period in order to provide institutions adequate time to identify a coordinator and to gather the appropriate records and data. Data collection is expected to end in the spring of 2020. The data collection for the FY 2021 cycle will begin in October of 2021 and will end in the spring of 2022.

The contractor will submit draft data tabulations within three months following completion of data collection. These will be reviewed and revised as needed by NCSES before production of final data tabulations. NCSES will be responsible for electronic dissemination of the tables to NSF offices, participating academic institutions, professional associations, and others who may request information about the survey.

The contractor will also provide a public use data file that will be accessible via the NSF website and includes electronic data files for use on personal computers. The data files, including documentation, will contain institutional data and will be delivered within 3 months of data collection. In addition, the contractor will provide a methodology report detailing all survey activities, materials, and procedures.

NCSES produced an Infobrief on the results of the FY 2017 survey in March of 2019. The Infobrief includes a presentation of major findings, charts and graphs relevant to the survey, and relevant statistical tables. It also refers the reader to additional information about survey limitations and other technical information.

NCSES anticipates a similar schedule for the FY 2019 and FY 2021 survey cycles.

A.17. Approval for Not Displaying the Expiration Date for OMB Approval

Approval not requested.

A.18. Exceptions to the Certification Statement

There are no expectations.